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Female labor force participation and total fertility rates in the OECD: New evidence from panel cointegration and Granger causality testing

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ABSTRACT

This article examines the relationship between the female labor force participation rate and the total fertility rate for 28 OECD countries using panel unit root, panel cointegration, Granger causality and long-run structural estimation. The article finds that there is either unidirectional long-run Granger causality running from female labor force participation to the total fertility rate or bi-directional Granger causality between the two variables depending on how the female labor force participation rate is measured and the time period. In each case it is found that there is an inverse relationship between the female labor force participation rate and total fertility rate. This result supports the role incompatibility hypothesis that states there is a negative relationship between these variables because of the strain of performing the roles of both employee and mother.

1. Introduction

The relationship between female labor force participation (FLFP) and total fertility rate (TFR) is a topic that has received a lot of attention in the literatures of demography and economics. In recent years European research on this topic has been sparked by the Presidency Conclusions of the European Union Council in Lisbon in 2000 which set an overall target of female employment of 60% for the year 2010. While Northern European and most Continental countries are set to realize this target, the Mediterranean countries are lagging behind (Del Boca, 2005). The FLFP rate generally falls around

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childbirth; mothers who have young children have traditionally been considered as having low labor force attachment. As recently as the 1980s, the Scandinavian countries were the only countries in the Organization for Economic Cooperation and Development (OECD) where the majority of females worked continuously over their lifetime (Kenjoh, 2005). However, more recently, this situation has started to change and there are now other OECD countries where women are working continuously throughout their lives or with only a short interruption at the time of childbirth. As Kenjoh (2005, p. 6) described it, "one could say that the increase in the labor force participation rate of mothers is one of the most prominent developments of the recent labor market in OECD countries".

One important issue that remains unresolved in studies of the relationship between FLFP and TFR is the question of 'what causes what?' Several studies have examined this issue but due to difficulties with design and method, findings have been mixed. The aim of this study is to clarify the direction of the relationship between FLFP and TFR in OECD countries. To realize this objective we make two main contributions to the literature. First, in addition to using FLFP rates for women aged 15–64, we also employ age-specific data on FLFP for females aged 15–34. Most existing studies of the causal relationship between FLFP and TFR use FLFP rates for women aged 15–64 because of the lack of a long time series for age-specific FLFP rates. Exceptions are Engelhardt, Kogel, and Prskawetz (2004) who used age specific FLFP rates to examine the causal relationship between FLFP and TFR for the United States, and McNown and Ridao-Cano (2005) who examined the relationship between TFR, age-specific FLFP rates and men's and women's wages for the United Kingdom. The problem with not considering age-specific FLFP rates is that for women above a certain age, say 35–40, fertility rates decline rapidly, then become close to zero so only using participation rates for women aged 15–64 potentially biases the findings. We are able to employ age-specific data on FLFP with a limited time series, because we use a panel framework to exploit the cross-sectional properties of the data.

A second contribution of this study is to use a panel unit root, panel cointegration and panel Granger causality framework and to estimate the long-run relationship between FLFP and TFR using a panel version of fully modified ordinary least squares. As Engelhardt et al. (2004) noted, most existing efforts to estimate the causal relationship between FLFP and TFR have not examined the time series properties of the variables and therefore suffer from a 'spurious regression' problem. Spurious regression refers to a situation in which there appears to be a statistically significant relationship between variables, but the variables are unrelated. Several studies have applied unit root, cointegration and Granger causality testing to examine the relationship between FLFP and TFR for individual countries (Engelhardt et al., 2004; McNown & Ridao-Cano, 2005; Narayan & Smyth, 2003, 2006). In this study we extend the unit root and cointegration approach in these studies to test for Granger causality with panel data.

The only existing study that applies a panel unit root, panel cointegration and panel Granger causality framework to examine the relationship between FLFP and TFR is Mishra, Nielsen, and Smyth (in press). The present study has two important advantages over Mishra et al. (in press). One advantage is that this study is broader in coverage. While the Mishra et al. (in press) study is restricted to a panel of G7 countries, this study considers a panel of 28 OECD countries. The larger cross-section of countries increases the power of the panel tests. It increases the variation in FLFP and TFR across countries, which is useful since adequate sample variation of a key variable is always needed to obtain precise estimates. The second advantage of this study over Mishra et al. (in press) is that in contrast to that study, we utilize age-specific female FLFP rates.

The structure of the article is as follows. Section 2 examines what it means, from an economic perspective, for FLFP and TFR to be stationary variables or to contain a unit root and to be cointegrated. Section 3 contains a discussion of alternative conceptual perspectives on the causal relationship between FLFP and TFR. Section 4 examines existing studies that have considered causality between FLFP and TFR, focusing on the gaps in the literature that we seek to address in this study. A discussion of the econometric methodology, data and empirical results are contained in Sections 5–7. The final section concludes with several suggestions for future research on the topic.

2. Theoretical underpinnings

What does it mean, from an economics point of view, for FLFP and TFR to exhibit (or not) a unit root process? First, consider FLFP. Several studies have used unit root tests to test the natural rate of