

WOMEN EMPLOYMENT TRANSITIONS AND FERTILITY*

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Abstract

This paper explores the dynamics of female employment decisions around childbearing using longitudinal data from the 2002 Chilean Social Protection Survey (Encuesta de Protección Social, EPS). The study evaluates how the birth of a child can affect the woman's decision to work, in particular among women with strong attachment to the labor market.

The results indicate that the hazard of leaving employment is high for women during the first year of their newborn child. The mother of a newborn child is twice as likely to leave employment. The effect of newborns on employment transitions is even greater among older generations and among voluntary quitters. Even one year after the birth of a child, women still face a high risk of leaving employment. A woman who is still working when her son reaches the age of one, still faces a 50% higher risk of leaving employment. Something is making these mothers reconsider whether they should remain at work, provided that they have been working during the child's first year of age. This could be related to the existence of maternal benefits in Chile, where women have a 20-week (paid) maternity and they are allowed up to a year of paid parental leave if the child is sick. A woman might not have any incentives (or have the need) to leave work while she is using these benefits but might be tempted (or have) to do it once she has exhausted them.

The introduction of individual effects and employment history variables reveal the persistence of two contrasting labor force patterns among women. As the actual labor experience increases, the probability of entering an inactivity period decreases. Additionally, the greater the number of years a woman remained inactive in the past, the greater is the probability of re-entering an inactivity period. In the voluntary transitions model, past inactivity periods have a smaller effect on the probability of leaving employment. This can be seen as a possible indication of an important penalization by the labor market, in terms of employment opportunities after prolonged periods of inactivity.

Keywords: Fertility; Childcare; Motherhood; Mothers; Participation; Women.

Jel-codes: J13, J62, J63

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1. Introduction

Within the last few decades, there have been a series of socio demographic changes, which have accelerated and intensified the demographic transition phases in the world. One of the most influential changes within these demographic dynamics has been the massive incorporation of women in the labor market.

In Chile, during the period of 1986 – 2005, the female labor force participation increased considerably. In particular, the labor force participation has grown significantly among mothers of very young children. The changes, however, have not been strong enough for the country's participation rate to be at par with those of the developed economies, and inclusively with those of many Latin American countries. In the Latin American context, when studying the female labor force participation, it is found that Chile exhibits a participation rate below that of the regional average. Countries such as Argentina, Columbia, Uruguay and Bolivia have achieved a greater insertion of women in the labor market.

The cultural factor can certainly be playing a fundamental role when explaining the scarce labor force attachment of the woman in Chile. Contreras and Plaza (2004) find that male chauvinistic behavior has a negative and significant effect on the decision of participating in the labor market. Together, such cultural factors counteract, more than twice, the positive effect of the human capital variables. The empirical evidence, found in this paper, is consistent with the theoretical papers of Vendrik (2003) and Neubourg and Vendrik (1994) and with the empirical results found by Fernández et al. (2004), Antecol (2003), Antecol and Bedard (2002) and Chuang and Lee (2003). The cultural perception of the woman's role in

the family is clearly related to her fertility rate, which in turn conditions her decision to participate in the labor market. Additionally, the labor supply of low-income females might be particularly affected by the limited supply of (formal) childcare along with an excessive compression in the wage structure.

In Chile, various studies find that there is a decreasing relationship between labor force participation and the number of children in the family, both the total number of children as well as those under the age of 5 years (Contreras et al., 1999; Mizala et al., 1999)¹. However, the results found do not necessarily indicate that the number of children negatively affects the female labor supply in Chile. The number of children in the family can also be associated with the family model adopted. Additionally, the models may contain omitted variables, which affect the decisions of fertility, as well as those of labor supply. Due to the correlation between the family structure variables and the error term in the participation equation, not only are the estimated coefficients of these variables biased, but so are the estimates of the labor supply parameters.

In this paper, the dynamics of female labor force participation in Chile is explored using a longitudinal database, the Social Protection Survey (Encuesta de Protección Social, EPS). The primary objective is to evaluate how the birth of a child can affect the woman's decision to work, including women strongly attached to the labor market. To capture the effects of cultural factors playing a role on the woman's attachment to the labor market and the effect of other non-varying omitted variables, the model developed includes a time-invariant

¹ According to the data from the 2003 CASEN Survey the participation rate of a woman, with no children, between the ages of 25 and 55 years (present in the household) is 67.7%, while that of a woman, with a child younger than 12 months, is 38.3%.

individual effect. Furthermore, pre-labor experience variables, defined in the model, control for the effect of the individual's intrinsic (time varying) attachment to the labor market and ensure the consistent estimation of the effect of the family structure variables on the current employment status.

The longitudinal database makes possible to evaluate the level of persistence of the woman's decision to participate in the labor market. There are two opposing extremes considered within the female labor force: a group with a strong attachment to the labor market, and another group that participates in the labor market on a sporadic basis. According to the 2003 CASEN Survey, 90% of the men and 80% of the women employed in 2003 were also employed in the year 2000. Furthermore, 90% of the women, who were inactive in 2003, were also inactive in the year 2000. The persistence of unemployment among women, however, is not so evident. There is an important discouragement effect, explaining why many of the housewives in 2003 were also unemployed in the year 2000. Hence, it is important to study the dynamics of the labor force participation using longitudinal data.

The following section presents the empirical model to be estimated. Section 3 describes the data and examines the mobility patterns between the different employment statuses for both men and women. In particular, the labor force participation and the employment patterns for both sexes are compared using data from the 2002 EPS and the 2003 CASEN Survey. Section 4 analyzes the main results of the estimation and finally section 5 concludes.

2. Determinants of the Labor Market Transitions to Inactivity

The purpose of this paper is to examine the determinants of the woman's decision to enter an inactivity period. In particular, the woman's decision to quit working is modeled as a function of human capital variables (schooling), employment history variables, such as actual labor experience, years of employment at job, and history of unemployment and inactivity periods, and family structure variables, such as the number and age of the children. The 2002 Social Protection Survey is used to undertake the analysis. This survey contains information on complete and incomplete periods of employment, inactivity and unemployment for each individual interviewed. These individuals are questioned on all periods of unemployment, inactivity and employment held between 1980 and 2002, the year the survey was conducted. The sample for the survey is extracted from an entire dataset of all persons affiliated to the private and public pension systems. A "historic sample" is selected from all individuals affiliated to the system since 1981 and who in August 2001 were in one of the following conditions: (a) employed; (b) unemployed or out of the labor force; (c) pensioned; (d) dead.

Hence, by design, the sample excludes individuals who have never contributed to any of the pension systems. This potentially biases the sample towards individuals with a stronger attachment to the formal sector of the labor market. This means that individuals who are continuously inactive or continuously employed in the informal sector are systematically excluded from the sample. While the sample, therefore, is not useful for exploring the determinants of the inactivity periods, it is useful for studying the female labor market

transitions, who after being employed for a certain period decide to exit the labor market. Section 3 presents statistics describing the database and discusses its possible biases.

The information on complete and incomplete periods of labor activity and on the type of labor market transition experienced by the individual makes it possible to model the entry to inactivity periods as (Klein and Moeschberger, 2003),

$$(1) \quad h_i(t; Z_i(t)) = \alpha_i \lambda_0(t) \exp(Z_i(t)\beta)$$

where $\lambda_0(t)$ is the baseline hazard function, $Z_i(t)$ is a vector of variables that can or cannot vary in time for worker i at time t , and β is a vector of parameters to be estimated. In the model, the dependent variable is an indicator variable that assumes the value 1 if the individual stops working and enters an inactivity period, and assumes the value 0 if the individual continues employed. A more restrictive indicator variable, assuming a value equal to 1 when the individual voluntarily goes from being employed to being inactive, is also defined. Therefore, the decision of leaving the job is not influenced by a layoff or by reasons unknown to the worker. Antel (1986; 1988), Moore et al. (1998) and McLaughlin (1990; 1991), among others, find that it pays off to distinguish between voluntary and involuntary labor market movements, even when this information is self-reported.

The model assumes that the probability of entering an inactivity period is a function of the continuous employment time t (that measures the attachment to the labor market and/or the acquisition of current labor experience), but it is also a function of the individual's characteristics, and the employment and family histories included in Z .

The likelihood function to be maximized depends on the assumptions made on the baseline function $\lambda_0(t)$. The baseline function can be assigned a parametric form or it can be left unspecified (non-parametric estimation). It is not a problem to have individuals with more than one event. The likelihood function of the complete employment history would consist of the sum of the likelihood functions of each event. Additionally, the model assumes an individual effect α_i , which captures the particular tastes of an individual with respect to employment. An individual, with less attachment to the labor market than the average worker, would have α_i greater than one, while an individual, with greater attachment to the labor market, would have α_i less than one. A parametric model assuming the following baseline function is estimated.

$$(2) \quad \lambda_0(t) = pt^{p-1}$$

If the parameter p is less than one, the hazard of entering an inactivity period is decreasing in the continuous employment time; while if it is greater than one, the hazard of entering an inactivity period is increasing in employment time.

The variables of interest in this model are those related to family structure. Other control variables to be included in the model are: years of schooling, age and employment history variables, such as years of actual pre-labor experience, years of inactivity and of unemployment since 1980. In some cases, the model also considers polynomials of these same variables, in an effort to control for the non-linear effects of the variables. The set of family structure variables essentially consists of the history of childbirths. Particularly, it is interesting to determine how the birth of a child affects the woman's decision to continue

working in different cohorts of women. That is, how different women react to the arrival of a child in different generations.

Two conditions adopted in the model will adequately identify the childbirth effect. One is the inclusion of a fixed effect, which potentially captures the effects of the cultural factors playing a role on the woman's attachment to the labor market and the effect of other non-varying omitted variables. The other is the inclusion of employment history variables (pre-labor experience). As reported by Duleep and Sanders (1994), Dex et al. (1998) and Nakamura and Nakamura (1994; 1996), the use of pre-labor experience variables makes it possible to control for the individual's intrinsic (time varying) attachment to the labor market and to consistently estimate the effect of the family structure variables on the current employment status. Furthermore, it is not necessary to have a long employment history. Having information on relatively recent labor experience is sufficient to consistently estimate the parameters of the dynamic labor supply model.

One drawback of this dataset is that is not possible to control for marital status. In 2000, 50% of the children in Chile were born outside marriage. Of this 50%, it is estimated that half are brought up by one parent. These figures have increased dramatically in the past twenty years. If women in single-parent households are more urged to remain at work and if single-parent households are more common now than twenty years ago, it is relevant to control for marital status².

² It is not in my interest to identify whether the parents are legally married or not. I will refer to married women as women who have a partner or significant other living in the household.

That is, in a model that does not control for marital status, the effects of children on the probability or risk of leaving employment in different cohorts of women might not be reflecting the differences in marital status, these being the fact that it is more common to find single parents among young cohorts than among the older cohorts and the fact that single parents are usually more urged remain employed regardless of the number and age of their children.

Unfortunately, variables related to the spouses' presence are not well defined in this dataset. The EPS contains a module on the marital history of the individuals interviewed, but only reports information on the year of marriage (or the year the couple began living together) and whether the individual became widowed or separated. It does not include information on the date of separation or the date of death of the partner. Therefore I will only observe complete marital status histories of women who have been continuously single or who have only had one couple and were are still together in 2002. With these restrictions, the marital status is unknown for a (potentially non-random) group of women.

In the model without marital status (Model I) I know that a high and positive coefficient for the old cohorts may be driven by the fact that most women in these cohorts had children in wedlock. This implies that the effects of the arrival of a new child might be overstated. I could restrict the estimation to women who, if married, have been continuously married to the same person (Model II-M) or I could consider all women whose marital status is known at all times (Model II-T). If the mechanism that generates this missing information is independent of the process of becoming at risk of leaving employment, my estimates based on these restricted samples should be consistent, although not necessarily asymptotically

efficient. Other options might be to estimate the model with the noisy marital status variable, assuming that a relationship does not end until the next relationship starts (Model III) or estimate the model with year effects (Model IV). The year effects would allow me to control for the trend of single-parent families.

Finally, information on the individual's history of income earnings is also not available. I will estimate a reduced form model in which the salary variable is approximated using human capital and employment history variables.

3. Data. Patterns of Female Labor Market Mobility

The 2002 Social Protection Survey reports information on 17,246 individuals, of which 7,611 are women³. The different modules of the questionnaire record information on these individuals and their household members. In particular, information on the employment history of each individual is recorded.

As mentioned in the previous section, the EPS sample methodology does not necessarily record the employment history of the individuals who were continuously inactive or continuously employed outside of the formal system. In principle, the EPS contains information on women who have a strong attachment to the labor market. The employment and participation rates of women in November 2002, as given by the EPS, are greater than those reported by the 2003 CASEN Survey, even after controlling by age (see Table 1).

³ The expanded sample includes 8,058,681 records, of which 3,629,519 are women.

**Table 1:
Employment and Participation Rates, 2003 CASEN Survey versus 2002 EPS**

Age at 2002	Women				Men			
	Participation		Employment		Participation		Employment	
	CASEN 2003	EPS 2002	CASEN 2003	EPS 2002	CASEN 2003	EPS 2002	CASEN 2003	EPS 2002
20-29	52.4	73.5	42.8	58.9	77.3	90.4	67.0	77.1
30-39	56.5	71.9	50.9	60.8	95.7	97.6	89.4	88.1
40-49	55.7	75.4	50.4	64.5	95.9	96.5	91.0	88.5
50-59	46.2	67.3	42.8	59.7	87.9	87.6	82.4	79.2

Source: Prepared using the 2002 EPS and the 2003 CASEN Survey.

Additionally, having self-reported and retrospective data generates doubt on the accuracy of the information contained in the survey. Preliminary studies conducted by the Superintendencia de Administradoras de Fondos de Pensiones⁴ reveal that the density of the contributions reported by the EPS are similar to those obtained from their administrative records⁵. Hence, this database is reliable for studying continuous employment periods.

The self-reported employment history recorded in the EPS contains detailed information on the periods of activity (employment and unemployment) and inactivity of the individuals interviewed. With this information, it is possible to reconstruct the employment history of both men and women. There is no information on the salary level but there is retrospective information on the years of schooling. This information was also reconstructed and annexed to the employment histories. With the objective of studying and controlling for differences in generations, the sample is stratified into four generations or cohorts according to the age of the individual in the year 2002: 34 or less, 35-44, 45-54 and 55 or more. The sample is

⁴ This agency regulates the Administrators of Pension Funds.

⁵ The SAPF has a data set with the provisional history of a sample of individuals affiliated to the system.

restricted to the events initiated after the individual reaches the age of 15 and before he reaches the age of 65.

Table 2 reports statistics on the duration of employment, unemployment and inactivity periods for both men and women considered in the sample. In general, it is observed that women have shorter median duration of employment periods (with the same employer) than men. More importantly, it is noted that women also have shorter median duration of continuous employment periods. Women clearly hold shorter periods of continuous employment than their male counterparts. Furthermore, it is seen that the continuous periods of inactivity and unemployment are substantially longer for women than for men. In fact, the statistics on the duration of inactivity periods reflected in this table are downward biased, since the sample does not contain continuously inactive individuals.

Table 2:
Distribution of the Duration of Employment, Unemployment and Inactivity Periods
In Months

	Male	Female	Total
Duration of Employment Periods			
Same Employer			
Percentile 25	11	6	8
Median	35	27	33
Percentile 75	113	89	104
Duration of Continuous Employment Periods			
Percentile 25	20	7	11
Median	140	46	79
Percentile 75	275 *	202	275
Duration of Inactivity Periods			
Percentile25	11	13	11
Median	35	47	38
Percentile 75	71	126	99
Duration of Unemployment Periods			
Percentile 25	2	3	2
Median	5	7	6
Percentile 75	12	21	14

Source: Prepared using the 2002 EPS.

Table 3 presents basic mobility statistics between the employment statuses for men and women. The second column illustrates the proportion of continuous periods of employment, unemployment and inactivity, which continued to be in effect until the end of the sample period (censored observations). The third to fifth columns show the proportion of continuous periods of employment, inactivity, and unemployment that terminate in periods of unemployment, employment, and inactivity, respectively. For women, it is observed that 55% of the continuous employment events end in inactivity periods, while 92% of the inactivity periods end in employment periods. The table further indicates that women are more inclined to retire from the labor market than their male colleagues. There is a greater probability for the employment periods held by men to terminate in unemployment periods.

**Table 3:
Persistence in the Employment Status by Sex**

Type of Event	% Events Continuing in 2002	% Events Terminate in Periods of		
		Unemployment	Employment	Inactivity
Men				
Unemployment	15.0		98.1	1.8
Employment	53.6	77.6		22.4
Inactivity	17.7	12.2	87.8	
Women				
Unemployment	18.9		96.1	3.8
Employment	37.9	44.7		55.3
Inactivity	27.1	7.3	92.7	

Source: Prepared using the 2002 EPS.

4. Results

Table 4 and Table 5 present the estimation of the five models presented in section 2. Models in Table 4 consider all transitions from employment to inactivity, while models in Table 5 consider only voluntary transitions. All these alternative models entail the inclusion of a random effect (frailty). In all the models, the variables included are those of employment history, years of schooling, and family structure.

Whenever possible I include a measure capturing the presence of a partner. This is done through the use of two dummy variables. One dummy variable (Married-T) is defined as one if the woman had a partner and was still with him in 2002. The other dummy variable (Married-U) equals one if the woman had been married, but the relationship ended at some point in time, which is unknown.

The employment history of the individual is reflected in the model by means of the time variable in equation (1), as well as through the variables that record the individual's employment history prior to the beginning of each employment period. The employment history is characterized by years of experience, years of inactivity, and years of unemployment. Additionally, the model includes the unemployment rate, sourced from the University of Chile Survey⁶, as a control variable.

⁶ A regional unemployment rate could not be used because a series of such rates for the period 1980 – 2002 does not exist.

The family structure variables are represented by time-varying dichotomous variables that record the age structure of each woman's children. In particular, I am interested in analyzing the transitions of women around childbirth and during the first years of the child. To this end, the variables "child less 1 year" and "child 1 year old" are defined such that they flag both the first and second year of age of a given child. These variables are created because Chile is a country with very generous maternal benefits. Specifically, women have a 20-week (paid) maternity leave and they are allowed up to a year of paid parental leave if the child is sick. A woman might not have any incentives (or have the need) to leave work while she is using these benefits but might be tempted (or have) to do it once she has exhausted them.

Hence, the interest lies in capturing the effect of the birth of a child on the employment status of the woman. These variables interact with the dichotomy variable, that divides the sample of women into four groups, each representing a different generation depending on the age of the individual in the year 2002. A priori, the birth of a child is expected to initiate different reactions, within the labor market, from each generation. At the same time the effect should be greater among women who self-report leaving their employment voluntarily.

The results of the duration model should be carefully interpreted. A positive coefficient means that the variable has a positive effect on the risk of leaving employment, while a negative coefficient means that the variable reduce the probability of leaving employment. Positive coefficients lead to a hazard ratio greater than one, while negative coefficients lead to a hazard ratio less than one.

**Table 4:
Estimated Results. All Transitions**

	Model I: Base Model, without marital controls		Model II-M:		Model II-T		Model III		Model IV (year dummies)	
	Coefficient	Sig.	Coefficient	Sig.	Coefficient	Sig.	Coefficient	Sig.	Coefficient	Sig.
Child less 1 year - G 20-34	0.8328	***	0.6578	***	0.6847	***	0.6856	***	0.8253	***
Child less 1 year - G 35-44	1.0273	***	0.7395	***	0.7649	***	0.8894	***	1.0062	***
Child less 1 year - G 45-54	1.1627	***	1.1662	***	1.1521	***	1.0664	***	1.1727	***
Child less 1 year - G 54 and more	1.0148	**	0.7815		0.6798		0.9686	**	1.1185	**
Child 1 year - G 20-34	0.3496	***	0.3205	*	0.3028	*	0.2103	*	0.3627	***
Child 1 year - G 35-44	0.3657	***	0.2403		0.2339		0.2341	*	0.3251	**
Child 1 year - G 45-54	0.6067	***	0.5610	*	0.4984	*	0.5243	**	0.6495	***
Child 1 year - G 54 and more	0.7984	*	0.3708		0.2828		0.7457	*	0.6843	
Child 2-3 years	0.1022	*	0.0831		0.0685		0.0158		0.1076	*
Child 4-5 years	0.0349		-0.0267		-0.0227		-0.0300		0.0163	
Child 6-14 years	-0.0365		-0.0763	*	-0.0861	*	-0.0670	*	-0.0427	
G 35-44	-0.1357		0.0553		0.0465		-0.1034		-0.4425	***
G 45-54	0.1766		0.2720		0.2708		0.1957		-0.2027	
G 54 and more	1.0358	***	1.0956	**	1.1884	***	1.0917	***	0.5665	*
Years of schooling	-0.1650	***	-0.1833	***	-0.1739	***	-0.1647	***	-0.1613	***
Age	-0.1673	***	-0.1950	***	-0.2020	***	-0.1886	***	-0.1555	***
Age Square	0.0014	***	0.0017	***	0.0018	***	0.0017	***	0.0013	***
Previous Experience LM (years)	-0.0096	***	-0.0103	***	-0.0120	***	-0.0101	***	-0.0087	***
Previous Experience LM Square	0.0001	***	0.0001	***	0.0001	***	0.0001	***	0.0001	***
Previous Inactivity (years)	0.1638	***	0.1609	***	0.1718	***	0.1582	***	0.1946	***
Previous Inactivity (years) square	-0.0015		-0.0009		-0.0014		-0.0016		-0.0010	
Previous Unemployment (years)	0.1072	**	0.1197	*	0.1040	*	0.1021	*	0.1474	***
Previous Unemployment square	-0.0008		-0.0019		-0.0004		-0.0008		-0.0009	
Unemployment Rate	-0.0438	***	-0.0423	***	-0.0445	***	-0.0452	***	-0.2261	***
Partner present - relationship never ends			0.6091	***	0.7521	***	0.6939	***		
Partner present - relationship ends, exact date unknown.							0.1686	*		
Constant Model	-1.5893	***	-1.5024	***	-1.6203	***	-1.6239	***	2.0630	***

Source: Prepared using the 2002 EPS.

Notes: * p<0.05; ** p<0.01;*** p<0.001.

**Table 5:
Estimated Results. Voluntary Transitions**

	Model I: Base Model, without marital controls		Model II-M:		Model II-T		Model III		Model IV (year dummies)	
	Coefficient	Sig.	Coefficient	Sig.	Coefficient	Sig.	Coefficient	Sig.	Coefficient	Sig.
Child less 1 year - G 20-34	0.9840	***	0.7977	***	0.7436	***	0.8340	***	0.9962	***
Child less 1 year - G 35-44	1.1621	***	1.0548	***	1.0221	***	1.0349	***	1.1507	***
Child less 1 year - G 45-54	1.1536	***	1.2470	***	1.1603	***	1.0642	***	1.1539	***
Child less 1 year - G 54 and more	1.3056	**	0.9455		0.7756		1.2613	**	1.4330	**
Child 1 year - G 20-34	0.3850	**	0.3184		0.2652		0.2403		0.4164	**
Child 1 year - G 35-44	0.4044	**	0.3658	*	0.3144		0.2838		0.3652	*
Child 1 year - G 45-54	0.3488		0.2984		0.1696		0.2743		0.3901	
Child 1 year - G 54 and more	1.3910	**	0.8133		0.6647		1.3413	**	1.4169	**
Child 2-3 years	-0.0590		-0.0920		-0.1418		-0.1396		-0.0414	
Child 4-5 years	-0.0950		-0.0743		-0.1189		-0.1610	*	-0.1000	
Child 6-14 years	-0.0756	*	-0.1626	**	-0.1852	***	-0.1116	**	-0.0801	*
G 35-44	0.0517		0.0451		0.0563		0.0853		-0.2598	
G 45-54	0.1803		-0.0324		0.0229		0.1959		-0.1688	
G 54 and more	0.7217	**	0.4032		0.5155		0.7755	**	0.3374	
Years of schooling	-0.0911	***	-0.1100	***	-0.0999	***	-0.0930	***	-0.0886	***
Age	-0.1581	***	-0.1600	***	-0.1675	***	-0.1799	***	-0.1516	***
Age Square	0.0018	***	0.0019	***	0.0020	***	0.0021	***	0.0018	***
Previous Experience LM (years)	-0.0104	***	-0.0115	***	-0.0131	***	-0.0108	***	-0.0094	***
Previous Experience LM Square	0.0000	***	0.0000	***	0.0001	***	0.0000	***	0.0001	***
Previous Inactivity (years)	0.1200	***	0.1088	***	0.1017	***	0.1145	***	0.1525	***
Previous Inactivity (years) square	-0.0018		-0.0014		-0.0010		-0.0018		-0.0012	
Previous Unemployment (years)	-0.0143		0.0065		-0.0161		-0.0123		0.0352	
Previous Unemployment square	0.0045		0.0029		0.0042		0.0040		0.0040	
Unemployment Rate	-0.0528	***	-0.0557	***	-0.0575	***	-0.0540	***	-0.3262	***
Partner present - relationship never ends			0.4432	***	0.6891	***	0.6334	***		
Partner present - relationship ends, exact date unknown.							0.1877	*		
Constant Model	-3.4070	***	-3.1402	***	-3.2707	***	-3.3984	***	2.0276	***

Source: Prepared using the 2002 EPS.

Notes: * p<0.05; ** p<0.01;*** p<0.001.

From these tables it can be seen that having a child increases the risk of leaving employment.

These effect increases as the generation gets older. The magnitude of the coefficient does not change under the different assumptions considered. It is true, however, that some coefficients loose significance when the sample is restricted, but this is due to the standard errors of the coefficients being higher in the restricted sample.

Table 6 presents, for each estimated model, a summary of the hazard ratios of entering an inactivity period after the woman in each generation has given birth to a child, during his first and second year. The childbirth effect increases as the generations get older and the effect is even greater when only the voluntary transitions are considered. While the hazard of entering an inactivity period, for a woman of the 68-87 generation, increases by 130% during the year the child was born, the hazard, for a woman born before the year 1948, increases by 176%. The effect on the voluntary transitions is even greater, 168% for the youngest generation versus 269% for the oldest generation.

The estimated values for the parameters of the family structure variables do not differ substantially between the different models. The estimated coefficients are smaller in the restricted samples, but they are still large and significant.

Even after one year of the birth of a child, women still face a high risk of leaving employment. A woman who is still working when her son reaches the age of one, still faces a 50% higher risk of leaving employment. Something is making these mothers reconsider whether they should remain at work or not, provided that they are working during the child's first year of age. This could be related to the generous maternal benefits the Chilean government offers during the first year of life of a child, as mothers are allowed up to a year of paid parental leave if the child is sick.

The effect of having older children in the household is small or statistically insignificant. This is expected since what is being modeled is the probability of employed women entering an inactivity period. It is assumed that when the woman is employed and has school-aged children she has no reason to leave the job and enter an inactivity period.

**Table 6:
The Effect of the Birth of a Child on the Probability of Entering an Inactivity Period**

Age in year 2002	15-34	35-44	45-54	55 or more
Year of Birth	1968-1987	1958-1967	1948-1957	Before 1948
All Transitions				
Base Specification - Model I				
Less than one year old	2.30 ***	2.79 ***	3.20 ***	2.76 **
1-2 years old	1.42 ***	1.44 ***	1.83 ***	2.22 *
Constant		0.87	1.19	2.82 ***
Model II-M				
Less than one year old	1.93 ***	2.09 ***	3.21 ***	2.18
1-2 years old	1.38 *	1.27	1.75 *	1.45
Constant		1.06	1.31	2.99 **
Model II-T				
Less than one year old	1.98 ***	2.15 ***	3.16 ***	1.97
1-2 years old	1.35 *	1.26	1.65 *	1.33
Constant		1.05	1.31	3.28 ***
Model III				
Less than one year old	1.98 ***	2.43 ***	2.90 ***	2.63 **
1-2 years old	1.23 *	1.00 *	1.69 **	2.11 *
Constant		0.90	1.22	2.98 ***
Model IV				
Less than one year old	2.28 ***	2.74 ***	3.23 ***	3.06 **
1-2 years old	1.44 ***	1.38 **	1.91 ***	1.98
Constant		0.64 ***	0.82	1.76 *
Voluntary Transitions				
Base Specification – Model I				
Less than one year old	2.68 ***	3.20 ***	3.17 ***	3.69 **
1-2 years old	1.47 **	1.50 **	1.42	4.02 **
Constant		1.05	1.20	2.06 **
Model II-M				
Less than one year old	2.22 ***	2.87 ***	3.48 ***	2.57
1-2 years old	1.37	1.44 *	1.35	2.26
Constant		1.05	0.97	1.50
Model II-T				
Less than one year old	2.10 ***	2.78 ***	3.19 ***	2.17
1-2 years old	1.30	1.37	1.18	1.94
Constant		1.06	1.02	1.67
Model III				
Less than one year old	2.30 ***	2.81 ***	2.90 ***	3.53 **
1-2 years old	1.27	1.00	1.32	3.82 **
Constant		1.09	1.22	2.17 **
Model IV				
Less than one year old	2.71 ***	3.16 ***	3.17 ***	4.19 **
1-2 years old	1.52 **	1.44 *	1.48	4.12 **
Constant		0.77	0.84	1.40

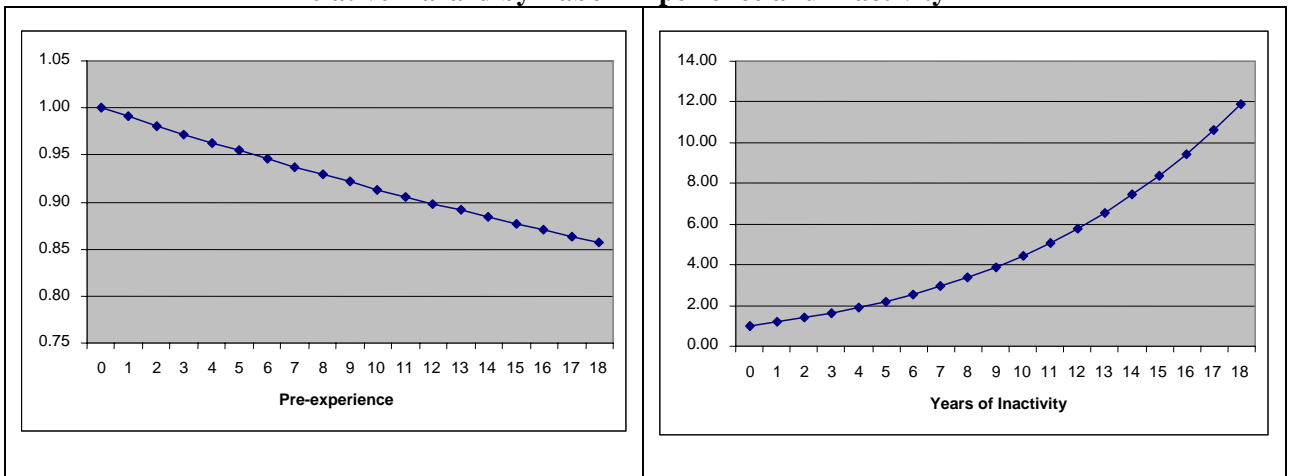
Source: Prepared using the 2002 EPS.

Notes: * p<0.05; ** p<0.01; *** p<0.001.

The inclusion of the individual effect and the employment history variables in the model show the persistence of the contrasting patterns of female labor force participation. The greater the actual labor experience, the lower the probability is of entering an inactivity period. Additionally, the greater the number of years the woman has remained inactive in the past, the greater the probability is of re-entering an inactivity period (Graph 1). A woman who initiates employment after being inactive for 5 years, has a hazard of becoming inactive twice as much as that of a woman who has been continuously employed.

The relative hazards predicted by each model differs, but qualitatively the effect is similar. In the particular case of the effect of years of past inactivity, the voluntary transitions model predicts a substantially smaller effect than the model that includes all transitions. This could be indicating that many of the women's involuntary transitions to inactivity periods are particularly conditioned by the history of inactivity. There is a possibility that the market is penalizing the women in terms of salary earnings or in terms of employment opportunities.

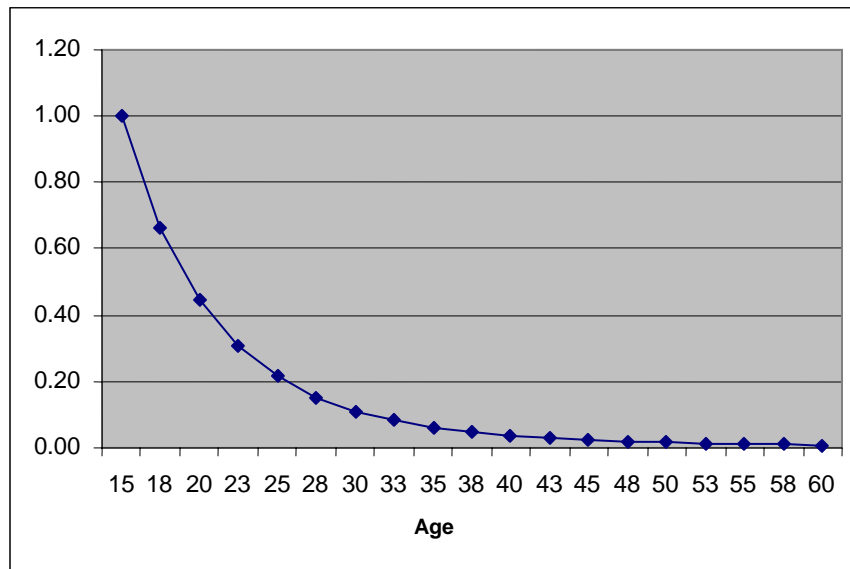
**Graph 1:
Relative Hazard by Labor Experience and Inactivity**



Source: Prepared using the 2002 EPS.

There are two other variables that influence the probability of entering an inactivity period, even after controlling for having children and employment history. Both age and level of education, significantly influence the probability of retiring from the labor market. The model includes a quadratic polynomial of age in an effort to evaluate the possible existence of non-linearities (Graph 2). The base category is defined as the 15-year old individuals. There are no fertile cycle effects, since there are controls for the presence of children in the household and for employment history variables. The hazard of entering an inactivity⁷ period decreases monotonically with age.

**Graph 2:
Relative Hazard by Age**



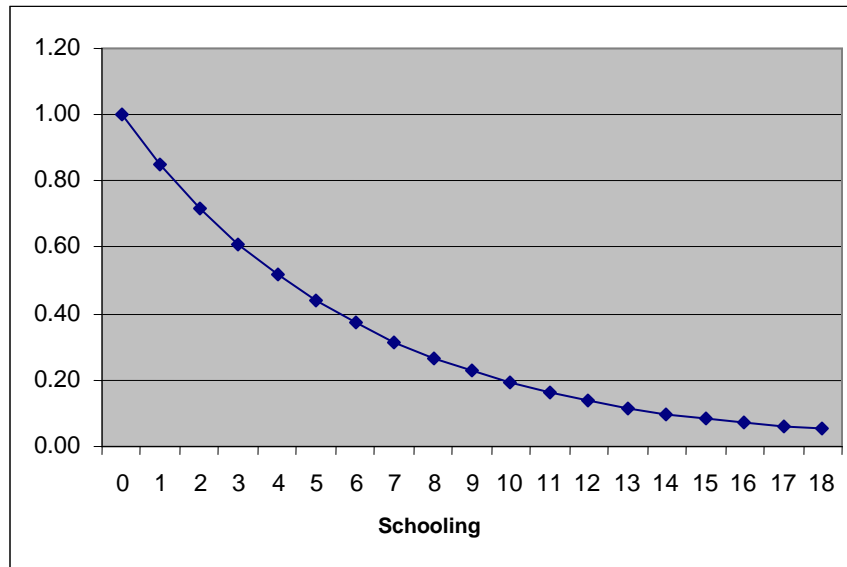
Source: Prepared using the 2002 EPS.

The human capital variables also reveal a strong trend to remain in the labor market, as is predicted by the dynamic theories of labor supply. A woman holding a university education

⁷ I am intentionally leaving out the analysis transition.

will enter an inactivity period with a substantially lower probability than a woman possessing an incomplete primary education (Graph 3).

**Graph 3:
Relative Hazard by Years of Schooling**



Source: Prepared using the 2002 EPS.

5. Conclusions

There are studies that estimate the effect of the family structure on the female labor supply in Chile. The estimation of standard labor supply models utilizing cross-sectional databases have suggested that the presence of children in the household conditions the female labor force participation, while it only marginally affects the male labor force participation. In particular, these studies report that greater effects are produced at the level of participation. A crucial problem encountered when evaluating these results is that the family structure variables are definitely conditioned by the family model adopted, which in turn also

conditions the female labor force participation. Considering these issues, the family structure variables are potentially endogenous.

This paper explores the dynamics of female labor force participation in Chile using longitudinal data to evaluate how the birth of a child can affect the woman's decision to work, including women strongly attached to the labor market. It is expected that an individual effect, which does not vary in time, will capture the effects of cultural factors playing a role on the woman's attachment to the labor market and the effect of other non-varying omitted variables. Furthermore, pre-labor experience variables control for the effect of the individual's intrinsic (time varying) attachment to the labor market and ensure the consistent estimation of the effect of the family structure variables on the current employment status.

The results indicate that the hazard of leaving employment is high for women during the first year of their newborn child. The mother of a newborn child is twice as likely to leave employment. The effect of newborns on employment transitions is even greater among older generations and among voluntary quitters. Even after one year of the birth of a child, women still faces a high risk of leaving employment. A woman who is still working when her son reaches the age of one, still face a 50% higher risk of leaving employment. Something is making these mothers reconsider whether they should remain at work, provided that they are working during the child's first year of age. This could be related to the existence of maternal benefits in Chile, where women have a 20-week (paid) maternity leave and they are allowed up to a year of paid parental leave if the child is sick. A woman might not have any

incentives (or have the need) to leave work while she is using these benefits but might be tempted (or have) to do it once she has exhausted them.

The persistence of the contrasting labor force patterns among women are confirmed when the individual effect and the employment history variables are considered in the model. As the actual labor experience increases, the probability of entering an inactivity period decreases. Additionally, the greater the number of years a woman remained inactive in the past, the greater the probability is of re-entering an inactivity period. In the voluntary transitions model, the presence of inactivity periods in the past is less frequent than in the model that includes all transitions. This can be seen as a possible indication of an important penalization by the labor market, in terms of employment opportunities.

References

Antecol, Hether. "Why Is There Cross-Country Variation in Female Labor Force Participation Rates?. The Role of Male Attitudes toward Family and Sex Roles." Claremont Colleges Working Papers 3, February 2003.

Antecol, Hether and Kelly Bedard. "The Decision to Work by Married Immigrant Women: The Role of Extended Family Households." Claremont College, Working Papers 34, October 2002.

Antel, John J. "Human Capital Investment Specialization and the Wage Effects of Voluntary Labor Mobility." *Review of Economics and Statistics*, 68(3), August 1986, pp. 477-83.

_____. "Interrelated Quits: An Empirical Analysis of the Utility Maximizing Mobility Hypothesis." *Review of Economics and Statistics*, 70(1), February 1988, pp. 17-22.

Chuang, Hwei Lin and Hsih yin Lee. "The Return on Women's Human Capital and the Role of Male Attitudes toward Working Wives: Gender Roles, Work Interruption, and Women's Earnings in Taiwan." *American Journal of Economics and Sociology*, 62(2), April 2003, pp. 435-59.

Contreras, Dante; David Bravo and Esteban Puentes. "Tasa De Participación Femenina: 1957-1997. Un Análisis De Cohortes Sintéticos." Universidad de Chile, Working Papers, 1999.

Contreras, Dante and Gonzalo Plaza. "Participación Femenina En El Mercado Laboral Chileno. ¿Cuánto Importan Los Factores Culturales?" 2004.

de Neubourg, Chris and Maarten Vendrik. "An Extended Rationality Model of Social Norms in Labour Supply." *Journal of Economic Psychology*, 15(1), March 1994, pp. 93-126.

Dex, Shirley et al. "Women's Employment Transitions around Child Bearing." *Oxford Bulletin of Economics and Statistics*, 60(1), February 1998, pp. 79-98.

Duleep, Harriet Orcutt and Seth Sanders. "Empirical Regularities across Cultures: The Effect of Children on Woman's Work." *Journal of Human Resources*, 29(2), Spring 1994, pp. 328-47.

Fernandez, Raquel; Alessandra Fogli and Claudia Olivetti. "Preference Formation and the Rise of Women's Labor Force Participation: Evidence from Wwii." NBER Working Papers 10589, 2004.

Klein, John P. and Melvin L. Moeschberger. *Survival Analysis*. Springer, 2003.

McLaughlin, Kenneth J. "General Productivity Growth in a Theory of Quits and Layoffs." *Journal of Labor Economics*, 8(1), January 1990, pp. 75-98.

_____. "A Theory of Quits and Layoffs with Efficient Turnover." *Journal of Political Economy*, 99(1), February 1991, pp. 1-29.

Mizala, Alejandra; Pilar Romaguera and Paulo Henriquez. "Female Labor Supply in Chile." Documentos de trabajo CEA 58, 1999.

Moore, Michael J.; W. Kip Viscusi and Richard J. Zeckhauser. "The Anatomy of Jumps and Falls in Wages," in S. W. Polachek, ed, *Research in Labor Economics*, Vol. 17. London: JAI Press Inc., 1998, pp. 201-32.

Nakamura, Alice and Masao Nakamura. "Predicting Female Labor Supply: Effects of Children and Recent Work Experience." *Journal of Human Resources*, 29(2), Spring 1994, pp. 302-27.

_____. "An Event Analysis of Female Labor Supply," in, *Research in Labor Economics*, 15. 1996, pp. 353-78.

Vendrik, Maarten C. M. "Dynamics of a Household Norm in Female Labour Supply." *Journal of Economic Dynamics and Control*, 27(5), March 2003, pp. 823-41.