EXTENDED ABSTRACT

Title: A study on the effect of temporary employment on technical efficiency

Authors and e-mail of all:
Francisco José Ledesma Rodríguez*
fledesma@ull.edu.es

Rosa Mª Lorenzo Alegría*
rlorenzo@ull.edu.es

Raquel Martín Rivero**
rmartinr@ull.edu.es

Department:
*Departamento de Economía, Contabilidad y Finanzas
** Departamento de Economía Aplicada y Métodos Cuantitativos

University:
Universidad de La Laguna

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Abstract:
This research focuses on analyzing the effect of the high temporality of employment in the hotel sector on the technical efficiency. On the one hand, a moral hazard model would suggest that temporality incentives labor effort given that workers fear being fired whether poor performance of the hotel happens. Furthermore, it is commonly argued that temporality provides flexibility in order to manage crises (Engellandt & Riphahn, 2005; Caguese & Cuñat, 2008; Booth et al, 2002a; Dolado et al, 2002). On the other hand, theories of temporary work suggest that temporary jobs reduce satisfaction of workers via poorly paid and insecure jobs and lack of opportunities for career advancement (Damiani et al, 2016; Alekynska, 2018; Chadi & Hestschko, 2016; Virtanen et al., 2005; Moscone et al, 2016; Franceschi and Mariani, 2016). Moreover temporary jobs deter work-related training (Sharma & Winkler, 2017; Casquel & Cunyat, 2011; Booth et al., 2002b). As a consequence they promote low labor effort and productivity (Lisi & Malo, 2017; Díaz-Mayans & Sanchez, 2003; Marchante et al., 2017).

This paper focuses on the estimation of the effect of temporary employment on technical efficiency for a special case where the presence of temporality is noteworthy. Furthermore this paper explores the influence of the level of conversion from fixed-term to permanent employment on efficiency.

To ascertain the influence of temporality on efficiency, the critical case of the hotel sector in the Canary Islands is studied where temporary employment rate (40% in 2016) more than double the average rate for the whole European economy (15%). Following EUROSTAT Statistics (2019), Canary Islands was the most popular region in the European Union (EU) visited by EU residents in 2017, reaching about 110 millions of overnight stays. This is noticeable since for the second and third most popular regions in the EU, i.e., Catalonia and Jadranska Hrvatska, the overnight stays were less than 80 millions. The combination of a massive sun-and-sand market segment, the absence of seasonality and the availability of a specific natural heritage may be a major reason behind this fact. Particularly Canary Islands received in 2017 about 16 millions of tourists, and the contribution of this sector to the GDP was about 35.2% and over 40% in terms of employment (IMPACTUR, 2017). As a consequence, a sizeable hotel sector emerges with more than six hundred hotels with an average size of over four hundred beds. Following Instituto Nacional de Estadística (INE) data, this size is striking since it is four times greater than the average size for Spain as a whole.

A major feature of the hotel sector of the Canary Islands is the very high temporary employment rate (40% in 2016) more than doubling the average rate for the whole European economy (15%). The main objective of this paper is precisely to analyze the effect of the high temporality of employment on the technical efficiency. Indeed the hotel sector of the Canary Islands may be a 'laboratory case' to study deeply the consequences of a high temporality of employment

A panel data of tourist accommodation from an exhaustive official survey of the hotel sector of the Canary Islands is used for the period 2011-2016. Data used in this paper have been collected mainly from Encuesta de Alojamiento Turístico of Instituto Canario de Estadística (ISTAC). These data are official and cover almost the whole of the hotel sector in the Canary Islands, including hotels belonging to hotel chains. Given that the procedure followed needs hotels with both fixed-term and permanent workers, the database of 635 hotels was filtered and, as a consequence, a definitive sample size of 407 hotels was used for the empirical analysis.

A production stochastic frontier is estimated by distinguishing between two types of employment, i.e. permanent and temporary employees. Also a set of potential determinants of technical inefficiency related to the labor market are explored. Battese and Coelli (1995) propose a stochastic frontier production function for data panel of firms, in which the non-negative technical inefficiency effects are assumed to be a linear function of firm-specific variables and time. Based in a one-stage procedure, the determinants of the inefficiency are directly incorporated into the estimation by maximum likelihood, improving the estimates of the frontier parameters. The parametric model followed includes two equations: (i) a production frontier, and (ii) an equation for the technical inefficiency.

The functional form for the production frontier is a translog function, expressed by:

$$lny_{it} = \alpha + \sum_{k} \beta_k lnx_{kit} + \sum_{j} \sum_{k \geq j} \beta_{jk} lnx_{jit} lnx_{kit} + \beta_t t + \beta_{t2} t^2 + V_{it} - U_{it}$$

$$i = 1, \dots., N; t = 1, \dots, T \qquad (1)$$

where *ln* indicates natural logarithms, y_{it} is the output variable, i.e., overnight stays in hotel i in year t, x_{kit} is the quantity of input *k* used in hotel *i* in year *t*, where *k*= L_P, L_T, *K*. In our case, L_P represents the number of permanent workers, L_T the number of fixed-term workers, and *K* is the capacity variable measured by the number of beds. V_{it} is an statistic error assumed to be iid $N(o, \sigma_V^2)$ and U_{it} represents technical inefficiency of hotel *i* in year *t*, and it is obtained by truncation (at zero) of the $N(\mu_{it}, \sigma_U^2)$. Finally *t* and t^2 denote linear and non-linear trends, respectively.

Likelihood function may be expressed in terms of variance parameters. So $\sigma_S^2 = \sigma_V^2 + \sigma_U^2$ and $\gamma = \sigma_U^2 / \sigma_S^2$. When Υ ratio increases to the value of one, the study of technical inefficiency becomes more relevant since it indicates higher variability of compound error term due to inefficiency.

Technical efficiency takes values from zero to one, and it may be calculated from the estimates of inefficiency. Therefore

$$TE_{it} = \frac{y_{it}}{\acute{O}ptimal\ y_{it}} = \approx \exp(-U_{it})$$

The general specification for technical inefficiency is given by:

$$U_{it} = \delta_0 + \sum_{i=1}^{m} \delta_i z_{it} + w_{it} \qquad (2)$$

where z_{it} denotes a set of *m* determinants of technical inefficiency and w_{it} is an error term.

Under the assumption that technical inefficiency of each hotel may be explained from a set of determinants, the variables proposed for the inefficiency equation are the following: (i) the temporary rate measured as the ratio of temporary workers over total workers, (ii) the squared of temporary rate in order to know whether a non-linear relationship between temporality and technical inefficiency is present, (iii) the conversion rate approximated by the permanent workers expressed in first differences divided by the fixed-term workers corresponding to the previous period , (iv) the quality of services offered by hotels approximated by the price variable named Average Daily Rate (ADR), i.e. the average rental income per paid occupied room, and (v) size of the hotel measured by the number of beds supplied.

Turning to the analysis of the specification of the inefficiency model, the results of various null hypothesis tests are reported. Three tests are carried out: (i) absence of inefficiency effects, (ii) non-stochastic inefficiency effects, and (iii) inefficiency effects non-linearly related to the regressors introduced in the inefficiency model. In all cases

null hypotheses are rejected. Therefore it confirms the presence of stochastic inefficiency effects, linearly dependent on the variables introduced in the inefficiency equation, i.e., quality, size, temporary rate and conversion rate.

Preliminary results suggest that for high levels of temporality, the share of temporary jobs tends to increase technical inefficiency. Furthermore a high conversion rate from temporary to permanent jobs seems to increase efficiency.

References

Alekynska. M. (2018). Temporary employment work quality and job satisfaction, *Journal of Comparative Economics*, 46 (3), 722-735.

Battese G.E. and Coelli. T. J. (1995). A Model for Technical Inefficiency Effects in a Stochastic Frontier Production Function for Panel Data. *Empirical Economics*. vol. 20: 325-332.

Booth, A.L., Dolado. J.J. & Frank. J. (2002a). Symposium on temporary work. Introduction. The Economic Journal. 112. 181–188.

Booth, A.L., Francesconi, M. & Frank, J. (2002b). Temporary jobs: stepping stones or dead ends? *The Economic Journal.* 112. 189–213

Caggese, A. & Cuñat, V. (2008). Financing constraints and fixed-term employment contracts. The Economic Journal, 118, 2013-2046.

Casquel, A. & Cunyat,. A. (2008). Temporary contracts, employment protection and skill: A simple model. *Economics Letters*, 100, 333-336

Chadi. A. & Hestschko. C. (2016). Flexibilization without hesitation? Temporary contracts and job satisfaction. Oxford Economic Papers. 68(1). 217–237.

Damiani. M., Pompei. F. & Ricci. A. (2016). Temporary employment protection and productivity growth in EU economies. International Labour Review. 155. (4). 587-622.

Díaz-Mayans, M. & Sanchez, R. (2003). Temporary employment and technical efficiency in Spain, *International Journal of Manpower*, 25 (2), 181-194.

Dolado. J.J., García-Serrano. C. & Jimeno. J.F. (2002). Drawing lesson from the boom of temporary jobs in Spain. The Economic Journal. 112. F270–F259.

Engellandt, A. & Riphahn, R. (2005). Temporary contracts and employee effort, *Labour Economics*, 12, 281-299.

EUROSTAT Statistics (2019). Tourism statistics at regional level. Retrieved from https://ec.europa.eu/eurostat/statistics-explained/index.php/Tourism_statistics_at_regional_level.

Franceschi. F. & Mariani. V. (2016). Flexible labor and innovation in the Italian industrial sector. *Industrial and Corporate Change*. 25 (4). 633-648.

IMPACTUR (2017). Estudio del Impacto Económico del Turismo. Canarias. Downloaded 6 September 2019 from https://www.exceltur.org/wp-content/uploads/2018/07/IMPACTUR-Canarias-2017.pdf

Lisi, D & Malo, M. (2019). The impact of temporary employment on productivity. *J Labour Market Res.*, 50, 91-112.

Marchante, A., García, A. & Sánchez, J. (2017). Labour flexibility and productivity in the andalusian lodging sector. *Revista de Estudios Regionales*, 108, 17-41.

Moscone. F., Tosetti. E. & Vittadini. G. (2016). The impact of precarious employent on mental health: The case of Italy. Social Science & Medicine. 158. 86-95.

Virtanen. M., Kivimäki. M., Joensuu. M., Virtanen. P., Elovainio. M. &Vahtera. J. (2005). Temporary employmente and health: a review. *International Journal of Epidemiology*. 34 (6). 610-622.

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