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Structural and reduced approaches of the equilibrium rate of unemployment, a comparison between France and the United States

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Abstract

This paper confronts, theoretically and empirically, two estimation methods for the Equilibrium Rate of Unemployment (ERU), which can be derived from a WS/PS model or from a wage Phillips curve. It shows how the TV-NAIRU reduced approach can be theoretically coherent with the structural approach even though their empirical diagnoses differ appreciably in the French case. It considerably improves the econometric and explanatory properties of the French TV-NAIRU model by identifying some of its determinants (namely, inflation, labour productivity and real interest rates).

JEL classification: C13; C32; E24; E31

Keywords: Equilibrium unemployment; TV-NAIRU; Phillips curve; Structural model; Kalman filter

1. Introduction

Despite abundant research since its formulation by Phelps (1967, 1968) and Friedman (1968), the concept of the Equilibrium Rate of Unemployment (ERU) is still clouded by many uncertainties. In particular, several definitions and estimation methods are proposed in the literature. The definition of "natural rate of unemployment" proposed by Friedman (1968) refers

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mainly to the frictional unemployment, i.e. the unemployment resulting from transitions between labour force states.[1]

The concept proposed by Friedman (1968) has mainly two drawbacks. Firstly, it is too vague to be empirically estimable. Secondly, it is disconnected from the notion of sustainable macroeconomic equilibrium used in empirical works. The concept of ERU derived from the resolution of wage and price equations overcomes these weaknesses. It is defined as the unemployment rate that equalises the real wage asked by workers to the one which employers are able to pay considering their price setting behaviour[2]. The wage curve may be written in level, which implies that workers have an objective in level for their real wages (WS/PS models), or in growth rate (Phillips curve models). Formally, the ERU is equivalent to the concept of *Non-Accelerating Inflation Rate of Unemployment* (NAIRU) formalised by Phelps (1967, 1968)[3] — which is incorrectly used instead as the *Non-Increasing Inflation Rate of Unemployment*. Indeed, inflation stability implies that workers and employers are both satisfied by their respective share of the value-added (see Layard et al., 1991; or Reynès, 2006, chap. 3). Hence, the level of the ERU is a sustainable target for the unemployment rate.

This paper confronts the two main estimation methods for the ERU used in the literature. The structural approach follows a two-stage procedure. First, a structural model of wage and price equations is estimated. As the ERU is the unemployment rate that stabilises inflation, it can then be calculated as a function of the estimated parameters and of the variables of the structural model. The Time-Varying (TV) NAIRU reduced approach inspired by the Gordon (1997) triangle model has only one step. The ERU is estimated simultaneously with a reduced Phillips curve[4] using the Kalman filter. These two methods which, as we shall see, have both advantages and drawbacks, are often opposed theoretically and empirically (e.g. Richardson et al., 2000). The present contribution evaluates instead how the two may converge on theoretical and empirical grounds.

Section 2 is devoted to the theory of the ERU. It interprets the Phillips curve as a theoretically relevant version of the wage curve. Section 3 presents the two main estimation methods for the ERU. It shows that the structural approach is mathematically equivalent to the reduced approach since our structural model can be reformulated as a reduced Phillips curve. Sections 4 and 5 present the estimations of American and French ERUs with the structural and reduced approaches

[1] "The 'natural rate of unemployment' [...] is the level that would be ground out by a Walrasian system of general equilibrium equations, provided there is imbedded in them the actual structural characteristics of the labour and commodity markets, including market imperfections, stochastic variability in demands and supplies, the cost of gathering information about job vacancies and labour availabilities, the costs of mobility, and so on" (Friedman, 1968, p. 8). Several studies using the terminology of ERU try to model this concept. General equilibrium models such as Cahuc and Zylberberg (1996) or Caballero and Hammour (1998) model the decisions of firms to hire a worker and of workers to accept a job, whereas partial equilibrium models of job matching describe job creations and destructions (e.g. Caballero et al., 1997).

[2] Using metaphor of Bean (1989), many authors consider the wage and price setting processes as akin to a "battle of mark-ups" in which the unemployment rate would be the "referee".

[3] Phelps uses the term of ERU even though the definition he proposes will become known as NAIRU: "The quantity $u*$ measures the 'equilibrium' unemployment ratio, for it is the unemployment rate at which the actual rate of inflation equals the expected rate of inflation so that the expected inflation remains unchanged. [...] The rate of inflation will continue to increase as long as the unemployment ratio is smaller than $u*$ [...]" (Phelps, 1967, p. 255).

[4] In this paper, the Phillips curve corresponds to a negative relationship between the growth rate of wages and the unemployment rate as in Phillips (1958). Specifications relating inflation directly to the unemployment rate are described as the reduced Phillips curve.