Merger Policy with Alternative Mergers and Efficiency Gains*

Carlos Razo
Stockholm University
June 22, 2004

Abstract
This paper models the behaviour of a Competition Authority (CA) that takes into consideration alternative future mergers when deciding whether to approve a current merger notification. The result is a more stringent CA that demands higher merger-efficiencies than the ones needed to restore pre-merger welfare, opening the possibility of challenging a merger that reduces prices. However, in the absence of entry and exit, a merger policy that considers alternative merges is never consumer welfare decreasing. Additionally, CA’s merger-efficiencies expectations play an important role in the stance the CA adopts (tougher or laxer). Lastly, the paper suggests that even when alternative mergers could have positive effects on consumer welfare, CAs should exercise caution in adopting such merger policy given the significant side-effects.

Keywords: Competition Policy, Mergers, Efficiency gains.

JEL-classification: K21, L40, L41

*I wish to thank Jonas Häckner for most helpful comments and discussion on this paper. I also would like to thank Richard Friberg for his insightful comments, seminar participants at Stockholm University, the Japanese Economic Policy Association Conference 2003, especially professor Keizu Mizuno, participants in the ENTER conference 2004 in Barcelona and seminar participants at the Swedish Competition Authorities. Useful suggestions from Maria Strömqvist and Janna Gamache are highly appreciated. As always, all errors and omissions remain the author’s. Financial support from the Mexican Council of Science and Technology (CONACYT) and the Widar Bagge foundation is greatly appreciated and acknowledged. Any comments are welcome at cara@ne.su.se
1 Introduction

Over the past years, the literature on merger policy has shown several interesting developments at the theoretical and empirical levels. Some of these developments have been incorporated and used by National Competition Authorities in order to assess the impact of specific mergers. Examples of such developments are the analysis of oligopoly behavior, the role played by efficiencies, the use of econometric techniques, simulation analysis, among others.

Thanks to the developments in simulation techniques, attempts have been made to predict the impact of mergers through simulation analysis. Inter alia, Nevo (2000) studies merger effects on the ready-to-eat cereal industry. Werden and Froeb (1994) calibrate a logit model to assess the effects of alternative mergers among US long distance carriers. Ivaldi and Verboven (2002) compare alternative merger sequences in the European truck industry and emphasize the importance of evaluating the regional versus pan-European nature of a merger.

Motivated by the Volvo/Scania case\(^1\), in Horn and Stennek (2002) it is discussed the idea of taking into consideration alternative mergers and the post-merger choice of firms location. They conclude that although it seems intuitively attractive to take alternative mergers into account, this is likely to be associated with serious problems.

Nevertheless, the issue of comparing alternative mergers\(^2\) when assessing a notified merger seems not to have been extensively analyzed in economic literature. This does not come as a surprise given the complexity of the issue. Such complexity arises from two main sources. The first complication is to correctly predict which alternative merger will occur in the future if the current merger notification was blocked. This is not an easy task and endogenous merger theory\(^3\) is needed. However, such theory is still at its early stages and much work needs to be done in order to more accurately predict mergers. The second source of complexity, is the evaluation of merger-specific efficiencies. Such efficiencies are easy to claim, but difficult to deliver\(^4\) and to assess the likelihood of those efficiencies is rather complex. In fact *efficiencies are difficult to verify, in part

---

\(^1\)See EU merger case number M.1672. Volvo/ Scania

\(^2\)By alternative mergers it is understood, those mergers that could occur if the current merger notification was blocked.

\(^3\)Endogenous merger theory aims at predicting which merger will occur when there are many alternatives, using different economic models of bargaining and/or stock market interaction. Some examples of endogenous merger models are Gowrisankaran (1999) or Fridolfsson and Stennek (2002)

\(^4\)According to Time Magazine, July 21, 2003 a McKinsey & Co. report found that 40% of mergers failed to capture the cost advantages that theoretically justified the takeover
because much of the information relating to efficiencies is uniquely in the possession of the merging firms."\(^5\) Consequently, to evaluate the potential efficiencies of a potential merger can be even more challenging.

The intention of this paper is to model the behavior of a Competition Authority (CA) that takes into consideration alternative possible mergers when deciding whether to challenge a current merger proposal, and taking into account the CA’s expectations on industry efficiencies and future levels of concentration.

The central question is how the decision of rejecting or approving a notified merger is affected, when a CA that maximizes consumer welfare, takes into consideration alternative future mergers. Will the CA be tougher or laxer, regarding the level of merger-efficiencies it demands from the notified merger? In the model presented below, it is possible to give answers to the above questions.

The main findings of the model are the following: a merger policy that takes alternative mergers into consideration will improve consumer welfare. However, it might well be stricter towards the notified merger, as in comparison to a merger policy that overlooks alternative mergers, since the CA with certainty will demand more efficiencies than the ones needed to restore a pre-merger welfare level. This implies that some "legal mergers" (mergers that reduce prices) will be prohibited. In a sense, this toughness of the CA arises as a result of its "optimism". Once alternative mergers are considered, the CA only takes into consideration those possible mergers that are welfare improving and ignores the possibility that welfare decreasing mergers can also occur. This is mainly due to the fact that the CA always has the possibility of challenging a bad merger.

Another important result is that the CA’s beliefs, with respect to the levels of efficiency that can be achieved through mergers in a particular industry, play an important role in determining how tough or lax the CA behaves. If the CA believes that high efficiencies can be achieved, it is intuitive to think that any welfare improving merger that offers low levels of efficiency will be blocked in order to wait for a merger that delivers more efficiency gains. Surprisingly and contrary to expectations, as the level of merger efficiencies that can be achieved become more uncertain, the CA adopts a more stringent stance.

Dynamic programming, which has been used lately in simulating decisions in merger analysis, is used in this paper. However, instead of analyzing firm behavior or the decisions of a set of firms interacting strategically, as previously done in other work\(^6\), this paper rather models the decisions of a single CA who


\(^6\) See for example, Gowrisankaran (1999), Holmes and Gowrisankaran (2002), Marino and Zjiang (2002).
behaves optimally with regards to the decision on whether to challenge a notified merger or not.

The remainder of this paper is divided as follows. In Section 2 the related literature is discussed. In Section 3 the model is presented. Section 4 explains some results and implications of the model. In Section 5 policy implications are discussed and Section 6 concludes.

## 2 Related Literature

Evaluating the welfare effects of a horizontal merger is certainly not an easy task and is even controversial in some cases. However, from a theoretical and an empirical perspective, a merger has a competitive and an anti-competitive effect. The competitive effect of a merger arises from the efficiency gains achieved. On the other hand, the anticompetitive effect follows as a consequence of an increase in market power which in turn can result in a price increase.

The welfare effects of horizontal mergers in a homogeneous product industry where firms interact "à la Cournot" and entry is not allowed, are extensively discussed in Farrell and Shapiro (1990). The authors demonstrate that in such an industry any merger that does not create synergies raise prices. The reason is that the concentration causes the merged firm to reduce output, and although the non-merging firms increase output in response, such increase is not enough to restore pre-merger levels of output. Thus, overall output falls and price increases. However, if the merger achieves efficiencies - a reduction in marginal cost - such efficiencies can offset the anticompetitive effect of the merger on prices. Moreover, if cost reductions are large enough output increases and price falls.

In what concerns the behavior of the CA in the presence of a trade off between market concentration and efficiency gains, Besanko and Spulberg (1993) develop a model of antitrust policy-making and enforcement toward horizontal mergers. In their model, there is a potential trade-off between market power and cost savings from the merger. However, firms are assumed to have better information regarding the cost savings than the CAs. As a result of such information asymmetry, they find that expected social welfare, i.e. producer plus consumer surplus, is maximized when the authority makes the enforcement decisions on the basis of a welfare standard that gives strictly greater weight to consumer surplus as compared to a total welfare standard.
In practice many of the CA’s, among them the EC and the FTC, use what is called a consumer welfare standard, which implies that any merger whose likely effect is to increase prices (to diminish consumer welfare) should be deemed unlawful. Probably, the Canadian Authorities are one of the few exceptions to the consumer standard approach. In April 2002 the Canadian Competition Tribunal approved a merger to monopoly in the Superior Propane case using a total welfare standard\(^7\). However, in what concerns merger-specific efficiencies, the EC does not take, at least not yet, efficiencies into consideration while assessing merger effects.

Returning to the concept of alternative mergers, Ivaldi and Verboven (2002) directly address this issue. In their paper, based on the Volvo-Scania case\(^8\), they formulate and estimate an oligopoly model with differentiated products for the truck industry in Europe. Through simulation techniques they then estimate the effects of a merger between Volvo and Scania on firms’ pricing behavior and social welfare. Given that, in the absence of efficiencies any merger would generate an increase in market prices\(^9\), Ivaldi and Verboven consider the effects of potential cost savings. Their results provide a suggestion for the minimum cost savings required from the merger in order for consumer surplus and total welfare to improve. Additionally, they evaluate the effects of two regional mergers, Volvo/Scania and Renault/Iveco, versus the effects of having instead two Pan-European Mergers, Volvo/Renault and Scania/Iveco. The authors find that the Pan European option is better than the regional option in terms of total and consumer welfare\(^10\).

### 3 The Model

Let us consider a homogeneous product industry where the agents interact strategically in quantities (Cournot), there are \(N\) asymmetric firms, where \(N<\infty\) and neither entry nor exit is allowed. The firms are differentiated by their marginal cost, thus, in equilibrium they have different market shares. By merging, firms can generate marginal cost savings and fixed cost savings. Mergers between more than two firms are not allowed. We assume that all mergers generate some efficiencies (fixed or marginal cost savings) such that the following condition is satisfied:

\[
\pi^m \geq \pi^j + \pi^i
\]  

\(^7\) See The Commissioner of Competition v Superior Propane Inc. File No. CT199802.

\(^8\) European Commission, case No. M1157.

\(^9\) See Deneckere and Davidson (1985).

\(^10\) In fact after the Commission blocked the Volvo/Scania merger, a merger between Volvo and Renault was proposed and approved.
The above expression is the Private Interest Condition (PIC), which implies that the profit generated by the new merged entity, \( \pi^m \), must be greater or equal than the sum of pre-merger profits of the merging parties. In other words, a merger must be profitable.

The CA has a consumer welfare standard. Thus, fixed cost savings are not taken into account by the CA. This implies that a merger will be approved by the CA if and only if

\[
\Delta CS = \Delta W \geq 0
\]  
(2)

Expression (2) is the Consumers’ Interest Condition (CIC), which implies that a merger will be approved, if and only if, it does not harm consumers. Given the consumer welfare standard used by the CA, for simplicity, hereinafter I will use the term welfare to denote only consumer surplus.

### 3.1 Optimal Policy with No Alternative Mergers

When the policy maker does not take into consideration alternative mergers, then her decision depends exclusively on whether the notified merger increases welfare in comparison with the welfare level generated by the current market structure. In other words, a merger will be approved if and only if the CIC is satisfied.

As shown by Farrell and Shapiro (1990), any merger failing to deliver efficiencies will result in a price increase. However, if the merger-efficiencies are large enough, the anticompetitive effect of the merger can be counteracted, resulting in a price reduction. Thus, the post-merger price depends on which effect dominates, the market power effect or the efficiency effect. Consequently, the post-merger welfare level, \( W^m \), also depends on the interaction between these two effects.

Following Froeb and Werden (1998)\(^{11}\), the CA recognizes that the level of efficiencies needed to ensure that a merger does not reduce consumer welfare (increase prices), is independent of the demand function and is given by

\[
\bar{e} = \frac{2s_j s_k}{c(s_j + s_k) - (s_j^2 + s_k^2)}
\]

\(^{11}\)Luke Froeb and Gregory Werden have developed a simple methodology for determining when efficiencies are likely to prevent price increases in the two standard unilateral effects models. For homogeneous products see Froeb and Werden (1998) and for differentiated products see Werden (1996).
Where \( \hat{e} \) is the percentage marginal cost reduction\(^{12}\) (level of efficiencies) that restore pre-merger welfare, i.e. \( \Delta W = 0 \), \( \varepsilon \) is the pre-merger equilibrium elasticity of industry demand, and \( s_j \) and \( s_k \) are the output shares of the merging firms, i.e. \( s_j = \frac{Q}{Q} \), where \( Q \) is the aggregate industry quantity. In case the merging firms have equal market shares, \( s_j = s_k = s \), the level of efficiencies required is given by

\[
\hat{e} = \frac{s}{\varepsilon - s} \tag{4}
\]

Thus, once a merger notification is received, by knowing the pre-merger market shares of the merging firms, the CA can calculate the level of efficiencies, \( \hat{e} \), that ensure that pre-merger welfare is restored. Thus, a merger that generates efficiencies \( e \geq \hat{e} \) will be approved since then the CIC is satisfied. This implies that a CA will approve a merger as long as pre-merger welfare is restored, i.e., as long as \( \Delta W = 0 \).

3.2 Optimal Policy with Alternative Mergers

In order to evaluate the welfare effects of a merger, it is necessary to assess what the combined market share\(^{13}\), \( \alpha \), of the proposed merger would be, as a way to measure its potential anticompetitive effect. However, when evaluating the welfare effects of alternative mergers the issue becomes more complicated. In order to assess the combined market share we, first, need to know which alternative merger would actually occur in the industry if the suggested merger proposition was turned down. This is not at all a simple issue and an endogenous merger model would be needed. Fridolfsson and Stennek (2002) could be a good candidate. However, its complexity increases and its level of predictability decreases as the number of asymmetric firms exceeds three. Moreover, it is not evident that the most profitable mergers are the ones that will be observed. Thus, the current status of endogenous merger theory provides little guidance on predicting which merger will occur. Therefore, and given that the CA has to make a decision relatively soon after the merger notification, the CA has to use a more pragmatic approach. Based on the market situation and available information, the CA generates expectations on which merger will occur and

\(^{12}\)Percentage marginal cost reduction is the percentage change between post-merger marginal cost and the pre-merger share-weighed average marginal cost of the merging firms.

\(^{13}\)By combined market share, \( \alpha \), it should be understood the sum of the pre-merger market shares of the potential merging parties. This is how, for instance, the European Commission assess the combined market share of a proposed merger. See Guidelines on the assessment of horizontal mergers under the Council Regulation on the control of concentrations between undertakings\(^{8}\) February 2004. Official Journal of the European Union.
assigns a probability to each possible alternative merger. This enables the CA to calculate the expected combined market share of the next possible merger and its corresponding anti-competitive effect.

It is assumed that all mergers are profitable but not necessarily welfare enhancing, i.e. all mergers can occur. The CA assumes that each of the $N$ firms is selected to bid with equal probability. Once selected, a firm bids with equal probability over the remaining $N-1$ firms\(^{14}\). Under this condition the expected combined market share of the next merger is stated in Lemma 1.

**Lemma 1** *In an industry where $N$ asymmetric firms compete à la Cournot, each firm is selected to bid with equal probability, $\frac{1}{N}$, and where the selected firm bids with equal probability over the remaining $N-1$ firms, the expected combined market share of the next merger, $\bar{\alpha}$, is given by*

$$\bar{\alpha} = \mathbb{E}[\alpha] = \frac{2}{N}$$

**Proof.** See Appendix □

If the expected combined market share is given by $\bar{\alpha}$, then the expected increase in market share is given by $\frac{\bar{\alpha}}{2}$. Thus, we can use equation (4) for symmetric market shares. It will then be possible to determine the level of efficiencies, $e^*$, needed from the *expected* merger to restore pre-merger welfare. Thus, if $s = \frac{1}{N}$, using equation (4) we get

$$e^* = \frac{1}{\varepsilon - \frac{1}{N}} = \frac{1}{N\varepsilon - 1}$$

The chart below shows the level of efficiencies $e^*$, the percentage of marginal cost reduction required to restore pre-merger welfare, as a function of the number of firms in the market for three different values of elasticity demand.

\(^{14}\)The assumption of mergers occurring with equal probability may seem simplistic, but it can be seen as a simplification that will not change the results of the paper. The main issue, as mentioned previously, is that as mentioned previously endogenous merger theory provides little guidance on which merger will occur. Thus it is difficult to pick a probability distribution based on this theory. In any case if mergers are assumed to occur with unequal probabilities, then the expected combined market share of the new entity will be different than the case with equal probabilities. However, it is possible to estimate the level of efficiencies required in order to counteract the anticompetitive effect of this potential merger.
Obviously, the more concentrated the market is, the higher the level of merger-specific efficiencies required.

Now let us consider a CA that receives one merger proposal in each period. At $t = 0$, the CA can assess with certainty the welfare impact of the merger it has at hand\footnote{This assumption comes from the fact that the CA has more time to evaluate the claimed efficiencies of a specific merger, than the potential efficiencies of all the other potential mergers.}, but it does not know which merger will occur in the future neither the level of efficiencies generated by it. However, the CA is aware that future mergers that occur in that particular industry will deliver efficiencies that come from the same probability distribution. In other words, once the future merger has occurred, the new merged entity draws a parameter $e$, the merger efficiencies the deal will deliver, from the probability distribution $F(E) = \text{prob}(e \leq E)$, where $0 \leq e \leq K$ with $E[e] = \mu$, and $Var(e) = \sigma^2$, $F(0) = 0$, $F(K) = 1$ and $K \leq 1$. Where $K$ is interpreted as the maximum level of efficiencies that can be achieved in that industry.

At every period, the Competition Authority must decide whether the proposed merger should be approved or blocked considering that its objective is to maximize the expected discounted value of consumer welfare. If the CA accepts the merger she will get $W^m$ at every period from thereon\footnote{Although this one-merger assumption may seem too restrictive at glance, it is more a simplifying one. Mergers are likely to raise competitive concerns in concentrated markets,}, but if the
CA blocks it then she will get the per period pre-merger level of welfare \( W \) and wait until next period to receive another merger proposal. Once a merger is approved it can not be dissolved. Thus, the CA devises a strategy to maximize 
\[ E \sum_{t=0}^{\infty} \beta^t W_t, \]  
where \( 0 < \beta < 1 \) is the discount factor. Let \( V(W^m, N) \) be the expected value of \( \sum_{t=0}^{\infty} \beta^t W_t \) for a CA that behaves optimally and has a merger proposal that generates \( W^m \) at hand and \( N \) is the current number of firms in the market, the state variable. Thus, the Bellman equation for the CA is

\[
V(W^m, N) = \max\{W^m + \sum_{t=1}^{\infty} \beta^t W^m, \ W + \beta \int_0^K V(W^m(\alpha, e))dF(e)\} \tag{5}
\]

Where the first term on the right hand side of equation (5) is the value of accepting the merger thus, getting post-merger welfare \( W^m \) at every period. The second term is the value of blocking the merger and getting the current value of welfare, \( W \), during the current period, and waiting for another merger to occur in the next period.

Thus, if we define \( \bar{W} \) as the post-merger welfare level at which the CA is indifferent between approving and blocking the merger, i.e. the threshold level of welfare at which a merger will be approved, then we can express equation (5) as follows:

\[
V(W^m, N) = \begin{cases} 
\frac{W^m}{(1-\beta)} & \text{if } W^m \geq \bar{W} \\
\bar{W} = W + \beta \int_0^K V(W^m(\alpha, e))dF(e) & \text{if } W^m \leq \bar{W} 
\end{cases} \tag{6}
\]

Thus the decision rule is: if \( W^m \geq \bar{W} \) approve the merger, otherwise block it. Thus, the point of indifference, \( \bar{W} \), is determined by the intersection of the \( W + \beta \int_0^K V(W^m(\alpha, e))dF(e) \) line and the \( W^m/(1-\beta) \) line. The graph for the expression that will characterize the solution for the reservation level of welfare, \( \bar{W} \), is depicted in Figure 2, where \( Z = W + \beta \int_0^K V(W^m(\alpha, e))dF(e) \).

and given that the efficiencies required to restore pre-merger welfare increase as the number of firms decreases, in concentrated markets it is unlikely that several mergers will be allowed since the level of efficiencies required may become too high to deliver. Moreover, in the absence of high market concentration, a merger is unlikely to reach a stage of further investigation, as shown in Bergman et al (2003), and thus unlikely to reach a stage where alternative mergers are considered. This paper should be seen as applying only when market concentration is high.
A merger that delivers welfare levels to the left of \( \bar{W} \) will be blocked, whereas a merger that generates welfare levels to the right of \( \bar{W} \) will be approved. Thus, the expression that will determine the reservation welfare level, \( W \) is given by:

\[
\frac{\bar{W}}{1 - \beta} = W + \beta \int_0^K V(W^m(\alpha, e)) dF(e)
\]  

(7)

Now, we need to find an expression that will determine the reservation welfare, \( \bar{W} \), at which the policy maker is indifferent between approving or blocking the merger, taking into consideration that the alternative merger has an expected combined market share \( \bar{\alpha} \). Such expression is stated in Proposition 1.

**Proposition 1** A policy maker that takes into consideration alternative mergers when assessing a current merger proposal is instructed to set the reservation level of welfare \( \bar{W} \), such that:

\[
\bar{W} - W = \frac{\beta}{1 - \beta} \int_0^K (W^m(\bar{\alpha}, e) - \bar{W}) dF(e)
\]  

(8)
where \( W \) is the pre-merger welfare level, \( \bar{\alpha} \) is the expected combined market share of the alternative merger and \( e^* \) is the level of efficiencies that exactly counteract the anti-competitive effect from the expected alternative merger.

**Proof.** See Appendix. ■

The left hand side (lhs) of equation (8) is the cost of waiting one more period when a merger notification, that generates welfare \( \bar{W} \), is in hand. The right hand side (rhs) of the equation represents the expected benefit of waiting for an alternative merger to occur, where \( \bar{\alpha} \) is the expected combined market share of the alternative merger, \( e^* \) is the level of efficiencies that counteract its anti-competitive effect and the expectation of \( W^m(\bar{\alpha}, e) \) represents the expected post-merger welfare level delivered by the alternative merger. Thus, \( \bar{W} \) is determined by the point where the cost of waiting equals the benefit of it.

In order to characterize a graphical solution for Proposition 1 let us define the left hand side of eq. (8) as

\[
h(W) = \frac{\beta}{1 - \beta} \int_{e^*}^{K} (W^m(\bar{\alpha}, e) - W)dF(e) \tag{9}
\]

**Lemma 2** The function \( h(W) \) is decreasing in \( W \) and convex to the origin.

**Proof.** See Appendix ■

Thus, based on Lemma 2 the graphical solution of equation (8) can be characterized as shown in Figure 3 where \( h(0) = \frac{\beta}{1 - \beta} \int_{e^*}^{K} (W^m(\bar{\alpha}, e)dF(e). \)
4 Implications and Results

Below, I will explain some of the implications of the suggested model and show that under certain circumstances a CA that takes alternative mergers into consideration, will adopt a more stringent merger policy, implying higher level of efficiencies, than if alternative mergers were irrelevant.

4.1 The Myopic Case ($\beta = 0$)

If the CA is not concerned with the alternative mergers that could occur in the future, this will imply that $\beta = 0$. In this case equation (8) in Proposition 1 becomes $\hat{W} = W$, it is, reservation welfare $\hat{W}$, equals the current welfare level $W$. This implies that the CA will approve any merger that restores (or improves) pre-merger welfare. That is, the decision rule will be exactly as in the static framework explained in section 3.1, where the merger needs to satisfy the Consumers’ Interest Condition. In other words, the merger proposal will be
approved or blocked based on its own merits: its combined market share and its cost efficiencies.

4.2 The Implication of Alternative Mergers

In case the CA takes the future into consideration ($\beta \neq 0$) the possibility of a future "better" merger affects the decision the policy maker makes concerning the merger proposal she has in hand.

**Proposition 2** If the CA takes the future into consideration, $\beta \neq 0$ and if $K > e^*$, the CA will not be satisfied with a merger that just restores pre-merger welfare levels. The new merger has to go beyond and deliver a positive increase in welfare, in other words:

$$W^m \geq W > W^*$$

where $W^*$ is the post-merger welfare level at which the CA is indifferent between approving or blocking a merger and $W$ is the pre-merger welfare level.

**Proof.** In the proof of Lemma 2, we have shown that the right hand side of eq.(8) is positive (above the horizontal axis), as long as $K > e^*$. Thus, if the actual level of welfare $W$ fulfills the condition that $W < W^m(\bar{\alpha}, K)$, then the left hand side of equation (8) intersects the horizontal axes at a point $W^m < \bar{W}$. This implies $\bar{W} > W$, as illustrated in Figure 3. 

The fact that the CA demands that the post-merger welfare level should be higher than the pre-merger level implies that, for any given merger notification the CA receives, it will demand more efficiencies than needed to restore pre-merger welfare. Thus, the CA becomes more demanding in terms of efficiencies generated by the merging parties. This toughness on the side of the CA arises from its "optimism" in assessing the welfare impact of future mergers, since they only take into consideration the welfare effects of those mergers that are not welfare decreasing.

The above result is also valid for cases when the CA has to approve a merger even when all the possible outcomes are anticompetitive, like for example in the "failing firm" case. In this situation, the CA will wait until it receives the merger, that in expectations, is the least harmful for consumer welfare or least anticompetitive. In fact, in the merger regulation, one of the relevant criteria, considered by the Commission, for the use of the "failing firm defense"

---

17 This result, of a more demanding CA, is likely to hold even in the presence of a risk averse CA. As shown in the proof of Proposition 2, as long as $K > e^*$, the rhs of equation (8) is positive and thus the threshold to approve the merger $W^m$ is strictly larger the the current welfare level $W$. 

13
is that "there is no less anti-competitive alternative purchase than the notified concentration."\textsuperscript{18}

4.3 The Impact of the Competition Authority’s Expectations

Another important question to consider is the following, how do the CA’s efficiency expectations, $F(e)$, affect the threshold level of welfare $\bar{W}$? This question is relevant because the expectations of the CA may change depending upon the industry analyzed. In other words, it might be rational to assume that mergers in "new" industries are likely to deliver higher levels of efficiencies than "old" and already consolidated industries. On the other hand, the expectations of the policy maker could shift due to a technological change that indicates that higher efficiencies could be achieved. I will interpret this change as an increase in the mean, $\mu$, of the probability distribution $F(e)$, while the variance remains unchanged.

**Proposition 3** In the presence of a technological change that increases the CA expectations of industry efficiencies i.e. an upward shift in the mean of $F(e)$, the CA will increase its reservation welfare from $\bar{W}$ to $\bar{W}'$, where $\bar{W}' > \bar{W}$, as shown in Figure 4. Thus, the CA becomes tougher and demands higher levels of efficiencies than under previous expectations.

**Proof.** Transforming equation (7) we get:

$$\bar{W} = (1 - \beta) \left[ W + \beta \int_0^K V(W^m(\alpha, e))dF(e) \right]$$ \hspace{1cm} (10)

and defining

$$\bar{W}' = (1 - \beta) \left[ W + \beta \int_0^K V(W^m(\alpha, e))dF'(e) \right]$$

where $F(e)$ is a probability distribution with mean $\mu$ and variance $\sigma^2$ and $F'(e)$ is a probability distribution with mean $\mu_1$ and variance $\sigma^2$. Then if $\mu_1 > \mu$, it follows that

$$\int_0^K V(W^m(\alpha, e))dF'(e) > \int_0^K V(W^m(\alpha, e))dF(e)$$

Thus, \( \bar{W}' > \bar{W} \). 

\[ \frac{W^m}{(1-\beta)} \]

\[ V(W^m) \]

\[ Z' \]

\[ Z \]

\[ \frac{1}{(1-\beta)} \]

\[ \bar{W} \quad \bar{W}' \quad W^m \]

**Figure 4**

In conclusion, and as indicated in the figure, an increase in the mean of \( F(e) \), will make competition authorities more demanding since the level of welfare required to approve the merger increases from \( \bar{W} \) to \( \bar{W}' \).

Now let us consider another change in the CA’s expectations. What if there is a mean preserving increase in spread of \( F(e) \)? In other words, what if the level of efficiencies come from a more risky probability distribution so that there is a higher probability of obtaining extreme values of efficiency gains. Since this increase in the variance of \( F(e) \) does not alter its mean, the impact of such change is not as straightforward as the previous result.

**Proposition 4** If the level of efficiencies that can be achieved through a merger in an industry becomes more uncertain, i.e. a mean preserving increase in spread of \( F(e) \), the CA will react to such increase by toughening its stance towards mergers. It will increase its reservation level of welfare and thus demand higher efficiencies from the merger proposal it has in hand.
**Proof.** By looking at equation (8),

\[ W - W = \frac{\beta}{1 - \beta} \int_{e^*}^{K} (W^m(\bar{x}, e) - W) dF(e) \]

we can observe the following: The right hand side of the equation only considers realizations of efficiencies that range from \( e^* \) to \( K \). It implies, that the equation that instructs the policy maker how to set \( \bar{W} \) is not considering the values of efficiency below \( e^* \). Since the increase in the variance implies fatter tails for \( F(e) \), then the probability of having an outcome between \([e^*, K]\) is higher than under a probability distribution with lower variance. As a consequence, the curve that represents the right hand side of equation (8) will shift outwards as indicated in Figure 5 below. \[ \square \]

![Figure 5](image-url)

Thus, as a consequence of the risk increase (the variance) of the probability distribution \( F(e) \), the CA becomes tougher since \( \bar{W} \) switches to \( W' \). The reason
for this result is more intuitive than one would think at first sight. The CA is confronted with a probability distribution with a high likelihood of getting extreme level of efficiencies, low and high. However, the CA becomes tougher since it is protected against very low levels of efficiencies (low levels of welfare), given that it can always block the merger and remain with the current welfare level. On the other hand the likelihood of very large future efficiencies increases. Hence, the increase in risk, increases the benefit or waiting.

5 Policy Implications

We have seen that a policy maker who considers alternative mergers will increase merger-efficiency demands from the notified concentration (Proposition 2) and this will lead to a higher level of consumer welfare. Nevertheless, and although at first sight such merger policy may look appealing for its consumer welfare implications, CAs should be cautious in implementing such policy or at least to explicitly consider it in their merger guidelines.

Taking alternative mergers into account could work as a commitment device that helps the policy maker to demand higher post-merger welfare levels than the pre-merger ones. In other words, a merger policy that considers alternative mergers will never be consumer welfare decreasing.

On the other hand, if CAs explicitly adopt, in their guidelines, a merger policy with alternative mergers, there is another important issue to consider: the increase in incentives for market players to put political pressures on the antitrust enforcers. Political influences cannot be simply ignored, "[t]hey are especially strong in the antitrust arena, where decisions and policy measures often significantly affect the profitability of market players."\(^{19}\) In the model presented above, we have shown that the policymaker’s expectations, with respect to the levels of efficiency that can be achieved through mergers, play an important role in the stance the policymaker adopts. As uncertainty on industry merger-efficiencies increases, the CA adopts a more demanding stance towards the notified merger (Proposition 4). It is precisely this feature that could constitute an open door for political pressures on the antitrust enforcers. Firms, opposing a notified merger, are aware that by affecting the enforcer’s expectations, they could harden the CA’s stance and therefore, the likelihood of blocking the notified merger increases.

As previously mentioned, merger-efficiencies are difficult to assess due in part to the asymmetry of information. If a CA had to assess not only the efficiencies of the notified merger but the potential efficiencies of the potential

\(^{19}\) Gal (2003)
ones, then outsider firms to the notified merger can try to affect the enforcer’s expectations. Moreover, the higher the stakes of firms, countries or private groups in the decision at hand, the stronger the motivations to influence the CA. Thus, before adopting a merger policy that explicitly considers alternative mergers, authorities should be aware of the incentives that market players have to increase political pressure to influence the enforcer’s decision.

6 Conclusions

Considering alternative mergers has recently been suggested as a possibility in merger control. This paper shows that under plausible conditions a merger policy that takes into consideration alternative mergers, will result in a more demanding CA that will not be satisfied with merger-efficiencies that only restore pre-merger welfare levels. As a consequence consumer welfare will increase. We have also shown that merger-efficiency expectations, play an important role on the stance the CA adopts. Moreover, technological shocks or increases in the uncertainty of such efficiencies will result in a more demanding policy maker.

However, and although the idea of alternative mergers sounds appealing because its consumer welfare implications, CA should be cautious in adopting such policy without stating it in their merger guidelines since it could lead to a merger policy that blocks a "legal" merger under the current merger regulations. On the other hand, a merger policy that explicitly considers alternative mergers could become an open door for political pressures. Firms or countries opposing a notified merger have strong incentives to influence the CA’s expectations in order to make it adopt a tougher stance towards the proposed merger.

Hence, although a merger policy that takes into consideration alternative mergers is never consumer welfare decreasing, CAs should be cautious in adopting such a policy since it would be information wise more demanding and its negative side-effects may be significant.
References


Appendix

Proof of Lemma 1.

\[
E(\alpha) = \frac{1}{N} \left[ \frac{1}{(N-1)} \left( \frac{q_1 + q_2}{Q} \right) + \frac{1}{(N-1)} \left( \frac{q_1 + q_3}{Q} \right) + \ldots + \frac{1}{(N-1)} \left( \frac{q_1 + q_n}{Q} \right) \right] + \\
\frac{1}{N} \left[ \frac{1}{(N-1)} \left( \frac{q_2 + q_1}{Q} \right) + \frac{1}{(N-1)} \left( \frac{q_2 + q_3}{Q} \right) + \ldots + \frac{1}{(N-1)} \left( \frac{q_2 + q_n}{Q} \right) \right] + \\
\ldots + \frac{1}{N} \left[ \frac{1}{(N-1)} \left( \frac{q_n + q_1}{Q} \right) + \frac{1}{(N-1)} \left( \frac{q_n + q_2}{Q} \right) + \ldots + \frac{1}{(N-1)} \left( \frac{q_n + q_{n-1}}{Q} \right) \right]
\]

The above expression is equivalent to

\[
E(\alpha) = \frac{1}{N} \left[ \frac{1}{(N-1)} \left( \frac{(N-1)q_1 + \sum_{i=2}^{N} q_i}{Q} \right) \right] + \frac{1}{N} \left[ \frac{1}{(N-1)} \left( \frac{(N-1)q_2 + \sum_{i \neq 2}^{N} q_i}{Q} \right) \right] + \\
\ldots + \frac{1}{N} \left[ \frac{1}{(N-1)} \left( \frac{(N-1)q_n + \sum_{i=1}^{N-1} q_i}{Q} \right) \right]
\]

\[
E(\alpha) = \frac{1}{N} \left[ \frac{1}{(N-1)} \left( \frac{(N-1)q_1 + Q - q_1}{Q} \right) \right] + \frac{1}{N} \left[ \frac{1}{(N-1)} \left( \frac{(N-1)q_2 + Q - q_2}{Q} \right) \right] + \\
\ldots + \frac{1}{N} \left[ \frac{1}{(N-1)} \left( \frac{(N-1)q_n + Q - q_n}{Q} \right) \right]
\]

\[
E(\alpha) = \frac{1}{N} \left[ \frac{1}{(N-1)} \left( \frac{(N-2)q_1 + Q}{Q} \right) \right] + \frac{1}{N} \left[ \frac{1}{(N-1)} \left( \frac{(N-2)q_2 + Q}{Q} \right) \right] + \\
\ldots + \frac{1}{N} \left[ \frac{1}{(N-1)} \left( \frac{(N-2)q_n + Q}{Q} \right) \right]
\]

\[
E(\alpha) = \frac{1}{N} \left[ \frac{1}{(N-1)} \left( 1 + \frac{(N-2)q_1}{Q} \right) \right] + \frac{1}{N} \left[ \frac{1}{(N-1)} \left( 1 + \frac{(N-2)q_2}{Q} \right) \right] + \\
\ldots + \frac{1}{N} \left[ \frac{1}{(N-1)} \left( 1 + \frac{(N-2)q_n}{Q} \right) \right]
\]

\[
E(\alpha) = \frac{1}{N} \left[ \frac{1}{(N-1)} \right] \left[ 1 + \frac{(N-2)q_1}{Q} + 1 + \frac{(N-2)q_2}{Q} + \ldots + 1 + \frac{(N-2)q_n}{Q} \right]
\]

21
\[ E(\alpha) = \frac{1}{N} \left( \frac{1}{N-1} \right) \left[ N + \frac{(N-2)Q}{Q} \right] = \frac{1}{N} \left( \frac{1}{N-1} \right) [2(N-1)] \]

\[ E(\alpha) = \frac{2}{N}. \]

Proof of Proposition 1.

\[ \frac{W}{(1 - \beta)} = W + \beta \int_0^K V(W^m(\tilde{\alpha}, e))dF(e). \] (11)

Using expression (6) we can express the right hand side of (11) as

\[ \frac{W}{(1 - \beta)} = W + \beta \int_0^{e^*} \frac{W}{1 - \beta} dF(e) + \beta \int_{e^*}^{K} \frac{W^m}{1 - \beta} dF(e). \] (12)

Transforming the left hand side of (12) we get

\[ \frac{W}{(1 - \beta)} \int_0^{e^*} dF(e) + \frac{W}{(1 - \beta)} \int_{e^*}^{K} dF(e) = W + \beta \int_0^{e^*} \frac{W}{1 - \beta} dF(e) + \beta \int_{e^*}^{K} \frac{W^m}{1 - \beta} dF(e). \]

Rearranging terms,

\[ \frac{W}{(1 - \beta)} \int_0^{e^*} dF(e) - W - \beta \int_0^{e^*} \frac{W}{1 - \beta} dF(e) = \beta \int_{e^*}^{K} \frac{W^m}{1 - \beta} dF(e) - \frac{W}{(1 - \beta)} \int_{e^*}^{K} dF(e). \]

Equivalently,

\[ W \int_0^{e^*} dF(e) - W = \beta \int_{e^*}^{K} \frac{W^m}{1 - \beta} dF(e) - \frac{W}{(1 - \beta)} \int_{e^*}^{K} dF(e). \]

Adding \( W^m \int_{e^*}^{K} dF(e) \) to both sides of the above equation we get

\[ W^m - W = \beta \int_{e^*}^{K} \frac{W^m}{1 - \beta} dF(e) - \frac{W}{(1 - \beta)} \int_{e^*}^{K} dF(e) + W \int_{e^*}^{K} dF(e) \]

\[ W - W = \beta \int_{e^*}^{K} \frac{W^m}{1 - \beta} dF(e) - \frac{W}{(1 - \beta)} \int_{e^*}^{K} dF(e) \]

\[ W - W = \frac{\beta}{(1 - \beta)} \int_{e^*}^{K} (W^m - W) dF(e). \]
Proof of Lemma 2. If equation (9), \( h(W) = \frac{\beta}{1-\beta} \int e^x (W^m(\bar{\alpha}, e) - W) dF(e) \)
then \( h(0) = \frac{\beta}{1-\beta} \int e^x (W^m(\bar{\alpha}, e), \text{ which is positive, and } h(W^*) = 0 \text{ where } W^* = W(\bar{\alpha}, K). \) In order to check the concavity properties of equation (9), it is important to notice the following: As the level of welfare demanded from merger, \( W, \) increases, then the minimum level of efficiencies required will also increase. In other words, the lower limit of the integral depends also on the welfare level that the policy maker is demanding. Thus, in order to differentiate equation (9) we need Leibniz’ rule\(^{20}\). Using this rule and differentiating the above equation with respect to \( W, \) we get that

\[
h'(W) = \frac{\beta}{1-\beta} \int e^x f(e) de = -\frac{\beta}{1-\beta} [F(K) - F(e^*)] \\
h'(W) = -\frac{\beta}{1-\beta} [1 - F(e^*)] < 0
\]

with the second derivative

\[
h''(W) = \frac{\beta}{1-\beta} \left( \frac{\partial F(e^*)}{\partial W} \right) > 0.
\]

Thus, based on the first and second derivatives we can note that \( h(W) \) is decreasing and convex to the origin. ■

\(^{20}\)Let \( \Phi(t) = \int_{\alpha(t)}^{\beta(t)} f(x, t) dx \) for \( t \in [c, d]. \) Assuming that \( f \) and \( f_r \) are continuous and that \( \alpha \) and \( \beta \) are differentiable on \([c, d]. \) Then Leibniz’s rule establishes that \( \Phi(t) \) is differentiable on \([c, d] \) and \( \Phi'(t) = f[\beta(t), t] \beta'(t) - f[\alpha(t), t] \alpha'(t) + \int_{\alpha(t)}^{\beta(t)} f_r(x, t) dx. \)