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EX POST EVALUATION OF ENFORCEMENT: A PRINCIPAL-AGENT PERSPECTIVE*

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Summary

This paper discusses a number of methodological challenges that ex post evaluation of competition policy faces. We argue that imprecise measurement and simplified analysis not only lead to unreliable results, but also trigger behavioural responses by competition authorities. Because evaluation works as an incentive scheme, it has an immediate impact on the way agencies operate. Faced with simplistic assessment, authorities may be tempted to be overly interventionist, to spend too many resources and to ignore relevant information. Therefore, a careful design of methodologies is important to ensure that ex post control does not bring about the very ills it is supposed to cure.

Key words: ex post evaluation, competition policy, incentives

Jel Code(s): L49, K21, K41

1 INTRODUCTION

The ex post evaluation of competition authorities involves a comparison between the outcome of antitrust intervention (or abstention) and a counterfactual that describes what would have happened (or not happened) in its absence. Such evaluation can be proved useful for the pursuit of at least two objectives. First, it is an instrument of internal quality control that can be used to improve the productivity of the organisation, for instance in terms of procedures and resource allocation. Second, it allows for an assessment of the benefits of enforcement and hence, when related to the cost of enforcement, can also be used for external quality control by the ultimate principals of the agency (the appointing authority) and/or the general public.

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The evaluation of enforcement raises a number of methodological issues and the design of a method for evaluation would appear to hinge partly on whether the evaluation is meant to achieve internal or external control.[1] Possibly the most problematic issues of methodology relate to the formulation of an appropriate counterfactual and the deterrent effect of enforcement.

By definition, a counterfactual can not be observed and has to be constructed. But its construction faces different degrees of difficulty, depending on the decision at stake. In the case of a merger that has been prohibited, it is necessary to evaluate what would have happened if it had been cleared and actual market development will provide little guidance for simulating this. In other words, the counterfactual involves deal specific information which is not observed. By comparison, with respect to a merger that has been cleared, it is necessary to evaluate what would have happened if the merger had not taken place and the observation of competitive dynamics prior to the merger may provide useful guidance to construct this counterfactual.

The impact that enforcement decisions have on other potential cases is not observed either. As long as decisions are sound, neglecting their deterrent effect might, however, significantly underestimate their effectiveness. Indeed, one could argue that a competition policy implemented solely or very largely through deterrence would be most effective. Paradoxically, what agencies announce as a success, e.g., the prohibition of supposedly anticompetitive mergers or the detection of cartels, could equally well be read as a failure: if the authority had been more efficient in deterring anticompetitive conduct, those antitrust violations would not have occurred in the first place. Deterrence effects are thus a central concern for external control. However, as discussed below, when the possibility of incorrect decisions is allowed for, the evaluation of deterrence effects is less clear cut.

Deterrence has no immediate bearing on the ex post analysis of individual decisions that is made for the purpose of *internal* quality control. If the objective of the evaluation is to assess whether enforcement was effective in a particular case, the magnitude of the aggregate costs and benefits of a decision, including deterrence effects, will be of secondary importance.[2]

1 The difficulty of this exercise is evidenced by the heated recent debates in the *Journal of Economic Perspectives* in 2003, the *Review of Industrial Organization* in 1997 and the *Journal of Industry, Competition and Trade* in 2001. In particular, see Crandall and Winston (2003) and Baker (2003).

2 This is of course not to say that authorities should not worry about the aggregate consequences of single decisions. But a comprehensive evaluation of all cases with sophisticated techniques (including an assessment of their aggregate impact on deterrence) will often be too difficult or costly. Nonetheless, an in-depth ex post analysis of a few selected cases may be feasible and helpful for an agency to review whether it made analytical mistakes and to learn for the future.

Deterrence effects will in particular be of limited relevance for internal quality control to the extent that they do not vary across different decisions.

A number of studies have been undertaken by competition authorities mostly for the sake of external control or advocacy (the OFT, the NMa and the DOJ among others). These studies often use simple rules of thumb to evaluate counterfactuals; for instance, it is often assumed that cartels typically lead to a price increase in the order of 10% so that in the absence of enforcement, prices would have been higher in such proportion. Similarly, it is often assumed that in the absence of a prohibition, a merger would on average have led to a price increase of 1%. More sophisticated methods are sometimes used, in particular simulations in the case of mergers. Structural models that estimate demand systems and recover the underlying cost functions can be employed for such simulations to compare different scenarios.[3] Several antitrust agencies, including the US, British and Dutch authorities, have used the Logit Model (Werden and Froeb (1994)) and the PCAIDS model (Epstein and Rubinfeld (2002)) in their efforts to report consumer savings from competition policy. Similar advances have been made in measuring the impact of cartel decisions (e.g., see Verboven and van Dijk (2007)).

However, these studies typically make the assumption that the taken decisions were correct. This should be seen as a significant shortcut in the construction of the counterfactual; in case of a merger prohibition, this approach effectively assumes that (in the counterfactual) the merger would have led to a price increase relative to the observed outcome, without considering whether in light of observed developments this assumption is warranted.[4]

As a consequence, these studies merely provide a rough answer to the question whether in general it is worth having a competition authority, making an assumption which is anything but conservative. However, precision in trying to answer this question may not be necessary as benefits are of an order of magnitude greater than the cost and it would take absurdly high rates of errors in order to reduce the benefits to the level of cost. To illustrate, DG COMP generates estimated consumers cost savings in the order of several billion € per year from cartel prosecution alone.[5] This is an area in

3 See, for example, Nevo (2000, 2001), Slade (2004), Ivaldi and Verboven (2005). While these models are typically designed to help ex ante decision making, they can also be applied to ex post analysis as in Pinkse and Slade (2004). LEAR (2006) has developed a general methodology for the ex post evaluation of merger cases for the European Commission. The report also contains further references to the literature.

4 The NMa's outcome calculations are an exception to this as they are adjusted downwards when an appeal is lost in court. Hence, to the extent that wrong decisions are appealed before the court and subsequently annulled, the correctness of decisions is taken into account.

5 As a first approximation, estimates can be calculated by multiplying the turnover of convicted firms by the expected price increase through cartels, which the OECD estimates at least at 15%. In 2006, collected fines alone exceeded 2 billion € (DG Competition (2007)).

which errors are potentially few and hence where the unmeasured benefits of deterrence are large. The direct cost of enforcement (i.e., DG COMP's budget) for all areas including state aid is, by comparison, less than 100 million € per year.[6] While the communication of the net benefit of enforcement remains an issue, that we will return to later, there is little doubt that net benefits from enforcement are positive (and likely significant). Investing resources on improving the precision of the estimates of net benefits may not be advisable.

Arguably, internal control should thus be the focus of ex post evaluation. Very useful case-specific evaluation methods have been devised and implemented over the past years. As an example, the British authorities have commissioned a study that analyzes the post-merger development of markets in a number of clearance decisions in merger control (PwC Economics (2005)). The study surveys industry experts to assess if markets evolved in the way that the Office of Fair Trading and the Competition Commission had forecasted and provides a detailed description of the extent to which the findings of the agencies have been validated.

Much progress still needs to be made in the ex post evaluation of individual cases. This paper will attempt to highlight some of the methodological challenges that such an endeavour faces. The central theme of the paper is that designing an ex post evaluation scheme to assess an agency's success will have an immediate impact on the way the agency operates. In particular, we will argue that imprecise measurement of an authority's performance may bring about detrimental behavioural responses, in an attempt to produce satisfying evaluation results. Such behavioural responses can be expected to prevail when results of the evaluation (whether for internal or external control) are used to allocate resources.

The rest of the paper is organized as follows. Section 2 describes some general methodological aspects of ex post evaluation. Section 3 then discusses in more detail specific issues that arise in merger control focusing on authorized mergers. Section 4 considers the use of event studies to construct a counterfactual. Finally, section 5 summarizes the incentive effects of imperfect evaluation and concludes.

6 To these have to be added the direct private costs of enforcement (expenses for filing, lawyers and economic consultants) and the indirect private costs of enforcement (in particular opportunity costs of management resources and deterrence of beneficial economic activity). Baker (2003) estimates those costs at below $2 billion annually for the U.S. Indirect costs are likely to be smaller in Europe. But if one takes the U.S. figure as an upper bound, cartel prosecution alone would still generate benefits that are commensurate with the total cost of enforcement—even if deterrence benefits are ignored.

2 GENERAL CHALLENGES

We will start by outlining some general issues that a comprehensive ex post evaluation of competition authorities will have to address. These issues arise in all fields of competition enforcement, including merger control, cartels, and abuse of dominance investigations.

2.1 *Marginal Evaluation*

Studies that measure the impact of antitrust intervention typically compare the total costs and benefits of enforcement. Thus, a reported result may be that an authority generated consumer savings of x € and produced costs of y €. If $x > y$, the agency will be evaluated favourably. Similarly, two agencies may be compared by noting that agency A took a correct decision in x% of the cases while agency B was correct in y% of the cases. If $x > y$, agency A will be evaluated favourably.

Unfortunately, such absolute comparisons are at best imperfect signals of an agency's efficiency. At worst, they will reward *less* efficient authorities. This is because an analysis that aims at deriving whether resources were spent efficiently should compare marginal—and not average—costs and benefits (where the former should be equal for the last Euro spent). A comparison of total costs and benefits will thus provide a poor indication of whether the agency received too many or too little public funds and whether it allocated its resources efficiently. Similarly, a comparison of the "success" probabilities of two agencies will reward excessive spending, since an efficient agency should reduce the probability of making mistakes only to the extent that the expected gain of spending further resources outweighs the costs of doing so (see Besanko and Spulber (1989)).

2.2 *Objective Ex Ante*

Evaluation ex post should in principle consider the objective and constraints that were faced by the decision maker ex ante. For instance, an evaluation of whether a particular decision led to an increase in consumer welfare may be inappropriate if such objective was not meant to be pursued ex ante, or alternatively, if constraints were imposed which restricted the pursuit of this objective. In other words, the metric ex post should be consistent with the decision making problem ex ante.

Consider the following example. A precondition for prohibiting exclusionary conduct in Europe is that the firm under investigation is dominant in the relevant market. This makes it difficult to prosecute monopolization practices. At the opposite, whenever dominance has been found, Article 82 may have been interpreted excessively formally, at least according to some

observers. This may have led to the per se prohibition of practices like bundling, which are well known to have beneficial effects in a large variety of circumstances.[7]

Hence, if it is found that a practice leading to monopolization has not been properly prosecuted (a type-II error), while the practice of a dominant firm has been prosecuted although being beneficial to consumers (a type-I error), it may say little about the performance of the agency.

An evaluation of competitive outcomes which does not control for the parameters of the decision ex ante will thus necessarily be biased against the authority if observed decisions merely reflect deficiencies of the framework in which they were taken.

2.3 *Standard of Proof*

The standard of proof which is laid down by courts and the legal system implicitly determines an acceptable level of errors. A standard of "balance of probabilities" can for instance be interpreted as allowing a probability of making a mistake which is as high as 50%.

Accordingly, if it is found that a decision was incorrect ex post, this does not mean that it was incorrect ex ante, given the information that was available at the time. Incorrect decisions may not be due to incompetence. They may reflect either incomplete information or an optimal decision not to seek additional information at the time at which the decision was taken. Indeed, the standard of proof sets a threshold on the degree of confidence that agencies should have in their decision. If the threshold is met, it is optimal not to seek more information that might further reduce the probability of making a mistake. If this is not taken into account in ex post analysis, evaluation will introduce a bias towards excessive spending, as competition authorities strive to improve the likelihood of being correct ex post without regard to the resources spent ex ante.

2.4 *Deterrence and Signalling*

As mentioned above, neglecting the deterrence effect of enforcement may significantly bias the evaluation of consumer benefits downwards. Estimates of the deterrence effect are rare and crude. Nonetheless, there are indications that it is substantial in size. Audretsch (1983), for instance, reports that an average merger case brought by the DOJ or the FTC deters between 11 and 16 other mergers. Of course, deterrence is not necessarily beneficial, as false

7 In the U.S., current case law has taken the opposite direction by suggesting that such practices should be considered under almost per se legality despite the fact that a large body of literature has shown that exclusionary conduct may be anticompetitive.

convictions will also deter beneficial economic activity for fear of prosecution. Hence, a simple multiplication of observed antitrust savings by a given factor would not be appropriate.

Moreover, as Schinkel and Tuinstra (2006) have shown, if enforcement agencies commit mistakes, active enforcement may actually make anticompetitive behaviour *more likely*, instead of deterring it.[8] There are two effects that drive this result. First, the higher the likelihood of type-II errors (false acquittals), the less likely it is that anticompetitive conduct is detected. Second, the higher the likelihood of type-I errors (false convictions), the more likely it is that firms are punished for benign conduct. Hence, active but imprecise competition enforcement may increase firms' incentives to behave anticompetitively and deterrence turns out to be self-defeating. It may also deter efficient behaviour and this concern has featured prominently in the debate on the enforcement of Art. 82.

The current self-evaluation of a number of countries' competition agencies aims at assessing the immediate consumer savings that result from the detection of cartels and the prohibition of anticompetitive mergers. As long as the deterrence consequences of the agencies' work are not properly taken into account in these analyses, however, authorities have every incentive to strive for obtaining large figures (because only observable prosecution is rewarded but not the unobservable success in deterring anticompetitive behaviour). This involves a risk of overenforcement to the detriment of social welfare. Such a risk will be particularly large if ex post evaluation is run under the assumption that all decisions were correct.

3 AUTHORIZED MERGERS

We will now turn to more specific issues that arise in the area of merger control, an area that absorbs a significant amount of enforcement agencies' resources. Mergers involve an assessment ex ante, which accordingly has to rely on factual evidence that is both less rich and more speculative than what is available ex post.

In this section, we will focus on the ex post analysis of mergers that have been cleared. In this case, the counterfactual can be constructed from the observed market dynamics pre-merger. Even the pre-merger situation may be an acceptable counterfactual. The comparison between post-merger market outcomes and what would have happened otherwise is then easier by comparison with prohibited mergers for which the construction of the counterfactual requires deal specific information that is not observed. Nonetheless, as will be

8 See also Besanko and Spulber (1989), who argue that enforcement agencies should tolerate some positive level of anticompetitive behaviour when mistakes are possible to adjust to the presence of asymmetric information between firms and agencies.

shown below, there are a number of pitfalls that should be avoided, in order to prevent giving perverse incentives to competition authorities.

3.1 *Strictness of Enforcement*

For mergers that have been cleared, it is possible to evaluate the price changes induced by a merger taking the pre-merger situation as the counterfactual (possibly coupled with survey evidence) in order to assess whether the merger indeed increased consumer welfare. The benefit of this approach is that it not only gives an indication of whether a decision was correct, but also allows estimating the costs and benefits of a decision by assessing the change in consumer surplus induced by the change in prices and quantities.

However, the probability that cleared mergers will later turn out to be welfare-enhancing increases in the strictness of enforcement: The harder the standards for allowing a merger to go through, the lower the likelihood of clearing an anticompetitive merger. If the analysis focuses on authorized mergers, leaving aside prohibited mergers, it will only allow for the detection of type-II errors, but not of type-I errors. Agencies will then be tempted to reduce the probability of the former at the expense of a higher likelihood of the latter. Hence, the observed quality of decisions is endogenous, and not only affected by the authority's ability. In essence, focussing on price changes of authorized mergers alone tends to reward authorities that are more interventionist. Supervision may therefore encourage overenforcement in order to achieve good evaluations, an outcome that is unlikely to be desirable.

We note, however, that the current incentive system, which mostly relies on courts to detect mistakes, may give enforcement agencies an incentive to be overly lenient. As prohibited mergers tend to be challenged in court more often than clearance decisions, authorities may be tempted to enforce too reluctantly, in order to prevent losses in court. Arguably, ex post evaluation works against this bias because it gives agencies an incentive to be concerned about type-II errors as well. Moreover, the lobbying influence of firms possibly induces underenforcement (Neven and Röller 2005). In summary, while ex post evaluation may push agencies towards stricter enforcement, this should be desirable to the extent that the current system encourages overly lenient merger control.[9]

9 As pointed out by a referee, lawyers are often worried about the legal risks of ex post evaluation. If ex post analysis conveys mistakes committed by an antitrust agency, damage claims by involved parties are likely to follow. While being punished for wrong decisions is helpful to induce effort, it is likely that the prospect of such damage claims would induce agencies to be overly lenient in much the same way as described above. Internal evaluation does not suffer from this shortcoming, as it points to mistakes without putting the agencies' reputation at risk.

3.2 *Industries in Disequilibrium*

Often, a natural reason to merge is that demand or cost conditions in an industry have worsened to an extent that does not allow the current number of firms to operate profitably. In that case, the counterfactual of a merger is not the pre-merger situation. In particular, the relevant counterfactual price level is not the pre-merger price but the price level after exit of the least efficient firms in the industry. A price increase post-merger is therefore not necessarily a sign of an incorrect decision, but may be the consequence of a market development that would have occurred anyway (see Ivaldi and Verboven 2005).

The need to consider such developments is the expression of a wider principle: all factors that are considered important in shaping an optimal decision ex ante should also be included in an ex post analysis. Otherwise, ex post evaluation will give competition authorities an incentive to disregard information that it should take into account in forming its decision.[10] In situations as the above, this will lead to overenforcement as mergers which should be cleared would be prohibited.

3.3 *Merger-specific Efficiencies*

Merger-specific efficiencies have to be at the heart of the authorization of horizontal mergers involving unilateral effects. Without efficiencies, such horizontal mergers would otherwise decrease welfare almost by definition, as market power will necessarily increase after integration (e.g., Deneckere and Davidson (1985)).[11] However, efficiencies take time to realize. For instance, if a merger allows the acquiring firm access to a cheaper production technology owned by the target company, reorganizing production to incorporate this technology will not take place over night.

The increase in market power that a merger allows, on the other hand, often materializes very quickly, as it is usually sufficient to adapt prices, a rather simple exercise. This means that early price comparisons will provide an excessively critical assessment of an authority's decision to clear a merger.[12]

10 This is an instance of the sufficient statistics result (Holmström (1979)), which states that an optimal contract should condition on all informative signals (and only on those).

11 Efficiencies may take the form of reduced marginal costs (Williamson (1968)) or of a relaxation of firm-specific constraints (Boone (2006)). For instance, some mergers grant the acquiring firm access to a market segment that it is not able to enter on its own.

12 Unfortunately, demand and cost conditions quickly change, which makes later price levels less precise signals of the quality of a decision. Imprecise observation, however, also leads to an overestimation of the number of mistakes an agency has made if the agency is relatively efficient. In principle, empirical studies can aim at identifying whether subsequent price

Similarly, merger-specific efficiencies may result from complementarities between the merging firms which permit the production of superior products. As a result, prices may increase post-merger due to improved product quality. Again, not taking this aspect into account in the ex post analysis will distort ex ante incentives by making it profitable for competition authorities to disregard valuable information they may possess on the implications of a merger (or not to collect it in the first place).

4 EVENT STUDIES AS A COUNTERFACTUAL

Event studies are an ingenious method of constructing a counterfactual which is particularly relevant in the case of prohibited mergers. Event studies exploit the reaction of competitors' stock prices to merger announcements to make a competitive assessment. If a merger is procompetitive in the sense that efficiencies allow the merged entity to post lower prices despite increased market power, one can anticipate that competitors' expected profits are harmed by the transaction. Therefore, this literature concludes, one should expect outside competitors' stock prices to decrease following the announcement of a procompetitive merger. If the increase of market power dominates potential efficiency gains, on the other hand, competitors' stock prices should increase, as the merger will permit larger profits even for outsiders to the transaction. Stock market reactions should therefore provide an indication of what would have happened if a merger had not been prohibited according to market participants. It also provides the market assessment of the consequences of mergers that are authorized.[13] A number of papers have adopted this approach, which however suffers from a number of shortcomings.[14]

4.1 *How Precise are Event Studies?*

It is well known that stock markets are not informationally efficient (Grossman and Stiglitz (1980)). In fact, mergers are often driven by the very fact that financial markets are myopic (Shleifer and Vishny (2003). This already casts some doubt on the predictive power of stock market reactions.

Footnote 12 continued
decreases result from merger-specific efficiencies or exogenous changes like shifts in demand or entry. But clearly, this requires either rich datasets and the application of sophisticated econometric techniques or extensive investigations of developments in the relevant sector (see PwC Economics (2005) for an example of the latter type).

13 The above analysis only describes the simplest possible form of event study. More advanced methods have been applied lately; see for instance Duso et al. (2006).

14 Early studies that have employed the methodology are Eckbo (1983), Stillman (1983), Eckbo and Wier (1985) and Eckbo (1992). Recent contributions include Mullin et al. (1995), Banerjee and Eckard (1998), Fee and Shawn (2004), Shahrur (2005), Duso et al. (2006, 2008).

In addition, stock price reactions to mergers may occur for a number of reasons that have nothing to do with anticipated market power. For instance, merger announcements may signal efficiency potentials for non-merging firms (Eckbo (1983)). Also, the one-to-one relationship between stock price changes and welfare implications will be blurred by expectations the market has about likely merger configurations and by the complexities of conglomorate mergers (Duso et al. (2008)).

Empirically, a positive (if weak) correlation between ex ante stock market returns and ex post measures of profitability has been found (e.g., Healy et al. (1992) and Kaplan and Weisbach (1992)). The approach therefore has its merits; but it does not guarantee that a correct counterfactual can be identified for prohibited mergers in each particular case.

4.2 *How Ex Post is Ex Post?*

Note that event studies are not really an ex post instrument as stock price data is readily available prior to the decision (in particular, also for the competition authority). Hence, if a different decision was taken than the one suggested by the stock market reaction, this may well be because the authority had access to *better* information than the market (e.g., internal documents of the merging firms or the results of questionnaires submitted to competitors and customers; see Werden and Williams (1989)). Event studies will thus be critical about a competition authority exactly when it makes efficient use of the available information. This will reduce the incentive to look for the information ex ante.

Of course agencies may not possess much additional information, may be incompetent or follow a political agenda. In this case, event studies *could* give a rough idea of what should have been done. Ultimately, these arguments suggest that event studies will be a good instrument for quality control if an authority is incompetent, but a poor instrument if the agency is efficient. This poses a dilemma inherent in all imprecise evaluation methods: if the ex post prediction differs from the ex ante decision, is it because the decision was wrong or the ex post assessment?

In principle, whether an agency is influenced by a political agenda and whether it performs better at predicting post-merger outcomes than stock markets can be tested. Some progress in this direction has been made (see Duso et al. (2008)), but more research is clearly desirable.

In summary, if competition authorities take evaluation on the basis of event studies seriously, they have an incentive to follow the market's assessment of a merger rather than their own investigation. Although event studies are a clever tool to construct unobservable counterfactuals, this limits their usefulness as an external control mechanism.

5 CONCLUSION

This paper has given a glimpse of the range of methodological challenges that a system of ex post evaluation faces. A number of potential biases in the estimation of errors that agencies make have been identified. If this were the only drawback of evaluation, there would be little reason for concern from a public policy perspective. The central theme of this paper, however, is that many of these biases will trigger behavioural responses by competition authorities. Agencies might be tempted to be overly interventionist, to spend too many resources and to disregard available information or not to collect it in the first place.[15]

One might question the significance of these behavioural responses. To deny those would however be to deny the merit of evaluation in the first place. Indeed, if significant resources are spent on evaluation, it must be because there is the expectation that the results of the evaluation can be used to steer incentives and discipline the agency's behaviour. It is also hard to deny that negative external reviews by the European courts in the context of recent merger cases have had effects on the internal management of DG COMP.

Overall, this paper has argued that limited resources should be spent on evaluation for the sake of external reviews. The order of magnitude of the benefits relative to the cost of enforcement is such that additional precision in the estimation of the benefits would not make much of a difference. If anything, additional evidence of the importance of the deterrence effect would be useful from this perspective. A focus on cartels may also be warranted given that the errors are potentially few in this area. As a consequence, the counterfactual is easier to identify with some confidence and the analysis of the deterrent effect is more straightforward. Still, what may matter most for external review is the development of effective ways to communicate to the wider public. It is likely to remain unimpressed by billions of euros of consumer surplus but might be more responsive to concrete examples with a direct link to personal experience.

Regarding internal quality control, this paper has argued that a careful design of methodologies is important to ensure that ex post control does not bring about the very ills it is supposed to cure. As a result, it may be appropriate to focus the evaluation on detailed case studies which explicitly control for the conditions in which decisions were taken. When the finding emerges that an incorrect decision may have been taken, a consistent story of why

15 These are all instances of Holmström and Milgrom (1991) more general result that incentivizing some elements of an agent's performance may have an adverse impact on other aspects that are not taken into account by the evaluation (e.g., for lack of observability). This effect can make it optimal not to provide incentives at all.

this may have been the case should also be constructed relying on evidence regarding process and dysfunctionalities at the time of the investigation.

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