

Buccella, Domenico; Meccheri, Nicola

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# Management centrality in sequential bargaining: Implications for strategic delegation, welfare, and stakeholder conflict

Domenico Buccella<sup>†</sup> and Nicola Meccheri<sup>‡</sup>

## *Abstract:*

This paper investigates the issue of strategic delegation by considering the role of management centrality in contracting with different stakeholders. Specifically, a sequential negotiation unionized duopoly model is analysed, in which the management relative bargaining power *vis-à-vis* shareholders and *vis-à-vis* unions can differ. In such a framework, differences in the relative bargaining power among involved stakeholders play a key role in determining the endogenous choice by firms' owners to delegate strategic decisions to the management, or, in other words, the choice of being an entrepreneurial or a managerial firm. Moreover, the distribution of stakeholders' relative bargaining power affects firms' profitability and overall welfare, also leading to novel results with regard to the received literature. In particular, to minimize potential conflict of interests between firms' owners and the overall society, regulation directed to soften the managers' bargaining strength *vis-à-vis* shareholders must be designed and implemented.

**JEL codes:** D21, L13, L14

**Keywords:** management centrality; strategic delegation; unions; bargaining power; social welfare; stakeholder conflict.

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<sup>†</sup> Department of Economics, Kozminski University, Poland. E-mail: [buccella@kozminski.edu.pl](mailto:buccella@kozminski.edu.pl)

<sup>‡</sup> Department of Economics and Management, University of Pisa, Italy and GLO (Fellow). E-mail: [nicola.meccheri@unipi.it](mailto:nicola.meccheri@unipi.it)

## 1 Introduction

The centrality of management in corporations has been well established and distinguishes its role from those of all other constituencies (e.g., Berle and Means, 1932). As highlighted first by Williamson (1985), the management centrality relates to the fact that “[it] is centrally implicated in all contracts” and “the management is regarded as the locus of power” (Williamson, 1985, p. 318).

The strategic and central role played by management in modern corporations has been recognized from a somewhat different perspective within the strategic delegation literature (Vickers, 1985; Fershtman and Judd, 1987; Sklivas, 1987).<sup>1</sup> By assuming firms’ owners can propose take-or-leave managerial contracts, the seminal contributions of this strand of the Industrial Organization (IO) theory points out how, under strategic interdependence, the delegation of decisions to managers can act as a commitment device, which affects their competitive interaction with rivals. This can help explain the choice by firms’ owners to delegate strategic decisions to managers, whose objectives are not consistent with profit maximization. Indeed, in an oligopoly market in which firms compete in quantities, a well-known Prisoner’s Dilemma equilibrium result arises: firms’ owners are better off if both can renounce to delegate strategic decisions to managers, but if only one does renounce, he/she is worse off.

More recently, the strategic delegation literature has extended the seminal works in various directions also contemplating the possibility that managers hold some bargaining power, hence the delegation decision and the form of managerial delegation contracts are the result of a bilateral negotiation process between managers and firms’ owners or owner-shareholders’ representatives in the board (e.g., van Witteloostuijn et al., 2007; Nakamura, 2008, 2011; Wang et al., 2008; Fanti et al., 2016). To date, however, the literature has ignored the fact that, as pointed out by Williamson (1985), managers are implicated in contract negotiation with different stakeholders and that this occurrence can affect the delegation decision by firms’ owners in the first place.

Important corporate stakeholders, together with firm owners, are represented by labour unions, with which the management of a corporation is typically involved in bargaining over labour contracts of rank-and-file workers. Indeed, the unionization of labour markets is an important feature that widely characterizes modern economies (e.g., Calmfors and Driffill, 1988;

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<sup>1</sup> For recent comprehensive surveys of this literature, see Sengul et al. (2012), Lambertini (2017) and Kopel and Pezzino (2018).

Freeman, 1988; Flanagan, 1999; Layard and Nickell, 1999). In addition, as pointed out by Booth (1995, p. 95), “[i]t appears to be an empirical regularity that imperfections in the labor market are correlated with imperfections in the product market.” This suggests that, in oligopoly markets, where the delegation of strategic decisions to managers plays a key role, consideration of the presence and the effect of unionization also becomes important.

Whilst unionized oligopolies, representing an important strand of IO (e.g., Davidson, 1988; Horn and Wolinsky, 1988; Dowrick, 1989; Naylor, 1999; Correa-López and Naylor, 2004), recognize the prominent role played by unions in oligopolies, the interaction between the choice of managerial delegation and the presence of unionization in imperfectly competitive markets has been considered only more recently, and the research on this topic is still relatively scarce. Specifically, the literature has not yet considered the implications of strategic delegation in oligopoly markets arising from management centrality in bargaining with, on the one hand, the ownership of the corporation and, on the other, labour unions.

In a duopoly framework, this paper analyses the choice of firms’ ownership to delegate strategic decision-making to managers by considering that they might be implicated in various relationships inside firms and could be involved in sequential bargaining with different stakeholders. Specifically, we consider a situation in which, after managerial contracts have been negotiated between owners and managers, the latter also bargain *vis-à-vis* labour unions over employment contracts of rank-and-file employees. Under this perspective, this work aims to build a bridge between two different strands of the literature: on the one hand, the new institutional literature, which emphasizes the management centrality in corporations due to its implication in various contract negotiation processes, and, on the other hand, the strategic delegation literature, which explains the delegation choice by firms’ owners as an equilibrium decision outcome.<sup>2</sup>

A key feature of our model is that managers’ (relative) bargaining power *vis-à-vis* owners can differ with respect to the one they have *vis-à-vis* unions. Indeed, as highlighted by the institutional and organizational literature (e.g., Porter, 1980; Pfeffer, 1981; Milgrom and Roberts, 1992), various factors affect the relative bargaining power of a stakeholder unit against the other stakeholder types, such as the capability of unified action, access to information, and the replacement cost to the firm if a stakeholder exits (Coff, 1992). For instance, the union bargaining

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<sup>2</sup> van Witteloostuijn (1998) refers to a strategic delegation model in building a bridge between behavioural and economic theories to explain differences in organizational decline (or exit rates) across firms. Instead, Vroom (2006) analyses how the interaction between managerial delegation schemes and organizational structure affects the competitive behaviour by firms in imperfectly competitive product markets. Whilst those works consider managerial delegation as exogenously given, a major goal of this paper is to analyse under which conditions it emerges endogenously.

power stems from its ability to get workers to act in concert, whilst the capability of unified action is generally low for a corporation's shareholders unless ownership is strongly concentrated. Relative to the management, it can typically derive power from accessing strategic information and high replacement cost (e.g., Rajan and Zingales, 1998), whilst (unlike other employees) it draws on an existing hierarchy of leadership from top management to lower levels that allows it to act in concert without the need for a union. In fact, depending on whether other internal stakeholders form a bargaining coalition, management can generally assume a better position over all other stakeholders to appropriate the rent. However, ownership concentration and board representation can contribute to increase the shareholders' bargaining power *vis-à-vis* both managers and unions by increasing management accountability and making monitoring more effective (e.g., Shleifer and Vishny, 1997). Furthermore, high stakes also amplify the exit cost of a shareholder, which represents another important aspect affecting its bargaining power against other stakeholders.

In addition to the conceptual work from institutional and organizational theories, anecdotal evidence also seems to support the idea underlying this work that each stakeholder type's bargaining power can differ from the other stakeholder's (bargaining) unit. As a general example, consider the story of Sergio Marchionne (1952-2018), who was appointed CEO of Fiat SPA in 2004, and then CEO of FCA NV in 2014. In the early years as CEO of FIAT, Marchionne showed extensive openness towards labour unions. According to Giorgio Airaud, long-time car manager of FIOM (the largest Italian metalworking union's, member of the main Italian union confederation, CGIL), between 2004 and 2008, Marchionne was "the man who went inside the factories to talk to the workers, who supported the need for new models, who did not blame the crisis on workers, who attacked financial speculation" (Il Manifesto, 2018). However, after the merger with Chrysler Automotive, Marchionne proposed that the Italian plants adopt the World Class Manufacturing production process scheme. In this light, it can be read the choice to leave Confindustria and start to negotiate directly with unions, however cutting out FIOM, which refused to accept the new contract and began a long and hard battle with the company. The clash led to a historic change not only in the history of FIAT's industrial relations (the ownership always looked at preserving good relations with FIOM), but also in the Italian industrial relations.<sup>3</sup>

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<sup>3</sup> The culminating moment of the clash came in June 2010, when the workers of the Pomigliano plant spoke in a referendum on the introduction of the new contract. The threat, if he won the no vote for the new contract, was clear: the plant would be closed. The yes won with 63%, a result lower than the management's expectations. In the referendum that took place shortly after at the Mirafiori plant, the result was even more in the balance: among the workers, the yes won by only 9 votes. In the following years, the new contract was introduced at all of the company's plants.

At the same time, while prudent with the majority shareholder (the Agnelli's family) in the early stages, Marchionne began to behave as an authentic dominus within FIAT, drawing upon his personality and charisma. For example, when Marchionne initiated the transfer of Ferrari (that belongs to the FIAT group) to the Netherlands (registered office), London (tax office), and New York (with the listing on the New York Stock Exchange), he decided to reunite the Board of Directors only 15 days after the decision was taken. This was an unusual move because, in general, the Board of Directors should meet before taking certain decisions. This episode reveals that the CEO was carrying out what the (overall) ownership of the company wanted, in line with his own viewpoint (Clubalfa.it, 2019).

Accordingly, this work aims to investigate the following issues: how do differences in relative bargaining power among (each pair of) stakeholders affect the choice by firms' owners to delegate a strategic decision to a manager in an imperfectly competitive environment? More specifically, do owners always prefer to delegate strategic decision to managers when firms are unionized and managers' bargaining power *vis-à-vis* unions is stronger than their own against unions? How does the relative bargaining power of owners against managers affect this choice? Moreover, we also analyse how the endogenous strategic delegation choice in such a framework affects firms' profitability, consumer surplus, and overall welfare and, depending on the situation, helps exacerbate or resolve the conflict of interest among the corporation's stakeholders.

Our main results can be summarized as follows. First, bargaining power's differences across each pair of bargaining units play a crucial role in affecting optimal delegation contracts, as well as the comparison of welfare outcomes under alternative delegation regimes, or firm types (i.e., entrepreneurial firms *vs.* managerial firms). Specifically, when managers' relative bargaining power *vis-à-vis* owners is high, firms' profits are always higher in entrepreneurial firms. However, when managers' relative bargaining power *vis-à-vis* owners is sufficiently low, firms' profits can be higher in managerial firms, provided that unions are sufficiently powerful in bargaining against owners, which reverses the standard strategic delegation result for which, under quantity competition, profits are higher in entrepreneurial firms.

Also relative to consumer surplus and overall welfare, the results are further elaborated with respect to those of the received literature, which points out that consumer surplus and overall welfare are always higher under managerial delegation. Indeed, the standard result is confirmed when managers' relative bargaining power *vis-à-vis* owners is high, unless owners are more powerful than unions in wage bargaining and managers' wage bargaining power is low. By contrast, when managers' relative bargaining power *vis-à-vis* owners is low, consumer surplus and overall welfare are higher (resp. lower) with entrepreneurial firms than managerial firms if managers' relative bargaining power *vis-à-vis* unions is sufficiently low (high).

Secondly, relative to the endogenous (equilibrium) choice by owners to delegate (or not) the strategic decision to managers and its Pareto property, we show that the distribution of the relative bargaining power inside each bargaining pair plays again a crucial role. Specifically, when managers have full bargaining power *vis-à-vis* firms' owners, the latter always chooses not to delegate strategic decisions; i.e., independent of how the bargaining power is distributed inside the other (manager-union and owner-union) bargaining pairs. This is also the Pareto-efficient outcome, that is, the solution for which both owners are better off. Instead, when the bargaining power is balanced between owners and managers or, even more significantly, owners are more powerful than their managers, the situation is much more pronounced. Furthermore, delegating and non-delegating can arise as equilibria, depending on how the bargaining power is distributed between parties within any bargaining pair. Furthermore, when owners are powerful with respect to managers but weak against unions, the delegation choice arises in equilibrium and proves to be Pareto-efficient from the firm owners' viewpoint, hence modifying the standard Prisoner's Dilemma result of the strategic delegation literature.

Those results also have relevant implications for determining a conflict of and common interest among involved stakeholders. In particular, it is more likely that the choice of shareholders/owners about the firm structure, specifically an entrepreneurial or a managerial firm, coincides with the desired outcome for the society as a whole when managers' bargaining power against shareholders is relatively low. Instead, an increase in the managers' bargaining power increases the possibility that the choice of the firm structure taken by shareholders contrasts with other stakeholders' goals. This is particularly true when managers have full bargaining power against owners, which leads the latter to keep their firms non-managerial, or entrepreneurial, whilst managerial delegation would increase the overall welfare.

This work refers to various strands of the received literature. First, it relates to the literature on whether firms choose to be managerial or entrepreneurial in a duopoly setting. This literature has pointed out that, when hiring a manager is not costly, a symmetric equilibrium with both managerial firms arises (e.g., Basu, 1995; Lambertini, 2000; Kräkel, 2004; Matsumura and Matsushima, 2012; Delbono et al., 2016; Choi et al. 2020), whilst asymmetric equilibria with only one firm choosing to delegate turns out to be rather uncommon (e.g., Basu, 1995; White, 2001; Mukherjee, 2001; Fanti and Scrimatore, 2017; Arai and Matsushima, 2021). By investigating the role of sequential bargaining involving management and different stakeholders, this work provides a further contribution and novel results to that strand of the literature.

Cross fertilization between the literature on managerial delegation and unionized oligopolies has become a fruitful agenda item, and this work also contributes in this regard. Specifically, Szymanski (1994) and Bughin (1995) first combine managerial delegation and unionized oligopolies to investigate how their interaction affects firms' decisions and product

market outcomes. More recently, Liao (2010, 2014), Fanti and Meccheri (2013, 2015), Meccheri and Fanti (2014, 2018), and Chatterjee and Saha (2017) study managerial-unionized oligopoly games to explore various issues such as strategic delegation in wage bargaining and optimal managerial delegation contracts under alternative competition and unionization regimes (for a more comprehensive survey, see Meccheri, 2022). To the best of our knowledge, the literature has yet to analyse the effects of managerial sequential bargaining with different stakeholders on the strategic delegation choice, despite the focus on the role of managerial centrality in various contracts and discretion on firm behaviour, dating back to Williamson (1985).<sup>4</sup>

The remainder of the paper is organized as follows. In Section 2, the basic framework is presented and the (exogenous) cases, in which strategic (output) decisions are delegated or not by firms' owners to managers, are analysed and then compared in terms of their equilibrium (welfare) outcomes. In Section 3, the endogenous choice by firms' owners to delegate the output decision to a manager is investigated by pointing out the crucial role played by the relative bargaining power inside each pair of the different stakeholders (i.e., shareholders, managers, and unions). In Section 4, the welfare implications of the endogenous (equilibrium) choice by firms' owners to opt for entrepreneurial or managerial firms is analysed, focusing particularly on whether, relative to this choice, a conflict of or common interest arises between shareholders and the society as a whole. Finally, Section 5 concludes, whilst further technical details are presented in the final Appendix.

## **2 Model**

### **2.1 Basic framework**

Consider a duopoly market in which two firms, 1 and 2, compete for homogeneous goods with labour being the unique factor of production. As usual, the standard (normalised) linear inverse market demand is as follows:

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<sup>4</sup> Liao (2014) also deals with the issue of delegation to the management of multiple tasks. However, the issue we consider in this work is different from that studied in Liao (2014). Specifically, whilst we analyse the role of sequential bargaining involving management (as well as of the different management bargaining power *vis-à-vis* different counterparties) on the strategic delegation choice by owners in the first place, Liao (2014) considers strategic delegation as given and studies whether a firm's owner prefers (or not) also to delegate wage bargaining together with output determination.



$$p = 1 - Q \quad (1)$$

where  $p$  denotes price and  $Q = q_i + q_j$  the firms' total output, with  $i, j = 1, 2$  and  $i \neq j$ .

A constant returns-to-scale technology characterizes the industry, so that one unit of labour,  $l$ , is required for one unit of output,  $q$ . The  $i$ -th firm faces a marginal (and average cost) for each unit of output produced,  $0 \leq w_i < 1$ , which is the wage per unit of labour. Therefore, the firm  $i$ 's cost function is linear and described by:

$$C_i = w_i l_i = w_i q_i \quad (2)$$

and, as a consequence, its profits are:

$$\pi_i = (1 - q_i - q_j - w_i)q_i. \quad (3)$$

The labour market in this industry is fully unionized; however the bargaining structure over the wage level is decentralized at the firm level. The rationale for this choice is that, in OECD countries, a decentralization trend in wage negotiations has widely been observed (see e.g., Buccella, 2018). The industry's bargaining institution in place is the Right-to-Manage arrangement (e.g., Nickell and Andrews, 1983), in which wages are the outcome of negotiations between firms and unions; however, once wages are fixed, firms retain the right to choose employment. Unions maximize the following objective function:

$$V_i = (w_i - \bar{w})l_i \quad (4)$$

where  $\bar{w}$  represents the reservation or, alternatively, the competitive wage. In this paper, we assume that firm-specific unions are identical. For simplicity, and without loss of generality, we set  $\bar{w} = 0$ . Hence, by recalling that  $l_i = q_i$ , we get  $V_i = w_i q_i$ .<sup>5</sup>

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<sup>5</sup> The unions' utility specification in (4) is a special case of the Stone-Geary utility function commonly adopted in the trade unions' economics literature (e.g., Pencavel, 1984, 1985; Dowrick and Spencer, 1994) which takes the form  $V = (w - \bar{w})^\theta (l - \bar{l})^{1-\theta}$ . A value of  $\theta = \frac{1}{2}$  and  $\bar{l} = 0$  gives the rent-maximising case, i.e., the union seeks to maximise the total rent. If, additionally,  $\bar{w} = 0$ , the union aims to maximise the total wage bill (e.g., Booth, 1995; Naylor, 2003). Also notice that, while we specifically refer to labour unions for the reasons pointed out in the Introduction section, the structural form adopted for representing the union's objective functions can effectively capture that of other potential firms' stakeholders, such as (firm-specific) suppliers of an input other than labour.

Each firm's owner must decide whether to hire and delegate decisions to a manager. In the case of managerial delegation, it is assumed that the owners delegate to the managers both the wage negotiation and the output/sales decision. The compensation scheme that each manager receives consists of two parts: 1) a fixed salary and 2) a bonus related to a weighted combination of firm's profits and sales. Therefore, manager  $i$ 's remuneration is expressed as  $R_i = A_i + B_i U_i \geq 0$ , where  $A_i \geq 0$  represents the fixed salary part in the managerial contract,  $B_i \geq 0$  is a constant, and  $U_i$  is the utility of manager  $i$ . Without loss of generality, the fixed salary component of the managerial compensation,  $A_i$ , is chosen by the firm's owners such that the manager exactly gets his/her opportunity cost, which is normalized to zero, while the "scale" parameter  $B_i$  is normalised to one. Then, the utility of manager  $i$  takes the following form (Vickers, 1985; Jansen et al. 2007, 2009):

$$U_i = \pi_i + z_i q_i \quad (5)$$

where  $z_i$  is the incentive parameter negotiated between the manager and the owners of the firm. The incentive parameter can be either positive or negative, depending on whether owners incentivise or penalise, respectively, the manager to expand sales (output); i.e., if  $z_i > 0$  (resp.  $z_i < 0$ ) the manager is more (less) aggressive in the product market.

The sequence and the structure of the bargaining process play a key role in this paper. Specifically, we model wage bargaining according to the generalized Nash product. However, depending on whether the wage negotiations with the union are conducted by a manager hired by the ownership of the company or by the owners themselves, the product changes, as does the parties' relative bargaining strength. Indeed, as highlighted in the Introduction, different factors, as well as managers' ability, experience, and patience in negotiations, can affect its relative bargaining power *vis-à-vis* unions, possibly making it different, even markedly so, from that of the firms' owners. Hence, we must distinguish the generalized Nash product as follows, depending on which party conducts the wage negotiation *vis-à-vis* unions:

$$\max_{w_i} N = \pi_i^\gamma V_i^{1-\gamma} \quad (6)$$

$$\max_{w_i} N' = U_i^\beta V_i^{1-\beta}. \quad (7)$$

Specifically, Eq. (6) refers to the (no-delegation) case, in which the owner bargains wages and the parameter  $\gamma \in (0,1)$  measures his/her relative strength *vis-à-vis* union, which is assumed to be identical across bargaining units. Instead, Eq. (7) applies to the (delegation) case in which

wage bargaining is delegated to the manager, whose relative strength *vis-à-vis* the union is captured by the parameter  $\beta \in (0,1)$  (assumed identical across bargaining units).

Moreover, in case managers are hired, also the bonus incentive parameter is subject to negotiation between managers and owners (or the owners-shareholders' representatives in the board), according to the following generalized Nash product:

$$\max_{z_i} \tilde{N} = U_i^\alpha \pi_i^{1-\alpha} \quad (8)$$

where the parameter  $\alpha \in (0,1)$  weighs the managers' relative strength, assumed identical across managerial firms.

The model is structured as a multi-stage game, whose timing is as follows. At stage 0 (pre-play stage), firms' owners decide on strategic (managerial) delegation. If owners decide to delegate strategic decisions to the managers at stage 1, they bargain with managers over the incentive parameter to be included in the managerial contract. At stage 2, negotiations with the unions over wages for rank-and-file employees take place. In case of no delegation, the owner conducts the wage bargaining with the union, otherwise, in the case of delegation, the manager negotiates with the union. Finally, at stage 3, firms compete in the product market *à la* Cournot and choose their quantities to maximise profits or managers' utilities, according to whether they are entrepreneurial or managerial firms, respectively. The equilibrium concept considered is the sub-game perfect Nash equilibrium (SPNE), obtained by solving the model using backward induction.

## 2.2 No delegation

Let us consider first the case of entrepreneurial or non-managerial firms, in which owners do not hire a manager, hence they do not delegate wage bargaining and output decision.<sup>6</sup> The analysis is carried out as usual through the maximization of (3) with respect to the quantity and solving the system of the two reaction functions. Hence, the market game equilibrium must satisfy  $\frac{\partial \pi_i}{\partial q_i} = 0$ . Solving the maximization problem, we obtain the system of the firms' reaction functions:

$$q_i(q_j) = \frac{1-w_i-q_j}{2} \quad (9)$$

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<sup>6</sup> This case corresponds to a standard unionized oligopoly model with decentralized wage setting (e.g., Correa-López, 2007).

from which the (subgame) equilibrium output is given by:

$$q_i(w_i, w_j) = \frac{1-2w_i+w_j}{3}. \quad (10)$$

Substituting the equilibrium quantities into the profit function, maximization with respect to  $w_i$  of the generalized Nash product (6) yields the following firm-union wage reaction function:

$$w_i(w_j) = \frac{(1-\gamma)(1+w_j)}{4} \quad (11)$$

with the standard comparative statics:  $\frac{\partial w_i}{\partial w_j} > 0$ , i.e., wages are strategic complements, and  $\frac{\partial w_i}{\partial \gamma} < 0$ , i.e., the higher the firm's bargaining power, the lower the negotiated wage.

Solving the system of the wage reaction functions, we get the following SPNE wages:

$$w^{ND} = \frac{1-\gamma}{3+\gamma} \quad (12)$$

where the superscript *ND* refers to the "no delegation" case. Then, after the usual substitutions, we also get the corresponding SPNE output and profits:

$$q^{ND} = \frac{2(1+\gamma)}{3(3+\gamma)} \quad (13)$$

$$\pi^{ND} = \frac{4(1+\gamma)^2}{9(3+\gamma)^2}. \quad (14)$$

### 2.3 Delegation

Let us now consider the case of managerial firms, in which owners delegate to executives both wage negotiations and output choices. At the final stage, the manager chooses output to maximize his/her utility  $U_i$  (Eq. (5)). Therefore, the equilibrium of the final stage of the game (the market game) must satisfy  $\frac{\partial U_i}{\partial q_i} = 0$ . Solving the maximization problem, we get the system of the two managers' reaction functions:

$$q_i(q_j) = \frac{1-w_i+z_i-q_j}{2} \quad (14)$$

from which we can obtain the subgame equilibrium output as:

$$q_i(w_i, w_j, z_i, z_j) = \frac{1-2(w_i-z_i)+w_j-z_j}{3}. \quad (15)$$

At stage 2, the managers and the unions negotiate the wage level according to the Nash product (7). Maximizing with respect to  $w_i$  leads to the following manager-union wage reaction function:

$$w_i(w_j, z_i, z_j) = \frac{(1-\beta)(1+w_j+2z_i-z_j)}{4} \quad (16)$$

with  $\frac{\partial w_i}{\partial w_j} > 0$ , i.e., wages are strategic complements, and  $\frac{\partial w_i}{\partial \beta} < 0$ , i.e., the higher the manager's bargaining power *vis-à-vis* union, the lower the negotiated wage.

Solving the system of the wage reaction functions, one obtains:

$$w_i(z_i, z_j) = \frac{(1-\beta)[5-\beta+(7+\beta)z_i-2(1+\beta)z_j]}{15-\beta^2+2\beta}. \quad (17)$$

As highlighted by the previous literature on managerial delegation in the presence of a unionized labour market (e.g., Fanti and Meccheri, 2013), we have that  $\frac{\partial w_i}{\partial z_i} > 0$  and  $\frac{\partial w_i}{\partial z_j} < 0$ . Indeed, by providing the manager with incentives on sales, an owner drives the manager to expand output and therefore also the labour demand, inducing the union to claim higher wages (especially when the latter's relative bargaining power *vis-à-vis* manager is high). Instead, since firms' quantities are strategic substitutes, when the rival owner drives his/her manager to expand output by increasing  $z_j$ , the output (and employment) of firm  $i$  decreases, thus reducing union  $i$ 's wage claim.

In the first stage, owners and managers negotiate the bonus incentive to include in the managerial compensation scheme. By substituting wages in (17) backwards and considering the subgame equilibrium profits and manager's utility, maximization of the Nash product (8) with respect to  $z_i$  leads to the following SPNE incentive bonus parameter:

$$z^D = \frac{(7-3\alpha)\beta^2+(26+6\alpha)\beta+45\alpha-17}{(6\alpha-4)\beta^2+(24\alpha+4)\beta+18\alpha+80}. \quad (21)$$

According to Eq. (21), the incentive parameter in managerial contracts depends on the manager's relative bargaining power both *vis-à-vis* union ( $\beta$ ) and *vis-à-vis* owner ( $\alpha$ ); in particular, we have that  $\frac{\partial z^D}{\partial \alpha} > 0$ , for any  $\beta \in (0,1)$ , and  $\frac{\partial z^D}{\partial \beta} > 0$ , for any  $\alpha \in (0,1)$ . Specifically, Figure 1 shows that the equilibrium incentive parameter is positive (i.e., owners provide managers with

incentives on sales) unless the managers are weak in bargaining against both counterparties.<sup>7</sup> This is because, with strong unions (low  $\beta$ ), the owners have strong reasons to penalize sales in order to reduce the union's wage claims. However, to get such a result, they also need to be sufficiently strong (low  $\alpha$ ) in negotiating managerial contracts with their managers.<sup>8</sup>

As usual, by substituting (21) backwards, one gets the SPNE wages, output, and profits for this “delegation” case:

$$w^D = \frac{3(1-\beta)(7+\beta)(1+\alpha)}{(6\alpha-4)\beta^2+(24\alpha+4)\beta+18\alpha+80} \quad (22)$$

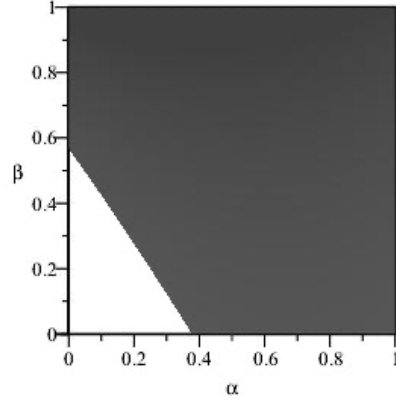
$$q^D = \frac{(7+\beta)(1+\beta)(1+\alpha)}{(3\alpha-2)\beta^2+(12\alpha+2)\beta+9\alpha+40} \quad (23)$$

$$\pi^D = \frac{(7+\beta)(1+\beta)(5\beta^2+10\beta-31)(\alpha^2-1)}{2[(3\alpha-2)\beta^2+(12\alpha+2)\beta+9\alpha+40]^2} \quad (24)$$

---

<sup>7</sup> Interestingly, Figure 1 includes those from the received literature as special cases. Specifically, the top left vertex (with  $\alpha = 0$  and  $\beta = 1$ ) refers to the standard strategic delegation model (Vickers, 1985; Fershtman and Judd, 1987; Sklivas, 1987), whilst the top horizontal axes, where  $\beta = 1$  and  $\alpha$  ranges from 0 to 1, extends to bargaining over managerial contracts (van Witteloostuijn et al., 2007). Instead, the bottom left vertex (with  $\alpha = 0$  and  $\beta = 0$ ) refers to a model with managerial delegation and monopoly union, such as that studied by Fanti and Meccheri (2013), whilst the left vertical axes, where  $\alpha = 0$  and  $\beta$  ranges from 0 to 1, refers to the case with manager-union bargaining over wages (Szymanski, 1994). As shown below, the case with  $\alpha = 1$  and  $\beta = 0$ , which instead has not yet been considered in detail by the literature, will prove to be of particular interest relative to welfare outcomes.

<sup>8</sup> Indeed, the final Appendix A.1 shows that managers always prefer higher incentive weights, since their utility function  $U_i$  is always increasing in  $z_i$ . This result is in line with that obtained by van Witteloostuijn et al. (2007) in a managerial delegation game without unions, even if, in the presence of unionization, the positive effect of incentive weights on managers' utility is softened by the wage raise driven by increasing weights.



Gray:  $\tau > 0$  (incentive); White:  $\tau < 0$  (disincentive)

**Figure 1. Equilibrium bonus incentive weights according to  $\alpha$  and  $\beta$**

#### 2.4 No delegation vs. delegation: exogenous comparison

In this section, we provide a first (exogenous) comparison of the results obtained in the previous subsections regarding firms' profits, consumer surplus, unions' utility, and overall welfare. In particular, consumer surplus and overall welfare are here defined, respectively, as:

$$CS = \frac{q_1^2 + q_2^2 + 2q_1q_2}{2}; \quad SW = CS + \sum_{i=1}^2 \pi_i + \sum_{i=1}^2 V_i.$$

The following lemma summarizes the main outcomes obtained by comparing the results of section 2.2 against those of section 2.3.

**Lemma 1.** Comparing the results obtained under exogenous firm structure (no-delegation/entrepreneurial firm vs. delegation/managerial firm), we get that:

- a. when managers' relative bargaining power *vis-à-vis* owners is high, firms' profits are always higher under no-delegation than under delegation. However, when managers' relative bargaining power *vis-à-vis* owners is sufficiently low, firms' profits can be higher under delegation, provided that unions are sufficiently powerful in bargaining against owners;

- b. when managers' relative bargaining power *vis-à-vis* owners is high, consumer surplus is higher under delegation than under no-delegation, unless owners are more powerful than unions in wage bargaining whilst managers' wage bargaining power is low. Instead, when managers' relative bargaining power *vis-à-vis* owners is low, consumer surplus is higher (lower) under no-delegation than under delegation, provided that the managers' relative bargaining power *vis-à-vis* unions is sufficiently low (high);
- c. when managers' relative bargaining power *vis-à-vis* owners is high, unions' utility is higher under delegation than under no-delegation, unless managers bargaining power *vis-à-vis* unions is high, whilst the owners bargaining power in wage bargaining is low. Instead, when managers' relative bargaining power against owners is low, unions' utility is higher under no-delegation unless owners' power in wage bargaining is sufficiently high; and
- d. overall welfare comparison displays the same pattern as consumer surplus.

Whilst the final Appendix A.2 provides an extensive graphical representation of Lemma 1, it is important to point out some unconventional results that, according to Lemma 1, may arise. First, managerial delegation can be Pareto-improving; that is, it may be profit-enhancing for all (managerial) firms. This happens when, in contract negotiation, owners are weak against unions and strong against managers. Indeed, in this case, firms' owners might impose on managers a negative bonus weight in managerial contracts, while at the same time exploiting wage bargaining delegation to keep wages as low as possible, which would be very difficult if they conducted the contractual dispute over wages directly.

Secondly, whilst the standard result of strategic delegation literature, with or without bargaining over managerial contracts (e.g., van Witteloostuijn et al., 2007), is that consumer surplus and overall welfare are always larger with managerial firms than entrepreneurial firms, a reversal result might apply in the presence of labour unions. This holds true especially when managers are weak against shareholders, hence a negative incentive weight (which disincentivizes output) is likely to be established. However, even when managers are powerful against shareholders, entrepreneurial firms can lead to higher welfare whether managers are very weak in bargaining against unions and, at the same time, owners are strong in wage bargaining. This is because, when managers conduct the contractual dispute against unions, the positive bonus weight they obtained in managerial contracts will result in a very high wage level, which



dampens output expansion and also those of consumer surplus and overall welfare.<sup>9</sup> In such a case, when owners are strong in bargaining against unions, conducting directly, i.e., without delegating to managers, the contractual dispute over wages will lead to much lower wages and consequently also higher output, consumer surplus, and social welfare.

### 3 Managerial bargaining power and endogenous firm structure

In this section, our focus is on the endogenous choice by firms' owners whether to delegate strategic and bargaining decisions to managers. To derive the endogenous equilibria of the game, one needs to analyse the asymmetric case, in which the owner of one firm delegates output decision and bargaining with the union whilst the rival firm does not.

#### 3.1 Asymmetric case (only one firm delegates)

Without loss of generality, let us assume that firm  $i$  is the managerial firm while firm  $j$  is the non-managerial one. In such a strategic profile, at stage 3, the managerial firm's market game equilibrium must satisfy  $\frac{\partial U_i}{\partial q_i} = 0$ , which leads to the reaction function in (14); instead, the non-managerial firm must satisfy  $\frac{\partial \pi_j}{\partial q_j} = 0$ , which leads to the reaction function in (9). Solving the system of the two reaction functions, we get the following subgame equilibrium output:

$$q_i(w_i, w_j, z_i) = \frac{1-2w_i+w_j+2z_i}{3} \quad (25)$$

$$q_j(w_i, w_j, z_i) = \frac{1-2w_j+w_i-z_i}{3}. \quad (26)$$

At stage 2, the manager and the union in firm  $i$  negotiate the wage level, whose bargaining solution is obtained from the Nash product in (7), whilst the owner and the union in firm  $j$  bargain their wage according to the Nash production (6). Making use of (25) and (26), one gets the following wage reaction functions:

---

<sup>9</sup> Obviously, all of those effects operating via the wage bargaining process, which play a key role in determining unconventional results, are not considered by the received strategic delegation literature, where wages (marginal production costs) are exogenously given.

$$w_i(w_j, z_i) = \frac{(1-\beta)(1+w_j+z_i)}{4} \quad (27)$$

$$w_j(w_i, z_i) = \frac{(1-\gamma)(1+w_i-z_i)}{4} \quad (28)$$

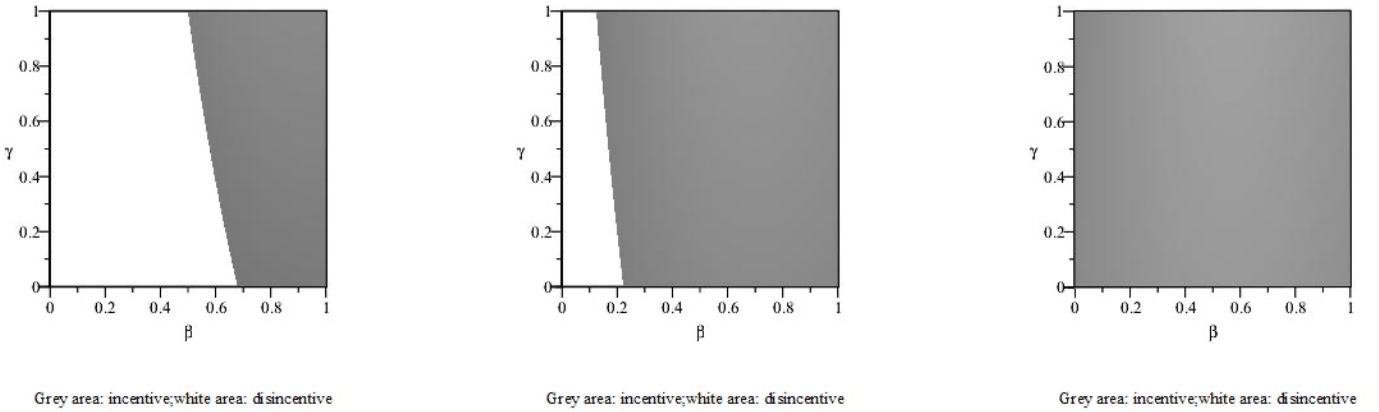
for the managerial and entrepreneurial firm, respectively. Solving the system of the wage reaction functions, we get:

$$w_i(z_i) = \frac{(1-\beta)[5-\gamma+(7+\gamma)z_i]}{15+\beta+\gamma-\beta\gamma} \quad (29)$$

$$w_j(z_i) = \frac{(1-\gamma)[5-\beta-2(1+\beta)z_i]}{15+\beta+\gamma-\beta\gamma}. \quad (30)$$

Taking (29) and (30) into account, at the first stage, the owner and the manager of firm  $i$  negotiate the incentive bonus parameter of the managerial compensation scheme, according to Eq. (8), which yields the following SPNE bonus for the firm  $i$ :

$$z^{D/ND} = \frac{\{[(7-3\alpha)\beta+3\alpha+1]\gamma+(25+3\alpha)\beta+45\alpha-17\}(5-\gamma)}{2(7+\gamma)(31-11\beta+\gamma-5\beta\gamma)}. \quad (31)$$



**Figure 2. Equilibrium bonus weight's sign according to  $\beta$  and  $\gamma$  for different values of  $\alpha$  (left box:  $\alpha = 0$ ; central box,  $\alpha = .25$ ; right box,  $\alpha = .5$ )**

For the given values of the manager's bargaining strength against the owner, Figure 2 shows that the incentive parameter is positive (i.e., owners provide managers with incentives on sales) unless owners are contractually weak against unions. The rationale for this result is as previously described: the presence of strong unions (low  $\beta$ ) leads owners to disincentive

production to reduce the union's wage claim. However, as the manager's bargaining power increases (higher values of  $\alpha$ ), his/her ability to negotiate a higher sales bonus in the managerial contract raises.

After the usual substitutions, one gets the SPNE wages, outputs, and profits of firm  $i$  (labelled with the superscript  $D/ND$ ) and of firm  $j$  (labelled with the superscript  $ND/D$ ):

$$w^{D/ND} = \frac{3(1+\alpha)(1-\beta)(5-\gamma)}{2(31-11\beta+\gamma-5\beta\gamma)}; \quad w^{ND/D} = \frac{3\{[(\alpha-4)\beta+\alpha+2]\gamma-(16+5\alpha)\beta-5\alpha+26\}(1-\gamma)}{2(7+\gamma)(31-11\beta+\gamma-5\beta\gamma)}$$

$$q^{D/ND} = \frac{(1+\alpha)(1+\beta)(5-\gamma)}{31-11\beta+\gamma-5\beta\gamma}; \quad q^{ND/D} = \frac{2\{[(\alpha-4)\beta+\alpha+2]\gamma-(16+5\alpha)\beta-5\alpha+26\}(1+\gamma)}{(7+\gamma)(31-11\beta+\gamma-5\beta\gamma)}$$

$$\pi^{D/ND} = \frac{(1+\alpha)(1-\alpha)(1+\beta)(5-\gamma)^2}{2(7+\gamma)(31-11\beta+\gamma-5\beta\gamma)}; \quad \pi^{ND/D} = \frac{4\{[(\alpha-4)\beta+\alpha+2]\gamma-(16+5\alpha)\beta-5\alpha+26\}^2(1+\gamma)^2}{(7+\gamma)^2(31-11\beta+\gamma-5\beta\gamma)^2}$$

from which, union utility, consumer surplus, and social welfare can also be derived for this (asymmetric) case.

### 3.2 Pre-play game analysis

Now we are in a position to derive the game equilibria at the pre-play stage (stage 0) regarding the firm structure (entrepreneurial firm vs. managerial firm). Specifically, given the solutions of the above sub-games, we can now turn to the decision made by an owner to delegate or not the output choice to a manager. This decision is taken by firms' owners simultaneously and independently, and the payoff matrix at the pre-play stage is as described in Table 1.

owner 1 \ owner 2	<i>Delegation</i>	<i>No delegation</i>
<i>Delegation</i>	$\pi^D, \pi^D$	$\pi^{D/ND}, \pi^{ND/D}$
<i>No delegation</i>	$\pi^{ND/D}, \pi^{D/ND}$	$\pi^{ND}, \pi^{ND}$

**Table 1. Endogenous firm structure: strategic form**

To solve the strategic form game of Table 1, we compare the equilibrium firm's profits under the two asymmetric cases to investigate whether delegation *endogenously* emerges as SPNE

for both firms and the payoffs in the symmetric case to analyse its Pareto-efficiency properties. Let us define the following profit differentials:<sup>10</sup>

$$\Delta\pi_1 = \pi_1^{D/ND} - \pi^{ND/ND} = \frac{[(9\alpha^2\beta + 9\alpha^2 - 49\beta - 1)\gamma^4 + (356 - 412\beta - 36\alpha^2 - 36\alpha^2\beta)\gamma^3 + (2586 - 1158\beta - 234\alpha^2 - 234\alpha^2\beta)\gamma^2 + (3236 - 2140\beta - 540\alpha^2 - 540\alpha^2\beta)\gamma + 2025\alpha^2\beta + 2025\alpha^2 - 2641\beta - 289]}{18(5\beta\gamma + 11\beta - \gamma - 31)(7 + \gamma)(3 + \gamma)^2} \begin{matrix} > \\ < \end{matrix} 0 \quad (32)$$

$$\Delta\pi_2 = \pi_2^{D/ND} - \pi^{D/D} = \Delta\pi_2(\alpha, \beta, \gamma) \begin{matrix} > \\ < \end{matrix} 0 \quad (33)$$

$$\Delta\pi_3 = \pi^{ND/ND} - \pi^{D/D} = \frac{\left\{ \begin{array}{l} [\alpha^2(333 + 126\gamma - 27\gamma^2) + 96\alpha(1 + \gamma)^2 - 77\gamma^2 - 334\gamma - 437]\beta^4 + \\ [\alpha^2(3474 + 1548\gamma - 126\gamma^2) + 288\alpha(1 + \gamma)^2 - 386\gamma^2 - 2572\gamma - 3986]\beta^3 + \\ [\alpha^2(5220 + 1368\gamma - 828\gamma^2) - 2016\alpha(1 + \gamma)^2 + 492\gamma^2 - 2040\gamma - 5556]\beta^2 + \\ [\alpha^2(-16146 - 13068\gamma - 3330\gamma^2) - 7968\alpha(1 + \gamma)^2 + 322\gamma^2 + 7052\gamma + 13138]\beta + \\ \alpha^2(-18225 - 13014\gamma - 2601\gamma^2) - 5760\alpha(1 + \gamma)^2 - 10847\gamma^2 - 13882\gamma + 4777 \end{array} \right.}{18[(3\alpha\beta^2 + 12\alpha\beta - 2\beta^2 + 9\alpha + 2\beta + 40)^2(3 + \gamma)^2]} \begin{matrix} > \\ < \end{matrix} 0 \quad (34)$$

$\Delta\pi_1$  describes the gain or loss of delegating the wage negotiations and output decision to a manager, given that the owners of the rival do not, with respect to the case in which no one delegates. On the other hand,  $\Delta\pi_2$  defines the gain or loss of managerial delegation (when the rival does not delegate) with respect to the case in which both firms delegate. Finally,  $\Delta\pi_3$  refers to the gain or loss of the overall no-delegation in the industry rather than the overall managerial delegation, which informs about the Pareto-efficiency properties from the owners' viewpoint.

Given that an in-depth discussion and derivation of the game equilibria would be complex because of the interplay of three bargaining parameters, we resort to the analysis of some precise cases to provide the basic intuitions that stem from the model. In particular, the analysis of the game is conducted for specific values of the bargaining power of the managers *vis-à-vis* the owners.

**Case 1: Owners' take-it-or-leave-it managerial contracts,  $\alpha = 0$ .** Let us first consider the case in which managers have no bargaining power *vis-à-vis* owners; that is, the latter offer *take-it-or-leave-it* managerial contracts.<sup>11</sup> Setting  $\alpha = 0$ , the profit differentials in (32), (33), and (34)

<sup>10</sup> The analytical expression of  $\Delta\pi_2$  is extremely long and complex, and therefore it is not reported here for brevity. It is available upon request from the authors.

<sup>11</sup> Basically, this is the case considered by the earliest strategic delegation literature as well as by the previous literature analysing the role of unions in a managerial delegation model (e.g., Liao, 2010). Here,

generate six regions, as shown in Figure 3, whose characteristics determine the game equilibria. The analysis of the sign of  $\Delta\pi_1$ ,  $\Delta\pi_2$ , and  $\Delta\pi_3$  leads to the following result.

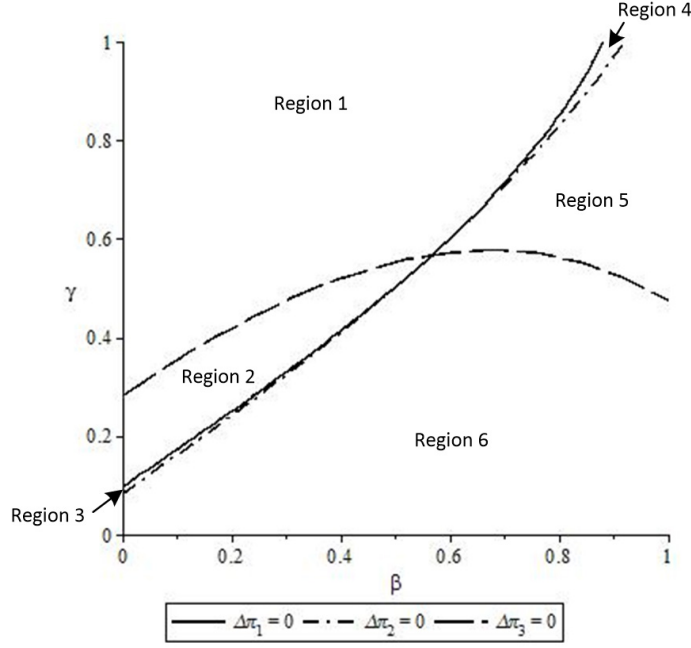
**Result 1.**

- *In regions 1 and 2, not delegating is the dominant strategy for firms, therefore the strategic profile (ND, ND) is the equilibrium of the game. However, from the firms' owners' viewpoint, in region 1, (ND, ND) payoff dominates (D, D), and the equilibrium is Pareto efficient, whilst in region 2, (ND, ND) payoff is dominated by (D, D), hence the equilibrium is Pareto inefficient and a Prisoner's Dilemma result arises. Such a Prisoner's Dilemma, however, is in contrast with that highlighted by the earliest strategic delegation literature, in which delegating is the dominant strategy for firms.*
- *In regions 3 and 4, there exist two pure-strategy symmetric Nash equilibria, that is (ND, ND) and (D, D), and the game becomes a coordination game. In addition, from the firm owners' viewpoint, in region 3 the equilibrium (D, D) payoff-dominates (ND, ND), while in region 4, (ND, ND) payoff-dominates (D, D).*
- *In regions 5 and 6, delegating is the dominant strategy for firms, therefore the strategic profile (D, D) is the equilibrium of the game. However, from the shareholders' viewpoint, in region 5, (D, D) is payoff dominated by (ND, ND), and the equilibrium is Pareto-inefficient so that the standard Prisoner's Dilemma result of strategic delegation literature applies. Instead, in region 6, (D, D) payoff dominates (ND, ND), and the equilibrium is Pareto efficient, hence reversing the standard result from the strategic delegation literature.*

**Proof.** The proof is derived straightforwardly from the following inequalities: Region 1:  $\Delta\pi_1 < 0, \Delta\pi_2 > 0, \Delta\pi_3 < 0$ ; Region 2:  $\Delta\pi_1 < 0, \Delta\pi_2 > 0, \Delta\pi_3 > 0$ ; Region 3:  $\Delta\pi_1 > 0, \Delta\pi_2 > 0, \Delta\pi_3 < 0$ ; Region 4:  $\Delta\pi_1 > 0, \Delta\pi_2 > 0, \Delta\pi_3 < 0$ ; Region 5:  $\Delta\pi_1 > 0, \Delta\pi_2 < 0, \Delta\pi_3 < 0$ ; Region 6:  $\Delta\pi_1 > 0, \Delta\pi_2 < 0, \Delta\pi_3 > 0$ .

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however, the role of the relative bargaining power of unions with respect to owners and managers, respectively, in affecting the delegation choice by the former is considered, which has not been done before.



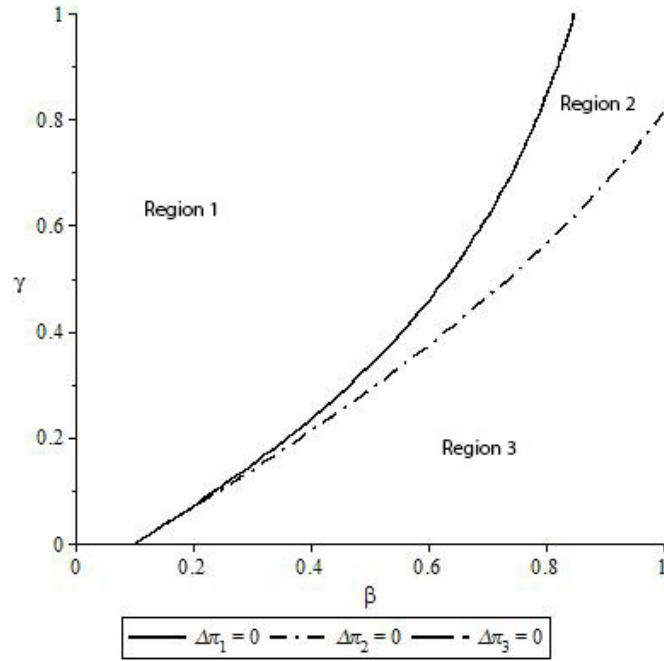
**Figure 3. Game equilibria when  $\alpha = 0$**

**Case 2: Managers and owners with equivalent bargaining power,  $\alpha = .5$ .** When managers and firms' owners have the same bargaining power, the profit differentials  $\Delta\pi_1$ ,  $\Delta\pi_2$ , and  $\Delta\pi_3$  generate three regions, as Figure 4 depicts, whose characteristics lead to the following result.

**Result 2.**

- In region 1, not delegating is the dominant strategy for firms, therefore  $(ND, ND)$  is the equilibrium of the game, and given that payoff-dominates  $(D, D)$ , it is Pareto efficient.
- In region 2, there are two pure-strategy symmetric Nash equilibria, with  $(ND, ND)$  that payoff dominates  $(D, D)$ .
- In region 3, delegating is the dominant strategy for firms, therefore  $(D, D)$  is the equilibrium of the game. However,  $(D, D)$  is payoff dominated by  $(ND, ND)$ , the equilibrium is Pareto-inefficient, and the standard strategic delegation literature Prisoner's Dilemma applies.

**Proof.** The proof is derived straightforwardly from the following inequalities: Region 1:  $\Delta\pi_1 < 0, \Delta\pi_2 > 0, \Delta\pi_3 < 0$ ; Region 2:  $\Delta\pi_1 > 0, \Delta\pi_2 > 0, \Delta\pi_3 < 0$ ; Region 3:  $\Delta\pi_1 > 0, \Delta\pi_2 < 0, \Delta\pi_3 < 0$ .



**Figure 4. Game equilibria when  $\alpha = 5$**

[Note:  $\Delta\pi_3 = 0$  does not appear because it is always negative in the relevant parameter range]

**Case 3: Managers with full bargaining power vis-à-vis owners,  $\alpha = 1$ .** When managers have full bargaining power, the profit differentials  $\Delta\pi_1$ ,  $\Delta\pi_2$ , and  $\Delta\pi_3$  directly lead to the following result.

**Result 3.** *Not delegating is the dominant strategy, and (ND, ND) is the unique Pareto-efficient SPNE.*

**Proof.** In the entire relevant parametric range  $\langle \beta \in [0,1] \rangle \cup \langle \gamma \in [0,1] \rangle$ , it holds  $\Delta\pi_1 < 0, \Delta\pi_2 > 0, \Delta\pi_3 < 0$ .

Results 1-3 clarify the importance of different parties' bargaining power, and especially related to managers who are implicated in all contracts in determining the endogenous equilibria of the delegation game. Let us consider first the classical *take-it-or-leave-it* managerial contract, in which managers have no bargaining power when they negotiate with the firms' owners or shareholders. On the one hand, if owners have a low bargaining power with respect to unions, they take advantage of delegating wage negotiation to a manager, even though the latter has weak bargaining power. This is because owners can indirectly lower the union wage claim via the negative bonus in the compensation scheme. Instead, if the owners are strong in negotiations with unions whilst the manager is weak, not delegating is the dominant strategy, which also leads to a

Pareto-efficient outcome for owners, since they can directly contrast the union's wage claim without the need to use strategically a managerial incentive contract.

On the other hand, when managers have a strong bargaining power *vis-à-vis* unions, shareholders prefer to delegate wage negotiations, albeit their bargaining strength against unions is balanced, and even if the (optimal) incentive bonus in managerial contracts is positive (which drives the union to bargain for higher wages). Indeed, in such a case, the manager's negotiation skills and its ability to curb the unions' claim drives the owners' (Pareto-efficient) choice. Still, if managers are strong in wage negotiations and owners are strong in such negotiations as well, the strategic interaction leads, in equilibrium, to a delegating outcome (this occurs unless owners have extreme bargaining power, for which multiple equilibria emerge), which is Pareto-inefficient from the owners' viewpoint. In fact, in such a case, the managerial contract provides for a positive bonus weight (see Figure 2, left box) which incentivizes output expansion, thereby lowering prices and reducing profits, whilst the benefit of delegating wage bargaining to the manager is negligible.

Instead, as long as managers have stronger bargaining power/better negotiation skills towards the owners, the parametric area in which delegation emerges as an equilibrium of the game tends to shrink. Intuitively, the stronger the managers are in bargaining against owners, the higher their ability is to negotiate a positive bonus. As a consequence, the possibility for owners of using strategically managerial delegation contracts to curb wage demand by the union vanishes. This can be exemplified by the case presented above of equal bargaining power between managers and owners. If the manager has low bargaining power *vis-à-vis* the union, the owners prefer to negotiate wages by themselves, regardless of their negotiation strength against the union. However, if the manager already has low/medium bargaining strength against the union, whilst owners are not strong enough, the latter prefer to exploit the managerial skills in wage negotiations to reduce the union's wage claims, even if they have to pay managers a positive bonus (see Figure 2, right box). Indeed, when the bargaining power between owners and unions is balanced, multiple equilibria arises, but the choice not to delegate is payoff dominant from the owners' viewpoint, since managerial delegation leads to a positive bonus weight, which reduces profits. Clearly, if owners have adequately negotiation skills (power) versus the union, they will generally prefer to conduct the contractual dispute over wages by themselves. However, when the manager has a strong bargaining position against the union, the owners can exploit those managerial skills to further improve their firms' profits, unless they have a considerably solid negotiation strength. In such a case, once again multiple equilibria arise, with the no-delegation equilibrium, which is profit-dominant.

Finally, if the manager is too strong in negotiations with the owners, not delegating is the unique equilibrium of the game. The rationale for this result is straightforward. If managers are too strong, they will negotiate with the owners' prohibitive (positive) bonuses. Higher bonuses

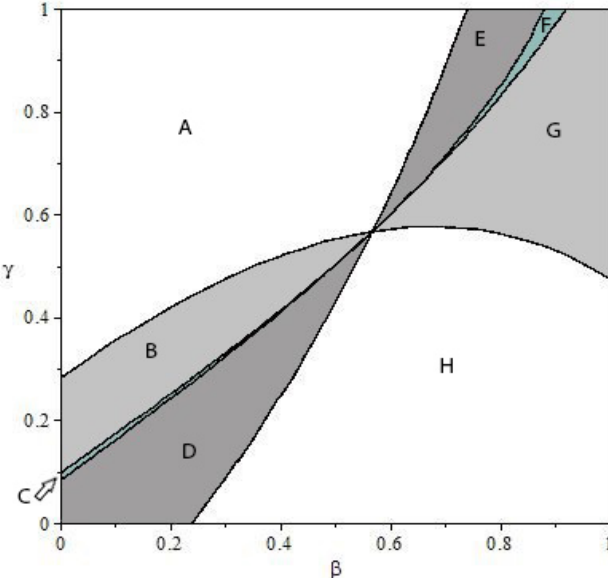


also lead to higher wage claims by the union, which will result in higher wages, unless managerial bargaining skills are so high that they restrict the union’s claim. Accordingly, firms’ owners will find it advantageous not to delegate strategic decisions to managers.

**4 Endogenous firm structure and stakeholder conflict**

Whilst in Lemma 1 of Section 2.4 we have compared social welfare results considering the firms’ structure (entrepreneurial or managerial firms) as exogenously given, now we are in a position to identify whether there is conflict of/common interest between the shareholders’ strategic choices and the overall welfare of the society, having derived the endogenous equilibria of the managerial delegation game.<sup>12</sup> The study of the welfare implication can be effectively carried out by means of a graphical analysis, for instance combining Figures 3 and 4 and recalling Result 3, with the Figures related to point d in Lemma 1 reported in the final Appendix.

Let us consider first the case of the take-it-or-leave-it contract (i.e.,  $\alpha = 0$ ). Figure 5 highlights eight regions with different characteristics.



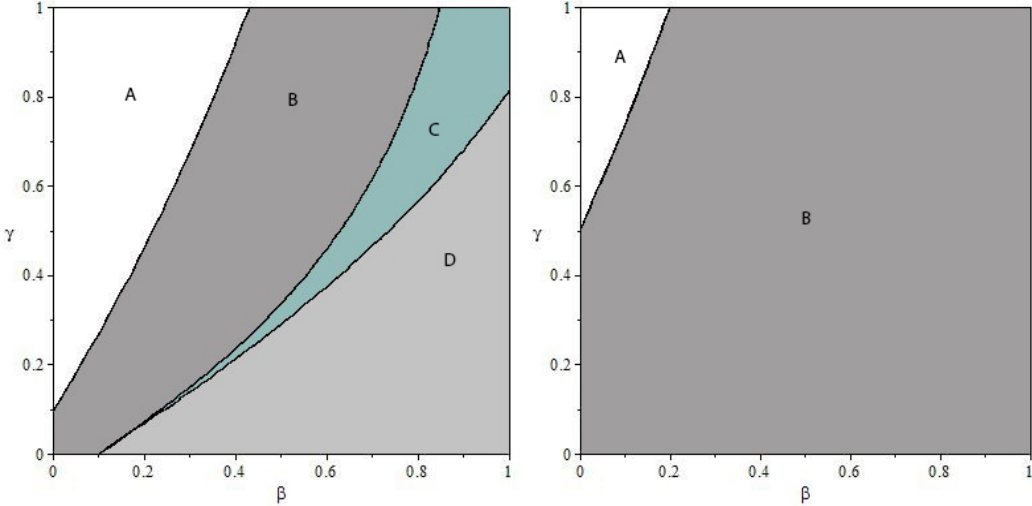
**Figure 5. Game equilibria and welfare outcomes (conflict of/common interest),  $\alpha = 0$**

[Legend: White regions: common interest; Light-grey regions: Nash equilibrium leads to a welfare-superior outcome but firms’ conflict of interest; Aquamarine-grey regions: multiple Nash equilibria, payoff-dominant equilibrium in contrast with the welfare superior outcome; Dark-grey regions: conflict of interest.]

<sup>12</sup> To simplify the exposition, we do not present the equilibrium values of the social welfare function and of its different components for the *D/ND* subgame because, as shown in the previous section, no asymmetric Nash equilibria arise for the delegation game.

Regions A and H are characterised by common interest between firms' owners and the society toward a firm structure (entrepreneurial firms in region A and managerial firms in region H, respectively), which arises as the unique Pareto-efficient equilibrium of the delegation game between owners. In region B (resp. G), the social welfare with non-managerial (managerial) firms is still higher, and not delegating (delegating) is the unique Nash equilibrium. However, it is in contrast with the firms' interest due to a Prisoner's Dilemma situation. Two symmetric Nash equilibria emerge in region C and F and, in both cases, coordination between owners towards the profit-dominant equilibrium ( $D/D$  in region C and  $ND/ND$  in region F, respectively) leads to a clear conflict of interest between firms and society arises. Finally, in regions D and E, a neat conflict of interest between firms and society emerges, since the unique Pareto-efficient (from the shareholders' viewpoint) equilibrium of the game, which leads respectively to managerial firms in region D and entrepreneurial firms in region E, is the one in which social welfare is lower.

Therefore, the most relevant conclusion that can be drawn from this analysis is that, when either the shareholders or the managers are sufficiently strong in wage bargaining, strategic interaction among firms leads to the best outcome for them as well as for society as a whole. From a policy perspective, this suggests that reforms directed to affect negotiation process should be directed to strengthen the bargaining power to one of those parties, but not all of them jointly.



**Figure 6. Game equilibria and welfare outcomes (conflict of/common interest)**  
**(left box:  $\alpha = .5$ ; right box,  $\alpha = 1$ )**

[Legend: White regions: common interest; Light-grey regions: Nash equilibrium leads to welfare superior outcome but firms' conflict of interest; Aquamarine-grey regions: multiple Nash equilibria, payoff-dominant equilibrium in contrast with the welfare superior outcome; Dark-grey regions: conflict of interest.]

Figure 6 shows the same graphical analysis for the cases in which, negotiating over managerial contracts, owners and managers have equal bargaining power (i.e.,  $\alpha = 0.5$ ) and managers have full bargaining power (i.e.,  $\alpha = 1$ ), respectively. According to Figures 5 and 6, as the bargaining strength of managers *vis-à-vis* the owners raises, as captured by  $\alpha$ , the area in which the social welfare under delegation is higher becomes broader. The reason for this result is that managers can increasingly negotiate higher positive bonuses, which incentivize output levels, leading to an increase in the consumer surplus (which is directly linked to output expansion), the latter being the predominant component of social welfare. Moreover, the area of common interest between shareholders and the society shrinks. In fact, for the already adequately high bargaining power of managers, the area of common interest in which delegation arises in equilibrium and social welfare is higher with managerial firms disappears.

Instead, the area of common interest in which entrepreneurial firms arise in equilibrium and at the same time social welfare is higher without delegation constantly shrinks as  $\alpha$  increases. This means that the higher the bargaining power of managers versus the owners, the higher the possibility that the firm structure that actually (endogenously) arises leads to greater tensions among different stakeholders. Therefore, the resultant policy insight is that, if the government is interested in minimizing potential conflicts among the social parties (hence maximizing the areas of common interest), a policy directed to enhance the shareholders bargaining strength *vis-à-vis* management needs to be designed and implemented.

## 5 Conclusion

This paper analyses the issue of strategic delegation by taking into account the role of management centrality in contracting with different stakeholders. This issue is relevant since there are typically many stakeholders of a firm, and various factors affect the relative bargaining power of a stakeholder *vis-à-vis* another. However, although the importance of management centrality (with respect to the other stakeholders) in corporations and the possible sources of stakeholders' bargaining power inside firms represent relevant subjects in the institutional and organizational literature, their role in affecting the managerial delegation decision has not yet been investigated in detail by the strategic delegation literature.

To address this issue, a sequential negotiation unionized duopoly model has been considered, in which the management relative bargaining power *vis-à-vis* owners and *vis-à-vis* unions can differ. In such a framework, the distribution of the bargaining power inside each bargaining-unit plays a crucial role regarding the endogenous choice by firms' owners to delegate strategic decisions to professional managers, also determining novel results regarding the

received strategic delegation literature. Indeed, when managers have full bargaining power *vis-à-vis* firms' owners, the latter never choose to delegate the strategic decision (i.e., independent of how the bargaining power is distributed inside any bargaining unit). Instead, when the bargaining power is balanced between owners and managers or, even more significantly, owners are powerful with respect to their managers, the situation is much more elaborate. Delegating and not delegating can arise as equilibria, depending on how bargaining power is distributed across different bargaining units, and the delegation choice can also represent a Pareto-dominant result for owners, since their profits are higher with respect to the decision to remain entrepreneurial firms. However, increasing the managers' bargaining power with respect to firms' owners leads the latter to run their firms directly, also increasing the conflict of interest between shareholders and the rest of society. Therefore, in order to minimize the risk that a potential conflict of interest arises between shareholders' choices about firm structure and the goal of society, managers should not be excessively strong in bargaining *vis-à-vis* owners.

Even if instructive, this work's findings should be considered with caution, because they rely on a set of specific assumptions concerning demand and cost functions (linear). Moreover, we have considered a simple Cournot model with homogeneous goods. Product differentiation and a broader analysis of different competition modes (quantity and price) represent natural extensions. Furthermore, regarding the unionized labour market, we have restricted our study to a) decentralized/firm-level negotiation and b) wage negotiation only. A more comprehensive analysis of alternative bargaining structures, e.g., centralized/coordinated negotiations, and a bargaining agenda including bargaining over employment, are definitively called for. Those extensions are left for future research.

## Appendix

### A.1 Bonus incentive weight and managers' utility

In this section, we show that managers' utility is always increasing in the bonus incentive weight, hence managers always prefer higher incentives on sales, which increase as managers are more powerful *vis-à-vis* shareholders in bargaining over managerial contracts. This demonstration follows the logic adopted by van Witteloostuijn et al. (2007, p. 899), but it is made more elaborated by the fact that wages (marginal production costs) are endogenous in our framework.

According to the first-order equation  $\frac{\partial U_i}{\partial q_i} = 0$  for output determination in Section 2.3, we have that  $1 - w_i - Q = q_i - z_i$ , which, taking Eq. (5) into account, implies that  $U_i = (1 - w_i - Q +$

$z_i)q_i = (q_i - z_i + z_i)q_i = q_i^2$ , where  $q_i = q_i(z_i)$ , hence  $\frac{\partial U_i}{\partial z_i} = 2q_i \cdot \frac{\partial q_i}{\partial z_i}$ . By taking Eq. (15) into account, we get:

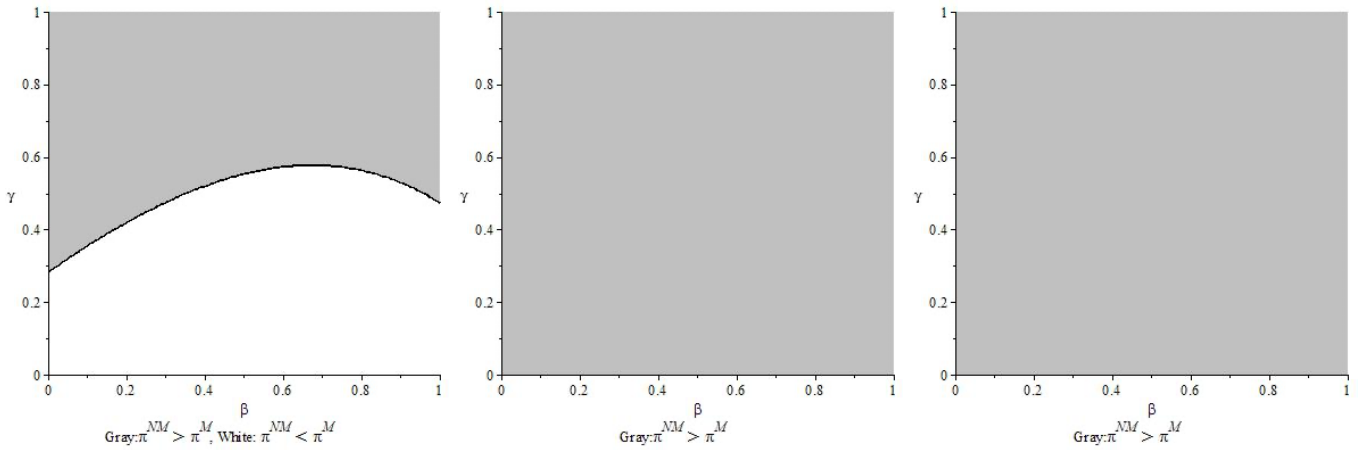
$$\frac{\partial U_i}{\partial z_i} = 2q_i \frac{1}{3} \left( 2 - 2 \frac{\partial w_i}{\partial z_i} + \frac{\partial w_j}{\partial z_i} \right).$$

Finally, by taking Eq. (17) and the corresponding one for  $w_j$ , into account, we obtain:

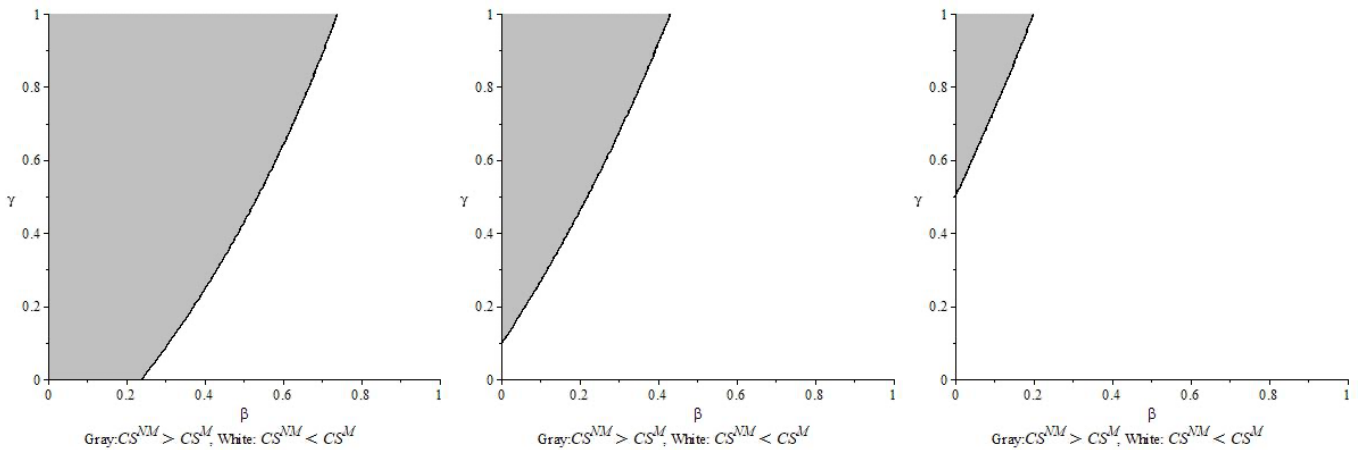
$$\frac{\partial U_i}{\partial z_i} = q_i \frac{4}{3} \left[ \frac{(1+\beta)(7+\beta)}{15+2\beta-\beta^2} \right] > 0, \text{ for any } \beta \in (0,1).$$

## A.2 Graphical representation of Lemma 1

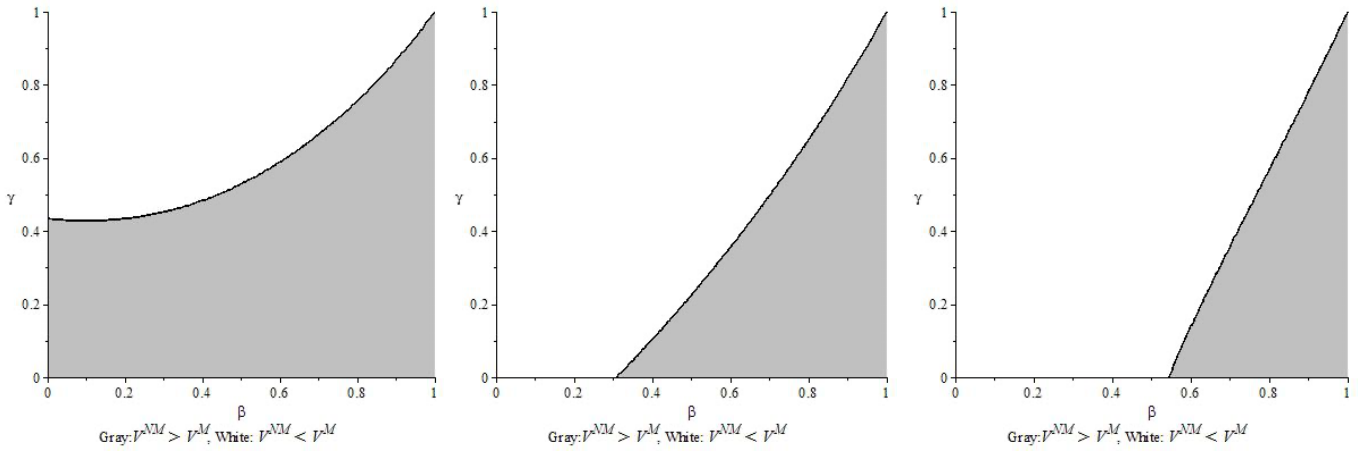
a. Firms' profits: left box,  $\alpha = 0$  (take-it-or-leave-it); centre box,  $\alpha = 0.5$ ; right box,  $\alpha = 1$



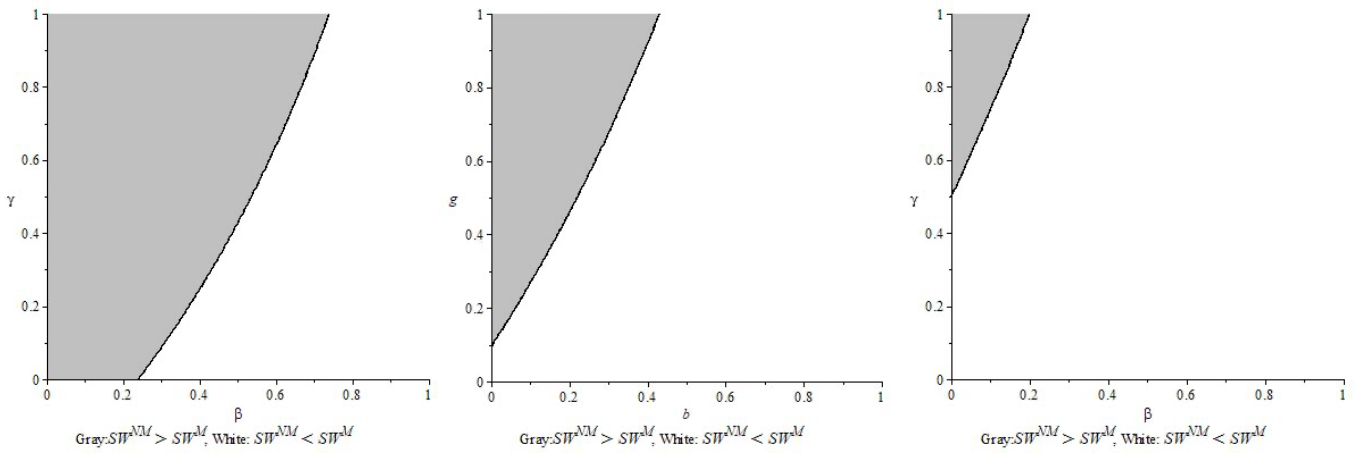
b. Consumer surplus: left box,  $\alpha = 0$  (take-it-or-leave-it); centre box,  $\alpha = 0.5$ ; right box,  $\alpha = 1$



c. Union utility: left box,  $\alpha = 0$  (take-it-or-leave-it); centre box,  $\alpha = 0.5$ ; right box,  $\alpha = 1$



d. Social welfare: left box,  $\alpha = 0$  (take-it-or-leave-it); centre box,  $\alpha = 0.5$ ; right box,  $\alpha = 1$



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