Merging In-Market vs. Cross-Border: The Impact of Merger Policy*

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Abstract

In this paper, we study how merger policy affects the choice between merging in-market and cross-border. We build a model where a firm chooses between both types of mergers. While an in-market merger, if anti-competitive, can be rejected by merger policy, a cross-border merger is subject to uncertainty on its ex-post profitability. We first study this tradeoff when after a non-profitable cross-border merger, exiting the foreign market by merger is not possible. In this case, a more lenient merger policy discourages to merge cross-border compared to in-market. However, when it is possible to exit by an in-market merger, a more lenient merger policy favors cross-border mergers by lowering exit barriers. Therefore, the tradeoff between both merging in-market and cross-border types is modified.

Keywords: merger policy, in-market vs. cross-border mergers, exit.

JEL codes: L22, L40, D21, G34.

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1 Introduction

Mergers, particularly in network industries such that energy or telecommunications, are today a hot topic. In an ever-changing economic environment impacted by liberalization and digitalization, firms now evaluate merger opportunities not only from their own domestic market but also cross-border. The telecommunications sector in the European Union illustrates the interplay between in-market and cross-border mergers. While telecommunications companies regularly question the severity of merger policy towards in-market mergers, the European Commission has expressed its desire for the emergence of pan-European telecommunications firms, and hence for cross-border mergers (less anticompetitive concerns).[1]Cross-border and in-market mergers are of distinct nature and therefore impact ex-ante firms decision to merge differently (i.e., profits, uncertainty of efficiency, regulation). In this context, an interesting question is to explore how merger policy impacts the tradeoff between merging in-market or cross-border.

As broadly discussed in the literature on horizontal mergers, an in-market merger is assessed by an antitrust authority based on a tradeoff between efficiency gains and market power (Williamson, 1968). According to whether its net impact on welfare is positive or negative, an in-market merger is cleared or not by an antitrust authority, and if cleared it is usually subject to merger remedies (Farell and Shapiro, 1992; Perry and Porter, 1995; McAfee and Williams, 1992). On the contrary, a cross-border merger raises a priori no anticompetitive concerns. Indeed, merging cross-border does not directly affect the number of firms neither in the home nor in a foreign market. It is true especially when it is assumed that the relevant markets are at the national level or segmented.

Therefore, we could first infer that merger policy should be designed focusing on in-market mergers only. Second, one may think that a merger policy intended for in-market mergers will impact the decision to merge in-market only. However, this presumption may be flawed. Indeed, it is possible that due to asymmetric information on the foreign market (Qiu and Zhou, 2006), a firm merging cross-border does not know its post-merger profitability. If ex-post the cross-border merger is found to be unprofitable, the firm would like to exit the foreign

[1]Here is an extract from the Financial Times (22/10/2015): "While regulators at the European Commission are turning up their noses at in-country consolidation, they have signalled that cross-border consolidation to create pan-European networks would be welcomed". In fact, the objective is the advent of a European "Digital Single Market". It meets essential stakes. Among them, first, the necessity to encourage investment in next-generation networks (Fiber, 4G, 5G...) and second, as claimed by firms, mergers are a way to gain more bargaining power when facing giants such as the so-called "GAFA".

market.[2] It means that it would have to sell its foreign subsidiary to a another competitor, which can translate into an in-market merger if it is sold to a firm from the foreign market. Yet, as said before, an in-market merger is subject to merger policy. Thus, the possibility to exit the foreign market or not rests on the leniency of merger policy (Mason and Weeds, 2013). In light of this, we analyze the tradeoff between merging in-market and cross-border in presence of merger policy and to what extent merger policy may ex-ante act as an exit barrier.

To study this issue, we build a simple model where four firms compete in a regional market. This regional market is composed of two markets: a home one and foreign one. These markets are segmented and of same size, with two firms in each one. At the beginning, these firms realize the same profits. Merger policy is defined by the probability to merge in-market. In this model, after observing merger policy, a firm chooses between merging cross-border or in-market. Thereafter, it decides whether to separate from its merging partner. In case of cross-border merger, this separation implies an exit by merger. An in-market merger is assumed always profitable and efficient but can be refused if anticompetitive.[3] A cross-border merger can be profitable or not, with some probability. It is initially not subject to merger policy in that it does modify market structure. However, the possibility to exit by merger or not depends on the leniency of merger policy.

Firstly, we find that, absent any possibilities of exit, a more lenient merger policy incentivizes to merge in-market and it is at the expense of cross-border mergers. However, when exit is possible and thanks to thresholds, we secondly find that a slightly more lenient merger policy encourage more cross-border mergers than in-market ones. We show it is due to the fact that barriers to exit are lowered. Regarding welfare, we find that when exit by merger is possible, merger policy takes into account cross-border mergers, which is not the case otherwise. We also find that the expected welfare if a firm merges cross-border is higher when exit by merger is possible and welfare-increasing. Then in some cases, merger policy may be better able to anticipate the diverse impacts of in-market and cross-border mergers on welfare.

[2] An interesting example is the case of Orange and Deutsche Telekom in UK with their foreign company, EE, which was sold to BT. Exit occurred for several reasons; among them (as stated in Le Monde (16-12-2014)), the fact that synergies had been hard to find. It also has been argued that it was a way for Orange to invest in more profitable cross-border opportunities in Europe or Africa.

[3] Merger policy is defined at a regional level. We abstract from conflicts between national regulators or international merger policy coordination. For more information, see the survey of Breinlich, Nocke and Schtuz (2016).

Relation to Literature

We contribute to the literature on entry and merger policy. While Marino and Zabojnik (2006) analyze the impact of entry on merger policy, we explore how merger policy can interfere with ex-ante decisions to merge in-market or cross-border (a cross-border merger can be seen as an "entry" in the foreign market). Closer to our analysis, Mason and Weeds (2013) study how competition policy can act as an entry barrier. Using the failing firm defense standard, they show that if ex-post, a lenient merger policy may increase concentration and decrease consumer surplus, future merger prospects increase the expected value of entry. While Mason and Weeds (2013) consider the severity of merger policy using the failing firm defense, we use the probability of merger acceptance. Along the same lines, Jaunaux, Lefouili and Sand-Zantman (2016) generalize Mason and Weeds (2013)'s analysis. They derive a measure which characterizes the design of optimal merger policy upon entry, relying on state dependency. Our paper differs from Jaunaux, Lefouili and Sand-Zantman (2016) and Mason and Weeds (2013) insofar as we study a firm's incentives to merge cross-border versus in-market in the presence of a regional merger policy. Notably, our analysis is also linked to the the discussion on the Contestable Market Theory (Baumol, Panzar and Willig, 1982) which states the idea that a firm enters in a market if entry and exit barriers are not too high.

Comparative analyses of cross-border and in-market mergers have been studied in the industrial organization literature by Haufler and Nielsen (2005). These authors compare in-market and cross-border mergers from a private and social perspective while allowing for synergies. In their model, firms from the producing countries compete only on the third market. They find that while merger policy on in-market mergers tend to be too restrictive for global efficiency, a laissez-faire approach is globally efficient for cross-border mergers (when the merger benefits the merging firms). Our paper differs from Haufler and Nielsen (2005) in that all firms compete into the regional market and cross-border mergers are subject to uncertainty upon their profitability.

We also find comparative analyses in the international economics literature. Horn and Persson (2001) focus on cross-border versus in-market mergers in the presence of trade costs. They find that an increase in trade costs can increase the profitability of in-market compared to cross-border mergers.[4] Contrary to Horn and Persson (2001), we assume segmented markets

[4]In this context, we note that a recent literature has studied the determinants and welfare effects of endogenous cross-border mergers (Bjorvatn, 2004; Norback and Persson, 2008; Chaudhuri, 2014) while other papers use labour market effects (Lommerud, Straume and Sorgard, 2006). In this spirit, recent trade theoretical

(i.e., no exports) and hence we do not integrate the trade costs impact in merger decision.

In the next section, we present the model framework. In Section 3, we determine a firm's decision to merge cross-border or in-market, when exit by merger is not possible. In Section 4, we determine how the possibility of exit by merger can modify the firm's merger choice. In Section 5, we provide comparative statics and draw a welfare analysis. In Section 6, we present some extensions to the main model. Section 7 concludes. All proofs are in the appendix.

2 Model

We build a model to study how merger policy affects the trade-off for a firm between merging in-market and cross-border for a firm.[5]

Market characteristics. Consider two countries, defined as the "home" (h) and "foreign" (f) markets. These markets are segmented (i.e., we assume away the possiblity of exports). They are also of same size and have symmetric demands. In each country, there is a duopoly: firms 1 and 2 compete in the home market, and firms 3 and 4 in the foreign market. At the beginning of the game, firms are symmetric: they have the same constant marginal cost of production c, and derive the same profits, $\Pi(c)$.[6]
Merger control is exerted on both the home and foreign markets. We assume that a merger is cleared with probability $\alpha \in (0, 1)$, which is assumed exogenous.

Agents. Among the four firms, some are *active* and the others are *inactive*. An *active* firm is a firm that can choose between a cross-border merger (CBM), an in-market merger (IMM), or no merger at all (status quo). An *inactive* firm has no merger decision to make. We assume that firm 1 is the only active firm. Figure 1 represents the market structure with firm 1's merger options.

In-market merger. An IMM is subject to the merger policy α. Let Π_{ij} be the profit after merger of firm i and j, with $i \neq j$. If the IMM is cleared, the new merged entity achieves a profit $\Pi_{12}(\underline{c})$ with marginal cost $\underline{c} < c$, i.e., the merger leads to efficiency gains for the

models show that what motivates CBMs is that they are primarily undertaken to gain access to complementary firm-specific assets in targets firms (Nocke and Yeaple, 2008), capabilities that are non-mobile across countries (Nocke and Yeaple, 2007),or country-specific assets (Norback and Persson, 2007)

[5] We assume away the possibility for a firm to merge cross-border and in-market at the same time. These choices are mutually exclusive.

[6] The symmetric Cournot model with constant marginal costs fits our model assumptions. Besides, we use a duopoly framework to simplify the analysis. It is without any serious loss of generality compared to the oligopoly case with n firms in each market (provided that n is no too large, i.e., concentrated markets).

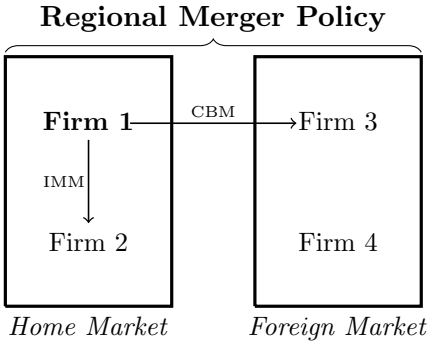

Figure 1: The market structure.

firms.[7] If the IMM is rejected, firm 1 obtains the duopoly profit $\Pi(c)$ in its domestic market.

Cross-border merger. A CBM raises no anticompetitive concerns since it does not affect the number of competitors in both markets: it is therefore not subject to the merger policy α.[8]

A CBM has an uncertain outcome. Let $\beta \in (0,1)$ be the probability that the CBM entails *market-level synergies*. If firm 1 merges with firm 3, a good outcome occurs with probability β, meaning that the merged entity achieves a profit $\Pi_{13}(\underline{c})$ with marginal cost $\underline{c} < c$, whereas a bad outcome happens with probability $1-\beta$, meaning that the merged entity achieves a profit $\Pi_{13}(\bar{c})$ with marginal cost $\bar{c} > c$.[9] Notice that due to market segmentation, the CBM's profit Π_{13} is the sum of profits realized separately in both countries.

If there is a bad outcome after firm 1 and firm 3's CBM, firm 1 may decide to exit the foreign market by an IMM; it means that it separates from its foreign company, firm 3, by selling it either to firm 4 (foreign competitor) or to firm 2 (domestic competitor).[10] Nevertheless, firm 3 would never be acquired by firm 2. In fact, firm 2 learns from the CBM between firm 1 and 3 that there are negative market-level synergies, and hence that this deal would be unprofitable. Therefore, exit can occur if firm 4 acquires firm 3. This is possible only if this IMM is cleared, which happens with probability α. In the foreign market, the new merged entity's profit is $\Pi_{34}(\underline{c})$. In the home market, we assume that after exit, firm 1 obtains its ex-ante profit $\Pi(c)$

[7] The IMM is supposed to be efficient; the question is then whether the efficiencies are sufficiently high so that welfare or consumer surplus do not decrease. This IMM may also require merger remedies to be accepted. The analysis of efficiency gains and merger remedies is beyond the scope of that paper. For an analysis along these lines, see Choné and Linnemer (2008) or Dertwinkel-Kalt and Wey (2016).

[8] It is true if ex-post, the merger is not price-increasing, which depends on whether the merger is cost-efficient or inefficient. We will take this into account in the analysis.

[9] If the CBM is efficient (marginal cost $\underline{c}$) , the efficiency gains apply to both the home and foreign markets. On the contrary, if the CBM is inefficient (marginal cost $\bar{c}$), there are negative spillovers on both markets.

[10] One could observe that there are other ways to exit for firm 1. Indeed, an "external buyer" could make an offer to acquire firm 3. For instance, a vertical merger would be possible. However, we ignore this possibility because it would considerably complicate the analysis without bringing any additional significant insights.

plus a share of the new merged entity profit from the sale of firm 3 to firm 4.

Payoffs. Define V_a^s as the expected payoff for an active firm a from making merger choice $s = im, cb, e$ where im means in-market, cb cross-border merger without possibility of exit, and e cross-border merger with possibility of exit. In what follows, we compare the choice of firm 1 between an IMM with firm 2 ($s = im$) or a CBM with firm 3 ($s = cb$ or e).
We assume that when firm 1 merges in-market or cross-border, the profit of the merged entity is shared with respect to a bargaining parameter b_i, with $i = 1, 2, 3, 4$. Since at the beginning firms are symmetric, we assume that after an IMM or a CBM, the new merged entity's profit is shared equally between the merging firms, i.e. $b_i = b = 1/2$. The bargaining parameters when there is exit by merger will be discussed in Section 4.

Timing. We consider the following sequence of events. First, the merger policy α is exogenously given. Second, firm 1, the active firm, observes α and decides whether to merge cross-border or in-market. If it merges cross-border, uncertainty on its cost-efficiency is realized. First-period payoffs are then realized. Third, (i) if firm 1 has merged in-market, it decides whether to separate from firm 2, the merging firm and, (ii) if firm 1 has merged cross-border, firm 1 decides whether to exit the foreign market by an in-market merger. Fourth, second-period payoffs are realized with a discount factor $\delta \in (0, 1)$. We look the subgame-prefect equilibrium of this game.

3 Benchmark Case: No Possibility of Exit

In this section, we consider a benchmark case where there are no possibilities of exit by merger after a CBM. We study firm 1's tradeoff between the two types of mergers. In our model, merging in-market is always preferred to the status quo. The following lemma gives the condition to ensure that firm 1 also prefers a CBM to the status quo.

Lemma 1. *Merging cross-border is preferred to the status quo if and only if* $\beta > \bar{\beta^{ne}}$, *where*

$$\bar{\beta^{ne}} = \frac{2\Pi(c) - \Pi_{13}(\bar{c})}{\Pi_{13}(\underline{c}) - \Pi_{13}(\bar{c})}.$$

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We make the following assumption to ensure firm 1's decision is a choice between an IMM and a CBM:

Assumption 1. $\beta > \bar{\beta^{ne}}$.

Consider first an IMM. Since it is efficient and there is no uncertainty upon its profitability, firm 1 has no incentive to separate from firm 2 ex-post. Moreover, firm 1 does not merge cross-border thereafter, since a CBM has an uncertain outcome and firm 1 is already an efficient monopolist in the home market.[11] Then, firm 1's expected payoff in this scenario is:

$$V_1^{im} = (1+\delta)\left[\alpha\frac{\Pi_{12}(\underline{c})}{2} + (1-\alpha)\Pi(c)\right]. \tag{1}$$

With probability α, the merger is cleared and firm 1 obtains a share $b = 1/2$ of the profit $\Pi_{12}(\underline{c})$ of the merged entity. With probability $1-\alpha$, the merger is rejected and firm 1 obtains the duopoly profit $\Pi(c)$.

Second, consider a CBM. If firm 1 has merged profitably cross-border with firm 3, it is better off than in the status quo situation, and hence it has no incentives to exit the foreign market. Furthermore, we also assume that firm 1 cannot merge in-market thereafter.[12] Then, firm 1's expected payoff in this scenario is:

$$V_1^{cb} = (1+\delta)\left[\beta\frac{\Pi_{13}(\underline{c})}{2} + (1-\beta)\frac{\Pi_{13}(\bar{c})}{2}\right]. \tag{2}$$

Merging cross-border is efficient with probability β and inefficient with probability $1-\beta$. In both cases, firm 1 obtains a share $b = 1/2$ of the profit of the merged entity.

From expression (1) and (2), we see that the merger policy parameter α impacts only IMM payoffs. From expression (1), we have $\partial V_1^{im}/\partial\alpha = (1+\delta)\left[\Pi_{12}(\underline{c})/2 - \Pi(c)\right] > 0$ and therefore, a more lenient merger policy increases the IMM payoffs while it does not impact the CBM ones. Thus, we can state the following proposition:

Proposition 1. *If there is no possibility of exit by merger, a more lenient merger policy, i.e. a higher α, favors in-market mergers at the expense of cross-borders mergers.*

The intuition is that a stricter merger policy (a lower α) makes IMM less profitable (in expectations) but does not affect the profitability of CBM. It thus shifts firms' decision towards CBMs.

[11] It anticipates that $\beta\Pi_{123}(\underline{c}) + (1-\beta)\Pi_{123}(\bar{c}) \leq \Pi_{12}(\underline{c})$ where Π_{123} is the profit when firm 12 merges cross-border with firm 3.

[12] In fact this merger would always be rejected since it is price-increasing: we have $\alpha p^m(\underline{c}) + (1-\alpha)p(\underline{c},c) \geq p(\underline{c},c)$ or $p^m(\underline{c}) \geq p(\underline{c},c)$, where $p^m(\underline{c})$ is the monopoly price after the IMM and $p(\underline{c},c)$ is the duopoly price when there is no IMM and firm 1 and 3 had merged profitably cross-border.

Under Assumption 1, $V_1^{cb} - V_1^{im}|_{\alpha=0} > 0$. Furthermore, for $\beta < (\Pi_{12}(\underline{c}) - \Pi_{13}(\bar{c}))/(\Pi_{13}(\underline{c}) - \Pi_{13}(\bar{c}))$, $V_1^{cb} - V_1^{im}|_{\alpha=1} < 0$. From Proposition 1, it follows that there is a threshold $\alpha^{ne} \in (0,1)$ such that firm 1 prefers merging in-market if $\alpha > \alpha^{ne}$, and prefers merging cross-border otherwise.

4 Possibility of Exit

In this section, we relax the assumption of impossibility of exit by merger after a CBM. As already explained, it means that firm 1 is now able to sell firm 3 to the foreign company, firm 4. We study firm 1's tradeoff between both types of mergers. Defining $\Omega = (2\Pi(c) - \Pi_{13}(\bar{c}))/2\alpha\Pi(c)$, the following lemma gives the condition that ensures that merging cross-border is profitable when there is a possibility of exit.

Lemma 2. *Merging cross-border is preferred to status quo if and only if for* $\frac{\delta}{1+\delta} \in (0, \Omega]$, $\beta > \bar{\beta}^e$, *where*

$$\bar{\beta}^e = \frac{(1+\delta)(\Pi(c) - \Pi_{13}(\bar{c})/2) - \delta\alpha\Pi(c)}{(1+\delta)(\Pi_{13}(\underline{c}) - \Pi_{13}(\bar{c}))/2 - \delta\alpha\Pi(c)}.$$

As in the previous section, we make the following assumption to ensure that firm 1's tradeoff is between an IMM and a CBM:

Assumption 2. $\beta > \bar{\beta}^e$.

We now derive the conditions under which an exit by merger is profitable. The exit by merger involves firm 1, the seller, and firms 3 and 4, the merging firms. It will occur if, for these firms, the post-exit by merger situation is better than if there is no exit. In particular, the bargaining parameter such that firm 1 finds it profitable to exit by merger is $b_1^e \geq \frac{\Pi_{13}(\bar{c})}{2\Pi_{34}(c)}$.[13] For the rest of the analysis, we assume that this condition "binds", i.e., if $b_1^e = \frac{\Pi_{13}(\bar{c})}{2\Pi_{34}(c)}$.

The IMM payoffs are the same as in the benchmark case, corresponding to expression (1). Consider now the CBM payoffs when an exit by merger is possible:

$$\begin{aligned} V_1^e = {} & \beta\frac{\Pi_{13}(\underline{c})}{2} + (1-\beta)\frac{\Pi_{13}(\bar{c})}{2} \\ & + \delta\left[\beta\frac{\Pi_{13}(\underline{c})}{2} + (1-\beta)\left(\alpha\left(\Pi(c) + b_1^e\Pi_{34}(\underline{c})\right) + (1-\alpha)\frac{\Pi_{13}(\bar{c})}{2}\right)\right]. \end{aligned} \tag{3}$$

[13] Detailed computations and bargaining parameters for firm 3 and 4 are provided in the appendix.

The first line in expression (3) represents the first-period payoff and is built as in the benchmark case. The second line corresponds to the second-period payoff, discounted with $\delta \in (0,1)$. With probability β, firm 1 has merged profitably cross-border and obtains a share $b = 1/2$ of the merged entity profit. With probablity $1-\beta$, it has not merged profitably cross-border and decides to exit the foreign market by merger. With probability α, firm 3 and 4 are allowed to merge and firm 1 obtains its ex-ante profit $\Pi(c)$ plus a share b_1^e of the profit $\Pi_{34}(c)$ of the merged entity. With probability $1-\alpha$, the IMM between firm 3 and 4 is rejected and firm 1 obtains a share $b = 1/2$ of the merged entity profit $\Pi_{13}(\bar{c})$. The payoff from merging cross-border can be simplified to:

$$V_1^e = V_1^{cb} + \delta\alpha(1-\beta)\Pi(c), \tag{4}$$

where $\Pi(c)$ is firm 1's net exit payoff.

The merger policy α now impacts both IMM and CBM payoffs. We have :

$$\frac{\partial V_1^{im}}{\partial \alpha} = (1+\delta)\left[\frac{\Pi_{12}(\underline{c})}{2} - \Pi(c)\right] > 0; \tag{5}$$

$$\frac{\partial V_1^{e}}{\partial \alpha} = \delta(1-\beta)\Pi(c) > 0. \tag{6}$$

From equation (5), as already observed in the benchmark case, a more flexible merger policy increases IMM payoffs. From equation (6), we observe that the merger policy now also affects positively CBM payoffs. The intuition is that a more lenient merger policy increases the profitability of exit by merger after an unprofitable CBM. Therefore, there are less barriers to exit. An additional insight we get from (6) is that when the probability of a profitable CBM decreases (i.e., β is lower), the positive effect of merger policy is more significant. Indeed, $\partial^2 V_1^e/\partial\alpha\partial\beta = -\delta\Pi(c) < 0$. From these results, we can state the following proposition:

Proposition 2. *When an exit by merger is possible, a more lenient merger policy, i.e. a higher α, impacts positively the incentives to merge cross-border by lowering exit barriers.*

One can also notice that the minimum β such that a CBM is preferred to status quo, β^e, decreases when merger policy is more lenient, i.e., $\partial\bar{\beta}^e/\partial\alpha < 0$. Thus, compared to status quo, firm 1 has in expectations more incentives to merge cross-border when α increases.

We now study the impact of merger policy on the decision to merge cross-border versus

in-market. We compare the effect of merger policy and observe that:

$$\frac{\partial[V_1^e - V_1^{im}]}{\partial \alpha} \leq 0 \qquad \text{if} \qquad \frac{\delta}{1+\delta} \leq \frac{\Pi_{12}(\underline{c})/2 - \Pi(c)}{(1-\beta)\Pi(c)}; \tag{7}$$

$$\frac{\partial[V_1^e - V_1^{im}]}{\partial \alpha} > 0 \qquad \text{otherwise.} \tag{8}$$

Equation (7) means that the merger policy has a stronger effect on the decision to merge in-market than cross-border, while equation (8) states the contrary. From equations (5) and (6), merger policy impacts the whole gain from merging in-market while it impacts only the second-period CBM payoff in the specific case where firm 1 decides to exit by merger.[14] Hence, we will assume that (7) for the rest of the analysis. We now analyze how the tradeoff between both merger types is modified compared to the benchmark case.

Under Assumption 1, we have $V_1^e - V_1^{im}|_{\alpha=0} > 0$. Furthermore, for $\delta/(1+\delta) < (\Pi_{13}(\underline{c}) - \Pi_{13}(\bar{c}))/2\Pi(c)$ and $\beta < (1+\delta)\left[\Pi_{12}(\underline{c}) - \Pi_{13}(\bar{c})\right] / \left((1+\delta)\left[\Pi_{13}(\underline{c}) - \Pi_{13}(\bar{c})\right] - \delta\Pi(c)\right)$, $V_1^e - V_1^{im}|_{\alpha=1} < 0$. Then, it follows that there is a threshold $\alpha^e \in (0,1)$ such that firm 1 prefers merging in-market if $\alpha > \alpha^e$ and prefers merging cross-border otherwise. By comparing thresholds α^{ne} and α^e, we can state the following proposition:

Proposition 3. *Merging cross-border is preferred to merging in-market for higher values of* α*, i.e.,* $\alpha^e > \alpha^{ne}$.

Proposition 3 states that when exit is possible, there is more scope for merging cross-border. Figure 2 explains this idea. We see that as α increases, firm 1 is more inclined to merge-in market than cross-border. Still, firm 1 can merge cross-border for higher values of α since $\alpha^e > \alpha^{ne}$. Hence, an interesting insight here is that a stricter merger policy now makes IMM and CBM less profitable (in expectation), contrary to what has been found in the benchmark case.

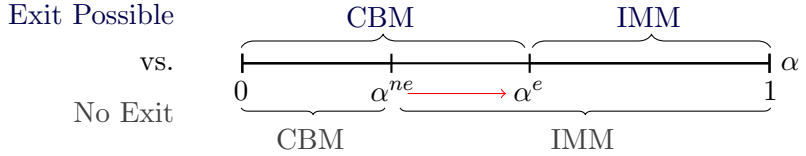

Figure 2: Merger decision: exit vs. no exit possible.

[14] In addition, we can see from equations (5) and (6) that $(1+\delta) > 1$ and $\delta(1-\beta) < 1$. Therefore, equation (8) would hold only if the duopoly profit $\Pi(c)$ is very high and the monopoly profit $\Pi_{12}(\underline{c})$ is very low, which is not realistic.

5 Welfare Analysis

In this section, we analyze the impact on welfare of merger policy. We use the following lemma to ensure that a CBM is in expectation never price-increasing:

Lemma 3. *In expectation, a CBM is never price-increasing if* $\beta \geq \beta_p$ *where*

$$\beta_p \equiv \frac{p(c,c) - p(\bar{c},c)}{p(\underline{c},c) - p(\bar{c},c)}.$$

The price $p(c,c)$ is the status quo price, $p(\bar{c},c)$ is the price after a profitable CBM, and $p(\underline{c},c)$ is the price after an unprofitable CBM. Hence, we make the following assumption:

Assumption 3. $\beta \geq \beta_p$.

In the benchmark case, exit by merger is not possible and merger policy only affects IMMs. In this case, merger policy concerns IMMs only. The welfare being an affine function of α, we denote ΔW^{im} the welfare variation if an IMM is accepted. If $\Delta W^{im} < 0$, then welfare decreases with α, i.e., IMMs should always be rejected. If $\Delta W^{im} \geq 0$, welfare increases with α, i.e., IMMs should always be cleared.

When exit by merger is possible, merger policy affects also CBMs. In this case, merger policy should take into account both IMMs and CBMs. Here, welfare is also an affine function of α. Denoting ΔW^e the welfare variation before and after exit by merger, if $\Delta W^e \geq 0$, exit by merger is welfare-increasing, i.e., welfare increases with α. Therefore, an exit by merger should always accepted. On the contrary, if $\Delta W^e < 0$, exit by merger is welfare-decreasing, i.e., welfare decreases with α. Then, an exit by merger should be refused.[15]
Hence, we assume for the rest of the analysis that when an IMM or an exit by merger is welfare-decreasing, it will not occur.[16]

Denote by W the expected welfare and by W^{cb} the expected welfare when firm 1 merges cross-border without a possibility of exit. Assuming that if the IMM or exit by merger are welfare-increasing, the merger occurs at the point α where welfare is the highest, we compare

[15] A major precision is that exit by merger has to be welfare-increasing separately in each segmented markets that are segmented (i.e., there is no compensation). Since after exit by merger firm 1 is better off (more efficient) without modifying the home market structure, it can be easily assumed that exit by merger is always welfare-increasing in the home market. It is different in the foreign market where there is an IMM due to exit.

[16] If a regulator could observe perfectly the ex-ante effects of mergers, it would not clear a welfare-decreasing one.

the expected welfare W between the benchmark case and when exit by merger is possible. Hence we state the following proposition.[17]

Proposition 4. ***(i)*** *If $\Delta W^e \geq 0$ and $\Delta W^{im} \geq 0$, $W \in \{W^{cb}, W(1^-)\}$ in benchmark case whereas it is $W \in \{W(\alpha^{e-}), W(1)\}$ when exit is possible.*
(ii) *If $\Delta W^e \geq 0$ and $\Delta W^{im} < 0$, $W = W^{cb}$ in benchmark case whereas $W = W(\alpha^{e-}) > W^{cb}$ when exit is possible.*
(iii) *If $\Delta W^e < 0$ and $\Delta W^{im} < 0$, $W = W^{cb}$ in both situations.*

The implication of Proposition 4(i)-(ii) is that when exit by merger is possible, the expected welfare if firm 1 merges cross-border is higher ($W^{cb} > W(\alpha^{e-})$). The intuition from Proposition 4(iii) is that a CBM will occur, but in any case exit will not be possible and hence $W = W^{cb}$. To gain more intuition, we analyze the situation derived in Figure 3, which is an illustrative subcase of Proposition 4(i). We observe on left graph (benchmark case) that $W^{cb} < W(1)$. It means that welfare is higher after an IMM than after a CBM. However, when exit by merger is possible (righ graph), we now observe that $W(\alpha^{e-}) > W(1^-)$. Therefore, welfare is now higher under a CBM. The intuition from this particular case is as follows: if a regulator could observe perfectly the expected welfare, it would have favored the IMM in the benchmark case. However, considering the possibility of exit, it may have encouraged the CBM. Therefore, the interesting insight from this welfare analysis is that by considering exit prospects after a CBM, merger policy may be better able to anticipate the diverse impacts of mergers on welfare.

6 Asymmetric Markets

In this section, we assume asymmetric markets: there is a duopoly in the home market and an oligopoly of $n > 2$ firms in the foreign market.

We first study the incentives to merge cross-border and in-market for firm 1, as a function of the number of firms in the foreign market. When firm 1 merges in-market, its profits are unchanged since the IMM benefits are independent of the foreign market structure. Thus, the incentives for IMMs are not modified. On the contrary, when firm 1 merges

[17] We do not treat the case where exit by merger is welfare-decreasing and the IMM is welfare-increasing; indeed, this case cannot happen in our model. Even if the IMM in the home market and the exit by an IMM in the foreign market are symmetric mergers to monopoly, situations before those mergers were different. In particular, the ex-ante situation is supposed to be worser in the foreign market. Hence, if the IMM is welfare-increasing, the exit by merger is also welfare-increasing.

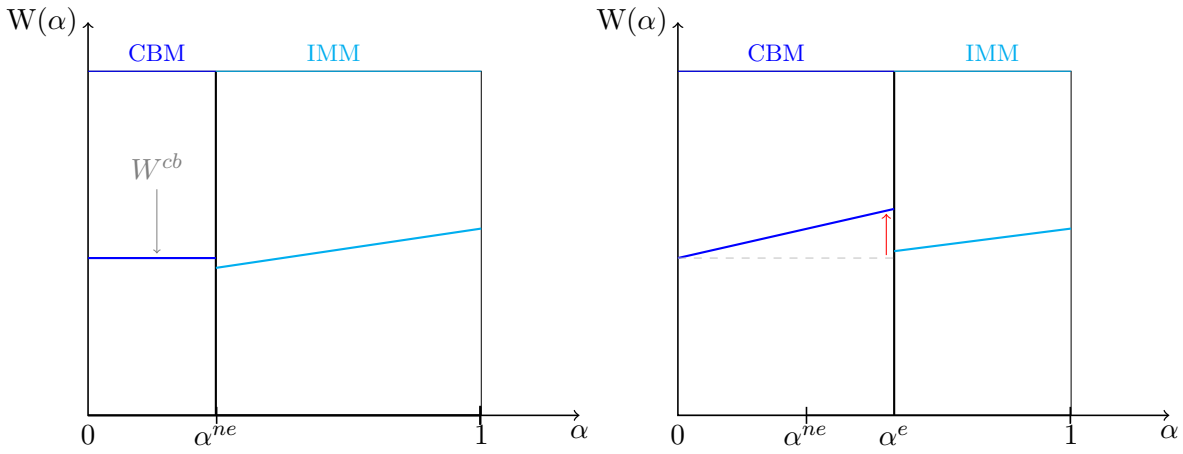

Figure 3: Welfare (i): benchmark (left) vs. possibility of exit (right).

cross-border, its (detailed) profits are $\Pi_{13}(\underline{c}) = \Pi_1(\underline{c}, 2) + \Pi_3(\underline{c}, n)$ with probability β, and $\Pi_{13}(\bar{c}) = \Pi_1(\bar{c}, 2) + \Pi_3(\bar{c}, n)$ with probability $1-\beta$ (where the second term in brackets designates the number of firms in the market). Since the foreign market is now less concentrated, the CBM profits are lower compared to the baseline model. In this case and independently from merger policy, merging cross-border is less beneficial.

While the welfare analysis of IMMs remains unchanged, it is not the case for CBMs. Indeed, a CBM is welfare-increasing if the exit by merger is welfare-increasing in both the home and the foreign markets. We thus assume that the exit by merger is welfare-increasing in the home market (firm 1 is more efficient after exit). On the foreign market, producer surplus increases since firm 3 and 4 merge efficiently in-market.[18] The foreign IMM could affect positively or negatively consumer surplus. However, a major difference with the main model is that the foreign market is now less concentrated, which means that an IMM raises less anticompetitive concerns. Hence, an IMM following exit have a lower probability to be rejected when the foreign market is less concentrated (contrary to the main model where exit by merger is a merger to monopoly).

This can be seen in Figure 4. Using a simple Cournot framework, we observe that the IMM following exit decreases consumer surplus when the foreign market is very concentrated ($n \leq 3$) whereas the same IMM increases consumer surplus otherwise ($n \geq 4$). Based on these intuitions, we can state the following proposition:

Proposition 5. *As the foreign market is less concentrated ($n \geq 4$), the possibility to exit by*

[18]Note that firm 3 could have been sold to any other foreign market firm. We could imagine that in the foreign market firms will compete to acquire firm 3 and they would make offers to firm 1. We do not go deeper on this issue which is beyond the scope of this paper.

merger is facilitated.

Therefore, more market concentration implies more difficulties to exit by merger since there are more risks that the IMM implied by exit lowers consumer surplus (and that producer surplus could not compensate). It is even more complicated if a competition authority has a consumer surplus criterion. Consequently, what impacts the possiblity of exit can also be the ex-ante market concentration. This raises the question of how this issue should be considered by merger policy.

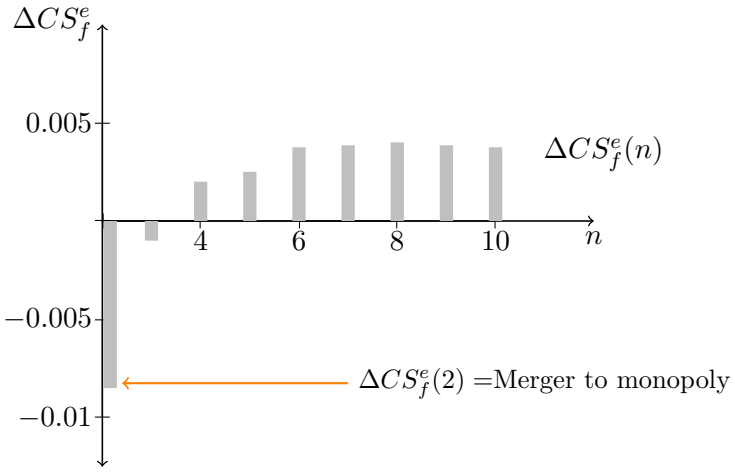

Figure 4: ΔCS after exit by merger.
Cournot Framework: $a = b = 1$, $c = 0.5$, $\bar{c} = 0.6$, $\underline{c} = 0.46$.

7 Discussion and Conclusion

In this paper, we have examined how merger policy impacts the tradeoff betweeen in-market and cross-border mergers. To this end, we first studied a benchmark case where exit by merger is not possible and we found that merger policy only affects in-market merger's expected profitability. Hence, a stricter (more lenient) merger policy shifts firms' decision towards cross-border mergers (in-market mergers). On the contrary, when it is possible to exit by merger, merger policy also affects the incentives to merge cross-border by lowering (or increasing) exit barriers. In this case, we secondly show that a slightly more lenient merger policy encourages more cross-border than in-market mergers compared to benchmark case. Given this analysis, if merger policy is very strict and market level synergies are low (the payoff from merging is low), we could end up with a status quo (i.e., no merger at all). Finally, we show that when the possibility of exit is considered, merger policy considers cross-border mergers besides in-market ones. We also find that the expected welfare if a firm merges

cross-border is higher when exit is possible and welfare-increasing. Then in some cases, merger policy may be better able to anticipate the different impacts of in-market and cross-border mergers on welfare.

Our analysis aims at highlighting the tradeoff between in-market and cross-border mergers in a regional market by focusing on the link between merger policy and exit (in ex-ante setting). Notably, in case of uncertainty on the profitablity to merge cross-border, exit prospects are dependent on the leniency of merger policy. Therefore, it creates a strong linkage between both types of mergers since a merger policy initially targeting in-market mergers also affects cross-border ones. Hence, our findings could give an additional decision tool to policymakers, in particular at a regional level. For instance, if the objective is the emergence of regional "global players", a regional market consolidation is necessary. Thus, by balancing incentives to merge cross-border versus in-market, a regional regulator can shape market consolidation pursuing this objective.

By building a very simple model, we have been able to discuss firms' choices between merging in-market or cross-border as a function of the merger policy. Our results rely on the assumption of market segmentation, which is relevant particularly for network industries - such as energy or telecommunications - where markets are usually segmented. Our analysis also assumes an exogenous merger policy, which could be viewed as a limitation. Yet, a regulator has no way to anticipate (perfectly) ex-ante effects of all mergers and in our paper merger policy is given at the beginning. Endogenizing it here would considerably complicate the analysis. Finally, an important feature of the model is that it is well-adapted for concentrated markets. On the contrary, if markets were ex-ante fragmented, our results would have to be revisited. In the context of our paper, an interesting research extension would be to examine the link between market concentration and merger policy with ex-ante endogenous market structures.

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APPENDIX

Proof of Lemma 1

(i) Firm 1 prefers merging in-market to the status quo if and only if $\alpha > 0$. Indeed, $V_1^{im} > \Pi(c) \Leftrightarrow \alpha\left(\Pi_{12}(\underline{c})/2 - \Pi(c)\right) > 0$. The inequality holds if $\alpha > 0$, which is true, and if $\Pi_{12}(\underline{c})/2 - \Pi(c) > 0$, which is true since the IMM generates efficiency gains as $\underline{c} < c$.

(ii) Firm 1 prefers merging cross-border to the status quo if and only if $V_1^{cb} \geq (1+\delta)\Pi(c) \Leftrightarrow$

$$\beta \geq \frac{2\Pi(c) - \Pi_{13}(\bar{c})}{\Pi_{13}(\underline{c}) - \Pi_{13}(\bar{c})} \equiv \beta^{\bar{ne}}.$$

The numerator is positive since $2\Pi(c) > \Pi_1(\bar{c}) + \Pi_3(\bar{c}) = \Pi_{13}(\bar{c})$ and the denominator is strictly positive since $\underline{c} < \bar{c}$.

Proof of Lemma 2

Firm 1 prefers merging cross-border to the status quo if and only if $V_1^e \geq (1+\delta)\Pi(c)$, that is, if and only if

$$\beta \underbrace{[\frac{(1+\delta)}{2}(\Pi_{13}(\underline{c}) - \Pi_{13}(\bar{c})) - \delta\alpha\Pi(c)]}_{A} \geq \underbrace{(1+\delta)(\Pi(c) - \frac{\Pi_{13}(\bar{c})}{2}) - \delta\alpha\Pi(c)}_{B}.$$

A first case is when $A > 0$ and $B \geq 0$. We have $A > 0 \Leftrightarrow \delta/1+\delta < \Pi_{13}(\underline{c}) - \Pi_{13}(\bar{c})/2\alpha\Pi(c)$ and $B \geq 0 \Leftrightarrow \delta/1+\delta \leq 2\Pi(c) - \Pi_{13}(\bar{c})/2\alpha\Pi(c)$. Since $\Pi_{13}(\underline{c}) > 2\Pi(c)$, $\Pi_{13}(\underline{c}) - \Pi_{13}(\bar{c}) > 2\Pi(c) - \Pi_{13}(\bar{c})$, we conclude that for $\delta/(1+\delta) \in ()0, \Omega]$, where $\Omega = 2\Pi(c) - \Pi_{13}(\bar{c})/\alpha\Pi(c)$, $\beta \geq B/A \equiv \bar{\beta}^e$.

A second case is when $A < 0$ and $B \leq 0$. We have $A < 0 \Leftrightarrow \delta/(1+\delta) > \Pi_{13}(\underline{c}) - \Pi_{13}(\bar{c})/2\alpha\Pi(c)$ and $B \leq 0 \Leftrightarrow \delta/(1+\delta) \geq 2\Pi(c) - \Pi_{13}(\bar{c})/2\alpha\Pi(c)$. Since $\Pi_{13}(\underline{c}) - \Pi_{13}(\bar{c}) > 2\Pi(c) - \Pi_{13}(\bar{c})$, we can conclude that for $\delta/(1+\delta) \in (\Pi_{13}(\underline{c}) - \Pi_{13}(\bar{c})/2\alpha\Pi(c), 1/2)$, $\beta \leq B/A \equiv \bar{\beta}^e$. Since β is the probability of that the CBM entails market level synergies, this case (with an upper bound on β) has no economic sense and is not considered. Indeed, the higher β, the higher a firm prefers merging cross-border compared to the status quo.

Sign of $\bar{\beta}^e$. Since $\Pi_{13}(\underline{c}) > 2\Pi(c)$, $\partial\bar{\beta}^e/\partial\alpha < 0$.

Bargaining parameters: exit by merger of firm 1

Firm 4 has to be better off after exit by merger (after the IMM with firm 3), i.e., if: $b_4^e\Pi_{34}(\underline{c}) - \Pi_4(c, \bar{c}) \geq 0$ (where the profit function $\Pi_4(c, \bar{c})$ is firm 4's profit when firm 1 and 3 had an unprofitable CBM). When this equation holds, we get $b_4^e = \Pi_4(c, \bar{c})/\Pi_{34}(c^e)$.

Firm 3 is better off merging with firm 3 if: $b_3^e\Pi_{34}(\underline{c}) - \Pi_{13}(\bar{c})/2 \geq 0$. When this condition holds, we get $b_3^e = \Pi_{13}(\bar{c})/2\Pi_{34}(\underline{c})$.

Finally, firm 1 exits by merger by obtaining a share from the sale of firm 3 to firm 4. In our setting, it means that firm 1's foreign market situation[19] has to be such that:

$$b_1^e\Pi_{34}(\underline{c}) - \frac{\Pi_{13}(\bar{c})}{2} \geq 0. \tag{A.1}$$

Consequently, when (A.1) holds, we have $b_1^e = \Pi_{13}(\bar{c})/2\Pi_{34}(\underline{c})$.

[19] It means we do not consider its post-exit home market profits in our computations.

We check that

$$b_1^e \Pi_{34}(\underline{c}) + b_3^e \Pi_{34}(\underline{c}) + b_4^e \Pi_{34}(c) = \Pi_{34}(\underline{c});$$

Which is true if it is assumed that $\Pi_{13}(\bar{c}) + \Pi_4(c, \bar{c}) = \Pi_{34}(\underline{c})$.

Proof of Proposition 3

We show here that $\alpha^e > \alpha^{ne}$. To this aim, we compute the difference between the payoff from merging cross-border and in-market in the benchmark case and when there is a possibility exit and equalize it to zero.

$$\begin{aligned}
&[V_1^e(\alpha^e) - V^{im}(\alpha^e)] - [V_1^{cb} - V^{im}(\alpha^{ne})] = 0 \\
&\Leftrightarrow \delta\alpha^e(1-\beta)\Pi(c) + (1+\delta)\left(\alpha^{ne} - \alpha^e\right)\left[\frac{\Pi_{12}(\underline{c})}{2} - \Pi(c)\right] = 0 \\
&\Leftrightarrow \alpha^e\left(\delta(1-\beta)\Pi(c) - (1+\delta)\left[\frac{\Pi_{12}(\underline{c})}{2} - \Pi(c)\right]\right) + (1+\delta)\alpha^{ne} = 0 \\
&\Leftrightarrow \alpha^e = \frac{-(1+\delta)[\Pi_{12}(\underline{c})/2 - \Pi(c)]\alpha^{ne}}{\delta(1-\beta)\Pi(c) - (1+\delta)\left[\Pi_{12}(\underline{c})/2 - \Pi(c)\right]}.
\end{aligned}$$

The numerator is negative and the denominator is also negative (by equation (7)). Therefore, $\alpha^e = k\alpha^{ne}$, where

$$k \equiv \frac{-(1+\delta)[\Pi_{12}(\underline{c})/2 - \Pi(c)]}{\delta(1-\beta)\Pi(c) - (1+\delta)\left[\Pi_{12}(\underline{c})/2 - \Pi(c)\right]} > 1.$$

Proof of Lemma 3

In the welfare analysis, we have to ensure that in expectation a CBM is not price-increasing (if it were the case, a CBM would be always refused). The following equation has to satisfied:

$$\beta p(\underline{c}, c) + (1-\beta)p(\bar{c}, c) \leq p(c, c) \tag{A.2}$$

$$\Leftrightarrow \beta \geq \frac{p(c,c) - p(\bar{c}, c)}{p(\underline{c}, c) - p(\bar{c}, c)} \equiv \beta_p. \tag{A.3}$$

Proof of Proposition 4

Case (ii): exit by merger is welfare-increasing ($\Delta W^e \geq 0$) and the IMM is welfare-decreasing ($\Delta W^{im} < 0$). Since firm 1 should not be allowed to merge in-market, we analyze welfare if it merges cross-border. In the benchmark case, firm 1 chooses a CBM if $\alpha < \alpha^{ne}$ and the

expected welfare is equal to $W = W^{cb}$, which is constant and does not depend on the merger policy α. On the contrary, when exit is possible, firm 1 chooses a CBM if $\alpha < \alpha^e$. Assuming that the CBM occurs for $\alpha = \alpha^{e-}$, the expected welfare becomes $W = W(\alpha^{e-}) > W^{cb}$.[20]

Case (i): exit by merger and the IMM are both welfare-increasing ($\Delta W^e \geq 0$ and $\Delta W^{im} \geq 0$). In the benchmark case, merger policy concerns IMMs only. If $\alpha < \alpha^{ne}$, firm 1 chooses a CBM and $W = W^{cb}$. Otherwise, firm 1 chooses an IMM. Assuming this IMM occurs at $\alpha = 1$, $W = W(1^-)$. Therefore, $W \in \{W^{cb}, W(1)\}$ in the benchmark case. When exit is possible, merger policy concerns both IMMs and CBMs. In this case, in a similar manner to case (ii), the expected welfare is such that $W \in \{W(\alpha^{e-}), W(1^-)\}$.

Case (iii): exit by merger and the IMM are both welfare-decreasing ($\Delta W^e < 0$ and $\Delta W^{im} < 0$). Firm 1 shoud not be allowed to merge in-market or to exit by an IMM after a CBM. Therefore, firm 1 will merge cross-border without a possibility of exit in any case. Hence, the expected welfare is $W = W^{cb}$.

[20] The welfare from merging cross-border when exit is possible is such that $W^{cb} + \delta\alpha(1-\beta)\Delta W^e$.