



Contents lists available at ScienceDirect

European Journal of Operational Research

journal homepage: www.elsevier.com/locate/ejor

Innovative Applications of O.R.

Technical efficiency, unions and decentralized labor contracts

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ARTICLE INFO

Article history:

Received 16 February 2016

Accepted 12 January 2017

Available online xxx

Keywords:

Data envelopment analysis

Unions

Decentralized bargaining

Truncated regression model

ABSTRACT

This paper explores the link between the presence of unions in the workplace, the adoption of decentralized labor agreements and technical efficiency, using a large sample of Italian manufacturing firms. We apply the Data Envelopment Analysis, and its robust version based on bootstrap theory, to get reliable estimates of technical efficiency at the firm level in a standard first stage. We devote particular attention to the specific technology adopted, by distinguishing 20 different sector frontiers, as well as to the presence of outliers. The obtained efficiency scores are analyzed in a second stage applying a truncated regression model estimated via Maximum Likelihood, following the Simar and Wilson (2007, 2011) methodology. Our results highlight that the presence of workplace unionization decreases the level of technical efficiency, while aspects limiting the unions' power such as a strong exposure to international markets, high debt levels or the prevalence of flexible assets partially reduce the negative effect. However, when firms adopt decentralized labor contracts agreements, the effect on efficiency is positive and partially compensates the negative unions' effect.

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1. Introduction

The ongoing debate on the Italian productivity crisis, in particular for the manufacturing industry, has been recently revived by a deep discussion on the alleged beneficial consequences of labor market reforms and the role of unions. In particular, the effect of unions on firm's productivity is one of the current hottest topic in Italy, with an increasing attention devoted by media, fostered by the delicate discussion, at the institutional level, on the future role of unions. If, on the one hand, the business community, members of the government and policy commentators often include unions among the factors behind the Italian productivity crisis, employees and trade unionists, on the other hand, highlight their fundamental role to protect workers' rights and to promote cooperation and communication.

The empirical literature still fails to reach a consensus on the real effects of unions on firm productivity, in line with the theory that identifies the so called *two faces* of unionism (Freeman & Medoff, 1984): the monopoly face and the collective voice/institutional response face (CV/IR). The monopoly face synthesizes the different adverse effects for the firm, based or not on wage aspects. To

begin with, unions can engage in rent-seeking activities, raising labor costs and reducing firms' profitability. As discussed in the hold-up literature, unions' opportunistic behavior may translate into a tax on a firm's capital investment and be detrimental to its innovation activities (Card, Devicienti, and Maida, 2014, and Cardullo, Conti, & Sulis, 2015). Moreover, unions can take different actions that limit workplace flexibility, encourage restrictive work rules or weaken employees' efforts (Kaufman, 2004). As a consequence, firms appear less flexible and adaptable to environmental shocks, and this impacts negatively on productivity. For instance, the presence of unions may limit a store's opening hours and reduce its competitive advantage with respect to non-unionized stores, which are therefore better able to adapt to new market trends. On the contrary, the CV/IR face highlights how the presence of unions increases the communication channels between the workforce and the management, reinforcing the *voice* option for employees¹. The outcome is a reduction of dissatisfaction at the workplace, absenteeism and turnover, with a general positive effect on productivity. In particular, the containment of excess worker turnover reduces human capital dispersion and training costs, and

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E-mail addresses: francesco.devicienti@unito.it (F. Devicienti), alessandro.manello@unito.it, alessandro.manello@ircres.cnr.it (A. Manello), davide.vannoni@unito.it (D. Vannoni).¹ The exit-voice dichotomy has been introduced by Hirschman (1970) and represents two sides of social interactions: the voice option suggests how it is possible to discuss and to contribute to a better environment, while the exit option represents a more radical choice of not discussing and exiting the relationship.<http://dx.doi.org/10.1016/j.ejor.2017.01.022>

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avoids the costly expression of the *exit* option by the employees (Ton & Huckman, 2008).

If unions can be considered as promoters and main actors of the voice option, the adoption of decentralized labor contract agreements (DLCAs), which integrate or derogate the national and industry-wide collective agreements, may represent the effective means of voice and imply a smoother conflict among employees and entrepreneurs. A general tendency towards the decentralization of labor contract bargaining has been recently suggested by the European Council², for its potential positive effects on productivity. The latter should stem from a better mix of wage settlements and more flexible terms in the organization of labor, which should be able to increase the satisfaction of the employees, their effort and firm attachment, reduce turnover, as well as improve firm's adaptability to changing market conditions.

Although there is a widespread interest on the potential effects of increasing decentralized bargaining, the recent scientific literature remains mainly focused on the influence of Performance Related Pay (PRP) schemes, one of the main components of firm local agreements, and investigates in particular their effect on productivity at the individual level (Bandiera, Barankay, & Rasul, 2005). However, the flexibility of wages, still limited in magnitude, is mainly accepted and adopted in a collective form, with a modest expected effect on productivity (e.g., Gielen, Kerkhofs, & van Ours, 2010; Lucifora & Origo, 2015). In the Italian context, the majority of firms adopting a decentralized contract also introduce a PRP scheme, typically on a collective basis, with a potentially limited effect on the employees' efforts. However, DLCAs can also sustain productivity through other channels not directly linked to wages, like additional flexibility in working hours and labor organization, and other clauses that increase trust and cooperation among employees and managers³. Moreover, DLCAs are the direct instrument through which unions make the voice option effective: they contribute to create a better working environment, to increase the employees' commitment with the firm and to favor a cooperative approach with the firms' managers. On top of these aspects, a DLCA can also be considered as an instrument to limit the monopoly face of unions and its opportunistic behavior, in that it formally specifies wage and non-wage claims through a written contract over a relatively long period of time (usually 3 years, and sometimes more). When the firm and the unions jointly discuss and bargain over wages and numerous other aspects of the employment relation or the organization of labor – as is often the case for the DLCAs observed in practice – inefficiencies are more likely to be avoided, compared to the outcomes obtained under a traditional monopoly union setting (e.g., Bennett & Kaufman, 2007). In this respect, the presence of a decentralized contract has a double face: on the one hand, it signals that the voice option has been formally expressed, reducing conflicts and increasing cooperation between the counterparts; on the other hand, it commits the union to a predetermined set of contractual terms (e.g., profit-sharing rules), thereby reducing uncertainty and the union's ex-post opportunistic behavior.

In this paper, we propose to revisit a traditional labor and industrial economics issue using efficiency analysis, a methodology relatively new in these fields. In particular, we compute firms' inefficiency using a Data Envelopment Analysis (DEA) framework, which measures the capacity of obtaining output for any given

input bundle with respect to the reference frontier. The bulk of previous literature, better analyzed in the next section, is mainly focused on labor productivity and estimates the effect of unions or performance related pay on measures such as value added per employee or revenues per employees⁴. If the impact of unionization and industrial relations can be straightforward on output obtained per unit of labor, their relationship with the technical efficiency level, which considers a complete input bundle, is more interesting. In fact, efficiency score are computed more coherently with the technology, assuming a production function characterized by many inputs combined to obtain outputs. The main advantage of the DEA approach is that the shape of this function, which is unknown, is not imposed, but is derived by the observed input and output bundles through linear programming techniques.

Using a large sample of Italian manufacturing firms observed over the years 2010–2012, we study the impact of both unions and decentralized labor agreements on technical efficiency. From a methodological point of view, we use a semi-parametric approach, which minimizes misspecification issues in the technology definition and compensates the limits of purely deterministic models (see Daraio and Simar, 2007 for a thorough reference). Our results show a clear negative effect of workplace unionization on technical efficiency that remains stable across all estimates; however, such a negative impact is roughly counterbalanced by a positive effect related to the presence of decentralized labor contracts. The obtained results are robust to the introduction of additional controls, as well as to the adoption of a propensity score based method, which is aimed at reducing endogeneity concerns between technical efficiency and unions or decentralized contracts.

The remainder of the paper is organized as follows. Section 2 reviews the relevant literature on the role of unions and decentralized bargaining. Section 3 describes the DEA model, the bias correction procedure and the second stage analysis. Section 4 presents the database and Section 5 illustrates our main results. Some general considerations and policy implications conclude our work.

2. Literature review and background

The literature on the effect of unions on productivity, vast and mainly dated, identifies two theoretical mechanisms, one leading to an increase of productivity and the other to a productivity drop (Metcalf, 2003). On the one hand, unions can promote cooperation, monitoring and information sharing between the employees and the management, all factors acting as a stimulus for increasing effort and motivation and contributing to a better workplace environment. On the other hand, they can lead to restrictive work practices, adverse industrial relations, conflicts and rent seeking, factors that contribute to deteriorate trust and cooperation between the employees and the managers, and to reduce investment (hold-up problem) and productivity levels. Despite the wide empirical literature on the relationship between unions and firms' economic performance, a general consensus on the negative impact of unions has been partially reached only as far as profits are concerned⁵, while the effect of unions on productivity remains substantially uncertain. Many surveys on this topic (see, for example, Addison & Hirsch, 1989; Doucouliagos & Laroche, 2003; Kuhn, 1998; Wilson, 1995), which mainly collect evidence from the US, fail in finding a common direction on the effect of unions on productivity. The results of the estimates are generally not stable and strongly

² See for example the recent Country-specific recommendations 2015 (Council recommendation, 14 July 2015; 2015/C 272/16).

³ The recent case of FIAT (now FCA) that decided to exit Confindustria (the main association representing manufacturing and service companies) and consequently to leave behind the National Labor Contract Agreements (NCLA) in order to apply more flexible (and mainly not wage-based) terms, represents a valid example of the issue

⁴ Papers focusing on standard total factor productivity (TFP) represent an exception, too. See Morikawa (2010) for a recent example.

⁵ See, for some recent reviews, Doucouliagos and Laroche (2009) and Bennett and Kaufman (2007).

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