CLADAG 2023

BOOK OF ABSTRACTS AND SHORT PAPERS

14th Scientific Meeting of the Classification and Data Analysis Group
Salerno, September 11-13, 2023

edited by

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HOW WOMEN REACT TO THEIR PARTNERS' WORK INSTABILITY. THE ADDED-WORKER EFFECT

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ABSTRACT: In this paper we study the relationship between female and male labour supply within Italian households, focusing on the reaction of women to the transitions from employment to unemployment of their partner. In literature the phenomenon of women entering in the labour market as a consequence of an unemployment episode of their partner is called Added-Worker Effect. The analysis is carried out over a long period of time, 2004-2019 on data from the Italian Labour Force Survey (ILFS). To identify the Added-Worker Effect, we adopt a differences-in-differences methodology. By exploiting the richness of information contained in the ILFS data on unemployment status and unemployment risk, we were able to evaluate different "dimensions" of the Added-Worker Effect.

KEYWORDS: household labour supply, diff-in diffs, female labour force participation.

1 Introduction

The aim of this work is to study the relationship between female and male labour supply within Italian households. In particular, we evaluate whether an Added-Worker Effect (AWE) exists in Italy, focusing on the transition of women from labour market inactivity to unemployment when their male partners move from employment to unemployment, using a differences-in-differences methodology.

The literature on the topic goes back to the first contributions of Humphrey (1940) and Woytinsky (1940) and the empirical studies on the Added-Worker Effect (AWE) by Mincer (1962) and Heckman and Macurdy (1980). The AWE has been revived with the recent economic crisis. Gong (2011), focusing on Australia, found a significant AWE in terms of increased full-time employment and working hours. Starr (2014) found, for the USA, that employment rates of women whose husbands were non-employed rose significantly during the recession. As to the Italian case, Ghignoni and Verashchagina (2016) found that an AWE exists, even if only in cases of serious hardship. More recently, Baldini et al. (2018), studying Italy in the years 2004-2014 using EU-SILC data, found a strong and robust evidence that households hit by an employment shock do respond by increasing labour supply.

2 Data and methodology

Our study evaluates the AWE in Italy over a long period of time, 2004-2019, employing the ILFS, a rotating panel provided by Istat. The longitudinal data of the ILFS observe individuals across couples of years (t_0, t_1): in the quarter of entrance in the panel, in the subsequent one (first two quarters of observation), and in the 5th and 6th quarter. In each quarter, new individuals enter the survey, for a share of one fourth of the total sample. The available data are from 2004-05 to 2018-19. Unfortunately, until 2012 Istat only makes available the panel data related to the first quarter of each year. Thus, for reasons of balance and comparability between samples, we carried out our analysis on the first quarter only. This means that the database is thus made by 15 panels of individuals observed in the first quarter of year t_0 and in the first quarter of year t_1. Our analysis focuses on couples – married or cohabiting – with or without children, with partners not retired and not unable to work, in the age range 25-54. To our purpose, we focus on households with unchanged composition in the two occasions (t_0 and t_1).

To identify AWE, we employ a differences-in-differences methodology (DD). Our first definition of treated women includes those women whose partners became unemployed between t_0 and t_1. AWE occurs when the probability of changing employment status from inactive to unemployed is significantly different between treated and untreated women. Then, the equation we estimate to detect AWE is the following linear probability model (Angrist and Pischke, 2009):

$$ES_{it} = \beta_0 + \beta_1 D_t + \beta_2 T_i + \beta_3 T_i D_t + \beta_4 X_{it_0} + \varepsilon_{it} \quad (1)$$

where ES_{it} is the employment status of female i at time t, D_t is a dummy with value equal to 0 in t_0 and 1 in t_1, T_i is a dummy that captures whether the woman is treated or not. D_tT_i is our variable of interest: the parameter β_3 captures the effect of being treated, compared to not being treated, on the change of employment status of females. X_{it_0} includes several covariates (female age cohort, male nationality, male and female educational level, number of children, number of children under 15 years old, number of children employed, male type of job, male sector of activity and dummies that capture male unemployment risk) all evaluated at t_0.

Exploiting the richness of the ILFS, Equation 1 is estimated under different specifications of the treatment (T_i) and the outcome (ES_{it}). The different definitions of treatment we adopt allow us to consider situations that might reveal an increased risk of losing one's job or a reduction in the household available income, which may affect the decision of female partners to enter the labour market. As regards women's outcomes, we adopted different definitions of the dependent variable *ES* in order to capture different 'degrees' of exit from inactivity and changes in preferences for work involvement. These different treatments and outcomes are explained in the next section.

3 Results

In this section, we discuss the results of the estimates of Equation 1 for the different treatment and work transitions of the woman and her partner (see Table 1). The first treatment we have considered is the partner's transition from employed to unemployed (*T1*). Then, to capture the emergence of a risk in the partner's employment stability and a worsening in the economic condition of the family, we have considered men's transitions either from employment to CIG[1] or from working full hours in t_0 to reduced hours in t_1, and men losing jobs other than the main one between the two years (*T2*). To complete the analysis, we have considered male transitions from employment to non-employment—either unemployment or inactivity (*T3*).

Table 1: *The AWE with different treatments and outcomes*

Outcomes	Treatments		
	T1	*T2*	*T3*
ES1	0.149***	0.023*	0.060***
ES2	0.123***	0.020	0.051***
ES3	0.138***	0.020	0.093***
ES4	0.038***	0.027***	0.028***
ES5	0.014	0.051***	0.023

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

For women, we adopted different definitions of the dependent variable *ES* in order to capture different 'degrees' of exit from inactivity and changes in preferences for work involvement. *ES1* is the dependent variable definition that captures women's transitions from inactivity to unemployment. *ES2* evaluates transitions from inactivity to the labour force—either unemployed of employed. *ES3* captures the intention to work and the change of the status from 'not searching' to 'searching' for work. Thus, the sample of women is restricted to the only ones who are inactive and 'not searching' for work in period t_0. *ES4* assesses preferences for greater work involvement, i.e. more working hours; in this case, the sample consists of women who are already employed and who do not wish more hours of work in t_0. We also considered a further specification to assess whether the market allows women to work more. In this case, we selected only women with a part-time job in period t_0 and evaluated the significance of the transition from part-time to full-time work between the two years (*ES5*).

[1] Cassa Integrazione Guadagni (CIG) is an institution under Italian law consisting of an economic benefit, provided by the Italian Security System, for workers suspended from the obligation to perform work or working reduced hours. It is paid to workers when companies are in temporary difficulty.

The results show that an AWE exists within Italian families. The classical definition of AWE, measured by women's transitions from inactivity to unemployment as their partners move from employment to unemployment, compared to women whose partners do not move to unemployment (ES1-T1), is significant and positive. In fact, treated women are 15% more likely to enter the labour market than untreated women. The effect is still positive— even if the size is smaller (2.3%)— when the treated group includes only families whose men are 'at risk of unemployment' (ES1-T2). This means that women react to changes in the family economic situation. Interestingly, working women are willing to work more hours (ES4) when the partner loses his job or he is at risk of losing it; this effect is significant for all treatment types, ranging from 2.8 to 3.8%. However, the transition from part-time to full-time (ES5) is 5% higher for treated women only in the case of T2 treatment. Possible explanations for this result could be the existence of labour market rigidities in the transformation of part-time work into full-time work or constraints on the supply side of the labour market (due to care activities that limit women's working hours).

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References

ANGRIST, J. & PISCHKE, S. 2009. Mostly harmless econometric, An empiricist's companion. Princeton: Princeton University Press.

BALDINI, M., TORRICELLI, C. & URZÌ BRANCATI, M.C. 2018. Family ties: Labor supply responses to cope with a household employment shock. *Review of Economics of the Household*. **16**, 809-832.

GHIGNONI, E. & VERASHCHAGINA A. 2016. Added worker effect during the great depression: evidence from Italy. *International Journal of Manpower*. **37**, 1264-1285.

GONG, X. 2011. The added worker effect for married women in Australia. *The Economic Record*. **87**, 414-426.

HECKMAN, J.J. & MACURDY, T. 1980. A life cycle model of female labour supply. *The Review of Economics Studies*. **47**, 47-74.

HUMPHREY, D.D. 1940. Alleged "additional workers" in the measurement of unemployment. *Journal of Political Economy*. **48**, 412-419.

MINCER, J. 1962. Labor force participation of married women: A study of labor supply, in Universities-National Bureau Committee for Economic Research, *Aspects of Labor Economics*, Princeton: Princeton University Press

WOYTINSKY, W.S. 1940. Additional workers on the labor market in depressions: A reply to Mr. Humphrey. *Journal of Political Economy*. **48**, 735-739.