HYBRID COOPERATION AGREEMENTS IN NETWORKS: 
AN APPLICATION TO THE AIRLINE INDUSTRY 

– EXTENDED ABSTRACT – 

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Firm collaboration is a widespread and well-known phenomenon across industries. However, the recent development of cooperation agreements has shown that, as expressed by Baker et al. (2008), ‘the existing governance structures in industries such as pharmaceuticals, biotechnology, medical devices, airlines, and telecommunications shows that firms have invented far more ways to work together than organizational economics has so far expressed (not to mention evaluated)’. In an attempt to classify these new forms of cooperation agreement Menard (2004) has used the term ‘hybrid’ forms of government structure.¹ These hybrid forms of firm government structures convey a limited pooling of resources, which may allow for risk sharing and the exploitation of economies of scale up to some extent. However, joint planning also concerns quality standards, information exchange, prices, and quantities. This is why cooperation agreements might have serious anticompetitive consequences even if they are not formed with this objective.

For antitrust authorities, the evaluation of the effects of new hybrid forms of cooperation agreements on market competition and consumer welfare is difficult for several reasons. First, most cooperation agreements are partial agreements and the partners involved in these agreements are multi-product firms that operate in markets with different degrees of competition intensity. As a consequence, it is not easy to assess the effect of these agreements as they might be procompetitive in one market but anticompetitive in another. Second, the scope of

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the agreements is not always made explicit. An example is cross-ownership. With the rapid growth of the private-equity market during the last decades, we observe that private equity firms own participations in rival firms (see Lopez and Vives, 2016). Apart from this kind of indirect cross-ownership, direct cross-participation is also observed. For example, in 2001, Nissan bought a 15% stake in Renault, which in turn increased its stake in Nissan to 44.4%. Finally, the forms and sophistication of cooperation agreements put in place by firm have evolved much faster than the economic analysis of their consequences. The objective of this work is to help filling this gap by providing a general analysis of different forms of cooperation agreements in network markets, from soft alliances to merger-alike joint ventures.

In the last decades, many network industries have rationalized their networks by reorganizing them around hubs. The rationale behind this process is to make efficiency gains (and take benefits from economies of scale), reduce transportation costs, improve cycle times, and drive down inventories. Hub-and-spoke networks involving more than one hub are common in many network industries such as passenger and freight transportation (air, rail, maritime, surface, and intermodal), telecommunications, industrial distribution, computer networks, data vault or postal services. Among the different markets that exist in hub-and-spoke networks involving more than one hub, two main types can be distinguished: the interhub market (direct connection between two hubs) and the interspoke market (connection between spokes via hubs). In the framework of a duopoly model, there is demand for a composite good (or system) in the interspoke market, where each complementary input is provided by a different monopoly firm. Differently, we assume an overlapping network in the interhub market and direct duopoly competition. Firm cooperation agreements are classified along two dimensions: the degree of cross-ownership (or revenue sharing) and the scope of joint venture (or cost sharing).

Our main contributions can be summarized as follows. First, we are able to model a wide-range of cooperation agreements such as soft alliances, full alliances, full alliances with cost sharing, joint ventures, and mergers. Second, we analyze the impact of these agreements on consumer welfare in the interhub and the interspoke market for different intensities of (dis)economies of scale. At this point, we conclude that the socially-optimal cooperation agreement in the interhub and the interspoke market typically do not coincide and the ultimate net welfare effect depends on the relative size of these two markets. Third, to elucidate the net welfare effect of cooperation agreements for different intensities of (dis)economies of scale, we use numerical simulations to allow for a global measure of consumer welfare under different scenarios regarding market size asymmetry between the interhub and the interspoke markets. Finally, we test the validity of some of our theoretical predictions by means of an empirical application based on recent intercontinental data from the airline industry (including the transatlantic, transpacific, EU-Japan, and EU-Middle East markets), which is an industry in which multiple cooperation agreements are common.
agreements of different kind have taken place over the last years and for which, recently, a rich data set has become available. Our sample includes data from the first quarter of 2010 to the third quarter of 2016, which represent 11661 observations with complete information for all variables.

Our theoretical results are twofold. First, we conclude that the degree of cross-ownership on traffic is always positive in the interspoke market and negative in the interhub market under diseconomies of scale, and that the effect of the scope of joint ventures on traffic is always positive in both markets under economies of scale. Second, the socially-optimal cooperation agreement in the interspoke market is full alliance in the presence of diseconomies of scale (either weak or strong); full alliance with cost sharing under constant returns; merger in the presence of weak economies of scale; and joint venture for strong economies of scale. The intuition behind this result is that alliances have a positive effect on consumer welfare because they allow internalizing a double marginalization externality but, simultaneously, an adverse cost effect can arise under strong economies of scale due to a fall of traffic in the interhub market that increases marginal costs and can result into higher prices and lower traffic volumes in both markets. Concerning the interhub market, the socially-optimal cooperation agreement is merger in the presence of strong economies of scale and joint venture otherwise. This is because, as economies of scale become stronger, the effect of deeper joint ventures on consumer welfare is increasingly positive because it translates into higher efficiency gains. In addition, stronger economies of scale reduce the potential anticompetitive effect associated with higher levels of cross-ownership.

The numerical simulation considers jointly the interhub and the interspoke markets and elucidates the net welfare effect of cooperation agreements for different intensities of (dis)economies of scale. On the one hand, this analysis illustrates in a transparent way the trade-offs between markets and the way the optimal agreements adapt to the degree market asymmetry. But, on the other hand, it also constitutes a robustness check of our theoretical results since almost all the optimal agreements contemplated in our propositions can be derived for different levels of market-size asymmetry and intensity of (dis)economies of scale.

Finally, our empirical application confirms our theoretical results on the effect of the degree of cross-ownership and the scope of joint ventures on traffic. More precisely, it shows that the effect of the scope of joint ventures on traffic is stronger in the presence of economies of scale in both interhub and interspoke markets, and provides evidence on the positive impact of a higher degree of cross-ownership on traffic in the interspoke market under diseconomies of scale. As for the negative effect of a higher degree of cross-ownership on traffic in the interhub market under diseconomies of scale, we do not find a clear empirical evidence, fact that can be explained by the relatively low level of competition in interhub markets regardless the prevailing type of cooperation between airlines. This results suggest that the potential anticompetitive effects of
a higher degree of cross-ownership in interhub markets, in practice, seems not to be an issue in the case of the airline industry.

References


Notes

1See also Williamson (1985 and 1996).

2Thereby, we take firms’ decision of choosing a particular cooperation agreement as given. For an analysis of the rationale behind this decision, see, for example, Menard (2004) and Gibbons (2005).