



# Life cycle employment and fertility across institutional environments<sup>☆</sup>

Daniela Del Boca<sup>a</sup>, Robert M. Sauer<sup>b,\*</sup>

<sup>a</sup> Department of Economics and Collegio Carlo Alberto, University of Turin, Italy

<sup>b</sup> Division of Economics, School of Social Sciences, University of Southampton, 58 Murray Building, Southampton SO17 1BJ, UK

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## ABSTRACT

In this paper, we formulate a dynamic utility maximization model of female labor force participation and fertility choices and estimate approximate decision rules using data on married women in Italy, Spain and France. The estimated decision rules indicate that first-order state dependence is the most important factor determining female labor supply behavior in all three countries. We also find that cross-country differences in state dependence effects are consistent with the order of country-level measures of labor market flexibility and child care availability. Counterfactual simulations of the model indicate that female employment rates in Italy and Spain could reach EU target levels were French social policies to be adopted in those countries.

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## 1. Introduction

The growth in women's participation in the labor market, especially among women with children, has been one of the most important economic and social phenomena of the last half century. The large scale movement of women into the labor market since the end of World War II has occurred in many different countries. However, the level of female employment rates across countries is still far from having converged, and the influence of social policies on female employment rates is not clearly understood. This has raised serious policy concerns, particularly in Europe, where the European Union (EU) has set quantitative targets for higher female employment rates for all member states.<sup>1</sup>

In order to try and better understand what underlies cross-country differences in female labor force participation rates, we formulate a general dynamic utility maximization model of female labor supply behavior and fertility choices, and estimate the approximate decision rules of the model separately for married women in Italy, Spain and France. The main focus is on measuring the differential relative importance of state dependence and unobserved heterogeneity in country-specific decision rules, and establishing a connection between the differential relative importance and variation across

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\* Corresponding author. Tel.: +44 2380592528.

E-mail address: [r.m.sauer@soton.ac.uk](mailto:r.m.sauer@soton.ac.uk) (R.M. Sauer).

<sup>1</sup> At the Lisbon summit in March 2000, the European Council stated that all member states should set quantitative targets for higher employment rates in line with EU targets. These were set at 70% for total employment and 60% for women's employment, to be reached by the year 2010. In 2001, intermediate targets of 67% (total) and 57% (for women) were set to be reached by 2005.

countries in social policies. With this purpose in mind, we limit the set of countries in the analysis to only those with “similar” cultural characteristics—i.e., Italy, Spain and France. This helps distinguish social policy variation across countries from confounding factors related to culture, such as attitudes towards gender roles.

The reason for focusing on the differential relative importance of state dependence and unobserved heterogeneity in female work and fertility choices is that past research on female labor force participation has repeatedly shown that persistence is an important aspect of the labor supply decisions of married women (see, e.g., Heckman and Willis, 1977; Heckman, 1981; Nakamura and Nakamura, 1985; Eckstein and Wolpin, 1989). Persistence in participation status may be due to state dependence which arises from human capital accumulation or the costs of searching for a new job. The costs of searching for a new job are, in turn, affected by social policies such as the extent of employment regulation and the availability of child care. However, persistence can also be accounted for by permanent unobserved heterogeneity that reflects differences in mostly immutable preferences for work and/or productivity in the labor market. If unobserved heterogeneity is not properly accounted for in estimation, one may obtain spurious state dependence effects and make faulty inferences about the importance of adjustment costs, social policies, and the institutional environment.

Although several recent studies have also concentrated on disentangling state dependence from permanent unobserved heterogeneity in female labor supply (see e.g., Hyslop, 1999; Carrasco, 2001), to the best of our knowledge, there is no previous work that analyzes the differential relative importance of these factors across countries. Thus, no previous studies have examined the hypothesis that institutions governing social policies are important underlying sources of cross-country differences in state dependence. Institutions which make it more costly to adjust employment levels from one period to the next should generate more persistence and state dependence in female labor supply.

The approximate decision rules that we estimate indicate that state dependence, as opposed to unobserved heterogeneity, is clearly the most important factor determining persistence in labor market participation in all three countries. We also find that the order of state dependence effects across countries is correlated with the order in aggregate measures of labor market flexibility and child care availability. This is consistent with the existence of important differences in institutional environments. It also suggests that employment and child care policies, which affect participation adjustment costs, are additional causes of state dependence and hence cross-country variation in the level of female employment rates.

The estimated decision rules are also used to perform counterfactual simulations. The simulations show that female employment rates in Italy and Spain could reach EU target levels, at least 60% by 2010, were French-like social policies to be adopted in those countries. Under French parameters, Italian and Spanish female participation rates substantially converge towards the higher French female participation rate of 68%. We find that Italian participation rates increase from 53% to 63%, and Spanish female participation rates rise dramatically from 35% to 62%.

One caveat for our results is that they are based on approximate decision rules rather than exact ones. Adopting an exact solution approach would have been much more computationally intensive, but would also have better incorporated cross-equation and forward-looking restrictions implied by the dynamic decision problem. Thus, exact decision rules may look very different from approximate ones.

The rest of this paper is organized as follows. In the next section, we provide a brief background on the relationship between female labor market participation and fertility choices that motivates our model of joint decision-making. In Section 3, we describe the data. Section 4 outlines the life cycle model of labor market participation and fertility decisions. Section 5 discusses estimation of approximate decision rules. Section 6 presents the estimation results and assesses model fit. Section 7 correlates the estimated state dependence effects with aggregate measures of social policies, and reports the results of counterfactual simulations. The last section of the paper summarizes and concludes.

## 2. Background

There is a vast literature that examines the relationship between fertility and female labor force participation. A negative effect of the number of children on female labor supply is often found. But the effect may not be causal because women with stronger preferences for motherhood may also be those with lower unobservable skills and motivation in the labor market. The endogeneity of fertility has been addressed in the past by looking at sources of unplanned births, e.g., the presence of twins (Rosenzweig and Wolpin, 1980), and variation in the availability and cost of contraceptives (Rosenzweig and Schultz, 1985). Angrist and Evans (1998) suggest using the sibling-sex composition as an instrument for fertility outcomes. However, this latter approach is not practical with European data since the number of women with at least two children is typically very small.

Instead of postulating and exploiting sources of exogenous variation in birth outcomes, there are a number of studies that attempt to directly test for the exogeneity of fertility within simple labor supply models. For example, Mroz (1987) tests the sensitivity of the parameters of the labor supply equation of married women with respect to a number of assumptions, including the exogeneity of fertility. Conditional on participation, he finds that fertility is exogenous to women's labor supply. However, using panel data and controlling for individual effects, Jakubson (1988) arrives at opposite conclusions. Hyslop (1999), following Browning (1992) and Chamberlain (1984), tests for the exogeneity of fertility via a discrete choice correlated random effects model. His results indicate that when dynamic factors such as state dependence or serial correlation are excluded, fertility is endogenous. However, in dynamic specifications with either first-order state

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