

# Merger Control With Transfers from the Capital Gains Tax, and Asset Divestments

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## Abstract

In a Cournot model of takeover in asymmetric information over synergies, we identify a link between efficiency gains and structural remedies, we show that more efficient Insiders are asked to divest more. Aware that a unique tool is insufficient to make Insider revealing their type, we rely on capital gains tax legislation to deal with transfers in merger control. The bidder firm uses a mix of cash and stocks as medium of payment in the merger, knowing that cash offers lead to capital gains tax for target shareholders. The procedure is costlier when the ratio of cash is more important, because the bidder firm must leave capital gains compensations to target shareholders. For each amount of cash in the mix bid, the Antitrust Agency is able to compute a transfer it indirectly collects. We introduce a relevant limited liability problem in the model, since the Antitrust Agency cannot deduct higher transfers than those defined by the costlier procedure, all in cash. In this context we show that inefficient Insiders divest more than their First Best and make an all cash offer, whereas efficient Insider divest their First best and incorporate less cash in the bid.

Key Words : Merger control, asymmetric information, structural remedies, Capital gains tax, Limited liability.

JEL Classification : L51, D82, L41

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# 1 Introduction

Economists interested in mergers are definite about one fact, all mergers increase market prices through an intensification of market power if they are not backed up with substantial efficiency gains<sup>1</sup>. The lack of synergies has a negative impact on the consumer surplus, since higher prices decreases purchasing power. Nevertheless, if anticompetitive effects are dominant, the competition authority (EC in Europe, FTC in US) can use behavioral or structural remedies in order to restore effective competition in relevant markets<sup>2</sup>.

We will focus on structural remedies which affect the allocation of assets through partial or total divestiture to, either an exiting competitor, or a new entrant. For instance, in the merger between General Electrics and Agfa in December 2003, General Electrics proposes to divest its ultrasound NDT activities of its subsidiary Panametrics to the Canadian company R/D Tech, in order to soften Commission's apprehensions<sup>3</sup>. The divestiture procedure is easier to implement, since it requires no control once implemented<sup>4</sup>.

The Commission encounters serious problems when it tries to regulate mergers. The first is represented by the information problem. When Insiders propose a merger, they have a definite idea of the gains they will achieve and their merger price effect on the sector, but the commission have not at one's disposal all elements which could permit to evaluate the exact level of synergy, and thus the knock-on effect on consumers. Merger regulation is an important issue in political competition, the regulator cannot get away with taking wrong decision : accepting a "bad" merger, or rejecting a "fair" merger.

The second problem is the lack of regulation's available tools. In competition policy, available tools are not as extended as those employed by a regulation authority. This one is indeed able to directly control prices or produced quantities, and

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<sup>1</sup>Among others Farrell and Shapiro (1990).

<sup>2</sup>Art. 6(2), or art. 8(2) with conditions and obligations of the EC merger regulation.

<sup>3</sup>See Case COMP/M.3136 - General Electrics/Agfa.

<sup>4</sup>See Monti (2002), Motta, Polo, Vasconcelos (2002), Motta (2004), for a discussion of remedies.

to specify the amount of transfer. For the merger commission, the objective is to find incentives tools which could permit to learn information about the amount of synergies that Insiders will achieve in the merger, in order to take a fair competition policy decision.

When a bidder firm wants to takeover a target firm, it puts down a merger offer on the Financial Market Authority desk. The offer specifies the ratio of securities and cash which are decided by the bidder firm's management. The role of the Financial Market Authority is to guarantee the fair development of the purchase procedure (buyout to a fair price, respect of the offer's rules, smooth functioning of market, avoiding insider trading,...). For the competition problem the regulation commission intervenes and proposes remedies if necessary. The recent Mittal Steel case is a good illustration of our problematic.

Mittal Steel (hereafter MS) officially submitted a takeover bid over Arcelor the 8th of February 2006 to the Financial Market Authority for an amount of 18.6 b.n euros. MS specifies it wish to get hold of Arcelor paying 75 percent of it offer in issuing new securities Mittal, and the last 25 percent in liquidity. The MS direction assures not to be afraid of the commission reaction, it promises to leave the Canadian Dofasco to the rival Thyssen Krupp. MS also predicts 1 b.n euro of scale economy in synergy form to reassure the commission about future prices on the sector.

To avoid sequentiality, we assume that Financial Market Authorities and the Merger Commission are grouped together in the same structure which we call the Antitrust Agency (hereafter called the AA).

In our objective to emphasize takeover regulatory tools, we look at the medium of exchange in mergers which can take several shapes : either all in cash, either all in stock, or with a mix of the two medium of paiement. The all cash procedure is costlier from the bidder point of view, in the sense that it must compensate target shareholders for the capital gain tax they have to incur for the sell of their stocks (capital gain can be taxed up to 26 %). A contrario, the all stock procedure is a pure stock exchange and need no immediate tax payment.

Our intuition is that, the design of divestiture is linked to the unavailable efficiency gains information, and that the ratio of cash in the bid defines an implicit transfer. The AA can both use the amount of divestiture and capital gains tax to build an incentive contract suitable for each type of synergy. The originality of this paper lie in the following hypothesis. We rely on the fiscal system about capital gains tax to deal with transfer in merger control.

On top of not being many tools, those available are reduced. The AA cannot ask the merged entity to divest more than a certain threshold because it will become unadvantageous to merge. In the same way our transfers are constrained by the takeover bid legislation. One of the issue which can occurs in our model, is the special case where transfers are not enough to saturate inefficient Insiders participation constraint, then a limited liability problem occurs.

For the taxation aspect we rely on the paper developed by Eckbo, Giammarino and Heinkel (1990) and more precisely on the idea of Brown and Ryngaert (1989) :

*" Bidders with unfavorable private information about their value, choose offers containing some stock too avoid the capital gains tax consequences of cash offers "*.

This paper picks up the framework developed by Medvedev (2004), and Cosnita and Tropeano (2005), an equilibrium analysis of a Cournot Market before and after a merger with a focus on structural remedies.

Medvedev model (2004), lead to some similarities with our results : when the market situation is symmetric, the divested assets are sold to existing competitor, and Insiders realize synergies, the more efficient are Insiders, the more they will have to divest. However Medvedev's framework evolve in perfect information. On the contrary, the model developed by Cosnita and Tropeano (2005), is dealing with asymmetric information, and the link between the amount of efficiency gains that the merging partners can achieve, and the amount of assets they will have to divest for the merger to be accepted. They build an incentive contract with divestment supposing that the commission can control asset sale price.

We will deal with the design of optimal remedies and transfers when efficiency gains are Insiders private information, and when divestiture of assets affects both Insiders and Outsiders marginal costs. We suppose, in a general Cournot competition game with homogenous good and constant marginal costs, the existence of fixed capital in the industry composed of three symmetric firms in the no-merger state. The amount of fixed capital in the firm determines its marginal costs. A merger between two firms increases the amount of fixed capital, and create costs saving in synergy form. The divestiture of assets increase Insiders marginal costs, and decrease Outsiders one<sup>5</sup>. For each type of Insiders, the AA proposes a contract which specifies a level of divestment and a transfer, and permits to screen among types.

The AA should leave an information rent to the efficient informed party and will try to minimize it, although it guarantees the true revelation on behalf of efficient type; and the respect of consumer trough price decrease. The prime objective of the AA is to protect consumers from price increases after the merger, which lead it to focus on a consumer welfare standard<sup>6</sup>. We show that the optimal divestiture will increase with the level of synergy, and that efficient Insiders accepts to divest a more important part of their assets provided that they incorporate less cash in their takeover bid. One of our objective is to characterize solution of the limited liability problem and to compare it with the no fiscal constrained problem. Importantly we show that in imperfect information with limited liability, optimal divestment are First Best for efficient Insiders, and that they incorporate less cash in the mix takeover bid.

The paper proceeds as follow. Section 2 describes the model. Section 3 analyzes the classical principal agent model in merger context. Section 4 mentions the shutdown contract. Section 5 deals with the limited liability contract. Section 6 concludes.

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<sup>5</sup>For simplicity, we suppose that the divested assets does not hold synergies.

<sup>6</sup>This hypothesis is subject to discussion, see for instance Neven and Roller (2000).

## 2 The model

### 2.1 Assumptions and market structure

We consider a Cournot competition game with homogenous products and constant marginal costs. We suppose the existence of exogenous fixed capital,  $s$ , in an industry composed of three symmetric firms in the no-merger state (indexed NM). All firms enjoy the same constant no-merger marginal cost  $Cm^{NM}(s)$ , with :  $Cm_s^{NM}(s) < 0$  (subscripts indicate partial derivatives). Each firm maximizes its profits as a Cournot-Nash player; the solution of this no-merger program defines individual *status quo* value :  $\bar{\Pi}$ , for firms ( $\Pi$  represents profits).

Arbitrarily, we suppose that the firm 1 (the Bidder), finds an opportunity to improve its costs in a merger with the firm 2 (the Target). In this procedure, firm 1 and 2 enjoy a fixed capital twice more important, and a positive multiplier of synergy gain  $\theta$ , which could not be obtained without a merger<sup>7</sup>. Low values of  $\theta$  indicates high values of synergies :  $\theta$  is in inverse proportion with synergy gain. This operation gives a new marginal cost function to the merged entity (hereafter called Insiders, indexed I) :  $Cm^I(\theta)$ , with  $Cm_\theta^I(\theta) > 0$ . The third firm (hereafter called Outsiders, indexed O) keeps its marginal cost constant :  $Cm^{NM} = Cm^O$ . This reasoning conducts to the following properties :

**Property 1** :  $\Pi_\theta^I(\theta) < 0$ ;

**Property 2** :  $\Pi_\theta^O(\theta) > 0$ ;

Consider an Antitrust Agency, who wants to regulate the merger. The value of the merger, from the AA point of view, is resumed in the consumer surplus  $CS(\theta)$ . The more merged firms realize synergies, the more firms can pass on their costs savings through a fall in the offered price, the more consumer surplus can be improved. Formally :  $CS_\theta(\theta) < 0$ . We said that a merger increases prices in the sector if it does not come with substantial synergies (Farrell and Shapiro (1990)).

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<sup>7</sup>See, for instance, Case COMP/M.3838 - Avid/Pinnacle.

Graphically<sup>8</sup> :

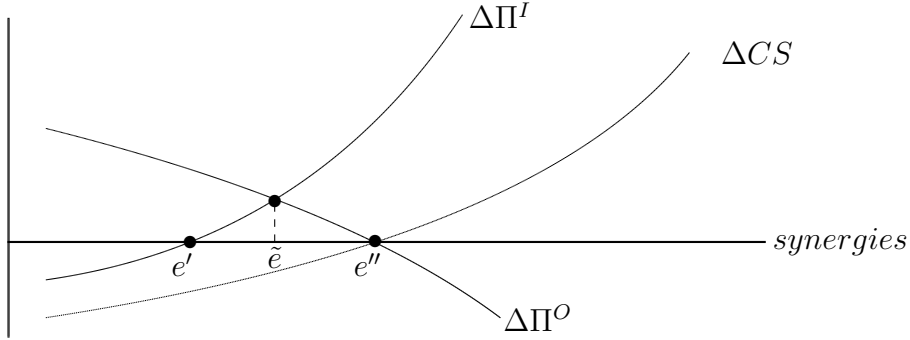


Fig 1. Gains in the merger for protagonists.

Curves redraw gains of the merger in utility terms depending on synergies for the three economic actors. From Insiders point of view, gains to merge are increasing with the level of synergy they realize. After  $e'$ , synergies improve Insiders situation, but cannot be sufficient to be transformed in a price decrease. It is the reason why the level of synergy which improves Consumer Surplus :  $e''$  is on the right of  $e'$ , where  $e''$  is such that prices stay after the merger. After  $e''$  costs savings are so important that Insiders can pass efficiency gains on consumers, by decreasing prices. The fall in price exaggerate competition in the sector : Outsiders are negatively affected by the merger. Between  $\tilde{e}$  and  $e''$ , Insiders gains are more and more important compared with Outsiders gains, the anticompetitive effect is more and more intensive.

The AA can use structural remedies in order to correct the inconveniences generated by the merger and to keep prices at least unchanged after the merger. Assets divested are sold to Outsiders. For more simplicity, we neglect the possibility that a new entrant buys Insiders assets and get into the sector. Outsiders are the unique potential buyers. We denote by  $\Delta$  the amount of assets required.

After the divestiture procedure, firms become more symmetric and prices are soften by the increase in competition between firms. It is a costly operation for Insiders insofar as, less fixed capital increases marginal costs :  $Cm_{\Delta}^I(\Delta, \theta) > 0$ .

<sup>8</sup>This standard graphical analysis is the basis of a lot of articles dealing with mergers. See for instance, Duso, Neven, Röller (2003).

On the contrary, the amount of divestiture required by the AA is positively seen for Outsiders since it increases their fixed capital :  $Cm_{\Delta}^O(\Delta, \theta) < 0$ . The following properties result from those facts :

**Property 3** :  $\Pi_{\Delta}^I(\Delta, \theta) < 0$  ;

**Property 4** :  $\Pi_{\Delta}^O(\Delta, \theta) > 0$  ;

Two other properties regarding marginal costs. For Insiders divestment are more and more costly, and divestiture are costless for high efficient Insiders :

**Property 5** :  $Cm_{\Delta\Delta}^I(\Delta, \theta) > 0$  ;

**Property 6** :  $Cm_{\Delta\theta}^I(\Delta, \theta) > 0$  ;

Divestments are beneficial for the AA, since they improve consumer situation :  $CS_{\Delta}(\Delta, \theta) > 0$ .

## 2.2 The tax structure of the implementation problem

The idea of this section is to justify the economic interest of a transfer tool in the mechanism design, for that we need to describe the merger procedure. A bidder firm, for different reason mentioned above, is interested to merge with a target firm. It disposes, then, to different medium of exchange to prepare the takeover.

The first manner is to propose an all cash exchange between the bidder firm and the target shareholders (the takeover bid system). In this procedure, the bidder buys each target share to a fixed price negotiated between the two parties, and which is generally incentives compatible with shareholders utility. The bidder offers a premium by share which exceed the value of the share established by financial markets. Target shareholders make capital gain on the sell of their shares and have to pay a tax on capital gain immediately (we will suppose to the AA). It is the reason why the bidder company still increase merger premium in takeover bid to compensate stockholders for the fiscal loss due to the exchange for cash payment.



The second possibility is to propose an all stock exchange (the share exchange offer system). In this procedure the bidder firm promises to target stockholders a predetermined quantity of the new entity shares, which could be created if they accept the deal, on the exchange of the target shares they hold. This procedure is not about money, and permit to avoid tax penalties.

The last procedure which draw our attention, is a mixed takeover which pool between the two merger technics. This procedure is even more costly than the ratio of cash is important in the global offer. Indeed, when the part of takeover bid is higher, the bidder firm has to compensate shareholder for the future tax penalties they are going to support, and from this fact is more onerous for the bidder company.

From those facts, we make a crucial assumption : the AA relies on the fiscal system on capital gains tax in order to implement a transfer. when Insiders propose to merge they choose the ratio of cash  $p$  in the takeover bid, and they publicly announce this medium of exchange. For increasing level of  $p$ , target shareholders have to pay increasing capital gains tax to the AA. The bidder firm must increase the merger premium in order to take care of this tax. The ratio  $p$  implicitly defines a monetary transfer  $t$  Insider must pay to the AA<sup>9</sup>. For each possible  $p$ , the AA computes the transfer  $t$  it goes to receive.

However, in its day to day functioning, the AA never uses transfer in a merger control objective. The aim of this paper is as well to emphasize other regulatory methods. The use of capital gains tax as transfer seems, at least, a relevant way to create incentive in merger procedure.

Of course, the transfer used by the AA depends implicitly on Insiders cash choice in the takeover bid. The AA can never implement a costlier transfer than the maximum transfer defined by the all-cash offer :  $t^{max}$ . Section 3 and 4 deal with optimal transfer under this threshold, and section 5 looks to limited liability, when optimal transfers are above the maximum implementable transfer.

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<sup>9</sup>The literature on medium of exchange in takeover stipulates that more efficient bidders propose more cash in the whole bid. This result remains in our model.

### 3 Traditional Principal Agent Results

We would like the AA to make right decisions in merger term, at least in a certain number of situations. For the moment, we look at the case where the merger is perceived as a good news for all level of synergies, provided that Insiders divest a part of assets they have just acquired (We are between  $\tilde{e}$  and  $e''$ , in Fig 1, for all type of Insiders). Later, we will consider the case of shutdown of the less efficient type, where the inefficient type should be forbidden to merge even with divestments (it is before  $\tilde{e}$ , in Fig.1), and the efficient type allowed.

The multiplier parameter  $\theta$  belongs to the type set  $\Theta = \{\underline{\theta}, \bar{\theta}\}$ . Insiders can be either efficient ( $\underline{\theta}$ ) or inefficient ( $\bar{\theta}$ ) in the merger; i.e, either they generate high synergies or low synergies, ( $\underline{\theta} < \bar{\theta}$ ). The sequence of events is the following : First Insiders learn their type. Then, the AA proposes a menu of contract to Insiders, in order to regulate the sector. This contract can be broken down into two economic variables : a transfer  $t$  Insiders must pay to the AA, and an amount of divestment  $\Delta$ , as structural remedies for Outsiders. Insiders choose a unique contract among those proposed, in announcing the ratio  $p$  in the takeover bid. Insiders can recover their *statu quo* utility in refusing to contract with the AA if no proposition is satisfactory for them. All transfer are relevant and implementable, we deal with transfers under the ceiling transfer  $t^{max}$ .

Let  $\mathcal{A}$ , be the set of feasible allocations. Formally this set is such that :

$$\mathcal{A} = \{(\Delta, t) : \Delta \in \mathbb{R}^+, t \in \mathbb{R}^+\}.$$

Twice economic variables are observable and verifiable by a third party, once the contract signed, nobody can deviate.

When Insiders merge, the combined entity receives a pure profit which take into account the fact that divestments are costly :  $\Pi^I(\Delta, \theta)$ , on the other side the merged entity receives a payment  $P$  from Outsiders for divested assets.  $P$  is endogenous, and depend on divestments and on synergies. Let  $U^I(\Delta, \theta) \equiv \Pi^I(\Delta, \theta) + P(\Delta, \theta)$ , be the whole Insiders utility. Furthermore, they pay a costly positive transfer  $t$ .

For more simplicity in the model, we suppose that Insiders have all bargaining power in the determination of the assets sale price : Insiders are able to propose a price  $P$  to Outsiders, which saturate their participation constraint. In a way,  $P$  is exactly the gain of divestments for Outsiders :  $P(\Delta, \theta) \equiv \Pi^O(\Delta, \theta) - \Pi^O(\Delta = 0, \theta)$ .

**Proposition 1** : *The assets sale price is all the more important than Insiders are inefficient :  $P_\theta(\Delta, \theta) > 0$ .*

*Proof* : From property 6 :  $Cm_{\Delta\theta}^I(\Delta, \theta) > 0$ , divestments impact are even more important on costs that the type is inefficient. Insiders profits are all the more negatively affected by divestments than Insiders are inefficient :  $\Pi_{\Delta\theta}^I(\Delta, \theta) < 0$ . Since we are in a Cournot game, Outsiders profit cross derivative is in inverse sign compared with Insiders one :  $\Pi_{\Delta\theta}^O(\Delta, \theta) > 0$ . Because of that,  $\Pi_\theta^O(\Delta, \theta) > \Pi_\theta^O(\Delta = 0, \theta)$ , implying Proposition 1.

To that extent, we can rewrite Insiders utility as a function of the sector's total profit :  $U^I(\Delta, \theta) = \Pi^I(\Delta, \theta) + \Pi^O(\Delta, \theta) - \Pi^O(\theta)$ . From now on Outsiders profits are part of Insiders utility. It is in Insiders interest that Outsiders realize important gain in receiving divestments, because they can get back those gains with  $P(\Delta, \theta)$ .

We will always make the hypothesis that the whole Insider utility has the same properties that Insiders pure profits, which leads us to make several assumptions.

**Assumption 1** :  $|\Pi_\Delta^I(\Delta, \theta)| > |\Pi_\Delta^O(\Delta, \theta)|$

First, Insiders lose more than Outsiders gain in divestments terms. If assumption 1 is true, then :  $U_\Delta^I(\Delta, \theta) < 0$ . Assumption 1 says that it is coster for Insiders to divest an asset than it is advantageous for Outsiders to receive this asset.

**Assumption 2** :  $|\Pi_\theta^I(\Delta, \theta)| > |P_\theta(\Delta, \theta)|$

Second, by proposition 1, an inefficient type receives a bigger price for the same amount of divestiture. Nevertheless the whole Insiders utility decrease when the type goes inefficient :  $U_\theta^I(\Delta, \theta) < 0$ . Low synergies decrease more pure profit than it increases the sale price of assets.

**Assumption 3** :  $|\Pi_{\Delta\theta}^I(\Delta, \theta)| > |\Pi_{\Delta\theta}^O(\Delta, \theta)|$

Third, Insiders profit cross derivative overcomes Outsiders profit cross derivative. In other words, the cross derivative for Insiders profit is even more negative than the cross derivative for Outsiders profits is positive, which lead to :  $U_{\Delta\theta}^I(\Delta, \theta) < 0$ .

The AA's objective in complete information stay to find a contract  $(\Delta, t)$  which maximize Consumer Surplus providing that Insiders accept the contract. For the implementation of the First Best (indexed FB), the AA must offer Insiders a level of utility at least as high as the sum of the separated entity no-merger profit :  $2\bar{\Pi}$ . In other words (*IR*) is :  $U^I(\Delta, \theta) - t \geq 2\bar{\Pi}$ . From a traditional way in Principal agent theory<sup>10</sup>, the AA chooses  $t$  to saturate Insiders participation constraint for each type, and finds amount of divestments solution of :

$$CS_{\Delta^{FB}}(\Delta^{FB}, \theta) = -U_{\Delta^{FB}}^I(\Delta^{FB}, \theta)$$

First Best divestments are given by the above first order conditions, which balance the first Consumer Surplus derivative in relation with divestments and the negative of the first Global profit derivative in relation with divestments. By assumption 1, the right member is positive, implying the positivity of the left member. Hence, the solution of the First Best, in divestments term, is on the left of the solution which maximizes consumer surplus ( $\underline{\Delta}^{FB} < \underline{\Delta}^*$  and  $\bar{\Delta}^{FB} < \bar{\Delta}^*$ , in Fig 2).

The AA's objective is not only to maximize Consumer Surplus, but also to check that Insiders make a profit in the merger with divestments, which could be collected thanks to the amount of transfer. Without this transfer tool, the AA will level out marginal costs in order to obtain the perfect symmetry in the sector associated with the lowest price and the maximum output<sup>11</sup>. But the AA can get away with decreasing the amount of divestments so as to provide a bigger profit to Insiders, which it will confiscate thanks to  $t$ .

<sup>10</sup>See Laffont and Martimort (2002).

<sup>11</sup>as in Medvedev (2004)

Note that, since the AA's marginal value of divestments is increasing in  $\Delta$ , the optimal divestments level defined above are such that  $\underline{\Delta}^{FB} > \overline{\Delta}^{FB}$ ; i.e., at the First Best efficient Insiders divest more. Furthermore, efficient Insiders pay the merger with a more important part of cash<sup>12</sup> :  $\underline{p}^{FB} > \overline{p}^{FB}$ . The complete information optimal contract is thus :  $(A^{FB}, B^{FB}) = [(\underline{\Delta}^{FB}, \underline{t}^{FB}), (\overline{\Delta}^{FB}, \overline{t}^{FB})]$ . In the First Best, efficient Insiders choose a more important ratio of cash  $\underline{p}^{FB}$ , knowing that for this choice they will have to divest  $\underline{\Delta}^{FB}$  and to pay  $\underline{t}^{FB}$ .

The problem lies in the fact that efficient Insiders are forced to divest more than inefficient Insiders, on the one hand, and on the other hand, the amount of synergies they are able to achieve is not perfectly observable, neither by Outsiders, nor by the Antitrust Agency in charge of the implementation of remedies. As there is a room for manoeuvre between what efficient Insiders are able to achieve in synergy terms and what the AA is able to observe, efficient Insiders be well advised to manipulate information they disclose in a sense which is suitable for them.

Actually,  $B^{FB}$  is preferred to  $A^{FB}$  by efficient Insiders, their iso-utility curve that passes through  $B^{FB}$ , corresponds to a positive utility level instead of a zero utility level in  $A^{FB}$ . There is no reasons which drives efficient Insiders to choose their contract  $A^{FB}$ , insofar as the AA is not able to screen off types, and since Insiders are utility maximizers. If the AA offers the contract of complete information  $(A^{FB}, B^{FB})$ , it will take a wrong decision, each times the  $\theta$ -type is efficient.

Traditionally, the AA must keep in mind that the contract it builds must satisfy participation constraints  $(\underline{IR})$ ,  $(\overline{IR})$  and incentive constraints  $(\underline{IC})$  and  $(\overline{IC})$  :

$$U^I(\underline{\Delta}, \theta) - \underline{t} \geq 2\overline{\Pi} \quad (\underline{IR})$$

$$U^I(\overline{\Delta}, \bar{\theta}) - \bar{t} \geq 2\overline{\Pi} \quad (\overline{IR})$$

$$U^I(\underline{\Delta}, \theta) - \underline{t} \geq U^I(\overline{\Delta}, \theta) - \bar{t} \quad (\underline{IC})$$

$$U^I(\overline{\Delta}, \bar{\theta}) - \bar{t} \geq U^I(\underline{\Delta}, \bar{\theta}) - \underline{t} \quad (\overline{IC})$$

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<sup>12</sup>It can be easily seen graphically that this result depend on the curvature of utility functions.

Asymmetric information between the AA and Insiders reduces the set of feasible allocation because of incentive constraints, both constraints imply that :  $\underline{\Delta} > \bar{\Delta}$ . This inequality stands for a standard single crossing condition. Inefficient Insiders benefit more from a low divestiture. A smaller  $\theta$ , lead to a bigger  $\Delta$ . The reason is quite obvious. We are in a synergy space insufficient to decrease prices (on the left of  $e''$  in Fig 1.), anticompetitive effect generated by Insiders overcome beneficial effect of efficiency gains. Insiders which generate higher level of synergies increase anticompetitive detrimental effect. The amount of divestments required is linked to the level of synergy realized :  $\Delta_\theta(\theta) < 0$ .

Formally, efficient Insiders which mimic inefficient Insiders obtain :

$$U^I(\bar{\Delta}, \underline{\theta}) - \bar{t} = U^I(\bar{\Delta}, \bar{\theta}) - \bar{t} + RI(\bar{\Delta}) \quad \text{with, } RI(\bar{\Delta}) = U^I(\bar{\Delta}, \underline{\theta}) - U^I(\bar{\Delta}, \bar{\theta})$$

Efficient Insiders which lie on their type, obtain exactly inefficient Insiders utility plus an information rent  $RI$  which depend on  $\bar{\Delta}$ . This information rent corresponds to a depreciation for consumer. The program of minimizing rent be the subject of the Second Best analysis (indexed SB). The AA must find  $\bar{\Delta}^{SB}$  which discourage efficient to mimic inefficient, minimizing at the same times information rent.

Both the AA and Outsiders have a common prior on Insiders type ; they are confronted with the probability  $\nu$  to observe an efficient type, and with the probability  $(1 - \nu)$  to observe an inefficient type. Classically we restrict our analysis to truthful direct revelation mechanisms according to the revelation principle. After an handling of constraints, we emphasize the information rent in the AA's optimization program :

$$\begin{aligned} & \max_{\{\underline{\Delta}, \bar{\Delta}\}} \nu \cdot [CS(\underline{\Delta}, \underline{\theta}) + U^I(\underline{\Delta}, \underline{\theta}) - 2\bar{\Pi}] \\ & + (1 - \nu) \cdot [CS(\bar{\Delta}, \bar{\theta}) + U^I(\bar{\Delta}, \bar{\theta}) - 2\bar{\Pi}] \\ & \quad - \nu \cdot [RI(\bar{\Delta})] \\ & \text{s.t. : } (\bar{IR}) \text{ and } (\underline{IC}) \end{aligned}$$

The AA wants to maximize the expected social value of the merger with divestments minus the expected rent it has to leave to the informed party, subject to achievable menu of contract. This expression shows that the AA is ready to accept some distortions away from what it could do in perfect information, in order to decrease the information rent.

Since the rent does not depend on the amount of divestments required for efficient Insiders, the maximization of the AA's program calls for no distortion away from the First Best for  $\underline{\theta}$ -type :

$$\underline{\Delta}^{FB} = \underline{\Delta}^{SB}$$

However, AA's program depend on the information rent given up to efficient Insiders which depend on  $\bar{\Delta}$ . The maximization yields to :

$$(1 - \nu) \cdot [CS_{\bar{\Delta}^{SB}}(\bar{\Delta}^{SB}, \bar{\theta}) + U_{\bar{\Delta}^{SB}}^I(\bar{\Delta}^{SB}, \bar{\theta})] = \nu \cdot [RI_{\bar{\Delta}^{SB}}(\bar{\Delta}^{SB})]$$

The Second Best solution in divestiture terms for inefficient occurs when the expected marginal efficiency gains of the merger with divestiture and the expected marginal cost of the rent are equated.

**Proposition 2** : *Information rent depends positively on the inefficient requested amount of divestments :  $RI_{\bar{\Delta}}(\bar{\Delta}) > 0$ .*

The AA must decrease  $\bar{\Delta}$  in the Second Best. It is the reason why we have :  $\bar{\Delta}^{SB} < \bar{\Delta}^{FB}$ . The  $\bar{\theta}$ -type has to divest even less than the  $\underline{\theta}$ -type in the Second Best. We said that, the  $\underline{\theta}$ -type wants to mimic the  $\bar{\theta}$ -type in order to enjoy a lower amount of divestiture. Our results shows that the AA is encouraged to decrease the level of inefficient requested divestments, in asymmetric information. We must not forget that the AA can recover Insiders profits since it disposes of the transfer tool. In addition, decreasing  $\bar{\Delta}$  is a relevant way to increase transfers devoted to inefficient Insiders above what the AA will ask to efficient, and to relax a little bit (*IC*) constraint.

Formally :

$$\underline{\Delta}^{FB} = \underline{\Delta}^{SB} > \bar{\Delta}^{FB} > \bar{\Delta}^{SB}, \quad \text{and} \quad \bar{t}^{SB} > \underline{t}^{FB} > \bar{t}^{FB} > \underline{t}^{SB}$$

Graphically :

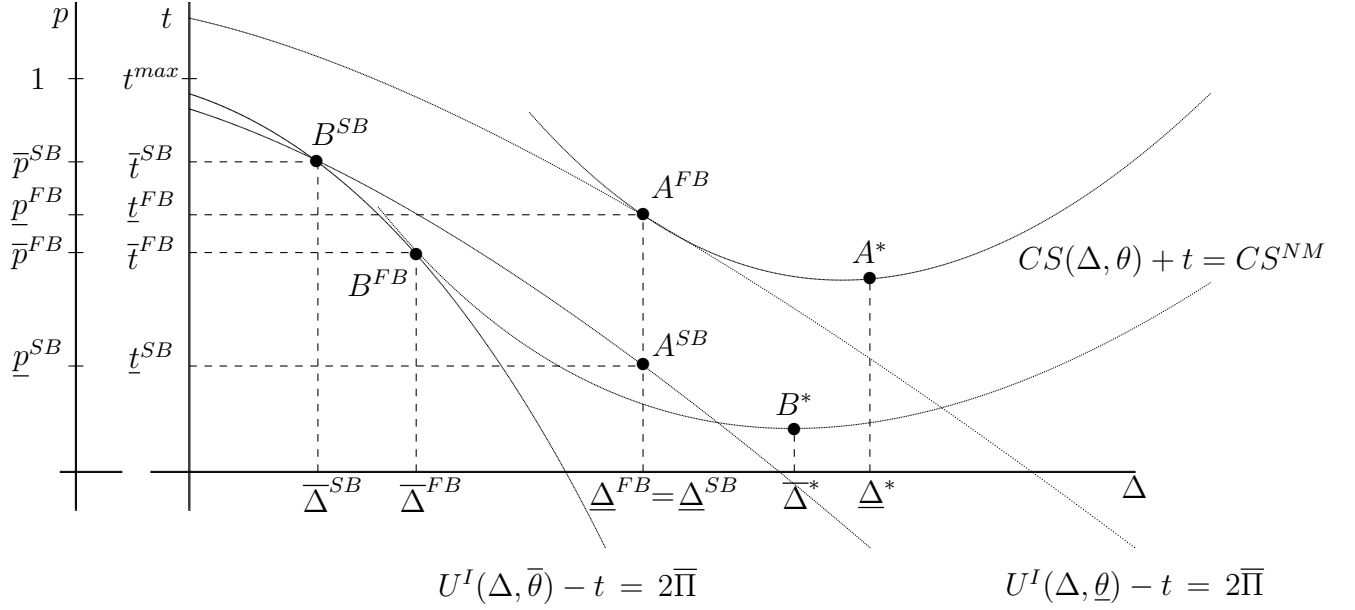


Fig 2. First Best and Second Best Contracts.

From Insiders point of view, divestments and transfers are costly. The iso-utility curves of both types correspond to increasing level of utility when one moves in the southwest direction. Iso-utility curves are decreasing and concave in  $\Delta$  and  $t$ , they represent the set of  $(\Delta, t)$ , which maintain Insiders in a situation at least as favorable as the no-merger situation. From AA point of view, divestments and transfers are beneficial since they improve Consumer Surplus. The increase in utility goes in the northeast direction, iso-utility functions are increasing and convex in  $\Delta$  and  $t$ . It is costless for an efficient to divest an asset (property 6), iso-utility curves for inefficient Insiders are steeper. Those curves, for different types cross only once, guaranteeing the Spence Mirrlees property.



## 4 Shutdown of the less efficient type

Since the beginning of the paper we restricted ourself to a particular case where all mergers improve consumer surplus, provided that merged entities divest a part of their assets to Outsiders. The AA computes revealing contracts knowing that each type is going to choose a separating ratio of cash which confer the amount of divestments and the transfer intended to him, and permits the merger with remedies to be consumer surplus enhancing. Nevertheless, we consider only a part of the problem since, even with divestment, an inefficient merger could be price increasing, if the level of synergy achieved by inefficient Insiders is insufficient (the inefficient type is before  $\tilde{e}$  in Fig.1).

We extend our framework assuming that the AA is confronted to a new problem : the possibility that inefficient mergers were suboptimal even with divestments. In other word the AA faces a new case where inefficient Insiders achieve a level of synergy too low for the merger associated with this level of synergy improves consumer surplus.

The timing of this new game is a little bit different. First, nature draws type from the set  $\Theta = \{\underline{\theta}, \bar{\theta}\}$  with prior probability  $\nu$  to come across a  $\underline{\theta}$ -type, and a prior probability  $(1 - \nu)$  to come across a  $\bar{\theta}$ -type. Except Insiders, nobody observes which type the nature has drawn. Then, the AA computes the value of  $CS(\bar{\Delta}, \bar{\theta}) - \bar{t}$  and confronts this result to the consumer surplus before the merger  $CS^{NM}$ . When the last overcomes the first, then the AA infers that it does not exist a contract for inefficient which could permit to improve consumer situation. This trade off defines a threshold  $\hat{\theta}$  above which an inefficient type must not be allowed to merge, even with divestments.

**Assumption 4** :  $CS(\underline{\Delta}, \underline{\theta}) - \underline{t} \geq CS^{NM}$ , is always true  $\forall \underline{\theta}$ .

Then the AA builds a merger contract. We can summarize the main features of the optimal contract in proposition 3.

**Proposition 3** : *The optimal menu of contract entails :*

- *If  $\bar{\theta} > \hat{\theta}$ , then the AA proposes the contract  $(\underline{\Delta}^{FB}, \underline{t}^{FB})$ , only  $\underline{\theta}$ -type merges.*
- *If  $\bar{\theta} < \hat{\theta}$ , and  $\nu$  high, then the AA proposes the contract  $(\underline{\Delta}^{FB}, \underline{t}^{FB})$ , only  $\underline{\theta}$ -type merges.*
- *If  $\bar{\theta} < \hat{\theta}$ , and  $\nu$  low, then the AA proposes the second best contract  $[(\underline{\Delta}^{SB}, \underline{t}^{SB}), (\bar{\Delta}^{SB}, \bar{t}^{SB})]$ , every type merges and the AA leaves an information rent to  $\underline{\theta}$ -type.*

*Proof* : Depending on the prior values, and the level of  $\bar{\theta}$  :

Either  $\bar{\theta} > \hat{\theta}$ , in this case the level of synergy realized by inefficient Insiders is not enough from the AA point of view. The AA proposes, then, a "Shutdown" contract  $(\underline{\Delta}^{SD}, \underline{t}^{SD})$ , where the less efficient type is excluded from the merger. This contract satisfies the following inequalities :

$$U^I(\underline{\Delta}^{SD}, \underline{\theta}) - \underline{t}^{SD} \geq 2\bar{\Pi}$$

$$U^I(\underline{\Delta}^{SD}, \bar{\theta}) - \underline{t}^{SD} < 2\bar{\Pi}$$

The best way to satisfy those two constraints is to propose a unique contract  $(\underline{\Delta}^{SD}, \underline{t}^{SD}) = (\underline{\Delta}^{FB}, \underline{t}^{FB})$  to both types. We be sure that the First Best contract intended to efficient would not be chosen by inefficient since it confers a negative utility. Moreover this contract provides no rent to efficient Insiders, so, it is the best solution from the AA point of view.

Or  $\bar{\theta} \leq \hat{\theta}$ , and the prior  $\nu$  is relatively high. In this case the proportion of efficient is, a priori, important in comparison with inefficient. The AA must leave, quite often, an information rent to efficient for a low probability that inefficient type be drawn. In that case, it is in the AA interest to apply a shutdown of the less efficient type contract, in order to avoid the costly information rent. The optimal contract must be  $(\underline{\Delta}^{FB}, \underline{t}^{FB})$ . The AA is going to exclude inefficient from the merger for incentive reasons, the presence of the first inefficient Insider creates efficient incentives to mimic inefficient, and so information rent to guarantee perfect revelation.

Or  $\bar{\theta} \leq \hat{\theta}$ , and the prior  $\nu$  is relatively low. In that last case the proportion of inefficient is, a priori, important compared with efficient. The AA must leave an information rent to efficient in very few cases and the elected contract should be the Second Best contract of the later part  $[(\underline{\Delta}^{SB}, \underline{t}^{SB}), (\bar{\Delta}^{SB}, \bar{t}^{SB})]$ . We come across Second Best analysis again when  $\nu$  is low.

The AA decision is influenced by the ratio  $\frac{\nu}{(1-\nu)}$ . The bigger this ratio is, the more the AA excludes inefficient type from the merger with divestments in order to avoid the costly information rent.

## 5 Limited Liability

The AA would want to implement the First Best contract  $[(\underline{\Delta}^{FB}, \underline{t}^{FB}), (\bar{\Delta}^{FB}, \bar{t}^{FB})]$  in perfect information, and for certain number of cases in asymmetric information  $[(\underline{\Delta}^{FB}, \underline{t}^{FB})]$ , depending on the prior probability. Nevertheless, all the present analysis is resting on the hypothesis of optimal transfers under the maximum transfer  $t^{max}$ . Until now, the AA was allowed to deduct any level of transfer, without limit, provided that the threshold was not crossed. Since transfers are implicitly defined by the ratio of cash in the merger procedure, what happens if the AA computes a transfer in the optimal contract, which requires an amount of cash over 100%? The AA cannot offer a contract with higher transfers than the transfer defined by  $p = 1$  (the costlier procedure is all cash). The purpose of the next section is to introduce limited liability in this merger control context. The AA uses a limited transfer which modifies substantially our results.

The central hypothesis from now on, is a fiscal hypothesis. We suppose arbitrarily that the AA cannot pinch all the First Best Insiders surplus even for the less efficient one. The maximum transfer the AA can recover is never First Best.

**Assumption 5** :  $\bar{t}^{FB} > t^{max}$ .

Since we said that efficient Insiders are characterized by a higher level of transfer in the First Best, the inequality holds for efficient. The maximum transfer  $t^{max}$ , is an additional constraint the AA must respect in its maximization program. The AA must compute another contract which takes into account the fiscal constraint :

$$(LL) : t \leq t^{max}.$$

Let  $\mathcal{B}$ , be the set of feasible allocations. Formally this set is such that :

$$\mathcal{B} = \{(\Delta, t) : \Delta \in \mathbb{R}^+, t \leq t^{max}\}.$$

This new constraint sends back the AA on an indifference curves nearer of the origin for all types. The AA is negatively affected by limited liability, it cannot reallocate transfer between firms and consumer as well, Insiders pay less than the First Best transfer, and consumers receive less in rent term.

The AA's maximization program becomes subject to a the limited liability constraint. Formally :

$$\begin{aligned} & \max_{\{\Delta, t\}} CS(\Delta, \theta) + t \\ & \text{s.t. : (IR) and (LL)} \end{aligned}$$

In perfect information, even with limited liability, the AA must saturate both constraints. The solution in transfer is immediately known :  $\underline{t}^{LP} = \bar{t}^{LP} = t^{max}$ , where the subscript LP is for Limited liability and Perfect information. In this context, the AA must implement a transfer just equal to the maximum transfer  $t^{max}$  (above is impossible, underneath is even more costly), and choose a pair  $(\Delta, t)$  in order to saturate Insiders participation constraint :  $t^{LP} = U^I(\Delta^{LP}, \theta) - 2\bar{\Pi} = t^{max}$ .

The optimal level of divestiture is no longer represented by the tangency between the participation constraint and the AA utility curve like in the First Best, but by the intersection locus of Insider participation constraint, the AA indifference curve and the fiscal constraint (see Fig 3.).

The AA has to increase divestment in the limited liability problem in complete information, since  $t^{FB} > t^{LP}$  which gives  $\Delta^{LP} > \Delta^{FB}$ . From assumption 1 :  $|U_{\Delta^{FB}}^I(\Delta^{FB}, \theta)| < |U_{\Delta^{LP}}^I(\Delta^{LP}, \theta)|$ . The limited liability equilibrium in perfect information moves to the right for each type along Insiders participation constraints.

We although can notice that in the First Best, the requested transfer is even more high that the type is efficient, which drives us to the following inequality :  $\underline{t}^{FB} - t^{max} > \bar{t}^{FB} - t^{max}$ . The fiscal economy for Insiders is even more important that the type is efficient, it is the reason why, the increase in divestment is bigger for efficient Insiders.

In perfect information with constrained transfer, the AA proposes a contract  $(A^{LP}, B^{LP}) = [(\underline{\Delta}^{LP}, \underline{t}^{LP}); (\bar{\Delta}^{LP}, \bar{t}^{LP})]$ . This situation does not affect Insiders satisfaction : they are on the same utility curve, nevertheless it negatively affects the AA situation : the fiscal constraint reduce the AA power. Both type pay the same maximal transfer, Insiders medium of paiement are all cash, but efficient have to pay more in divestiture term. Formally and graphically :

$$\underline{\Delta}^{LP} > \underline{\Delta}^{FB} > \bar{\Delta}^{LP} > \bar{\Delta}^{FB}, \quad \text{and} \quad \underline{t}^{FB} > \bar{t}^{FB} > \underline{t}^{LP} = \bar{t}^{LP}$$

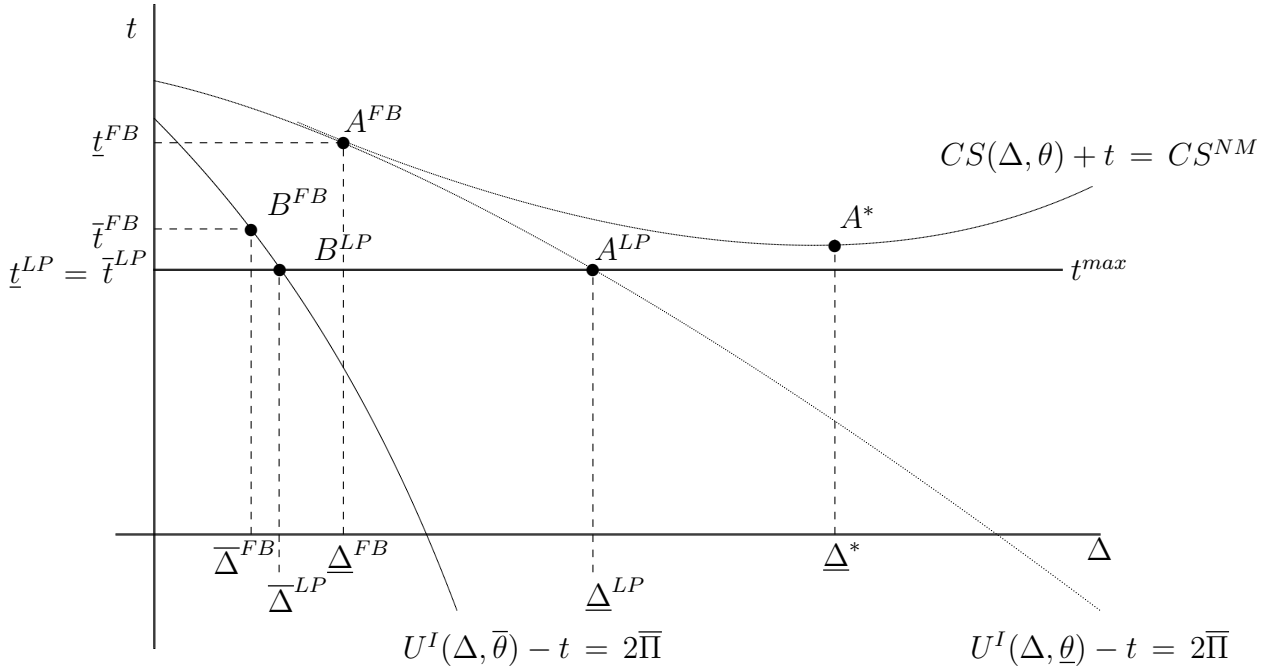


Fig 3. Limited liability contract in perfect information.

This contract is implementable only in the special case where information about synergy type is perfect, indeed, both type pay the same transfer but efficient type divests more. If Insiders have access to information on type and the AA not, nothing drives efficient Insiders to accept the contract  $A^{LP}$ . Both type are going to choose the same  $B^{LP}$  contract and the level of divestment will be insufficient each time nature draws the  $\underline{\theta}$ -type, depreciating consumer surplus. The AA commits an error in divestment term each times Insiders are efficient, prices on the sector increase with probability  $\nu$ . Proposing the contract  $(A^{LP}, B^{LP})$  in asymmetric information fails in self selecting between Insiders. The AA must propose an adapted contract respecting incentive constraint ( $\underline{IC}$ ), taking into account limited liability constraints :

$$\underline{t} \leq t^{max} \quad (\underline{LL})$$

$$\bar{t} \leq t^{max} \quad (\bar{LL})$$

Under imperfect information and limited liability, the AA maximizing program becomes :

$$\begin{aligned} \max_{\{(\underline{\Delta}, \underline{t}); (\bar{\Delta}, \bar{t})\}} & \nu \cdot [CS(\underline{\Delta}, \underline{\theta}) + \underline{t}] + (1 - \nu) \cdot [CS(\bar{\Delta}, \bar{\theta}) + \bar{t}] \\ \text{s.t. :} & (\underline{IR}); (\bar{IR}); (\underline{IC}); (\bar{IC}); (\underline{LL}), \text{ and } (\bar{LL}) \end{aligned}$$

At this stage the crucial point is to find which constraints are relevant. First we cannot be over the straight line ordered  $t^{max}$ , but nothing guarantees that this constraint is binding for both type.

The problem comes from efficient Insiders willing to mimic inefficient and not the reverse; ( $\bar{IC}$ ) is never achievable for inefficient Insiders considering ( $\bar{IR}$ ), since inefficient incentive constraint is on the right of their participation constraint. We can neglect the irrelevant ( $\bar{IC}$ ) constraint. On the contrary ( $\underline{IC}$ ) must be binding at the optimum, we want to avoid imitation behaviors :

$$\underline{t} = U^I(\underline{\Delta}; \underline{\theta}) - U^I(\bar{\Delta}; \underline{\theta}) + \bar{t}$$

In asymmetric information, the amount of transfer for efficient Insiders depends on the divestment for both type  $\theta$  (A graphical analysis can be done in Fig.3).

Classically, transfer for efficient Insiders decreases when the efficient amount of divestment increases. To stay on the same incentive curve, the AA must arbitrate between transfer and divestment, since they are both costly for Insiders; formally :  $\underline{t}_{\underline{\Delta}}(\underline{\Delta}, \bar{\Delta}) < 0$ .

Nevertheless, the way efficient transfers are affected by inefficient amount of divestment depends on which constraint among  $(\overline{RI})$  and  $(\overline{LL})$ , are saturate. If only  $(\overline{RI})$  is satisfied with strict equality, contracts can move along the  $(\overline{RI})$  constraint. The  $(\underline{IC})$  constraint which cuts  $(\overline{RI})$  constraint gets closer to the origin for higher levels of  $\bar{\Delta}$ . Then increasing  $\bar{\Delta}$  decreases  $\underline{t}$ ; formally :  $\underline{t}_{\bar{\Delta}}(\underline{\Delta}, \bar{\Delta}) < 0$ .

If only  $(\overline{LL})$  is saturate, contracts can move along the  $(\overline{LL})$  constraint. The  $(\underline{IC})$  constraint which cuts  $(\overline{LL})$  constraint moves away from the origin for higher levels of  $\bar{\Delta}$ . Then increasing  $\bar{\Delta}$ , increases  $\underline{t}$ ; formally :  $\underline{t}_{\bar{\Delta}}(\underline{\Delta}, \bar{\Delta}) > 0$ .

We try now to determine imperfect information equilibrium in the case of limited liability. Proposition 4 characterizes this optimum for inefficient Insiders.

**Proposition 4** *The Limited Liability equilibrium contract intended to inefficient Insiders is the same in perfect and in imperfect information :  $B^{LP} = B^{LI}$ .*

*Proof* : For proposition 4 to be true, we must show that both participation constraints and limited liability constraints are binding at the optimum. If both  $(\overline{RI})$  and  $(\overline{LL})$  are binding, then the optimal contract in asymmetric information with limited liability for inefficient Insiders is located in the intersection of those constraints, that is to say in  $B^{LP}$ . We proceed in to time, at least one of those two constraints is satisfied with strict equality. First, suppose that  $(\overline{RI})$  is saturate and  $(\overline{LL})$  not. We can increase the AA utility along  $(\overline{RI})$  by decreasing  $\bar{\Delta}$ , since the optimum get closer to the First Best, the AA utility curves move away from the origin, and the AA can relax  $(\underline{IC})$ . We come up against limited liability constraint which is thus binding at the optimum.

Second, suppose that  $(\overline{LL})$  is saturate and  $(\overline{RI})$  not. We can do better in increasing  $\overline{\Delta}$ , since  $(\underline{IC})$  gets nearer from  $(\underline{RI})$ . We must stop on  $(\overline{RI})$ . Thus, limited liability contract for inefficient Insiders in imperfect information corresponds to the intersection between  $(\overline{LL})$  and  $(\overline{RI})$ , that is to say in  $B^{LP}$ .

The result of proposition 4 has several knock-on effect on the model. First, information quality in limited liability on transfers does not affect inefficient Insiders contract. However, we can deal with some positive distortion away from the First Best for inefficient Insiders :  $\overline{\Delta}^{LI} > \overline{\Delta}^{FB}$  compared with the no limited liability case which lead to negative distortion in asymmetric information :  $\overline{\Delta}^{SB} < \overline{\Delta}^{FB}$ .

Second, proposition 4 implies that the relevant incentive constraint for efficient Insiders must passe trough  $B^{LP} = B^{LI}$ , which immediately gives a divestment and a transfer result for efficient Insiders. We just find which incentive constraint is relevant ; the solution of the AA program is defined by the tangency between the incentive constraint which passes trough  $B^{LI}$ , and the AA utility curve.

We must find  $\underline{\Delta}$  and  $\underline{t}$  consistent with the AA optimization program :

$$\begin{aligned} \max_{(\underline{\Delta}, \underline{t})} \quad & \nu \cdot [CS(\underline{\Delta}, \underline{\theta}) + U^I(\underline{\Delta}, \underline{\theta}) - U^I(\overline{\Delta}^{LI}, \underline{\theta}) + U^I(\overline{\Delta}^{LI}, \overline{\theta}) - 2\overline{\Pi}] \\ \text{s.t. :} \quad & (\underline{IR}) \text{ and } (\underline{LL}) \end{aligned}$$

The solution of this program gives the following proposition.

**Proposition 5** *The Limited Liability amount of divestment intended to efficient Insiders in imperfect information is First Best :  $\underline{\Delta}^{LI} = \underline{\Delta}^{FB}$ , and  $\underline{t}^{LI} < \underline{t}^{max}$ .*

*Proof* : The solution in divestiture term is given by :

$CS_{\underline{\Delta}^{LI}}(\underline{\Delta}^{LI}, \underline{\theta}) = -U_{\underline{\Delta}^{LI}}^I(\underline{\Delta}^{LI}, \underline{\theta})$ . Since utility curves for the AA and Insiders are concentric, since the relevant  $(\underline{IC})$  constraint passes trough  $B^{LP}$ , and since in the First Best :  $CS_{\underline{\Delta}^{FB}}(\underline{\Delta}^{FB}, \underline{\theta}) = -U_{\underline{\Delta}^{FB}}^I(\underline{\Delta}^{FB}, \underline{\theta})$ ; we obtain the same divestiture solution in the First Best without Limited Liability, and in asymmetric information with Limited Liability :  $\underline{\Delta}^{LI} = \underline{\Delta}^{FB}$ .



The solution in transfer term is given by :

$\underline{t}^{LI} = U^I(\underline{\Delta}^{LI}; \underline{\theta}) - U^I(\bar{\Delta}^{LI}; \underline{\theta}) + \bar{t}^{LI}$ . Since  $\bar{t}^{LI} = t^{max}$ , since  $\underline{\Delta}^{LI} > \bar{\Delta}^{LI}$ , and since assumption 1 is satisfied :  $U^I(\underline{\Delta}^{LI}; \underline{\theta}) < U^I(\bar{\Delta}^{LI}; \underline{\theta})$ ; we obtain a transfer solution in asymmetric information with limited liability under the ceiling transfer :  $\underline{t}^{LI} < t^{max}$ .

Formally, the asymmetric information with limited liability contract satisfies<sup>13</sup> :

$$\underline{\Delta}^{LI} = \underline{\Delta}^{FB} > \bar{\Delta}^{LI} > \bar{\Delta}^{FB}, \quad \text{and} \quad \underline{t}^{FB} > \bar{t}^{FB} > \bar{t}^{LI} = \underline{t}^{LI}$$

Graphically :

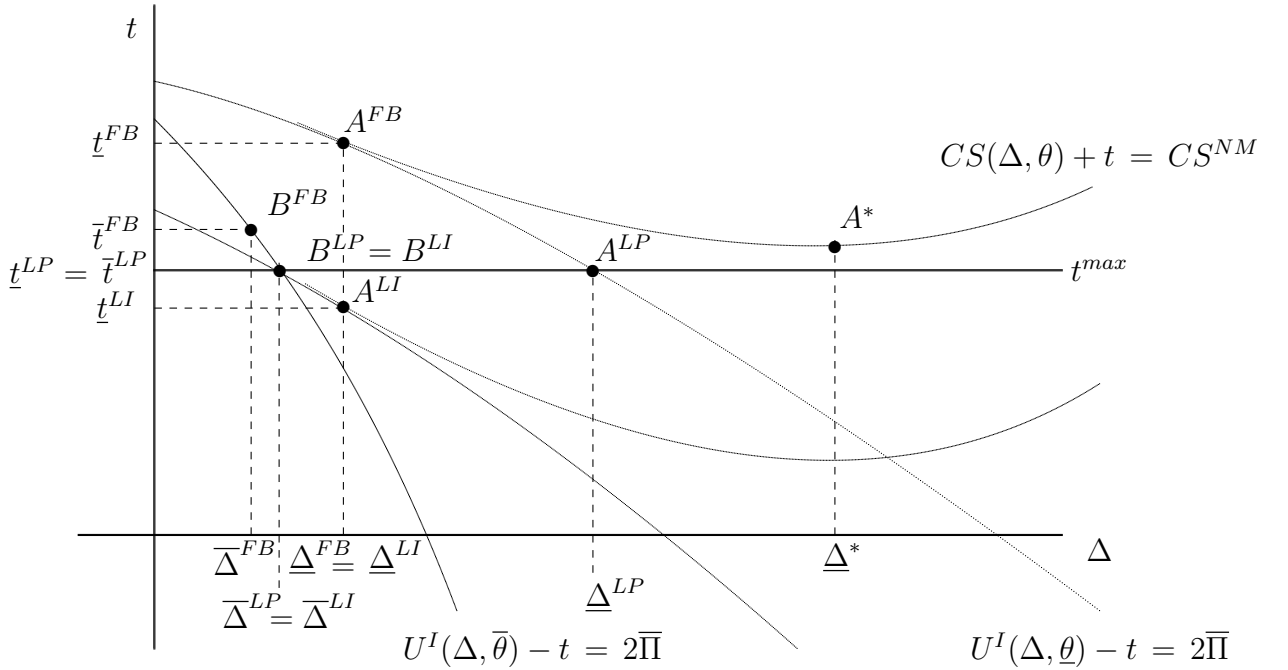


Fig 4. Limited liability contract with asymmetric information.

We must have no distortion at the bottom in the limited liability problem :  $\bar{\Delta}^{LP} = \bar{\Delta}^{LI}$ , and distortion at the top :  $\underline{\Delta}^{LP} > \underline{\Delta}^{LI}$ . The AA proposes the contract  $(A^{LI}, B^{LI}) = [(\underline{\Delta}^{LI}, \underline{t}^{LI}); (\bar{\Delta}^{LI}, \bar{t}^{LI})]$  when transfers are limited in asymmetric information. Inefficient Insiders get no rent :  $\bar{t}^{LI} = t^{max}$ , they choose a medium of paiement exclusively in cash, the costlier procedure, whereas efficient Insiders enjoy an information rent :  $\underline{t}^{LI} < t^{max}$ , incorporating stocks in their merger offer.

<sup>13</sup>We obtain, in our ex-post contracting framework, something quite close to Laffont and Martimort (2002), with ex-ante contracting.

**remark** : A particular case occurs when the AA should ask the same amount of divestment for efficient Insiders in perfect information without limited liability, and for inefficient Insiders in perfect information with limited liability. When the threshold  $t^{max}$  decreases, the AA as to distort the inefficient amount of divestment upward, it exists a  $t^{max}$  for which the AA is in conflict with the monotonic condition  $\underline{\Delta} \leq \overline{\Delta}$ . In this case a bunching problem arise, the AA proposes the same contract for efficient and inefficient Insiders when information is asymmetric. This result occurs also in Laffont and Martimort (2002).

## 6 Conclusion :

Merger regulation is a crucial issue in international politics, and is prey to informational problems. The model presented here proposes to rely on capital gains tax legislation and on structural remedies to build incentive contract in a merger control framework. This method seems to be a relevant way to create incentive in merger control and to screen among "good" and "bad" mergers.

The analysis shows that, the AA must decrease inefficient Insiders divestments in asymmetric information without fiscal constraint in comparison with the First Best requested level of divestment. Although, the AA must increase inefficient Insiders divestments in asymmetric information with limited liability constraint compared with the First Best requested level of divestment. The crucial result is that efficient Insiders must divest the First Best level when asymmetric information and limited liability constraint occurs, which seems to be a good news. The First Best, traditionally represents the optimal solution in welfare term, for consumer as well for merged firms. In transfer term, inefficient Insiders pay more than efficient Insiders when asymmetric information and limited liability are considered. Inefficient Insiders incorporate thus, a more important part of cash in their mix bid.

We should add a continuum of Insider type, divestment containing synergies and multi-products firm to extend the model. Those enrichment could be done in subsequent analysis.

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