Referee Report on Economics 2103-1

The paper analyses a theoretical model in which unions aim to maximise a weighted product of wages and employment, demand is characterised by network effects and firms can decide whether to bargain efficiently with firm-specific unions or not. First, a Cournot-duopoly is considered and it is enquired under which conditions collective bargaining may emerge as equilibrium outcome for both firms. Subsequently, it is assumed that there is an incumbent that can try to deter entry by another firm. The incumbent can do so by determining whether both firms bargain collectively or not, given the assumption of 'committed bargaining'. The analysis shows that choosing to bargain with a union may deter entry.

Major Comments (in decreasing order of importance)

1) I found the paper relatively hard to read. It was not made sufficiently clear what the objective of the analysis is and how the authors proceed to establish their main findings. More specifically, Section 2 shows that collective bargaining may be beneficial for firms. Section 3 then considers the question of whether a monopolist deters entry by accepting collective negotiations or not. The link between the two topics should be developed much more succinctly. Moreover, the figures are not easily understandable and the derivation of Result 5 is rather tedious to follow. All in all, I found the analysis too technical. The reader would like to learn more about the economic intuition underlying the results. Please also note that the manuscript is full of awkward or incorrect expressions. Therefore, it urgently needs to be edited in terms of language.

2) The authors solve the models for the case of efficient bargaining. Why don't they also consider wage bargaining? Can such a model not be solved? Are results different?

3) The main modelling features of the framework which distinguish the analysis from other contributions are that the weights of wages and employment in the union's utility function differ and that there are network effects on the output market. When providing intuition for the results, these two aspects only play a minor role. More generally, one would like to learn more about the mechanisms which determine the findings.

4) On page 11 it is stated: "Rather paradoxical it is the result that an incumbent may strategically recognize the presence of a union in the company to ensure a monopoly industry."
I find this assertion somewhat puzzling because unionisation appears to be tantamount to raising rivals costs in order to deter entry, given the assumption of 'committed bargaining'. Such an argument appears to be well established in the literature. Moreover, the literature on raising rivals costs is not referred to.

5) The description of the entry game in Section 3 is relatively hard to follow. Furthermore, Figure 2 does not seem to match the verbal descriptions since it does not depict 'committed

bargaining'. In addition, I was not sure what the relevance of Section 2.2 is, given that its results do not appear to be utilised for the analysis conducted in Section 3.

6) A central modelling assumption is that the firm can decide whether to be unionised or not. Given that workers benefit from unionisation, this assumption is tantamount to the idea that the firm can avoid unionisation. This appears to be costless in the present set-up. How can this feature be rationalised?

7) The first and second paragraph in the introduction do not really introduce the topic and seem to be almost superfluous.

8) Some of the findings in the present submission are similar to or at least related to the results contained in the 2016 paper of the authors in Italian Economic Journal. It would be desirable to relate the current submission more thoroughly to the earlier paper.

9) In Section 2.1 the outcome for the case of bilateral efficient bargaining is developed. I was wondering why the employment outcome is not strongly efficient in the sense of Layard and Nickell (QJE 1990), given a linear production technology. It does not appear to be solely due to network effects. It could help to understand the findings if a relationship (or distinction) could be established.

10) Result 5: Why is there a statement about unionisation but not about non-unionisation in the absence of network externalities, while this is different for strong network effects?

11) On page 2 it says: "… it is also the Pareto-efficient outcome from the firms standpoint." What is meant by this statement? How can an outcome be Pareto-efficient from the vantage point of one (type of) agent?

12) Figure 1: Are the red and blue lines the same in part c)? I do not understand the last sentence below the figure stating that EB > PM.

Minor comments

- I believe that PM is not defined prior to its first use on page 4.

- The notation in Section 2.4 (profits) is not consistent with the notation of the other (sub-) sections.

- Page 8, top: The description suggests that collective bargaining does not take place simultaneously in the two firms. However, the calculations are not consistent with this.

- Result 3 seems to follow directly from Result 2, or to be almost the same.

- It may be obvious, but I was wondering whether monopoly profits without collective bargaining are always higher than duopoly profits, given the network externality and assuming the same manner of wage and employment determination. Only if this is the case Lemma 2 seems to be sufficient to establish Result 4.