

Reply to Referee report on "When unionisation is profitable for firms in network industries"  
MS number 2103

We are grateful to the referee for comments, remarks and suggestions to the Discussion Paper version of our work. In what follows, we present our clarifications to the points the referee has raised (in italics), and proposal to improve the exposition of the article.

- 1) *My main concern is about the second order conditions that are not checked. For instance, result 2 does not take into account the restrictions  $q^{EB/EB} > 0$ , which requires, from (8), that  $n < \frac{b(\theta-1)+3}{2}$ . [...] My fear is that a similar critique is applicable in section 3.*

We thank the referee for highlighting the point, giving us the opportunity to clarify it in a future revision. First, we acknowledge that, at the current stage, it is missed in the text the specification of the relevant range of the parameter  $\theta$ , which is  $\theta \geq 0$ . Second, an in-depth analytical investigation reveals that the condition  $q^{EB/EB} > 0$  is always satisfied in the relevant range of the network effects parameter,  $n \in [0,1)$ . In fact, the lower bound of the restriction  $n < \frac{b(\theta-1)+3}{2}$  can range, depending on the values of the parameters  $b, \theta$ , from  $n=1$  (when  $b=1$  and  $\theta=0$ ) to  $n=\frac{3}{2}$  (when  $b=0$  or  $\theta=1$ ). In other words, the (exogenously given) network effects parameter can take whichever value  $n > n^*$  in  $n \in [0,1)$  for  $\theta < 1$ .

- 2) *My second concern is about the motivation of the paper, which I do not understand precisely. What is the aim? Why is it important to deal with unionization in network industries? Do you have specific examples to illustrate your case? Try to be more convincing.*

We are grateful to the Referee for signaling this gap in the current version of the paper. As underlined in Fanti and Buccella (forthcoming), given the importance of network industries in contemporary economy, it is timely to investigate what is the impact of unionisation in those sectors. As known, many large companies in network industries (e.g., Silicon Valley giants such as Microsoft, Google, Yahoo and Apple) are predominantly not unionised. Nonetheless, workers have recently been able to form unions in those companies. A few examples. In early March 2015, Apple bowed to pressure from the labour union SEIU-USWW and agreed to directly employ security guards on its Cupertino, California, campus instead of hiring the work out through a subcontractor. Facebook shuttle drivers gained final approval for their union contract (Al Jazeera America, 2015). Even more remarkable is the case of 38 bug tester who work full time in Microsoft's offices to review apps, who voted, in September 2015, to create a union, the Temporary Workers of America (BloombergBusinessweek, 2015). Those are only few selected cases; however, additional evidence can be reported.

- 3) *My third concern is related to the modeling strategy. By assuming that  $y_i = q_i$ , (see page 4), you can rewrite the inverse demand function (1) as  $p_i = a - (1-n)(q_i + q_j)$ . [...] If this is correct, then I do not see any difference between what is studied in the*

*paper and the classic analysis on unions. In other words, you should be able to perform the same analysis without having to limit yourself to network industries.*

In this paper, we simply follow the approach of Katz and Shapiro (1985), in which the simple mechanism of network effects is that the surplus that a firm's client obtains increases directly with the number of other clients of this firm. Nonetheless, the referee is right in pointing out that, as the model is currently presented, the reader may conclude that the demand function can be directly presented in the form  $p_i = a - (1-n)(q_i + q_j)$ , which is not correct because that expression is valid only at equilibrium, once consumers' fulfil their expectations. Therefore, a precise description of all the stages of the game is needed, as in Fanti and Buccella (2016). In fact, at p.8, it is missed that at the fourth stage, consumers fulfil their expectations and, finally, in the fifth and last stage of the game, each union-firm unit simultaneously negotiate the wages and employment, taking into account the product market interaction with the rival.

4) *The results on pages 5-6 should be presented more clearly. Examples:[...]*

The referee has properly identified some imperfections on those pages, mainly typos. For example,  $\pi^{EB/EB}$  and  $\pi^{PM/PM}$  introduced in subsection 2.4 are respectively  $\Pi^{EB/EB}$  and  $\Pi^{PM/PM}$ . The order of the inequalities in Result 2 is inverted. We are going to clarify better the finding of Result 1 and to simplify the legend in Figure 1.

5) *In Section 3, you should explain how  $\Pi_1^{EB/EB}$  is computed. [...] I am not sure that this is how the profits were computed.*

Following Bughin (1999), we assume that once entry takes place, competition is of the Cournot type. Therefore, the post-entry bargaining and product market games simultaneously occur at both bargaining units. We thank the referee for signaling this lack of information in the current version.

6) *You should at least discuss the hypothesis that firms either bargain over wages and employment with a bargaining power exogenously given by  $1-b$ , or are able to hire labor on a perfect labor market, which amounts to a bargaining power equal to 1. Why do you consider two discrete cases instead of a continuous one in which you would perform a comparative statics on the firms' bargaining power  $b$ ?*

We are going to discuss in more detail our assumptions as regards the labour market institutions and the rationale for our choice. We consider two discrete cases because, in the case of unionization, the unions can have a higher/lower wage sensitivity, an aspect which is absent in the case of a firm hiring workers at the perfectly competitive wage.

7) *Page 3:  $y_i$  is not a "market share" but the output because you assume (page 4) that  $y_i = q_i$ .*

We thank the referee for pointing out this imperfection.

We conclude this note with our best regards to the Referee, thanking her/him once again for her/his valuable comments that will be embedded in a possible revision of this work.