Decision-making in Merger Control: The Influence of Policy Preferences and Communication on the Choice of a Welfare Standard

An Renckens*

ABSTRACT – The paper presents a three-stage game to analyse the optimal welfare standard (a weighting of consumer and producer surplus) competition authorities should apply in merger policy. Besides the role of efficiencies, two implementation issues matter. First, communication between the merging parties and the competition authority is costly, so the parties should get incentives to investigate efficiency gains. Second, policymakers have their own preferences about the welfare standard. The model shows a non-increasing relationship (after a certain cut-off point) between the optimal welfare standard and policy preferences (both in terms of the importance assigned to producer surplus). Moreover, although policymakers should in general adapt their preferences in the direction of consumers' interests, a pure consumer welfare standard would almost never be optimal.

1. Introduction

The implementation of the new EC Merger Regulation (ECMR)[1] on 1 May 2004 made an important change in the assessment of mergers. The formal shift from the old 'dominance' test to the new 'SIEC' test[2] made clear that the commission wanted to continue its approach to focus more on market-related effects of mergers instead of only looking at structural parameters (market shares, concentration ratios). Although under the old regulation it was already recognized that a merger giving rise to a position of market leadership (dominance) for the merging parties, is not necessarily anti-competitive (in case of low entry barriers, buyer power,…), the new test adds new arguments why dominant firms might not raise

[1] Council Regulation 139/2004 (replacing Council Regulation 4064/89)
[2] Significant Impediment of Effective Competition

competition concerns. Moreover, the new test also takes into account that even mergers where the parties do not obtain a dominant position might be damaging for competition.

The paper will focus on the role of efficiency gains as argument to mitigate possible welfare-reducing effects of mergers where the firms obtain a dominant position in the market. Policymakers and economists seem to have a different point of view on the role of efficiencies in merger control. Economists - starting with the seminal work of Williamson (1968) - are already long time aware of the trade-off between the negative effect of increased market power and the positive effect of efficiency gains on welfare. In contrast, policymakers (in particular EU-policy) merely have a tradition to focus more on the anti-competitive effects of mergers (the effect on prices and the consequences for consumers) and to be less concerned about the possible positive effects of mergers through efficiency gains. The new ECMR seems to be willing to reduce this gap by assigning more weight to efficiencies[3].

This evolution in EU merger policy might have implications for the optimal choice of a welfare standard. The welfare standard is a rather abstract concept applied in all types of policy design, i.c. merger policy. In short it determines how policy takes into account the interests of all players in the market: consumers and producers (merging parties and their competitors). In this sense the only relevant factors to look at when assessing a merger are the effects on producer and consumer surplus (PS and CS respectively). The impact of the merger on employment or other policy issues is not taken into account. Therefore, the welfare standard can be represented by a weighting of consumer and producer surplus: $CS + \alpha'PS$, where the weighting factor α' represents the welfare standard[4]. This α' should not be confused with the - exogenously determined - policy preferences (represented by parameter α).

The main purpose of this paper is to look at the effect of taking into account costly communication and policy preferences on the choice of a welfare standard. In sum, there would exist a non-increasing relationship between policy preferences and the optimal welfare standard (from a certain cut-off point onwards). More specifically, for a broad range of policy

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[3] However three requirements still have to be fulfilled before efficiencies shall be taken into account: merger-specificity, verifiability and pass-on to consumers. The merging parties also bear the burden of proof. This may explain why efficiency gains have up to now never been invoked as main argument to clear an at first sight anti-competitive merger.
[4] If α' equals 0, then we have a pure consumer welfare standard; if α' equals 1, then we have a total welfare standard; if α' lies between 0 and 1, then policy is relatively more concerned about consumers; if α' is higher than 1, then policy is more concerned about producers.

preferences assigning at least some positive weight to producer surplus would be optimal. Only for policy preferences that are very much biased towards either of the two parties' interests (only consumers or only producers), it would be better to give no weight to PS or at least less weight than to CS. For an intermediate range of policy preferences it would be optimal to assign the maximum weight to producer surplus. Although policymakers should in general adapt their own preferences in the direction of more attention for consumers' interests, a pure consumer welfare standard would almost never be optimal.

This result contrasts with the literature on welfare standards. Different papers, focussing on different aspects, come to the conclusion that a pure consumer welfare standard would perform better in most situations (i.e. giving no weight to PS). Besanko and Spulber (1993) focus on the presence of *asymmetric information*. Because the merging parties have superior information about the cost savings resulting from their merger, a welfare standard giving relatively higher weight to consumer surplus would be good to counteract the negative consequences of this information bias. Werden (1996) looks at the practical side and argues that a pure consumer welfare standard is easier to deal with for competition authorities (CA), because *less information is then required* to make a well founded decision. Neven and Röller (2005) focus on the *political environment* and analyze how lobbying and 'regulatory capture' may influence the choice of a welfare standard. Finally, Lyons (2002) takes into account different *market structures* and the presence of *alternative merger possibilities*. All these papers do not take into account that communicating efficiencies is costly for the merging parties, so that they should be given incentives to be willing to incur these investigation costs. The study of Heidhues and Lagerlöf (2005) is more related to the analysis in this paper. These authors also take into account that information processing/acquisition is costly (and so detrimental to total welfare). However, while this paper merely focuses on the choice of a welfare standard, Heidhues and Lagerlöf derive conditions to determine when an 'efficiency defence' would be desirable. By taking into account policy preferences more explicitly, this paper may also explain why different competition authorities from different jurisdictions over the world apply different welfare standards.

The paper is organized as follows. Section 2 discusses the relevance of costly communication in competition policy issues. Section 3 describes the setup and outcomes of the game. Section 4 concludes. Directions for future research are set out in section 5.

2. Preliminary discussion: costly communication

Before digging into the model, I show the relevance of this problem by answering the following three questions: (1) why is communication between firms and competition authorities desirable? (2) why should firms and competition authorities get incentives to communicate? (3) how can policy design contribute to the provision of these incentives?

(1) Why is communication between firms and competition authorities desirable?
To make economically relevant decisions - as the new ECMR requires - two possible effects of a merger on social welfare should be considered:

1. On the one hand, the merging parties may see a merger as an ideal opportunity to strengthen their position in the industry and to gain market power. An increase in market power usually reflects the possibility to raise prices, hereby increasing the parties' profits, while at the same time reducing consumer surplus.

2. On the other hand, mergers may contribute to the realization of economies of scale/scope and as a consequence generate efficiencies that might otherwise remain unexploited. Efficiency gains are represented by a decrease in marginal costs of the merging firms giving rise to an increase in producer surplus[5].

If information on both effects were publicly available, competition authorities would be able to take a decision just by comparing the importance of these changes in consumer and producer surplus resulting from the merger: a merger would be permitted if and only if the increase in producer surplus - due to higher efficiencies/cost savings - would outweigh the decrease in consumer surplus - due to increased market power/higher price. In practice competition authorities do not have this information - certainly not on the cost side - which makes it very difficult for them to assess correctly the impact of the merger on social welfare. However, the merging firms do possess (after investigation) private information about the effect of the merger on marginal costs. This *information asymmetry* makes information sharing (communication) between merging firms and competition authorities desirable for optimal decision-making[6].

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[5] Efficiencies may also raise consumer surplus, if the cost savings are high enough to make firms willing to decrease prices.
[6] Not only the merging firms may provide information about the effects of the merger; also other interested (third) parties - competitors and customers - are asked to give their opinion about the transaction and as a consequence are an important source of information. However, while third parties may be useful in the provision of information on the anti-competitive effects of a merger, information on efficiencies merely has to come from

(2) Why should firms and competition authorities get incentives to communicate?

Communication is not problematic if it is costless and if the interests of the communicating parties (sender and receiver) are perfectly aligned. However, these two conditions are often not met in practice and certainly not in merger control. I will briefly explain how these communication costs and conflicting preferences can be interpreted and why they are relevant to consider.

Communication costs – As in Dewatripont and Tirole (2005) communication is assumed to be costly. First, when firms have the opportunity to defend the merger by invoking efficiency arguments, they also have to provide *hard* (verifiable) information; it is not sufficient to make a *cheap talk* statement (provide *soft* information at no cost) about possible efficiency realizations. As a consequence, firms have to investigate the possibilities for efficiency realizations and report the result of their investigation to the competition authority. These investigation costs can then be seen as communication costs[7] (cf. infra).

However it is not sufficient that firms provide efficiency arguments: competition authorities should also be willing to take into account these arguments. So communication costs of the merging parties may also be interpreted in terms of effort to convince the CA of the relevance of their arguments. This is more difficult if the preferences of the CA differ more from those of the merging parties, since the CA also has to exert costly effort to try to understand the efficiency arguments (they also incur communication costs).

Conflicting preferences - When the interests of communicating parties are not perfectly aligned, a suboptimal level of communication (i.c. an insufficient level of investigation by the merging firms and insufficient attention to efficiency arguments by the CA) or even a communication breakdown (i.c. not notifying or abandoning the idea to merge) may result (Dewatripont and Tirole (2005)). The larger this conflict in interests, the more difficult it becomes to communicate. In merger cases the interests of the merging parties and policymakers/CA differ to a higher or lower extent: mergers resulting in higher market power can be assumed to be always beneficial for the merging firms, while the CA should prevent

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the merging firms self. Since in this model information sharing only concerns efficiencies, only communication between the merging firms and the competition authority is relevant.

[7] Dessein (2003) also considers investigation costs as communication costs. However in Dessein (2003) only the receiver of private information has to conduct costly investigations, while in this model only the sender of information (the merging firms) has to investigate efficiency realizations. Investigation costs refer to undertaking studies, writing reports,… by firms' own personnel or by external consultants.

them (opposite preferences); on the other hand, these mergers may still generate efficiencies that are beneficial for both parties (same preferences).

If the CA lacks own preferences and just decides according to the decision rule assigned by policy, the relevant conflict in interests is the one between policymakers and merging firms, the height of which is related to the policymakers' choice of a welfare standard. On the other hand also the CA may have own preferences with respect to the decision criterion and interpret the merger guidelines (designed by policy) accordingly. This point is made in Besanko and Spulber (1993) and Neven and Röller (2002); the latter argue that *"[…] EU merger control is not sufficiently accountable and its decision-making process enjoys excessive discretion. […] individual civil servants and more generally the hierarchy of the MTF[8] can pursue their own objectives at the expenses of those assigned by the regulation"*. This conflict in interests has an impact on the amount of communication between the merging firms and the CA. If preferences of the CA are biased towards firms' (consumers') interests, then they will (not) be eager to take into account efficiency arguments and exert a lot of effort to communicate with the merging firms (to investigate their arguments, read their reports,…). In turn, this influences the communication efforts of the merging firms: if they expect that the CA will not listen to their arguments or if they take it for granted that the CA will always be in favour of the merger (allowing it without further investigation of efficiency claims[9]), they will be discouraged to investigate efficiency opportunities. In sum, when the CA has its own preferences, firms may be uncertain or too certain about the extent to which their efficiency arguments will be taken into account, even if they can observe the decision rule designed by policymakers, since it is not sure that this rule will be followed strictly [10].

(3) How can policy design contribute to the provision of these incentives?

Before answering this question, it is good to explain how merger policy is exactly defined in this paper. Merger policy is reduced here to policy's choice of a welfare standard - to be used

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[8] Since the reform in 2004, the Merger Task Force (MTF) has been replaced by the Merger Control Network.
[9] In the terminology of Dewatripont and Tirole (2005): rubberstamping the request to merge; as in Aghion and Tirole (1997): firms obtain *real* decision-making authority.
[10] Several arguments can be given why firms are unsure about the fact that their efficiency claims will be heard. First, although the new ECMR clearly states that efficiencies will be given a major role, efficiency claims will only be taken into account if they are expected to be passed on to consumers. Second, the merger guidelines state that it is unlikely that efficiencies will be sufficient to permit a merger leading to a (quasi-) monopoly to be cleared. Third, there is also the risk of the so-called *efficiency offence*: the CA may be tempted to interpret too high efficiency gains as a sign that the merged entity will distort competition in the market because of their advantageous cost structure (cf. Neven and Röller, 2002, note 13). This makes firms reluctant to claim high efficiency gains.

by the CA in the assessment of mergers[11]. In the model the welfare standard is defined by the weight (α') given to the (expected) change in producer surplus due to the merger[12], while the weight to the (expected) change in consumer surplus is normalized to one. Therefore, in order to give firms and competition authorities incentives to communicate, it might be better for policymakers to deviate from their own preference (their preferred weight assigned to PS, α).

When choosing the appropriate welfare standard (α'), policymakers face a trade-off. First, when ignoring the CA's preferences and only taking into account communication efforts of the merging firms, this trade-off is the following: when choosing a too low weight firms may refrain from notifying (to avoid costly investigations), since the probability of a clearance is too small if the CA is not supposed to take into account efficiency considerations. As a consequence, profitable mergers might not be implemented. Communication can then be stimulated by assigning high enough weight to PS[13]. On the other hand, if the weight is too high, it may be in the interest of all firms (also inefficient ones) to notify because the probability of clearance will be very high. Next, own preferences of the CA may again influence the choice of the weight. The larger the conflict in interests (i.e. the more the CA is biased in favour of consumers) the more 'costly' it is for the CA to listen to efficiency arguments of the parties, which could make a lower weight more attractive (e.g. to increase transparency of merger policy). But larger conflicts make firms more doubtful about whether their arguments will be taken into account, so that a higher weight may be better to make firms willing to communicate. In sum, when taking into account communication costs and conflicting preferences, it is not a priori clear how policymakers should choose the optimal welfare standard to improve decision-making. Therefore it is useful to investigate this question by a theoretical model.

In this paper I will only take into account communication costs of the merging firms. As a consequence the CA is assumed to be a "passive" or "neutral" player in the sense that it does

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[11] So merger policy is defined differently here than in other papers; Heidhues and Lagerlöf (2005, p.8) define merger policy by the probability that the merger will be allowed (following the approach taken in BS (1993)), depending on the height of efficiency realizations.
[12] The higher the weight assigned to producer surplus, the more competition authorities are expected to take into account firms' interests in their decision.
[13] Apart from incentive considerations transparency of merger policy is another argument why it might be important to give sufficient weight to producer surplus. This can be understood as follows: whereas in the past EU merger policy was biased in favour of consumers, relatively few mergers were rejected. From this it can be inferred that the Commission - applying a consumer welfare standard - already took into account that merging firms attained a certain level of efficiency gains. It would be good for transparency of policy to make the extent to which firms' interests are taken into account more visible through another choice of standard.

not choose its communication effort (communication costs are fixed) and takes objective decisions since it lacks own preferences (and therefore perfectly obeys to the welfare standard set by policymakers that fully determines to which extent efficiency arguments should be taken into account). In section 5, I will indicate in which direction this simple model can be extended to take into account communication effort and own preferences of the CA (making them "active" players).

3. Description of the game

The basic set-up of the model follows from a combination of Williamson's classical (1968) model and recent insights about communication in Dewatripont and Tirole (2005).

MARKET STRUCTURE

As in Williamson (1968) merger policy is defined here as a balancing of the changes in consumer and producer surplus. Depending on the chosen welfare standard (determined by policy preferences and the height of communication costs), efficiencies play a more or less important role in the assessment of mergers.

Figure 1: Graphical representation of the model
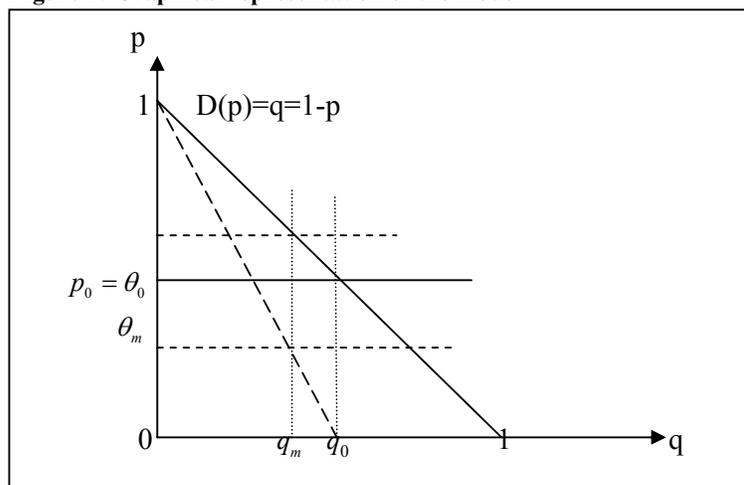
Williamson starts from a pre-merger Bertrand duopoly, so that a merger between the two market parties results in a monopoly (figure 1) [14]. Two extra assumptions are made:

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[14] One might argue that a merger resulting in monopoly has very little probability to be cleared (even if huge efficiencies are realized). However, one could think of the presence of a capacity-constrained fringe, besides the two merging firms. A merger then results in a dominant position (position of market leadership) for the merging

(A1): $p_0 = \theta_0 \in \left(0, \frac{1}{2}\right]$

(A2): $D(p) = 1 - p$

The first assumption implies that there is always a trade-off between decreased consumer surplus and increased producer surplus. After the merger marginal cost has decreased to θ_m and price has increased to p_m, with $\theta_m < p_0 = \theta_0 < p_m$. This is the most interesting situation for the purpose of this paper, since decision-making is only difficult if the effects on CS and PS are opposite and so really have to be balanced against each other. The choice of the welfare standard is crucial for the decision-making procedure.

The second assumption characterises market demand, which makes it possible to calculate the analytical expressions of the changes in CS and PS:

- Change in consumer surplus $\equiv \Delta CS = -\frac{1}{2}(p_m - p_0)(q_m + q_0) = -\frac{1}{2}\left(\frac{1+\theta_m}{2} - \theta_0\right)\left(\frac{1-\theta_m}{2} + 1 - \theta_0\right) < 0$

- Change in producer surplus $\equiv \Delta PS = q_m(p_m - \theta_m) = \left(\frac{1-\theta_m}{2}\right)^2 > 0$

INTERACTION BETWEEN THE MERGING FIRMS AND THE COMPETITION AUTHORITY

Efficiency gains resulting from the merger are modelled by the decrease in marginal costs. The height of the expected post-merger marginal cost level (and related price increase) depends on the amount of communication effort (*x*) of the merging parties. Communication effort can be interpreted in two ways. On the one hand, *x* can be interpreted as the amount of (verifiable) information the parties gathered after investigating the possible efficiency realizations resulting from the merger. On the other hand, *x* can be seen as the degree by which the merging firms can convince the CA of the efficiency realizations. In any way, *x* influences the competition authority's view on the post-merger market situation. If no communication effort has been exerted (i.e. no information has been provided or the parties could not convince the CA; *x = 0*), the CA does not believe that efficiency gains will be realized; therefore, the *ex ante* (i.e. before receiving convincing information) expected level of

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parties instead of monopoly. Moreover, the ECMR stresses that dominance alone is not a sufficient condition to prohibit a merger. What really counts is the effect of the merger on the market, not market shares alone.

marginal costs (θ^{EA}) equals θ_0[15]. It is also assumed that the more communication effort is exerted (i.e. the higher x), the more the CA believes that the post-merger marginal cost will decrease. Therefore, the *ex post* (i.e. after receiving convincing information) expected level of marginal costs (θ^{EP}) can be formalised by $(1-x)\theta_0$. The expected changes in CS and PS can therefore be written as follows:

$$\Delta CS^e = -\frac{1}{2}\left(\frac{1+(1-x)\theta_0}{2}-\theta_0\right)\left(\frac{1-(1-x)\theta_0}{2}+1-\theta_0\right)$$

$$\Delta PS^e = \left(\frac{1-(1-x)\theta_0}{2}\right)^2$$

Since information on efficiencies should be verifiable, communication is costly (no cheap talk). Communication costs are assumed to be increasing and convex in communication effort: $S(x) = \frac{1}{2}cx^2$. The merging parties face a trade-off: the more communication effort they exert, the more the CA will become convinced that efficiencies will be realized (i.e. that marginal cost will decrease) and so the higher the probability that the merger will be cleared. However, more communication effort entails higher communication costs, affecting the post-merger pay-off of the merging parties negatively.

THREE-STAGE GAME

The decision-making procedure in merger control can be described in general terms as a three-stage game (cf. appendix 1). First, policymakers determine the welfare standard (α') on which the CA has to base its decision, according to their own preferences (α) and communication costs ($S(x)$) of the merging parties[16]. Second, firms - knowing the welfare standard - decide how much communication effort they have to exert to convince the CA of the appropriateness of the merger. They balance the expected gains from merging with the costs of communication. Third, the CA decides whether to clear the merger. Lacking own preferences, they exclusively base their decision on the welfare standard imposed by policy and on the information received by the merging parties. Only if the expected change in social welfare (weighting of CS and PS) due to the merger is positive, the merger will be cleared.

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[15] This assumption is in line with the current regulation: the merging parties have the burden of proof when invoking efficiency arguments. If the parties do not take the initiative to provide information, then no efficiency gains from merging are assumed.

[16] Since the CA lacks own preferences, it does not choose communication effort, but just investigates the received information to the maximum extent, hereby just following the imposed welfare standard.

This game can be solved by backward induction.

Stage 3: The CA decides whether to clear (k = 1) or to prohibit (k = 0) the merger. Mergers are only assessed with respect to their impact on the expected change in (weighted) social welfare: $\Delta W^e = \Delta CS^e + \alpha' \Delta PS^e$. Therefore the decision rule can be formalised as follows:

$$\begin{cases} k=1 & \text{iff} \quad -\dfrac{1}{2}\left[\dfrac{1+(1-x)\theta_0}{2}-\theta_0\right]\left[\dfrac{1-(1-x)\theta_0}{2}+1-\theta_0\right]+\alpha'\left[\dfrac{1-(1-x)\theta_0}{2}\right]^2 \geq 0 \\ k=0 & \text{otherwise} \end{cases}$$

This can be rewritten in terms of the minimum required communication effort the merging parties have to exert before they can convince the CA of the appropriateness of their merger.

$$\begin{cases} k=1 & \text{iff} \quad x \geq x^{oo} = \dfrac{1-\theta_0}{\theta_0}\left(\dfrac{2}{\sqrt{1+2\alpha'}}-1\right) \\ k=0 & \text{otherwise} \end{cases}$$

Since x is assumed to be uniformly distributed on the interval [0,1], the probability that the merger will be cleared is given by the following expression:

$$\Pr(k=1|\alpha',\theta_0) = \Pr(x \geq x^{oo}|\alpha',\theta_0) = 1-x^{oo} = \dfrac{1}{\theta_0}\left(1-\dfrac{2(1-\theta_0)}{\sqrt{1+2\alpha'}}\right).$$

Since the value of x^{oo} should lie between 0 and 1 (to have realistic values for the clearance probabilities), the range of feasible α'-values is restricted to: $\tilde{\alpha}'(\theta_0) \equiv 2\theta_0^2 - 4\theta_0 + \dfrac{3}{2} \leq \alpha' \leq \dfrac{3}{2} \equiv \alpha'_{max}$.

Stage 2: The merging parties decide on how much communication effort they have to exert to convince the CA of the efficiency realisations, by balancing communication costs ($S(x)$) and the expected pay-off from merging (i.e. $\Pr(k=1|\alpha',\theta_0)\cdot\Delta PS^e$). The optimization problem of the merging parties is the following: $\underset{x}{Max}\left\{\dfrac{1}{\theta_0}\left(1-\dfrac{2(1-\theta_0)}{\sqrt{1+2\alpha'}}\right)\left(\dfrac{1-(1-x)\theta_0}{2}\right)^2 - \dfrac{1}{2}cx^2\right\}$.

The optimal level of communication effort therefore is: $x^*(\theta_0,\alpha') = (1-\theta_0)\left[\dfrac{2c}{1-\dfrac{2(1-\theta_0)}{\sqrt{1+2\alpha'}}}-\theta_0\right]^{-1}$.

Stage 1: Policymakers decide on the welfare standard, so as to maximise the net-expected change in social welfare. Note that this welfare concept differs from the expected change in

social welfare according to which the CA decides about the merger. Policy takes into account communication costs and their own policy preferences with respect to efficiencies (α)[17]. Their optimisation problem is the following:

$$\underset{\alpha'}{Max}\left\{-\frac{1}{2}\left(\frac{1+(1-x^*)\theta_0}{2}-\theta_0\right)\cdot\left(\frac{1-(1-x^*)\theta_0}{2}+1-\theta_0\right)+\alpha\left(\frac{1-(1-x^*)\theta_0}{2}\right)^2-\frac{1}{2}cx^{*2}\right\}.$$

This gives the following general solution for the optimal welfare standard, depending on policy preferences and the initial level of marginal costs of the merging firms[18]:

$$\alpha'^*(\alpha,\theta_0)=\frac{1}{2}\left[\frac{16(1-\theta_0)^2}{\left(2-\theta_0(1+2\alpha)\right)^2}-1\right].$$

Because the merging firms have to be given incentives to provide information on efficiencies, the chosen welfare standard (α'^*) generally differs from policy preferences (α). While α can be seen as the first-best welfare standard (if information on efficiency gains would be public or if communication costs would be nil), α' can be interpreted as the second-best welfare standard (if information on efficiency gains is private and communication is costly).

The relationship between α and α'^* is not just given by the analytical solution found by solving the policymakers' optimization problem. From stage 1, it already followed that the range of optimal α' values is restricted (α' should lie between $\tilde{\alpha}'(\theta_0)$ and α'_{max}). Now, it should also be checked that the net-expected change in social welfare is positive. If not, it would always be better to put α' equal to 0 so that firms are not given incentives to exert communication effort (that would only make the effect on welfare more negative). The following condition determines the range of α values (depending on the level of c and θ_0) for which the analytical solution for the relationship between α and α' is valid:

$$\left[\frac{\frac{1}{2}\theta_0^2(1+2\alpha)-c(1+\theta_0)}{4c-\theta_0^2(1+2\alpha)}+\frac{\theta_0}{2}\right]\cdot\left[\frac{2c(1-\theta_0)}{4c-\theta_0^2(1+2\alpha)}+1-\theta_0\right]+\alpha\left[\frac{2c(1-\theta_0)}{4c-\theta_0^2(1+2\alpha)}\right]^2-\frac{c}{2}\left[\frac{(1-\theta_0)\theta_0(1+2\alpha)}{4c-\theta_0^2(1+2\alpha)}\right]^2\geq0$$

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[17] Communication costs are not relevant to consider in the clearance decision (stage 3). In contrast, they are important for policy to take into account when deciding about the optimal welfare standard (stage 1): in stage 1, policymakers can still influence firms' incentives by the choice of the welfare standard, while this is not the case in stage 3, where firms already provided their information.

[18] Remark that the optimal welfare standard does not depend on the (exogenously determined) level of communication cost, c.

This inequality determines a minimum value of α for which α' may take a positive value, i.e. for which positive weight can be given to PS in the welfare standard.

Figure 2 shows the relationship between the optimal welfare standard (α'^{*}) and the welfare standard according to policy preferences (α), taking into account the two restrictions.

Figure 2: Relationship between α and α'*
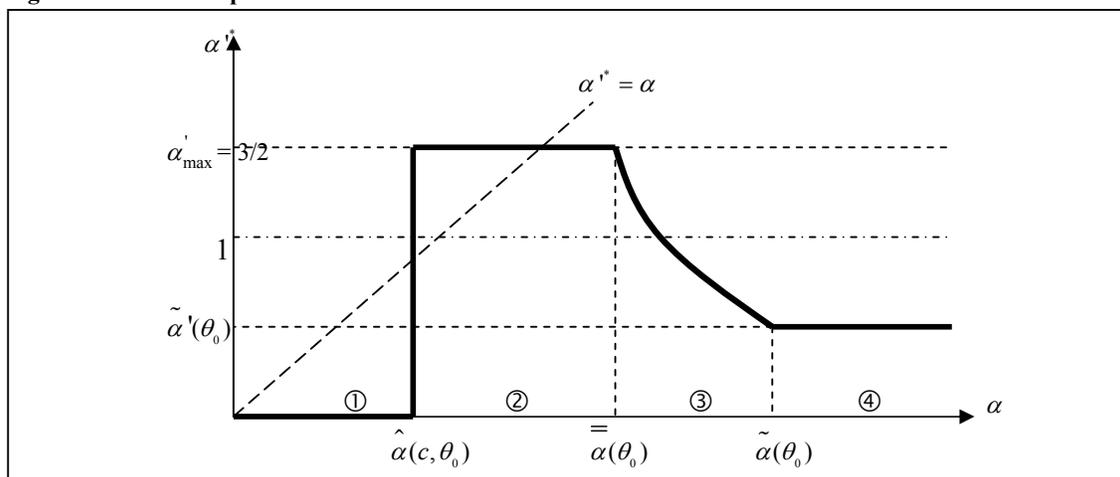
This graph has generally the same shape for all values of c and θ_0, the two parameters of the model. Only the thresholds $\hat{\alpha}$, $\bar{\bar{\alpha}}$, $\tilde{\alpha}$ and $\tilde{\alpha}'$ change as c and θ_0 are changing. Table 1 shows the relation between the thresholds and the parameters[19].

Table 1: Relationship between thresholds (for α) and parameters

	$\hat{\alpha}(c,\theta_0)$	$\bar{\bar{\alpha}}(\theta_0)$	$\tilde{\alpha}(\theta_0)$
θ_0	-	-	-
c	+	na	na

Note that the first threshold $\hat{\alpha}(c,\theta_0)$ is the only one depending on both c and θ_0. The relationship with the initial level of marginal costs would indicate that the lower the initial efficiency level in the firm, the sooner α' may become positive. So it seems that more inefficient firms benefit from this rule, since they have more often the opportunity to get their

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[19] Only the tresholds on α are given because α'_{max} is fixed (always 3/2) and $\tilde{\alpha}'(\theta_0)$ is determined by $\tilde{\alpha}(\theta_0)$.

arguments on efficiency gains to be taken into account in the decision-making process. This might be explained by the fact that in inefficient firms a lot can still be done to improve efficiency, so that it might be good to give them more incentives to investigate these possibilities. However, the positive relation between $\hat{\alpha}$ and the fixed communication cost parameter opposes this effect and makes that if communication costs become too high it is better to refrain firms from putting too much effort in searching for efficiencies by giving more often no weight to PS in the decision rule. The negative relationship between the initial level of marginal costs and the two other thresholds is intuitively easier to understand: the lower the initial level of efficiency, the smaller the range of α-values for which the optimal welfare standard (α'*) is at its maximum level ($\overline{\overline{\alpha}}(\theta_0)$ is smaller) and the faster it returns to its minimum level ($\tilde{\alpha}'(\theta_0)$), determined by $\tilde{\alpha}(\theta_0)$.

When further analysing this graph, four regions can be distinguished (according to the different thresholds). These different regions may characterise different directions of policy, so that this graph may shed a light on why different jurisdictions apply different welfare standards.

If policy is not very interested in efficiencies (cf. region 1: α < $\hat{\alpha}$), it seems to be better not to give any weight to PS in the welfare standard. This result is intuitively understandable. More interesting is the observation that for intermediate α-values (cf. region 2: $\hat{\alpha} \leq \alpha \leq \overline{\overline{\alpha}}$) it would always be optimal to maximally take into account efficiency gains, while the relationship between α and α'* would become negative if policy gets more biased towards the interests of the merging firms (cf. region 3: $\overline{\overline{\alpha}} \leq \alpha \leq \tilde{\alpha}$). This can be explained by the fact that the more policy is in favour of the firms' efficiencies, the more firms might infer from this that it is interesting to put more effort in communication since their arguments will be taken into account more often. Therefore, to discourage bad mergers and to avoid excessive communication costs, the weight to PS should better decrease. This decreasing relationship ends at a certain point: if policy is extremely biased towards firms' interests, the optimal weight stabilizes at its minimum level (cf. region 4: $\alpha \geq \tilde{\alpha}$)[20]. Proposition 1 summarizes this discussion.

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[20] The higher the initial level of marginal costs, the lower this minimum level will be. For θ_0 = ½, the 'stabilization level' is 0.

Proposition 1: *Except in the case when policy is very biased towards consumers' interests, the relationship between the optimal welfare standard (α'^*) and policy preferences (α) is non-increasing: the more policy is interested in efficiency gains from merging, the less weight should be assigned to producer surplus in the welfare standard.*

In real life we see that different jurisdictions over the world apply different welfare standards in merger policy: Canada, Australia, New Zealand are more oriented towards a total welfare standard, whereas the EU and the US apply a consumer welfare standard. According to proposition 1 this implies that Europe and the US would be intrinsically more concerned about firms' interests, although merger policy is based on a consumer welfare standard. On the other hand, policymakers in Canada would be 'ideologically' more oriented towards consumer welfare.

A second conclusion that can be drawn from the graph is that for a large range of policy preferences it is generally good to assign positive weight to PS. So a pure consumer welfare standard would almost never be optimal, except if policy is extremely biased towards either consumers' or merging firms' interests. Moreover, for a large range of moderate policy preferences, it would be optimal to give more weight to PS compared to CS (i.e. $\alpha'^* > 1$).

Proposition 2: *Taking into account communication costs and policy preferences has the following implications for the choice of an optimal welfare standard:*
   - *low policy preferences for efficiencies: it is optimal not to assign any weight to PS in the welfare standard (pure consumer welfare standard would be optimal);*
   - *intermediate policy preferences for efficiencies: it is optimal to give more weight to PS than to CS (or even to set the weight to PS at its maximum level (3/2));*
   - *high policy preferences for efficiencies: it is optimal to give less weight to PS than to CS (the higher the initial inefficiency level, the lower this weight becomes).*

The general conclusion from proposition 2 is that when it is costly for firms to communicate their efficiency gains to the CA, then it is in general optimal to assign at least some positive weight to PS in the welfare standard.

A last result that can be read from the graph has to do with the relationship between the first-best and the second-best welfare standard. Therefore, we have to compare the values of α and

α'*. In general there is only a small region of policy preferences for which the second-best criterion would exceed the first-best. This small region depends on the location of $\hat{\alpha}(c, \theta_0)$.

Proposition 3: *For a large range of policy preferences, the first-best welfare standard (according to policy preferences) exceeds the second-best (taking into account communication costs).*

Proposition 3 implies that policymakers should be less focussed on firms' interests in the welfare standard than according to their preferences. So the bias should go in the direction of consumer welfare (although this results almost never in the application of a pure consumer welfare standard). Note that we get a particular result when the fixed communication cost parameter (c) would become very large (i.e. $c \rightarrow \infty$): the first threshold, $\hat{\alpha}(c, \theta_0)$, would then be 3/2, for all values of θ_0. This would imply that the first-best criterion is *always* higher than the second-best. This strengthens the previous result that policymakers better adapt their own preferences in the direction of consumer welfare. Intuitively, when communication costs become extremely high, it is better to reduce the merging firms' incentives to exert communication effort.

4. Conclusion

Mergers may increase market power and/or generate efficiencies. Since Williamson (1968) economists recognize that these two effects should be taken into account in merger policy. Since only the merging parties can have relevant information on efficiency gains, they should be willing to communicate them to the competition authority. This communication is said to be costly since only verifiable (hard) information will be taken into account. A first contribution of this paper is therefore to explicitly model these communication costs and to look how they affect the optimal choice of the welfare standard. Secondly, it also has to be recognised that policymakers have their own preferences with respect to the interests of consumers and producers. Therefore these (exogenously determined) preferences also influence the welfare standard. When taking into account these three elements - efficiencies, communication costs and policy preferences - it seems to be optimal to assign at least some positive weight to producer surplus so that firms get incentives to investigate and communicate efficiency gains from merging. This result contrasts with the outcome in most

other papers assessing the problem of the optimal welfare standard. A second result concerns the implementation of policy preferences. Due to the existence of communication costs it is generally not optimal to implement policy's first-best welfare standard. The second-best welfare standard is in general smaller than the first-best. This implies that policymakers should modify there preferences in the direction of giving more attention to consumer welfare. Thirdly, these different policy preferences may be an indicator of different jurisdictions, having different priorities in terms of producer and consumer surplus. The model shows that the more policy would be concerned about efficiency gains, the more it would be optimal to apply a consumer welfare oriented standard.

5. Directions for future research

Real communication – When talking about real communication an element of *interaction* between the information sharing parties should be present. Therefore communication effort of the competition authority (y) - becoming an "*active* player" - should also be included in the model. One possibility to take into account the competition authority's communication effort is to model the *ex post* beliefs of the competition authority as follows: $\theta^{EP} = (1-xy)\theta^{EA}$. The model discussed in this paper - with a "*passive*" or *"neutral"* competition authority - could therefore be seen as a special case of the extended model, where the competition authority always exerts maximum effort, i.e. $y = \bar{y} = 1$. Note that the term "passive" only refers to the fact that the competition authority does not choose the level of communication effort. It does not mean that they do not investigate efficiencies at all; in fact the opposite is true: they always exert the maximum investigation effort.

Competition authorities having own preferences – As argued in Besanko and Spulber (1993) and in Neven and Röller (2002) competition authorities have more or less discretion to assess the appropriateness of a merger. This would mean that they may have own preferences with respect to the optimal weight to assign to producer surplus (different from α'). This could be modelled by inserting a third possible weight to PS *α"* indicating the preferences of the competition authority. In a model with an "active" competition authority, not only *x*, but also *α"* would then influence the communication effort of the competition authority (*y*). A further complication involves the fact that good (transparent) policy should try to avoid this discretionary behaviour by imposing a penalty, for instance linearly increasing with the height of deviation between the outcome (in terms of social welfare) under the assigned decision

criterion α', compared to the outcome under the preferred criterion α" of competition authorities.

'Unbundle' investigation and communication stage – In the model mergers always generate efficiencies; the only issue is to obtain hard information. Therefore, they investigate efficiency gains from merging until enough positive information is gathered, which will always be communicated to the competition authority. However, this does not need to be the case: investigating possible efficiency realizations might bring no positive information about efficiencies, so that firms who first had decided to investigate efficiencies can still refrain from notifying and will not communicate their results to the competition authority.

More information sources – In this paper it was assumed that only the merging firms themselves could offer information about the possible effects of the merger. However, as argued in Neven and Röller (2002), competition authorities often rely on complaints of competitors and customers. The paper by Dewatripont and Tirole (1999) looks at the issue of different information flows for decision-making purposes. Their insights could also be used in designing optimal merger policy taking into account information supplied by third parties.

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Appendix 1: Three-stage game

(1)
POLICYMAKERS   Design of welfare standard (choice of α'):

$$\alpha'^* \in \arg\max_{\alpha'} \left\{ \Delta W^e = \Delta CS^e + \alpha \Delta PS^e - S(x) \right\}$$

↓

(2)
MERGING   Decision whether to notify merger or choice of
FIRMS   investigation effort (x):

$$x^* \in \arg\max_{x} \left\{ \Pr(allowance).\Delta PS^e - S(x) \right\}$$

Abandon merger if
x* = 0   ↙   ↓   notify if $x^* > 0$

(3)
COMPETITION   Decision whether to clear the merger:
AUTHORITY

Prohibit merger if
$\Delta CS^e + \alpha' \Delta PS^e < 0$ ↙   ↓   allow merger

if $\Delta CS^e + \alpha' \Delta PS^e \geq 0$
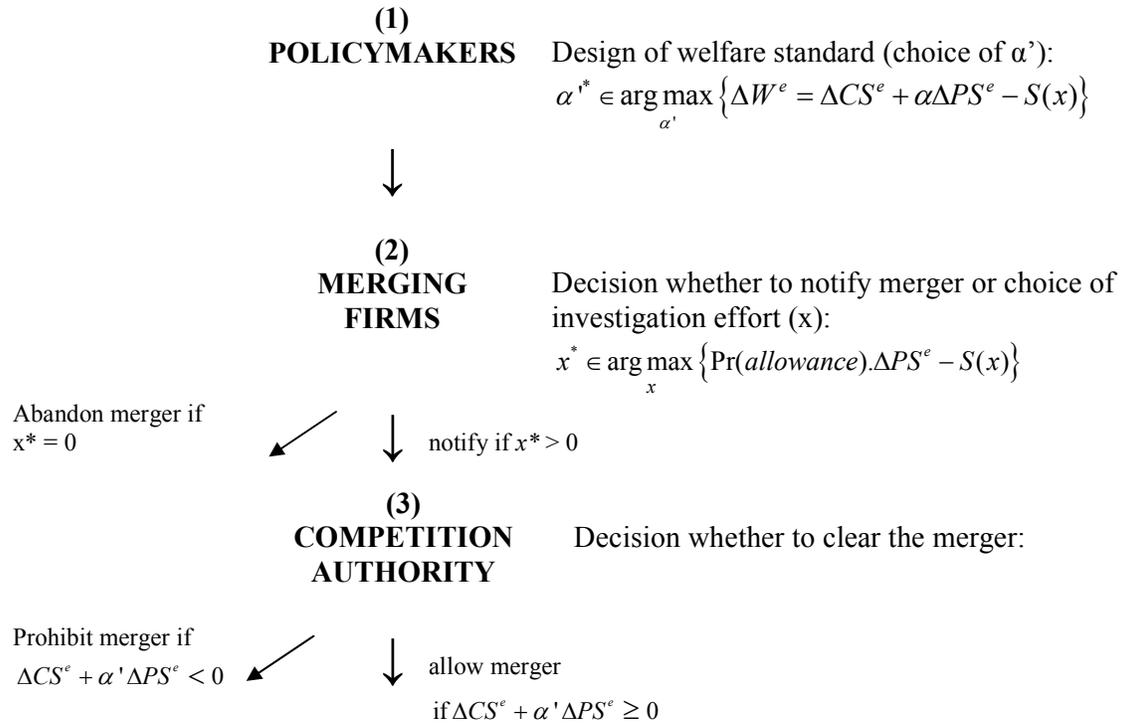
EXECUTIVE SUMMARY

Mergers may have two effects: they may increase market power of the merging firms and/or generate efficiency gains.

The model developed in this paper - a *merger* of the classical Williamson (1968) model on the role of efficiencies and insights from the paper of Dewatripont and Tirole (2005) on communication - investigates the choice of an optimal welfare standard (i.e. the weight assigned to producer surplus in the decision rule competition authorities are held accountable to) in merger control. Three main contributions are made to this debate.

First, the model takes into account that firms can only release private information on efficiencies after performing costly investigations. Therefore firms should be given incentives to incur these costs to obtain hard, verifiable information that can be communicated to the competition authority. This can be guaranteed by assigning enough weight to producer surplus in the welfare standard so that socially efficient mergers are not prohibited (even if efficiency gains are not fully passed on to consumers).

Second, attention is paid to the implementability of merger policy by taking into account the constraints on the optimal welfare standard caused by the existence of policymakers' preferences and firms' investigation/communication efforts. Only if policy preferences are not too biased in favour of either consumers or producers, it is good to assign higher weight to producer surplus in the welfare standard. Moreover, policymakers should generally mitigate their preferences in the direction of more attention to consumer welfare (i.e. the first-best weight assigned to producer surplus is most often higher than the second-best).

Third, by explicitly modelling policy preferences, one can try to explain why different jurisdictions in the world apply different welfare standards. The model shows that in jurisdictions where policymakers are more interested in efficiencies and therefore in the merging parties' interests, it would be better to apply a more consumer welfare oriented standard.