ABSTRACT: In this paper we analyse the horizontal merger of companies in an already concentrated industry. The participants in mergers are obliged to submit notification to the Competition Commission but they also have the option of rejecting the merger. At the time of the notification submission the participants do not know whether the Commission is strong or weak, and they can complain to the Court if the Commission prohibits the merger.

We model the strategic interaction between Participants and Commission in a dynamic game of incomplete information and determine weak perfect Bayesian equilibria. The main finding of our paper is that Participants will base their decision to submit notification on their belief in a weak Commission decision and will almost completely ignore the possibility of a strong Commission decision. We also provide a detailed examination of one case from Serbian regulatory practice, which coincides with the results of our game theoretical model.

JEL CLASSIFICATION: C72, K21, L40, L41
1. INTRODUCTION

In this paper we will analyse an important topic from competition policy and industrial organisation. The control of concentrations (mergers and acquisitions) represents one of cornerstones of competition policy in all developed market economies\(^1\), along with the prevention of collusive behaviour and the abuse of dominant position.

The aim of this paper is to present the logic and mechanism of the strategic interaction between the companies involved in concentration on the one hand, and the Competition Commission on the other. In order to identify the possibility of Participants and Commission behaving strategically in the process of merger control, it is necessary to describe the mechanism of regulation in this area and the motives of the parties entering into strategic interaction.

In fact, unlike other areas of competition policy, the control of mergers is specific in that it requires Commissions to have an \textit{ex ante} approach when analysing the impact of a merger. According to most developed market economies’ guidelines regulating this area, companies are obliged to report the intended concentration to the Competition Commission, whose task it is to assess the potential impact of the notified merger on the competition conditions in the relevant market\(^2\). When the test procedure is implemented these impacts have not yet occurred, which makes this kind of regulation particularly difficult for the Commission and uncertain for the Participants. The result of the test procedure conducted by the Commission might be approval of concentration if it is determined that a merger has no potential to undermine the established criterion of regulation, or prohibition of concentration in the opposite case. Intermediate solutions are also possible, where concentration is conditionally approved, if the Commission estimates that, with fulfilment of the necessary conditions, the merger would meet the imposed criterion.

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\(^1\) The fourth cornerstone of competition policy in EU is the control of state aid, which is different from the US where this type of regulation is not enforced.

\(^2\) All concentrations are not subject to regulatory analysis of this kind, but only those which are considered large enough according to established ‘thresholds’, and these cases are the subject of detailed examination.
When the regulatory criterion is satisfied it is judged that competitive conditions will not be seriously affected, and the opposite is considered the case when the criterion is not met. The selection of the optimal criterion for regulation has been the subject of an intensive debate between economists and jurists which has lasted for several decades. There are two generic criteria, the criterion of consumer’s surplus and the total welfare criterion in a given partial market. Generally, from an academic point of view, the second criterion that respects both consumer’s and producer’s surplus is preferred. This criterion considers neutrally the transfer of surplus between the two parties in the market as long as the net effect on the total welfare is positive. Classical models presented in Williamson (1968) and Farrell and Shapiro (1990) argue in favour of total welfare as a criterion for regulation. On the other hand, practitioners in this field and Commissions around the world are more inclined to the first criterion, and indirectly respect producer’s surplus through expected innovations from the merger. Regulatory entities in the US and EU on the supranational level are not exceptions from this policy.

The assessment of whether the merger is in accordance with the established criterion requires complex economic calculations, which, properly implemented, significantly occupy the capacities of the Commission. In countries where competition policy is in its infancy it is usually the case that the implementation of the test procedure in this field is beyond the capabilities of the Commission due to a lack of adequate human resources and the necessary skills to conduct detailed test procedures. This is usually accompanied by insufficient independence of the Commission from the government and from the influences of various interest groups. Although the Commission is formally independent, in practice this is often not the case, especially for Commissions with a short history of successful regulation. In such cases the Commission may be considered ‘weak’. With the accumulation of knowledge and experience gained through the successful resolution of cases, the competence of the Commission and its reputation and independence, both formal and informal, increase. In this way the Commission becomes more able to make difficult decisions prohibiting large concentrations which threaten the conditions of market competition. Thus building a ‘strong’ Commission cannot be achieved in a short period of time. The best illustration of this is the system of competition protection in the US, which is now considered the most developed
in the world, having been developed over the last 120 years since the adoption of the Sherman Act in 1890. It should be noted that the Sherman Act remained silent on merger cases, except in cases where the merger resulted in monopolisation of the market. According to Motta (2004), the introduction of the Sherman Act is the most likely reason for the sharp increase in the number of mergers in the period after its adoption. Unable to coordinate their decisions on fixing the market price, the companies opted for a formal merger, which in fact did not violate the guidelines of the Sherman Act. In response to these problems the Clayton Act was passed in 1914, aimed at filling the identified gaps. The key novelty brought in by the Clayton Act was the possibility of prohibiting business activities where there was judged to be a substantial likelihood of jeopardizing competition conditions, which was the beginning of the history of market concentration control.3

The character of the Commission’s decision is an important variable in the objective function of companies intending to merge. A positive decision enables companies to benefit from external growth through mergers, while in the opposite case they are prevented from obtaining these benefits. It should also be added that missed benefits from external growth are not the only loss that may befall Participants in the case of a negative Commission decision. The total loss of this decision includes the opportunity costs of time spent in planning the merger and other material costs that cannot be recovered in the case of a negative Commission decision.

Since the Commission has to deal with complex economic analyses, Participants cannot be certain of the outcome of the test procedure. It is natural to expect that the results of weak Commissions’ test procedures will contain a significantly higher proportion of unexplained variability in the total variability than in the case of a strong Commission. This fact increases the doubts of Participants, the Court, and the general public about the accuracy of the weak Commission’s analysis and its decisions. On the other hand, Participants can go to Court to contest the weak Commission’s decision, which will result in additional expenses for the Commission and reduce its reputation. For that reason weak Commissions are not prone to accept concentrations in cases when

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3 For detailed discussion of the content of the mentioned US laws, which are still in force in the spirit of the common law system, see Shenefield and Stelzer, (2001).
they are not able to perform analysis of sufficient quality. If weak Commissions prohibit a concentration when lacking sufficiently clear arguments to back up their decision, they become vulnerable if Participants complain to the Court. Under these circumstances it is not unusual for weak Commissions to approve concentrations using the shortened procedure, even though these concentrations might endanger competition (for example, with the abuse of dominant position or with collusive behaviour). This opportunistic behaviour of weak Commissions imposes a transfer of responsibility, from control of concentration as the preventive mechanism for protection of competition to the prohibition of cartel behaviour and the abuse of dominant position as *ex post* mechanisms of regulation that are enforced when the anti-competitive behaviour becomes evident. In that sense we are prone to believe that weak Commissions have a more permissive attitude towards concentrations than strong Commissions. Strong Commissions possess competence and a positive public reputation, enabling them to perform complex economic analyses and provide judgements that can be defended in Court and to the general public if Participants decide to take a Commission decision to Court.

Could the relationship between the Commission and the parties involved in concentration be considered as a strategic game? In the model that we develop in this paper, Commission and Participants are rational Bayesian players, intending to maximise their expected payoffs. Since the Commission's decision represents an important variable in the Participants’ objective function, they have a clear strategic motive when dealing with the Commission. But how can the strategic motivation of the Commission be explained?

In general, the motives arise from inherent imperfections in the functioning of this specific bureaucratic entity. Although we can discern several motives, we will list those that we consider the most important. First, it is in the interests of each Commission to solve cases according to the law and with minimal effort. The Commission also has to convince the Participants, Courts, and general public that its decisions are optimal. To achieve this objective the Commission needs to build a strong reputation as a competent, unbiased, and independent regulatory entity. It is not in the interest of any Commission to have its decisions rejected by the Court. Therefore, it is in the Commission’s interest to successfully solve the cases with minimal effort and to reinforce its reputation.
during this process, which makes the resolution of future cases much easier. Second, given that in some systems of competition protection the Commission’s budget is very dependent on the money that Participants are required to pay in the form of merger notification fees, there is a possibility of moral hazard and over-investigation and of the Commission participating in strategic interaction. It should be added that in the majority of cases the fees paid depend on whether the Commission decides to conduct a detailed investigation or grant approval based on a shortened procedure⁴. It is in the Commission’s discretion to decide which of the two procedures to use. The detailed investigation procedure requires higher expenditure of material and human resources. Even in systems where the Commission’s budget does not depend predominantly on fees and where the State covers the cost of the Commission, the incentives for over-investigation still exist, because in this case the Commission as an independent entity determines its budget based on the scope of planned activities and is responsible for its realisation. It is evident that strategic motives exist for both Participants and Commission, and that a strategic game between Participants and Commission can be constructed.

The model that we present in this paper is in line with current guidelines for regulation in the US⁵ and the EU on the supranational level⁶, which area set of policies and procedures that do not precisely define whether each type of merger will be thoroughly investigated and what the outcome of the process will be, or if it will be approved according to shortened procedure. The laws and guidelines which define the control of concentrations leave plenty of space for the Commission to make discretionary decisions, even in the most developed systems, which provides incentives for the Commission and companies that are the subject of regulation to behave strategically.

Probably because the motives behind the Commission acting strategically are often blurred and not immediately apparent, to the best of our knowledge there is a negligible amount of literature dealing with this issue. In the literature dealing with the effects of horizontal mergers, the regulatory entity’s decisions,

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⁴ The shortened procedure is also called the first phase of investigation, while detailed procedure is called the second phase of investigation.
carried out within the established procedures and criteria, are assumed to be truly objective, and discussion is mainly related to the optimality of procedures and criteria and the choice between *per se* rules and rules of reason in the regulation of mergers. For example, this kind of analysis is presented in Neven and Roller (2005), Christiansen and Kerber (2006), Piraino (2007), and Ottaviani and Wickelgren (2008). The strategic behaviour of the Commission in performing its responsibilities is rarely the subject of discussion.

Besanko and Spulber (1993) developed a model to analyse the optimal regulatory policy for the control of horizontal mergers, which is focused on the trade-off between market power and the cost efficiency resulting from a merger. Their paper is based on the conclusions of the classical models presented in Williamson (1968) and Farrell and Shapiro (1990). Besanko and Spulber (1993) assume that Participants and Commission are asymmetrically informed due to the fact that companies have better information than the regulatory authority about the increase in cost efficiency after the merger. Besanko and Spulber (1993) conclude that the outcome of the regulatory process is the result of a strategic interaction between Participants and the Commission’s credible commitment to persist in competent law enforcement. The latter largely depends on the type of Commission (weak or strong), which is the main idea of the model that we develop in this paper.

The rest of the paper is organised as follows. In the second part we explain the assumptions of the model, derive main results, and explain the intuition behind the conclusions that this model provides. In the third part the discussion concerning the results of the model is extended to the recent example of a merger of two sugar producers in Serbia, which was the subject of investigation by the Serbian Competition Commission. The last part is reserved for concluding remarks about the assumptions of the model, discussion of the results, and possible extensions.

2. THE MODEL

The Companies planning to merge (Participants) have not dealt with the Competition Commission and do not know how the Commission will react to the notification that they will submit. Before the formal submission of the notification the Participants have already made some preliminary negotiations...
and have an internal agreement to merge, and the only possible constraint would come from the Competition Commission.

This model might explain the situation facing international companies operating in several countries. If these companies are planning to merge they must notify each national Competition Commission in all the countries where they have established subsidiaries, and each national Commission decides on its own whether to accept or prohibit the merger in the national market. As we will see later on, this model could be also applied to cases of companies operating predominantly in a national market but that have not dealt with the Commission in the past.

Our model describes the situation of a sizeable merger in an industry where there is already an intermediate or high level of concentration significant enough to trigger investigation by the Competition Commission. The Participants are not sure how the Commission will react to the proposed merger, but believe that there exists a positive probability that the merger will be prohibited.

The Commission is authorised by law to decide whether the merger should be accepted or prohibited. If they are successful the Participants in the concentration will benefit from external growth and will receive a payoff $\pi_h$, otherwise they receive a payoff of $\pi_l$, $\pi_h > \pi_l$. The difference in payoffs, $\Delta\pi = \pi_h - \pi_l$, represents the net effect between the present value of benefits if the proposed merger is accepted (the increase in productive efficiency and market power) and present value of the opportunity costs of preliminary negotiations between Participants. Naturally, companies are motivated to merge if this difference is positive, $\Delta\pi > 0$. These payoffs will be relevant to the Participants’ decision in the absence of any legislative obligations and any further costs of submitting the proposal to the Commission. On the other hand, the Commission can be strong with probability $p$, and weak with probability $1-p$. There is a higher probability

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7 For the sake of simplicity, we will rule out the conditional approval of concentration as an intermediate solution.

8 Our model represents a dynamic game that lasts at most three periods. However, for the sake of simplicity, we will assume that the interest rate is zero since this assumption does not alter the conclusions of the model.
that a strong Commission will challenge the merger than a weak Commission\(^9\). The Commission knows what type it is, but the Participants only know the discrete distribution of the two types. We think that it is more appropriate to assume the discrete distribution in this case than continuous distribution, since the Participants base their decision on their belief of there being only two possible types of Commission, not on the continuum of possible types.

In Figure 1 we present this dynamic game of incomplete information in its extensive form. The Participants make the first move. They have the outside option of giving up on further negotiations and not submitting notification, thus avoiding the costs of the process\(^{10}\). In that case the Participants have a payoff of \(\pi_l\) and the Commission has a payoff of 0. If the Participants decide to submit notification to the Commission, Nature makes the move and determines the type of Commission.

After Nature has determined the type, the Commission can Accept or Prohibit the concentration. If the Commission accepts concentration, the Participants receive a payoff \(\pi_h - \varepsilon\), regardless of the type of Commission. We will denote by \(\varepsilon\) the notification costs, which include a submission fee and the opportunity costs of time and material resources spent on collecting evidence for the Commission to prove that the proposed merger will not endanger the criterion of regulation.

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\(^9\) Besanko and Spulber (1993) model the Commission’s type with the probability of challenging the merger. Thus, we might consider a strong Commission as one that has a higher probability of challenging the merger. They use total welfare as the regulatory criterion, with different weights attached to increase in profit and increase in consumer’s surplus. They derive the first-best probability of the merger being challenged. However, due to the asymmetric information about the increase of productive efficiency between regulator and Participants, the equilibrium probability of challenging the merger is lower that the first-best level. To correct this bias they conclude that more weight should be given to the consumer’s surplus in the regulatory criterion than to the profit of the Participants.

\(^{10}\) In European practice it is possible for the parties interested in the merger to have preliminary consultations with the Commission, which helps the potential Participants to assess the probability of the notification being accepted if they submit it.
On the other hand, the Commission receives a payoff $c_h - \alpha$ if it is strong and $c_l - \beta$ if it is weak, with $c_h > c_l$, where $c_h$ and $c_l$ are fixed payoffs that a strong and weak Commission achieve regardless of the final outcome of the game. These fixed payoffs could be considered as average revenues accruing to the Commission from one examined case of concentration.
In some systems of competition protection, for example, in Serbia, notification fees represent an important part of the Commission’s budget. The level of the fee is determined in the tariff plan that the Commission adopts, and it depends on the amount of work that the Commission has to do in the investigation. If the Commission is certain that concentration does not harm competition in a partial market it can make a decision using the shortened procedure, which does not demand detailed economic analyses. If the Commission is not certain that the merger does not harm competition, it has to perform detailed economic analysis of the case. In the first case the fee is considerably lower than in the latter case. The majority of weak Commissions are prone to resolving cases by rule of thumb in lieu of making a detailed examination of the case, due to a lack of competent human resources. By contrast, a strong Commission is sufficiently competent to perform a detailed investigation of the case. This implies that a strong Commission’s revenues are higher on average than a weak Commission’s revenues \( c_h > c_w \). In the same fashion, in systems where fees are not an essential part of the Commission’s budget, i.e., in systems where the Commission is predominantly financed by government, there exists a difference in the level of fees depending on how detailed the economic analysis is. It is obvious that a part of the Participants’ costs, \( \varepsilon \), constitute part of the Commission’s revenues.

Parameters \( \alpha \) and \( \beta \) in this model measure the Commission’s cost of effort in investigation. We assume that \( \alpha > \beta \) since a strong Commission provides higher, more valuable, and more sophisticated investigative work.

If the Commission prohibits concentration, the Participants’ information set is reached. The Participants do not know whether the history is \{Strong, Prohibit\} or \{Weak, Prohibit\}, and they assign probability \( p \) to the first history and \( (1-p) \) to the second history. The Participants have two possible strategies in their information set. They can agree with the Commission or complain to Court, which is enabled by antitrust legislature.

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11 Approximately 80% of the budget of the Serbian Commission is realised in the form of fees for merger notification, which is not the case in most EU countries, where the percentage is much lower because the Commission is predominantly publicly funded (see: UNCTAD, (2011)).
If the Participants agree with the Commission’s decision, they receive payoff $\pi_l - \varepsilon$, which is less than the payoff when concentration is allowed, since $\pi_l < \pi_h$. On the other hand, both types of Commission receive an additional benefit of $\delta$, and the final payoff will be $c_l + \delta - \alpha$ for a strong Commission and $c_l + \delta - \beta$ for a weak Commission. The term $\delta$ captures reputational effect, which is based on increased confidence in the validity of the Commission’s decisions. In other words, if the Participants do not complain, it could be inferred that the Commission’s decision is based on solid and irrefutable evidence. It is logical to assume that building a history of successfully resolved cases is every Commission’s objective, since the reputation of a strong and competent regulator increases the probability that the decision will not be questioned by either Participants or Court, which makes this bureaucratic entity’s job much easier. In a dynamic context, these reputational increments make a weak Commission stronger, and enable a strong Commission to maintain its position.

If the Participants are not satisfied with the Commission’s decision, and if they consider that the decision is based on deniable evidence, they can complain to the Court. In order to simplify the game, the Court is not modelled as an additional player. Instead, we assume that Nature determines the Court’s decision. This implies that the Court’s decision is made without any exogenous influence. If the Commission is strong, the Court will confirm the Commission’s decision with probability $\lambda = \phi / (\phi + \theta)$, and reject it with probability $1 - \lambda = \theta / (\phi + \theta)$, where $\phi$ and $\theta$ are some positive parameters that will be defined later. For now it is sufficient to say that $\phi > \theta$. The probability $\lambda$ is common knowledge. It is logical to suppose that when the Commission is strong it is more likely that the Court will confirm the decision than reject it. In other words, the assumption that $\phi > \theta$ implies that $\lambda > 0.5$. On the other hand, if the Commission is weak it is more likely that the Court will reject the Commission’s decision with probability $\lambda > 0.5$ and confirm it with probability $1 - \lambda < 0.5$, which is also in line with our assumption that $\phi > \theta$. It is logical to assume that the more competent and at the same time more influential Commissions with positive reputations have a

\[\lambda = \phi / (\phi + \theta)\]

However, a more complex model could include the assumption of impact on the Court’s decision.

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higher probability that the Court, as a less competent entity for conducting economic analyses, will confirm their decision. In the same fashion, it is reasonable to suppose that the quality of a strong Commission’s evidence will be higher than the quality of evidence provided by the Participants, which should not be the case with a weak Commission.

If the Court confirms the Commission’s decision, the Participants receive payoff $\pi_l - \phi \varepsilon$ in the case of a strong Commission and $\pi_l - \theta \varepsilon$ in the case of a weak Commission, where $\phi > \theta$. The preparation of the Participants’ court appeal requires sophisticated economic analysis, with arguments against the Commission’s decision. The purpose of this economic analysis is to convince the Court that the Commission has made a mistake prohibiting the concentration. The appeal’s preparation incurs additional costs, comprising the economic costs of conducting analysis and the opportunity cost of time that elapses between the Commission’s decision and the Court’s final verdict. The assumption that $\phi > \theta$ implies that a higher level of effort is needed to refute a strong Commission’s decision than a weak Commission’s decision. Furthermore, we will assume that $1 < \theta < 2$ and $\phi > 2$, meaning that Participants increase their costs due to complaining less (more) than double in the case of a weak (strong) Commission. During the time between the two decisions all merger activities are on hold, and this imposes uncertainty on the companies’ business strategy. In general, companies postpone the opportunity of creating external growth by other means. We will also assume that $\phi[1 - 1/\theta] > \theta[1 - 1/\phi]$ in order to rule out illogical separating equilibrium in the post-entry sub-game, where a strong Commission accepts and a weak Commission prohibits the merger. As we will soon see, this condition implies that there is a significant difference between the costs of complaining against a strong Commission and the costs of complaining against a weak Commission.

On the other hand, if the Court confirms the Commission’s decision, the payoff of the strong Commission will be $c_l + \phi \delta - \phi \alpha$ and the payoff of the weak Commission $c_l + \theta \delta - \theta \beta$. The Commission will increase its reputation when the Court, as an independent entity, confirms the validity of its decision. The increase in reputation is proportional to the level of effort provided by Participants and Commission. If the Court declines the Commission’s decision the Commission must examine the case again, which further occupies its limited
resources. Also, the Court process creates uncertainty concerning the final decision, which is not in the Commission’s interest. The strong Commission studies the case more seriously than the weak Commission, and the process in the Court is not an exception from that practice. This argument justifies the decrease in the Commission's payoff of $\phi \alpha$ if it is strong and $\theta \beta$ if it is weak.

If the Court declines the Commission’s decision and rules in favour of the Participants, the payoff for the Participants will be $\pi_h - \phi \varepsilon$ in the case of a strong Commission and $\pi_h - \theta \varepsilon$ in the case of a weak Commission. In this case the Commission does not receive any increase in reputation, and it will have a payoff of $c_i - \phi \alpha$ if it is strong and $c_i - \theta \beta$ if it is weak.

It is evident that the worst scenario for Participants is when the Court confirms the Commission’s decision to prohibit concentration, and the worst outcome for the Commission is when the Court declines its decision in favour of the Participants.

2.1. The equilibrium concept

As we said before, this game is a dynamic game of incomplete information. In static games of complete information the concept of Nash equilibrium is used, in dynamic games of complete information the sub-game-perfect Nash equilibrium, in static games of incomplete information the Bayesian Nash equilibrium, and in dynamic games of incomplete information we use the concepts of perfect Bayesian equilibrium, sequential equilibrium, and proper equilibrium. We will briefly discuss these three concepts and their relationship. Loosely speaking, perfect Bayesian equilibrium refines Bayesian Nash equilibrium and eliminates some equilibria, in the same fashion as sub-game-perfect Nash equilibrium refines Nash equilibrium. To solve our model we will use the concept of ‘weak perfect Bayesian equilibrium’, which is a variant of perfect Bayesian equilibrium. The concept of weak perfect Bayesian equilibrium imposes a consistency requirement on strategies and beliefs. In other words, a player’s strategy must be optimal at his information set, given his belief and other players’ strategies. At the same time, the player’s belief must be consistent with strategies on the equilibrium path. More precisely, a player assigns the probability to any history in the information set in which he is called upon to move on the equilibrium path. A player calculates conditional probability of any
history in his information set according to the strategy profile by using Bayes’ rule, where the numerator represents probability of the history and the denominator represents total probability of reaching that information set. The adjective ‘weak’ relates to the fact that this equilibrium concept imposes no restriction on beliefs off the equilibrium path. Perfect Bayesian equilibrium strengthens the concept of weak Perfect Bayesian equilibrium by imposing consistency requirements on strategies off the equilibrium path, i.e., on information sets that are not reached in the game when players use their optimal strategies. Perfect Bayesian equilibrium requires that beliefs off the equilibrium path are determined according to Bayes’ rule and players’ equilibrium strategies where possible. The concept of the ‘sequential equilibrium’ of Kreps and Wilson (1982) is based on the assumption of trembles. In other words, players can make mistakes and play suboptimal strategies. To derive a sequential equilibrium we begin with a sequence of completely mixed strategies and the equilibrium strategies and beliefs in sequential equilibrium are obtained as the limit of a sequence of totally mixed strategies. When the game involves an infinite number of actions or types, finding a sequential equilibrium is a tedious task. In that case it is more appropriate to use the concept of perfect Bayesian equilibrium. The two equilibrium concepts are closely related and under certain conditions the set of sequential equilibria coincides with the set of Perfect Bayesian equilibria. Fudenberg and Tirole (1991a) derive conditions under which the two sets of equilibria coincide. Among other things, they prove that when each player has at most two possible types or there are two periods, the sets of perfect Bayesian equilibria and sequential equilibria coincide. In our game the Competition Commission has two possible types (strong and weak), and the above condition is satisfied. Therefore, in our model sequential equilibrium corresponds to perfect Bayesian equilibrium. Myerson (1978) defines the concept of ‘Proper equilibrium’ for dynamic games of incomplete information. His idea is that when players tremble from their optimal strategies, they are more likely to tremble to strategies that are closer to optimal than to strategies that are further

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13 A good definition of weak perfect Bayesian equilibrium at the introductory level and its application to various economic, political, and biological phenomena can be found in Osborne, (2009). Very concise treatment of the topic is given in Gibbons, (1991), and a more advanced treatment is presented in Fudenberg and Tirole (1991b) and Osborne and Rubinstein (1994).
from optimal. In other words, for a small number \( \psi < 1 \), the player plays his second-best strategy with probability \( \psi \) times the probability of playing his optimal strategy, he plays his third-best strategy with probability \( \psi \) times the probability of playing his second-best strategy, and so on.

We will solve our game by finding equilibria in the post-entry sub-game, and after that we will go backward to determine when the Participants notify the Commission and enter the sub-game and when they prefer to stay out of the process. We will identify one separating and two pooling equilibria in the post-entry sub-game. However, the other two possible pooling equilibria in which Participants play agree are strictly dominated by the outside option. Moreover, some of the equilibria that are not strictly dominated by the outside option could be ruled out with this option. The important result of our paper is that the probability of entry is increasing in the Participants' benefit from the merger, decreasing in their costs, and decreasing in the Commission's additional reputational benefit that it obtains if the Court confirms its decision. At the same time, if the Commission's reputational benefit is higher than a certain threshold it will prohibit the merger; otherwise it will accept it.

The main finding of our paper is that in deciding whether to submit notification of the merger to the Commission, the Participants, ignorant of the type of Commission, will base their decision mainly on their belief concerning the weak Commission's decision and will almost completely ignore the strong Commission's decision (the Independence theorem). If the Participants believe that a weak Commission will prohibit the merger, they will enter only if the probability that the Commission is weak is high and the probability that the Court will decline the weak Commission's decision is also high. On the other hand, if the Participants believe that the weak Commission will accept the merger, they will almost surely enter. They will not enter only when the probability that the Commission is strong is very high and the probability that the Court will confirm the strong Commission's decision is high as well. The striking result of this model is that the Participants' decision whether to submit the notification to the Commission is almost completely independent of the strong Commission's decision.
2.2. Equilibria of the post-entry sub-game

In this section we will identify the separating and pooling equilibria of the post-entry sub-game. We will derive conditions under which each of the equilibria holds. We will analyse one separating and two pooling equilibria. The important feature of all these equilibria is that Participants always complain when they enter.

The separating equilibrium is very intuitive, since a strong Commission prohibits whereas a weak accepts. This equilibrium exists if the costs of different types of Commission satisfy certain properties. The existence of the separating equilibrium is proved in the following proposition.

Proposition 1. (Separating equilibrium.) If \( \pi_h - \pi_l > \varepsilon (\theta + \phi - 2) \) and \( \alpha < \beta K_1 \) where \( K_1 = \phi \cdot \left[ \frac{1 - 1/\theta}{1 - 1/\phi} \right] > 1 \), then there exists a separating equilibrium in which a strong Commission plays prohibit, a weak Commission plays accept, and the Participants play complain and attach probability 1 to the left node in the information set, i.e., \( p=1 \).

Proof. See Appendix A.

Note that all equilibria in the post-entry sub-game, separating or pooling, where Participants play agree are strictly dominated by the outside option. Therefore, we will not analyse any such equilibria. Thus, if Participants submit notification they are determined to complain to the Court, regardless of the type of Commission and its negative decision.

We will analyse two pooling equilibria. In the first pooling equilibrium both types of Commission accept the proposed merger, and in the other both types prohibit. Which of the equilibria occurs depends on the relationship between the Commission’s reputational benefit and costs. If the reputational benefit is lower than a certain threshold, we have pooling equilibrium where both strong and weak Commissions accept. Otherwise, we have the other pooling equilibrium where strong and weak Commissions prohibit.
Proposition 2. (Pooling equilibrium 1.) If $\pi_h - \pi_i > \varepsilon(\theta + \phi - 2)$ and 

$$\delta < \alpha \left[1 - \frac{1}{\phi}\right] + \beta \left[1 - \frac{1}{\theta}\right],$$

then for every system of beliefs there exists a pooling equilibrium in which both types of Commission play accept and the Participants play complain.

Proof. See Appendix B.

The last result shows us that both types of Commission prefer to accept if the reputational benefit is lower than a certain threshold. For a given level of reputational benefit, the higher the cost of either type of Commission, the more likely it is that both types of Commission will accept. If the reverse relationship holds we have the other type of pooling equilibrium, which is identified in the next proposition.

Proposition 3. (Pooling equilibrium 2.) If $\pi_h - \pi_i > \varepsilon(\theta + \phi - 2)$ and 

$$\delta > \alpha \left[1 - \frac{1}{\phi}\right] + \beta \left[1 - \frac{1}{\theta}\right],$$

then for every system of beliefs there exists a pooling equilibrium in which both types of Commission play prohibit and the Participants play complain.

Proof. We know that the Participants will complain if $\pi_h - \pi_i > \varepsilon(\theta + \phi - 2)$.

From the previous proposition, by reversing the inequalities in (B1) and (B2), we obtain:

$$\delta > \alpha \left[1 - \frac{1}{\phi}\right] + \beta \left[1 - \frac{1}{\theta}\right]. \quad (1)$$

The intuition of the last result is the same as in the previous proposition. If reputational benefit is higher than a certain threshold, both types of Commission prefer to prohibit. For a given level of reputational benefit, the higher the costs of either type of Commission, the less likely it is that both types of Commission will prohibit.
2.3. Equilibrium of the whole game

We have identified one separating and two pooling equilibria in the post-entry sub-game. We will now determine the equilibrium of the whole game, including the outside option, i.e., the possibility of Participants not entering at all. First, note that the outside option strictly dominates all post-entry sub-game equilibria in which Participants play agree, \( \pi_l > \pi_l - \varepsilon \). Thus, we have already used that fact to eliminate all such equilibria.

We will now examine the impact of the outside option on separating equilibrium. We will first examine if this outside option is more attractive to Participants than the expected payoff in the separating equilibrium. We will see that pooling equilibrium where both types of Commission accept is never dominated by the outside option, while the separating equilibrium and the pooling equilibrium where both types of Commission prohibit can be dominated by the outside option for some range of parameters which is naturally more restrictive in the former case than in the latter.

**Proposition 4.** (Outside option and separating equilibrium.) If

\[
\pi_h - \pi_l < \frac{\varepsilon(p\phi + 1 - p)}{1 - p\lambda}
\]

then Participants prefer to stay out if the post-entry sub-game results in separating equilibrium.

**Proof.** We will first calculate ex ante expected payoff of the Participants before they enter. We know that a strong Commission plays prohibit and a weak Commission plays accept, and the ex ante expected payoff for Participants is:

\[
p[\lambda(\pi_l - \phi\varepsilon) + (1 - \lambda)(\pi_h - \phi\varepsilon)] + (1 - p)[\pi_h - \varepsilon].
\]

(2)

The payoff of the outside option is \( \pi_l \) and Participants prefer to stay out if:

\[
p[\lambda(\pi_l - \phi\varepsilon) + (1 - \lambda)(\pi_h - \phi\varepsilon)] + (1 - p)[\pi_h - \varepsilon] < \pi_l,
\]

(3)

\[
\pi_h - \pi_l < \frac{p\phi + 1 - p}{1 - p\lambda}.
\]

(4)

This result shows us that Participants prefer to stay out if the potential benefit from the merger is lower than the cost of notification multiplied by some
positive constant. The numerator of this constant on the right hand side is higher than the denominator (the constant is greater than one) if:

\[ p\phi + 1 - p > 1 - p\frac{\phi}{\theta + \phi}, \]  
\[ p[\phi^2 + \phi - \theta] > 0, \]  

which always holds. Moreover, the left hand side of (5) is increasing in \( \phi \) and the right hand side is decreasing in \( \phi \). This means that the probability that Participants submit notification if the post-entry sub-game results in separating equilibrium decreases with the strong Commission's additional reputational benefit that it obtains if the Court confirms its decision (\( \phi \)). The same comparative statistics result holds for \( p \), which means that the probability of notification submission decreases with \( p \) (the probability of facing a strong Commission).

**Proposition 5.** *(Outside option and pooling equilibrium 1.)* The outside option never breaks pooling equilibrium 1 in the post-entry sub-game.

**Proof.** We know that in pooling equilibrium 1, \( \pi_h - \pi_i > \varepsilon(\theta + \phi - 2) \). The expression on the right hand side of this inequality is obviously higher than \( \varepsilon \). The expected payoff to Participants if they enter is \( \pi_h - \varepsilon \) and if they stay out \( \pi_i \). Participants will stay out whenever:

\[ (\pi_h - \pi_i) < \varepsilon. \]  

Clearly, the two sets are disjointed and the outside option never breaks pooling equilibrium 1. ■

This proposition shows us that Participants will always enter in the pooling equilibrium 1 in the post-entry sub-game. The next proposition shows that Participants prefer to stay out if the post-entry sub-game results in pooling equilibrium where both types of Commission prohibit if their benefit from the merger is low and the Commission's additional reputational benefit is high.
Proposition 6. (Outside option and pooling equilibrium 2.) The outside option breaks pooling equilibrium 2 in the post-entry sub-game if
\[
\pi_h - \pi_l < \frac{\epsilon(p\phi + (1-p)\theta)}{p + \lambda - 2p\lambda}.
\]

Proof. The ex ante payoff of Participants is
\[
p[\lambda(\pi_l - \phi\epsilon) + (1 - \lambda)(\pi_h - \phi\epsilon)] + (1 - p)[(1 - \lambda)(\pi_l - \theta\epsilon) + \lambda(\pi_h - \theta\epsilon)].
\]

The payoff of the outside option is \(\pi_l\) and Participants prefer to stay out if:
\[
\pi_l > p[\lambda(\pi_l - \phi\epsilon) + (1 - \lambda)(\pi_h - \phi\epsilon)] + (1 - p)[(1 - \lambda)(\pi_l - \theta\epsilon) + \lambda(\pi_h - \theta\epsilon)],
\]
\[
\pi_h - \pi_l < \epsilon \frac{p\phi + (1-p)\theta}{p + \lambda - 2p\lambda} \quad \blacksquare
\]

The numerator of the expression on the right hand side is higher than the denominator if:
\[
p\phi + (1-p)\theta > p + \frac{\phi}{\phi + \theta} - 2p - \frac{\phi}{\phi + \theta},
\]
\[
(\phi + \theta)[p\phi + (1-p)\theta] + 2p\phi > \phi + p(\phi + \theta),
\]
which certainly holds. The left hand side of the last inequality contains quadratic terms of \(\phi\) and \(\theta\) and the right hand side is linear in \(\phi\) and \(\theta\), which means that the probability of entry in pooling equilibrium 2 decreases with both a strong and a weak Commission's additional reputational benefits that the Commission obtains if the Court confirms its decision\(^{14}\).

\(^{14}\) Recall that the cost to Participants of complaining against the Commission is equal to the additional reputational benefit of the Commission. Thus, the last statement is equivalent to the statement that the probability of entry decreases with the Participants' additional cost of complaining.
In the next table we can summarise our findings concerning the three different
equilibrria in the post-entry sub-game that are not strictly dominated by the
outside option.

Table 1. Separating and pooling equilibria

<table>
<thead>
<tr>
<th>Equilibrium</th>
<th>Outcome</th>
<th>Participants</th>
<th>Commission</th>
<th>Outside dominates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Separating</td>
<td>((prohibit, accept),complain)</td>
<td>(\pi_h - \pi_i &gt; \varepsilon(\theta + \phi - 2))</td>
<td>(\alpha &lt; \beta \frac{\lambda}{1 - \lambda} \left[1 - \frac{1}{\lambda} \theta\right])</td>
<td>(\pi_h - \pi_i &lt; \frac{\varepsilon(p\phi + 1 - p)}{1 - p\lambda})</td>
</tr>
<tr>
<td>Pooling 1</td>
<td>((accept, accept),complain)</td>
<td>(\pi_h - \pi_i &gt; \varepsilon(\theta + \phi - 2))</td>
<td>(\delta &lt; \alpha \left[1 - \frac{1}{\phi}\right] + \beta \left[1 - \frac{1}{\theta}\right])</td>
<td>(\pi_h - \pi_i &lt; \varepsilon)</td>
</tr>
<tr>
<td>Pooling 2</td>
<td>((prohibit, prohibit), complain)</td>
<td>(\pi_h - \pi_i &gt; \varepsilon(\theta + \phi - 2))</td>
<td>(\delta &gt; \alpha \left[1 - \frac{1}{\phi}\right] + \beta \left[1 - \frac{1}{\theta}\right])</td>
<td>(\pi_h - \pi_i &lt; \frac{\varepsilon(p\phi + (1 - p)\theta)}{p + \lambda - 2p\lambda})</td>
</tr>
</tbody>
</table>

Source: Authors' calculation

By using the results from the table we can obtain some further insights
concerning the Participants' decision whether to submit notification. In other
words, by comparing the conditions for Participants that are necessary for the
separating and pooling equilibrium 2 to prevail (column 3) with the condition
for the dominance of the outside option (column 5), we can obtain an ex ante
criterion related to the Participants' decision of notification submission. We
know that the outside option never breaks pooling equilibrium 1, and the
comparison in this case is not necessary. The main finding of this algebra is
summarised in Proposition 7, which states that Participants' decision to enter
depends only on a perceived weak Commission's decision.

The table shows us that the outside option never breaks pooling equilibrium 1.
However, for some range of parameters the outside option breaks pooling
equilibrium 2. This occurs when:

\[ \varepsilon(\theta + \phi - 2) < \frac{\varepsilon(p\phi + (1 - p)\theta)}{p + \lambda - 2p\lambda}. \] (13)

This inequality implies that the outside option breaks pooling equilibrium 2 if:

\[ \lambda(1 - 2p)(\phi - 2) - 2p(2 - \theta) + \theta(\lambda - 1) < 0. \] (14)
We assumed that $\theta < 2$, which implies that the second and the third term are negative. We also assumed that $\phi > 2$, which implies that the first term is negative for $p > 1/2$. Recall that we are dealing with mergers in an industry that is already in the zone of intermediate or high concentration and that Participants believe that there exists a possibility that the merger will be prohibited. Therefore, if it is more likely that the Commission is strong than weak, Participants prefer to stay out. When $p < 1/2$ the first term is positive and it can outweigh the last two terms for low values of $p$ and high values of $\lambda$. When $p=0$ and $\lambda = 1$ the last inequality is clearly positive and equal to $\phi - 2$. This means that Participants prefer to submit notification when there is a tiny likelihood that the Commission is strong and when the probability that the Court decides in their favour is high in the case of a weak Commission.

Finally, we will determine when the outside option breaks the separating equilibrium. The outside option breaks the separating equilibrium in the post-entry sub-game if:

$$
\varepsilon(\theta + \phi - 2) < \frac{\varepsilon(p\phi + 1 - p)}{1 - p\lambda},
$$

(15)

$$
p\phi(1 + \lambda) - (1 - \lambda)p\theta - 2\lambda p - (\phi - 2) > 0.
$$

(16)

Since $\phi > 2$, the last three terms are negative. The first term is positive and it can outweigh the other three terms only for high values of $p$ and $\lambda$. Therefore Participants prefer to stay out if the probability that the Commission is strong is very high and the probability that the Court will confirm a strong Commission’s decision is high as well. When $p=1$ and $\lambda = 1$ the last inequality is positive and equal to $\phi$. This means that Participants prefer to stay out when they believe that they will almost certainly face a strong Commission and when it is almost certain that the Court will confirm a strong Commission’s decision.

Previous results and Table 1 shows us that the Participants’ decision whether to submit notification depends mainly on a perceived weak Commission’s decision and is almost independent of their belief concerning a strong Commission’s decision. We can summarise our findings in the following proposition.
**Proposition 7. (Independence theorem.)** The Participants' decision to submit notification depends mainly on their belief regarding a weak Commission's decision and is almost independent of their belief about a strong Commission's decision. If Participants believe that a weak Commission will prohibit (pooling equilibrium 2), they will almost surely stay out (they enter only if \( p \) is very low and \( \lambda \) very high). If Participants believe that a weak Commission will accept (separating equilibrium), they will almost certainly enter (they do not enter only if \( p \) and \( \lambda \) are very high). Thus, Participants focus their attention on a weak Commission's decision and almost completely ignore a strong Commission's decision.

This result is not in collision with Proposition 5, which determines that Participants always enter if they believe that both types of Commission will accept. In this case Participants also base their decision on the weak Commission's decision and if in addition they believe that a strong Commission will accept, the tiny uncertainty concerning their entry disappears and they will enter with probability 1. However, this case is the least interesting from the strategic point of view.

The previous proposition shows us that if Participants do not know the type of Commission they are dealing with, it is sufficient to predict only the possible weak Commission's behaviour, which makes the decision of notification submission much easier.

We will now provide empirical evidence supporting our results by analysing the case of a horizontal merger of two companies in Serbian sugar industry, which was highly concentrated even before the proposed merger.

**3. A CASE OF CONCENTRATION FROM SERBIAN REGULATORY PRACTICE**

A typical case of a horizontal merger of two companies from Serbian regulatory practice can illustrate the key results of our model very well. We will analyse the merger of two companies in the granulated sugar market (Sunoko and Hellenic Sugar Industry), which is clearly a horizontal merger, since sugar is a nearly homogeneous product. The Sunoko company is the largest producer and exporter of sugar in Serbia (it has an approximately 50% share of the market for purchasing sugar beet and the same share of the national and foreign markets
for production and sale of sugar, according to the Serbian Competition Commission. The Commission identified a Greek company, Hellenic Sugar Industry, as the second largest sugar producer in Serbia, with approximately 30% of the same markets. The rest of the market belongs to the third largest producer (TE-TO Senta), which implies that the market is a classic oligopoly with three players, and after the merger of the two largest companies the market would become a duopoly\textsuperscript{15}.

**Table 2. Market shares and concentration measures**

<table>
<thead>
<tr>
<th>Producers</th>
<th>Market shares (in %)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Sunoko</td>
<td>50</td>
</tr>
<tr>
<td>2. Hellenic</td>
<td>30</td>
</tr>
<tr>
<td>3. TE-TO Senta</td>
<td>20</td>
</tr>
<tr>
<td>CR2</td>
<td>80%</td>
</tr>
<tr>
<td>HHI (before concentration)</td>
<td>3800</td>
</tr>
<tr>
<td>HHI (after concentration)</td>
<td>6800</td>
</tr>
<tr>
<td>ΔHHI</td>
<td>3000</td>
</tr>
</tbody>
</table>

*Source: Authors’ calculation*

Given the market shares of the companies, the previous table shows the result of a simple calculation of the level of market concentration before the merger and the resulting concentration if the merger were to be approved.

Based on the value of the concentration ratio of the two largest companies (CR2) that intended to merge, and on the value of the Herfindahl-Hirschman Index (HHI) before and after concentration, it is evident that the proposed merger would be implemented in a market characterised by very high level of concentration. The increase in the value of HHI after the merger (ΔHHI) would be 3000, leading to a significant concentration in this already highly concentrated industry. According to the guidelines for the regulation of horizontal mergers in the US and EU (at the supranational level), levels and changes in HHI indicate potentially harmful mergers that cannot be approved.

\textsuperscript{15} The data were obtained from the decision of the Serbian Administrative Court number 1861/12, a response to the appeal of the companies intending to merge on the decision of the Serbian Competition Commission to prohibit the merger.
by the shortened procedure and require a detailed investigation by the Competition Commission. Also, the value of CR2 indicates the formation of an extremely dominant position in the Serbian sugar market, which is another argument for analysing the case cautiously. The result from the literature that fits the case well is Kolasky and Dick’s paper (2003), which uses the experience of regulatory authorities in the analysis of US guidelines for the regulation of horizontal mergers, and finds that the cost efficiency expected from the merger can almost never justify mergers resulting in a monopoly or a dominant position in a market that is a near-monopoly. We should extend the above argumentation with the fact that Serbia imposes tariff barriers on sugar imports, which eliminates the competition to domestic companies of foreign sugar producers.

It is important to note that the main objection to the use of market shares and measures of concentration is based on the fact that market shares are not perfectly correlated with the level of market power, and that the relationship between the two is not analogous to the relationship between the Celsius and Fahrenheit temperature scales. A high market share does not necessarily imply high market power nor the potential for its increase; hence the need for detailed investigation. Despite sharp criticism, regulation based on market shares is still practiced, but the importance of evidence of potentially harmful mergers based on market shares has been reduced to an appropriate level. Despite the claim

16 According to the Federal Trade Commission & the US Department of Justice (2010), the range of values of HHI, as in the European guidelines, is divided into three zones. The zone of low concentration is for the value of HHI below 1500; of moderate concentration from 1500 to 2500, and of high concentration above 2500. If a merger takes place in the range of low concentration, regardless of the value of ΔHHI, further analysis is not conducted (the same rule is applied in the EU). Also, all concentrations in the areas of moderate and high concentration with ΔHHI below 100 do not require further analysis. Special attention should be given to mergers in the zone of high concentration when ΔHHI exceeds 200. European guidelines are more restrictive than US guidelines, since the threshold for the zone of high concentration is set at 2000, whereas the value of ΔHHI does not significantly differ (See: Official Journal of the European Union, 2004/ C 31/03).

17 For instance, in Landes and Posner (1981) market shares are present in expressions of the calculation of market power, but market shares are not the only element in the calculation. The price elasticity of market demand and residual demand facing the company whose market power has to be determined must also be taken in to consideration. A recent criticism of regulation based on market shares is given in Kaplow (2011).
that market shares cannot be the measure of the market power of a company, Baker (2010) lists the cases in which it is justified and often possible to use only them in regulation. We believe that weak Commissions are prone to make judgments based on market shares and measures of concentration (the traditional analysis), compared to strong Commissions that apply calibrated economic and econometric models in simulations of the effect of proposed mergers. With that in mind, it is logical to assume that the Participants in the concentration of the Serbian sugar market could not expect their case to be approved using the shortened procedure, regardless of the type of Commission.

After the Participants submitted the notification at the beginning of 2012, the Commission performed a detailed test procedure and decided to prohibit the concentration. The Participants responded by complaining to the Administrative Court responsible for the Serbian Commission’s decisions. The Court rejected the Commission’s decision in the middle of 2012 for procedural reasons, and returned the case to the Commission for reconsideration. The resolution of this case is on going.

Given all the circumstances surrounding this case, and in the light of the strategic model that we have presented in this paper, we will try briefly to make a parallel between the logic of our model and the strategies of the players in the Serbian sugar industry. Given the sequence of events that actually occurred in this case, it turns out that the game was finished at the final node that can be reached when Participants decide to submit notification, a weak Commission prohibits the concentration, and the Participants complain to the Court. After receiving the appeal the Court plays decline, which is modelled in our simplified game as a random move of Nature, because it was not competent enough to review the Commission’s decision, nor to accept the burden of responsibility for the high concentration. In the game tree (Figure 1) the dashed line indicates the path leading to this outcome.

Given the size of the merger, the distribution of market shares, and the oligopolistic market structure, considerable benefits for the Participants are expected from this form of external growth (the difference between $\pi_h$ and $\pi_l$, where $\pi_h >> \pi_l$). This is in accordance with numerous studies that find incentives for companies to merge in increased market power and higher cost efficiency. In
the abundant literature that analyses the incentives for horizontal mergers in oligopolistic markets, it can be unambiguously determined that large concentrations are profitable. This is also in accordance with the general conclusion of our model that Participants prefer to submit notification rather than to stay out of the process if the potential benefit from the merger is high. Taking into consideration all these arguments, it should be expected that the benefits for the Participants in the analysed case of concentration significantly exceed the expected costs of the procedure, including the consequences of the Commission’s and the Court’s decisions.

In a static Cournot model, which best describes the above case under the reasonable assumption that sugar is a homogeneous product, Salant, Switzer, and Reynolds (1983) show that horizontal mergers are profitable under rigorous assumptions, which our case satisfies. The authors conclude that a merger is profitable only when it leads to the formation of a highly dominant market position, which is certainly the case in our example. Specifically, the authors determine that the merged company should possess over 80% of the market share, taking into account all companies in the industry\textsuperscript{18}. In the literature that followed this paper this result is generally called the ‘80% rule’\textsuperscript{19}. In our example, if we assume that the market share of the company created by merging the two largest companies is the simple sum of the shares of the two Participants, the merged company would possess approximately 80% of the market (Table 2). The rigorous assumption of Salant, Switzer, and Reynold’s model (1983) is that unit costs are constant and that a merger does not lead to a reduction of unit costs. Criticising this extremely restrictive assumption, Perry and Porter (1985) state that it is not appropriate to assume that in a symmetric Cournot oligopoly a merger of two companies leads to the formation of a new company with a market share equal to the simple sum of the shares of the two merging companies, and that a merger does not lead to changes in technology and consequently in unit costs. In that sense, they assume that a merger of two companies in a symmetric Cournot model with \(n+1\) companies leads to a new equilibrium with \(n-1\) old companies, and with the new one, which is larger than the others and represents a combination of the production capacities of two former competitors, allowing significant reduction of unit costs. They assume


\textsuperscript{19} See, for example: Pepall, Richards and Norman, (2011), p. 290.
that the unit costs of a company are inversely proportional to the level of capital stock it possesses. With external growth through mergers, companies increase their capital stock, which reduces their unit costs. Unlike Perry and Porter (1985), where the analysis of the profitability of merger is based on the assumption that the strategic variable is quantity, Deneckere and Davidson (1985) analyse merger incentives in a symmetric oligopoly with differentiated products. The main conclusion of this analysis is that with the price as a strategic variable, mergers of any size are profitable, with mergers of larger companies being more profitable than mergers of smaller ones. McAfee and Williams (1992) consider a model that represents a special case of the model given in Perry and Porter (1985) without fixed costs, and they also conclude that large mergers are profitable for Participants. The authors come to the intuitive conclusion that mergers in a Cournot model that lead to the formation of the new largest company in an industry, or to the enlargement of the market share of the largest company, necessarily lead to the reduction of welfare in this market.

Given the short and not too effective history of the Serbian Commission, we believe that in the analysed case the Participants attached significantly higher probability to the fact that they would face a weak Commission, which means that \((1 - p) \gg p\). This also implies significantly lower additional costs for the Participants of appealing to the Court against the Commission's decision, in comparison to the case of a strong Commission. From the short history of cases of high concentration that the Serbian Commission prohibited after a detailed investigation and that ended up in the Court, it is unrealistic to expect that the Court will confirm a negative Commission decision in the majority of cases.

On the other hand, taking into account the size of the concentration and the characteristics of the partial market where the concentration was planned, a successfully resolved case by the Serbian Commission would significantly increase its positive reputation \((\delta)\), which since its formation in 2006 has been lower than necessary for its successful operation. In its relatively short history the Commission has rarely faced important cases of concentration successfully. Based on historical facts, it may be concluded that in these important cases the Administrative Court did not have sufficient competence to interpret and
confirm the Commission’s decision. For example, in one of the most important cases in its history (concentration in the food retail industry, whose main participant was Delta), where after a detailed investigation the Commission decided to prohibit the merger, the Administrative Court rejected the Commission’s decision. The increase of reputation is not easily empirically measurable, but we believe that the Commission’s increase in reputation if this milestone case had been successfully solved would be considerably higher than the revenue collected from Participants for notification submission and all additional expenses to which the regulator was exposed in the resolution of this case. However, after the Administrative Court rejected the Commission’s decision, the game was finished at the final node, at which the payoff of the Commission was $c_l - \theta \beta$ and there was no increase in the Commission’s reputation.

Bearing in mind all the facts deduced from the available data concerning the merger in Serbian sugar industry and the atmosphere surrounding the Commission’s decision, the outcome of this case does not contradict the logic of our model and the set of propositions that describe the most important conclusions. This is certainly true for Propositions 1, 2, and 3, which describe the sub-game that results if Participants send a request for notification of the merger. Proposition 1 claims that Participants under certain conditions, which are clearly met in this case, will complain to the Court against a negative Commission decision. On the other hand, Propositions 2 and 3 leading to pooling equilibria indicate that the Commission will prohibit the merger if it expects a significant increase of its reputation; otherwise it will accept it. In principle, all successfully resolved cases that are recognised as such in the Court and in the general public, bring result in a large increase in reputation, and this effect in the case of the Serbian Commission is reinforced by its short period of existence. It is logical to expect a greater increase in the Commission’s reputation in the case of successful resolution of high concentrations, without pronounced synergy effects, which are more likely to harm the competition than otherwise. The sequence of events in the above case does not contradict Propositions 4, 5, and 6, which describe the equilibrium of the whole game with the outside option, since in this case the benefits of the concentration for Participants are higher than their costs. The Independence theorem claims that the Participants’ decision to enter depends only on their belief of a weak
Commission's decision. In this sense, Participants will almost certainly enter if they believe that a weak Commission will accept the merger. If they believe that a weak Commission will prohibit, they will almost surely stay out and enter only if they believe that the probability that the Court will reject a weak Commission's decision is very high. It is almost certain that the Participants in the described merger had such beliefs, which led to the realised outcome of the game.

The general conclusion of our model is that for Participants the ‘outside’ option will be dominated by the notification submission if the expected benefits of a merger are sufficiently larger than the costs. The information that we have concerning the analysed case of concentration in the Serbian economy certainly does not contradict this finding. In the absence of accurate and complete information about the case that would enable us to calibrate the parameters of the model and to test it on this concrete example, the above case can be understood only as an illustration that coincides with the model’s logic.

4. CONCLUDING REMARKS

In this paper we have analysed the game of notification submission between companies planning to merge and the Competition Commission. Companies planning to merge will obtain benefits from the merger in terms of increased productive efficiency and market power. These companies are obliged to submit notification to the Competition Commission. The Competition Commission has to decide whether to accept or prohibit the merger. The Participants do not know whether the Commission they are facing, is strong or weak. This might be particularly the case with international companies operating in several countries. In some complex cases, if they intend to merge they must submit notification in all countries where they have established subsidiaries, and each national Competition Commission decides on its own whether to accept or prohibit the merger in the national market. Then Participants must decide whether to submit notification or abandon the merger (which includes the possibility of selling a subsidiary in one national market and merging in other markets). If the Commission prohibits the merger they can complaining to the Court, which can confirm the Commission's decision or overturn the verdict to the benefit of the Participants.
We modelled this game as a dynamic game of incomplete information and we determined weak Perfect Bayesian equilibria. The most important results of our research can be summarised as follows. The Participants will submit notification if the potential benefit from the merger is high. In other words, the probability that Participants will submit notification increases with the potential benefit from the merger, decreases with the Participants' costs of submitting the notification, and decreases with the Commission's additional reputational benefit that is obtained if the Court confirms its decision. How the Commission reacts to the notification submission depends on its type, reputational benefit, cost of making the decision, and cost of the process if the case ends up in the Court. In general, the higher the reputational benefit of the Commission the more likely it is to prohibit the merger. Finally, we determined that the Participants' decision to submit notification to the Commission depends mainly on a weak Commission's decision. If Participants believe that a weak Commission will prohibit the merger they will almost surely abandon it, and if they believe that a weak Commission will accept the merger they will almost surely submit notification.

Our analysis excludes the presence of political pressure on the Commission and assumes that its formal independence is also informal. In the case of weak Commissions, weak and very corrupt democratic systems, and undeveloped or non-existent institutions this is often not the case, since large private interests exist regarding the Commission's decision. The fact cannot be ignored that the difference between $\pi_h$ and $\pi_l$ can be a strong incentive to lobby Participants to approve the concentration, even though this is not the Commission's initial decision does not agree with that initially.

Our model is based on some parameters that can be estimated empirically and it contains important implications for competition policy and industrial organisation. The costs and benefits of Participants and Commission can easily be measured. The only parameter difficult to measure in our model is the Commission's reputation. However, some proxies for the Commission's reputation could be sought, such as the percentage of court verdicts in favour of the Commission's decision to prohibit large concentrations. This empirical test of our model would be an interesting endeavour for further research.
APPENDIX

A. Proof of Proposition 1

We will identify the range of parameters that hold in the separating equilibrium. We will first determine when Participants have a dominant strategy of playing complain. Complain is the optimal strategy for the history \{strong Commission, prohibit\} if the following condition holds:

\[
\lambda (\pi_l - \phi \epsilon) + (1 - \lambda)(\pi_h - \phi \epsilon) > \pi_l - \epsilon , \tag{A1}
\]

\[
\pi_h - \pi_l > \frac{\epsilon \cdot (\phi - 1)}{1 - \lambda} . \tag{A2}
\]

This condition is quite intuitive and it says that Participants will complain if the possible benefit from merger, \(\pi_h - \pi_l\), is sufficiently high, additional cost of making a complaint against strong Commission, \(\epsilon \cdot (\phi - 1)\), sufficiently small, and when the probability that the Court will reject the decision of a strong Commission, \(1 - \lambda\), is sufficiently high. Rearranging the above condition, we obtain:

\[
1 - \lambda > \frac{\epsilon \cdot (\phi - 1)}{\pi_h - \pi_l} , \tag{A3}
\]

\[
\lambda < 1 - \frac{\epsilon \cdot (\phi - 1)}{\pi_h - \pi_l} . \tag{A4}
\]

After the history \{weak Commission, prohibit\} complain is the optimal strategy when the following inequality is satisfied:

\[
(1 - \lambda)(\pi_l - \theta \epsilon) + \lambda(\pi_h - \theta \epsilon) > \pi_l - \epsilon , \tag{A5}
\]

\[
\frac{\lambda}{\pi_h - \pi_l} > \frac{\epsilon (\theta - 1)}{\pi_h - \pi_l} . \tag{A6}
\]

\[
\frac{\lambda}{\pi_h - \pi_l} > \frac{\epsilon (\theta - 1)}{\pi_h - \pi_l} . \tag{A7}
\]
Therefore the separating equilibrium, where complain is the dominant strategy on the Participants’ information set containing two histories, exists if and only if:

\[
\frac{\varepsilon(\theta-1)}{\pi_h - \pi_l} < \lambda < 1 - \frac{\varepsilon(\phi-1)}{\pi_h - \pi_l}.
\] (A8)

This space of parameters is non-empty if:

\[
\frac{\varepsilon(\theta-1)}{\pi_h - \pi_l} < 1 - \frac{\varepsilon(\phi-1)}{\pi_h - \pi_l},
\] (A9)

\[
\pi_h - \pi_l > \varepsilon(\theta + \phi - 2),
\] (A10)

This condition determines that complain is the dominant strategy for Participants when the benefit from the merger is higher than the additional cost of complaining against both types of Commission.

On the other hand, when complain is the dominant strategy for Participants, a strong Commission will prohibit the proposal if:

\[
\lambda(c_h + \phi\delta - \alpha\phi) + (1 - \lambda)(c_h - \alpha\phi) > c_h - \alpha.
\] (A11)

The left hand side of this inequality represents a strong Commission’s expected payoff when it prohibits, and the right hand side is a strong Commission’s payoff if it accepts. Rearranging this condition we obtain:

\[
\delta > \frac{\alpha(\phi - 1)}{\phi\lambda} = \frac{\alpha}{\lambda} \left[1 - \frac{1}{\phi}\right].
\] (A12)

By using the same argument, a weak Commission will accept when:

\[
c_l - \beta > (1 - \lambda)(c_l + \theta\delta - \theta\beta) + \lambda(c_l - \theta\beta),
\] (A13)

\[
\delta < \frac{\beta(\theta - 1)}{\theta(1 - \lambda)} = \frac{\beta}{1 - \lambda} \left[1 - \frac{1}{\theta}\right].
\] (A14)
By combining the two conditions for $\delta$, we conclude that:

\[
\alpha < \beta \cdot \frac{\lambda}{1-\lambda} \left[ \frac{1}{1-\phi} - \frac{1}{\theta} \right] = \beta \cdot \phi \cdot \frac{1}{\theta} \cdot \frac{1}{1-\phi} = \beta K_1, \quad (A15)
\]

where $K_1 > 1$ by assumption. In other words, in separating equilibrium the cost of a strong Commission is lower than the cost of a weak Commission multiplied by some constant.●

Note that we assumed that $\alpha > \beta$ and, for the last inequality to hold, $K_1$ has to be sufficiently high. From the last requirement it could be inferred in a straightforward manner that $\phi$ has to be sufficiently larger than $\theta$.

It could be proved that in the other separating equilibrium where a strong Commission accepts and a weak Commission prohibits:

\[
\alpha > \beta K_1. \quad (A16)
\]

Inequalities (A15) and (A16) cannot hold simultaneously, and we have assumed that (A15) holds, which automatically rules out a strange separating equilibrium where a strong Commission accepts and a weak one prohibits. This strange equilibrium would prevail if $K_1$ is sufficiently small or when the difference between $\phi$ and $\theta$ (strong and weak Commission’s additional reputational benefit) is low.

**B. Proof of Proposition 2**

In Proposition 1 we have shown that Participants complain when $\pi_h - \pi_i > \varepsilon(\theta + \phi - 2)$. Also, from (A12) we have that a strong Commission accepts if:

\[
\lambda < \frac{\alpha}{\delta} \left[ \frac{1}{1-\phi} \right], \quad (B1)
\]

and from (A14) that a weak Commission accepts if:
\[ \lambda > 1 - \frac{\beta}{\delta} \left[ 1 - \frac{1}{\theta} \right] . \]  
(B2)

Thus, the set of parameters is not empty if

\[ 1 - \frac{\beta}{\delta} \left[ 1 - \frac{1}{\theta} \right] < \frac{\alpha}{\delta} \left[ 1 - \frac{1}{\phi} \right] , \]  
(B3)

\[ \delta < \frac{\alpha}{\phi} \left[ 1 - \frac{1}{\phi} \right] + \beta \left[ 1 - \frac{1}{\theta} \right] . \]  
(B4)

REFERENCES


Received: August 28, 2014
Accepted: September 11, 2014