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The productivity effect of permanent and temporary labor contracts in the Italian manufacturing sector☆,☆☆

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ABSTRACT

This paper studies the effect of permanent and temporary labor contracts on both labor-augmenting and TFP-augmenting technological factors using a panel dataset of Italian manufacturing firms. The empirical analysis applies a structural approach in which firm TFP follows a controlled Markov process that is affected by the relative use of labor contracts, and labor services are perfect substitutes but with different labor-augmenting factors. The empirical results show that when including labor-contract composition in the TFP process: *i*) the difference between permanent and temporary contracts in the labor-augmenting productivity factor is not significant and *ii*) the incidence of permanent contracts in total contracts has a positive effect on TFP dynamics.

1. Introduction

This paper studies the effect of labor-contract choice on firm productivity. We consider permanent and temporary contracts and investigate their impact on both labor-augmenting and TFP-augmenting technological factors. Generally, it is assumed that these types of labor services are perfect substitutes and that permanent contracts imply higher productivity and higher expected costs than temporary contracts (see Caggese and Cuñat, 2008). We substantially agree with this view, but we question the source of the productivity gap. The literature has generally emphasized the difference in the labor-augmenting factor (see Aguirregabiria and Alonso-Borrego, 2009; Caggese and Cuñat, 2008) but we do not feel fully comfortable with this interpretation, because it does not capture the intertemporal effect of labor-contract choice, while the time dimension is the element characterizing the type of contract. Our analysis suggests that labor-contract choice may affect the evolution of the firm productivity process and not (or not only) the level of labor productivity in a given productivity framework. We test our hypothesis using a panel dataset of Italian manufacturing firms. We assume that firm TFP follows a controlled Markov process that may be affected by the relative use of labor contracts and that labor services are perfect substitutes but may be characterized by different labor-augmenting factors. The empirical analysis is conducted by following the structural approach originally proposed by Olley and Pakes (1996) and by taking into account the multicollinearity issue highlighted by Ackerberg et al. (2006). The empirical results show that by endogenizing the TFP process: *i*) the difference between permanent and temporary contracts in the labor-augmenting productivity factor is not significant and *ii*) the incidence of permanent contracts in total contracts has a positive effect on TFP dynamics. These results are consistent with the idea that the use of temporary contracts may allow an efficient allocation of labor services but dampen a source of TFP growth, as some empirical analyses based on aggregate data seem to highlight (references discussed in the next section).

Our view is that workers determine the productivity process and not only the way they interact with it. Personal ability and attitude to work affect not only worker productivity but also the way the productivity process works and evolves, because some personal knowledge is not *kept secret* but shared within the firm.[1] Labor conditions are a key element affecting workers' willingness to participate in the improvement of the productivity process, and the perspective of a short-term relationship reduces such willingness. In this light, firms should benefit from the commitment to long-lasting labor relationships. For example, Gächter and Falk (2002) analyze a *gift exchange game* based on the wage-effort exchange, finding that long-term interaction enhances reciprocity in labor relationships. Lorenz (1992) emphasizes the role of

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[1] The same argument is reported in Kleinknecht et al. (2006) who find that externally flexible labor is associated with lower labor productivity growth.

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trust in the interactions among boundedly rational agents with limited foresight. Trust can be enhanced by accepting "a situation where the future penalty suffered if the trust is abused would lead one to regret the action". In this sense, the commitment to permanent labor contracts with high penalty in the case of unfair dismissal represents an example of trusting behavior. Even without referring to reciprocity and trust, it is reasonable to expect that workers are incentivized to exert effort in activities that can grant themselves high and long-lasting returns. Consequently, they would be incentivized to improve the firm production process only if they expect to share in the returns. In the absence of a long-lasting commitment, it is hard to expect high degree of involvement in activities that generate gains in the future and that are firm-specific (as the TFP is) and not worker-specific (as the labor-augmenting factor is, at least partially). The previous arguments support the idea that temporary contracts should dampen TFP dynamics. On the other hand, temporary contracts may affect labor productivity positively because they ease the employment of *the right person at the right moment* and they incentivize workers to exert higher effort in order to get a contract renewal or transformation to a permanent contract. Anyway, the worker with a temporary contract would be interested in showing her/his own ability and not in sharing knowledge that the firm could use also after the expiry of the contract. Altogether, the effect of the use of temporary contracts on productivity does not seem obvious, suggesting that labor-contract choice may have contrasting effects on firm TFP and labor productivity.

Starting from a Cobb–Douglas production function, we disentangle the labor-augmenting and the TFP-augmenting effects of labor-contract choice, which, to the best of our knowledge, is an attempt that has not yet been made. We find that the incidence of temporary contracts reduces TFP growth. This result suggests that a structural change in labor-contract composition may induce not only a level effect on productivity (as in Aguirregabiria and Alonso-Borrego, 2009; Boeri and Garibaldi, 2007) but may also affect its evolution. In some way, our contribution is related to Iranzo et al. (2008) and Parrotta et al. (2010). The former investigates the role of skill dispersion within and between status groups of workers, focusing on how labor-specific elements affect labor-augmenting productivity (with no reference to possible dynamic effects). The latter investigates the effect of labor diversity (skill, education, demographics, and ethnicity) on firm TFP without taking into account the type of labor contract. The rest of the paper is organized as follows. Section 2 reviews the related literature, focusing on the contributions concerning the relationship between labor contracts and productivity. Section 3 presents the empirical strategy, describing the dataset and estimation procedure, and discusses the empirical results. Section 4 presents some robustness checks of our estimations. Section 5 draws conclusions.

2. Related literature

The effects of the choice between permanent and temporary contracts have been studied from both macro and micro perspectives. Since this literature is too vast to be summarized here, we limit citations to the contributions that mostly add to understanding the impact of labor-contract choice on productivity.[2] A first way to approach the issue is to take as given the labor demand function and assume that labor services are characterized by the same productivity independent of the type of labor contract. Under these conditions, Boeri and Garibaldi (2007) suggest that an increase in the margin of employing temporary labor contracts should induce an increase in employment, due to reduced expected costs, and a fall in labor productivity (measured as value added per worker), due to the decreasing marginal return of labor.[3] An implication of their analysis is that a two-tier labor market reform shifts the equilibrium point of the economy but does not affect its dynamics, and in the *long run* there is no use of permanent contracts.

On the contrary, new hirings with both types of labor contracts, even if characterized by different (expected) costs, can be rationalized through the introduction of a source of productivity gap. For example, each type of labor contract may imply a specific labor-augmenting factor. Indeed, permanent contracts are generally considered to be more expensive than temporary contracts because they imply lower flexibility (the labor hoarding phenomenon) and higher firing costs but, at the same time, they are supposed to imply higher productivity in some way. In line with this view, Aguirregabiria and Alonso-Borrego (2009), who analyze the impact of the two-tier labor-market reform implemented in the 1980s in Spain, estimate that temporary contracts are characterized by a lower labor-augmenting factor.[4] Similar to Aguirregabiria and Alonso-Borrego (2009), we allow labor contracts to be characterized by different labor-augmenting factors but we also investigate the effect on firm TFP dynamics. The introduction of this element allows us not to impose that the labor-augmenting factor of permanent contracts is higher than that of temporary contracts.

Another recent field of literature that is strictly related to our investigation uses cross-country industry-level data to analyze the effect of either the use of, or the regulation concerning the use of, temporary contracts on TFP and labor productivity dynamics. Some examples are Bassanini et al. (2009), Damiani and Pompei (2010), and Iona-Lasinio and Vallanti (2011). Bassanini et al. (2009) analyze the effect of labor market regulation on TFP dynamics using annual cross-country aggregate data referring to the OECD area. They find that high constraints on permanent workers' dismissal have a negative impact on TFP growth, especially in industries with greater layoff propensity. Anyway, another result of their analysis is particularly interesting for our purposes. The authors find that a stricter regulation for temporary contracts has no impact or a positive impact on TFP growth. Even stronger results emerge in Damiani and Pompei (2010), and Iona-Lasinio and Vallanti (2011), supporting the hypothesis of an inverse relationship between temporary contracts and productivity growth.[5] Similar conclusions characterize Ortega and Marchante (2010), who find that the use of temporary contracts reduced productivity growth in Spain, even if not in all sectors. The results of the cited literature are fully consistent with our investigation concerning the dynamic effect of labor-contract choice on productivity.

Our contribution encompasses most of the cited studies. In the next section, we present the production function equation to be estimated, which includes both a difference in the labor-augmenting factor of permanent and temporary contracts, and the influence of labor-contract composition on TFP dynamics. In this way, we are not imposing that a productivity gap should emerge or suggesting the way in which it should come out.[6] Anyway, our investigation also includes a restriction that does not find a definitive justification on theoretical grounds.[7] There are good reasons to presume that the type of labor contract could affect the dynamics (and not just the level) of the labor-augmenting

[2] Other contributions have investigated the opposite relationship, i.e. the effect of productivity on labor-contract choice. Casquel and Cunyat (2008) state that productivity contributes to determining whether temporary contracts represent a way to access permanent contracts or represent a trap. Caggese and Cuñat (2008) provide evidence of the pro-cyclical behavior of the incidence of permanent contracts through the analysis of the firm's labor demand under positive and negative TFP shocks.

[3] This type of labor contract was assumed not to affect productivity directly in other contributions, such as Paolini and de Dios Tena (2012).

[4] Even if they do not use the same structural form, Cappellari et al. (2012) analyze the impact of the reforms aimed at easing the use of temporary contracts in the Italian labor market. They use a panel of Italian firms observed over the period 2004–2007 and find a negative impact of these reforms on labor productivity and TFP. A difference in the labor productivity is assumed also in Addessi et al. (2014) who analyze the interaction between two firm's choices: the type of labor contract and the engagement in R&D and innovation activities.

[5] Precisely, Damiani and Pompei (2010) refer to multi-factor productivity while Iona-Lasinio and Vallanti (2011) refer to labor productivity in level and growth terms.

[6] Excluding the presence of a productivity gap or imposing the way it should show up would represent a restriction stricter than ours and not well grounded from a theoretical and empirical perspective.

[7] We thank an anonymous referee who mentioned this point.