Judicial Review, Economic Evidence and the Choice of Legal Standards
by Utility Maximizing Competition Authorities

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Abstract

For most of the various types of business conduct that can potentially violate Competition Law, excluding hard-core collusive conduct and horizontal mergers, the issue of which legal standards (or decision rules) Competition Authorities should be adopting has been hotly debated for many years. In the EU, while about 10-15 years ago there were many voices arguing for a movement towards effects-based standards, as many commentators recognize at present, this movement never seriously took off, so much so that currently the main question concerns whether we are actually moving towards its demise. This contradicts a growing body of economic theory using an welfare-based approach to show the superiority of effects-based in many circumstances.

In this paper we propose an alternative framework for examining the choices between legal standards that CAs make that does not associate these choices, as is done in the existing literature, with error-cost minimization or welfare maximization. Rather, we propose a framework in which the CA maximizes its utility, which depends positively both on the expected benefits that its activities bring to society but also on its public image. Within this framework we are able to identify the fundamental role of the judicial review process in explaining why Competition Authorities may favor Per Se type procedures, why the extent of economic analysis and evidence used by CAs can be severely limited, how the standard of proof affects the optimal choice of the number of investigations and how these choices depend on the type of conduct examined.

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1. Introduction: Review, Objectives and Motivation

Economic analysis has been extensively applied for many years in Competition Law (CL) enforcement in order to provide analytical tools and models for understanding cartel behavior, types of monopolization, the impact of vertical and horizontal mergers, as well as playing, more recently, an increasingly important role in the assessment and optimal choice of legal standards and the shaping of tools of enforcement, such as leniency programs, detection, determination of fines and settlements, and alternative sanctions.

Nevertheless, the issue of the appropriate role and extent to which economic analysis and evidence should be applied in the enforcement of CL has always been very controversial. How widely divergent the opinions have been and how dominant specific points of view become in terms of their influence on enforcement practice has varied over time and across countries and continents. Thus, while not without dissenting voices that even become dominant at certain periods over the last hundred or so years, the US (or North America) point of view has tended to give economic analysis and evidence a much more important role to that which the dominant point of view has assigned to economic analysis in Europe.

The debate concerning the appropriate role and extent of economic analysis and evidence in CL enforcement is usually couched in terms of what is the best legal standard or decision rule (or “enforcement procedure”) that should be used in order to be able to proclaim liability or violation of CL.

Broadly speaking, there are two types of decision rule that can be used, those (to use the terminology common in the EU) that are effects-based and those that are object-based, which in US are referred to as rule of reason and Per Se rules, respectively, though the terms are not strictly speaking exactly equivalent. Of course, there are variations in these rules and it is probably best to think of legal standards as forming a continuum at the extremes of which are the Per Se (or object-based) and the (“full”) rule of reason (or full effects-based) standards (see for

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2 For discussions and empirical information concerning the use and usefulness of economics in competition law enforcement see Baker (2003), Neven (2006), Schinkel (2008) and Lianos (2012).
3 Both at the level of the EU Commission and that of Member States. For an excellent overview of the application of economics in a century of antitrust enforcement in US see Kovacic and Shapiro (2000). Also Gual and Mas (2011) for the use of concepts and tools from modern Industrial Organization theory and Fisher (1989) for an early skeptical view. For an exchange that encapsulates quite perfectly the controversy raging presently again in Europe, see articles of Wils (2014) and Rey and Venit (2015) discussing the recent EU Intel decision.
4 Alexander Italianer, ab.cit. p. 2, referring to Justice Stevens who was probably the first to point out that one should think of legal standards (for dealing with restraints under US Section 1) as forming a continuum with Per Se and Rule of Reason being at the opposite ends of this continuum. As Italianer notes, the US Supreme Court has explicitly recognized that “the categories of analysis cannot pigeonholed into terms like “per se” or …. “rule of reason”. No categorical line can be drawn between them. Instead, what is required is a situational analysis moving along what the Court referred to as a “sliding scale”.

details below). Further, while in US a Per Se offence concerns conduct that is necessarily and irretrievably unlawful, this standard does not exist in EU where the object-based standard refers to a “rebuttable Per Se” rule and an effects-based standard is usually thought of as falling short of the full-blown rule of reason in terms of how discretionary is the Authority’s case-by-case decision making approach\textsuperscript{5}.

Of course, the choice of legal standard may also be affected by the \textit{substantive standard} of the CA. Thus, generally, the application of an effects-based standard (interpreting the term in the usual way where “effects” refers to effects on consumer or total welfare) may be excluded by, for example, the fact that the Authority’s objective is just to “protect the economic freedom of market participants”, or, the pursuit of a “system of undistorted competition” (Wils, 2014), without obligation to show adverse effects on consumer welfare or efficiency (Rey and Venit, 2015)\textsuperscript{6} – which would imply that any conduct that puts one or more competitors at a disadvantage would be considered unlawful\textsuperscript{7}, irrespective of the ultimate consequences of the conduct for consumer or total welfare\textsuperscript{8}. As they also stress assessing the effects on “consumer welfare” (a) includes assessing impact on prices but also on all other factors that influence consumer welfare such as consumers’ choice, product variety and product quality and (b) does not imply a focus on just the short-run effects.

But we will assume here that the ultimate objective of the CA is primarily that of the protection of consumer welfare\textsuperscript{9}, hence prohibiting conduct that impacts adversely on price, quality, variety or innovation, which are the main dimensions affecting consumer welfare. Given this, the conduct’s potential implications for

\begin{itemize}
\item \textsuperscript{5} See Katsoulacos Y and D Ulph (2009). Also, Gavil (2008), ab.cit. p.141. We return to some of these distinctions below.
\item \textsuperscript{6} It should be noted that Wils’ (2014) use of the term “welfarist” for the objective he associates with the effects-based standard is misleading. As argued in a discussion of the point by Farrell and Katz (2006) “antitrust is not welfarist in the sense that, whether the antitrust law allows a particular conduct depends not just on the consequences of that conduct but also on the nature of the conduct or the process that generates the consequences. Thus conduct that creates harm or lowers welfare will normally not be disallowed, under antitrust law, if it does not involve anticompetitive actions”.
\item \textsuperscript{7} The meaning of “preserving undistorted competition” was actually made clear by the EU General Court which, upholding in its entirety the Commission’s Decision on Intel, argued that making it more difficult for a rival to compete “in itself suffices for a finding of infringement”.
\item \textsuperscript{8} As Rey and Venit (2015) note, the effects-based standard starts with a showing of a distortion of the competitive process but argues that in order to assess this distortion and find liability one “should look at the actual or likely effects of the conduct ” producing the distortion on consumer welfare or efficiency (p. 17, italcs ours). Note that in this paper we will not try to examine the pros and cons of using “consumer welfare” or “total welfare / efficiency” as the right substantive standard. Some authorities are already using a total welfare standard (e.g. in Canada, Australia and New Zealand) though in EU and US the authorities lean towards the «consumer welfare» standard (and in EU often a weaker standard – such as that concerning the «competitive process» - is used). There is currently quite an intense debate on this issue, with some eminent economists arguing for a total welfare standard, e.g. D. Carlton (2007). For a recent contribution containing a review of the recent debate see also Katsoulacos, Metsiou and Ulph (2016).
\item \textsuperscript{9} Without contradicting the presence of “public interest concerns” that may affect enforcement.
\end{itemize}
consumer welfare can be assessed by either of the legal standards mentioned above: and, it should be stressed that, in both cases, “the purpose of the analysis is to form a judgment about the competitive significance of the restraint”\textsuperscript{10}.

Thus, the main difference between these two types of standards must be thought of as been that under effects-based, the Authority’s threshold for discharging its burden of proof and establishing its ultimate contention that the conduct will result in a reduction in consumer welfare, is higher than it is under an object-based standard. How much higher will depend on the exact variant of Per Se or effects-based rule that is used. This of course implies that the extent and sophistication of the economic analysis and evidence utilized under an effects-based standard is greater than that under an object-based standard – and again, how much greater will depend on the exact variant of Per Se or effects-based rule that is used.

Under a pure or “full” effects-based standard the effect of the conduct on competition must be examined and it must be proved that with a high probability the conduct will affect negatively at least one of the factors that influence consumers’ welfare – usually the emphasis is on showing that the conduct results in a substantial increase in price relative to a counterfactual in which the conduct would be absent. Under an object –based standard, on the other hand, it is not necessary to examine the effects on competition in the sense just mentioned: “Rather, it is sufficient to show that the restraint is capable of resulting in a distortion of competition”\textsuperscript{11}.

Between these extremes one finds “modified Per Se (or modified object-based)” standards where the application of the object rules require application of quite extensive contextual analysis of market and firm characteristics and “structured rule of reason” where conduct is assessed through a specific series of screens to distinguish lawful from unlawful cases, in contrast to the (unstructured or) “full” or “open” rule of reason where all potentially anti-competitive and pro-competitive effects are assessed and compared\textsuperscript{12}. This has the important implication that the object-based approach might not require much less in analysis than witnessed in cases determined via an effects-based approach.

Thus, in the context of our analysis here the question is, assuming that the substantive standard is consumer welfare or efficiency, what is the optimal choice of legal standards along the continuum (and hence of the role of economics in CL

\textsuperscript{10} See Gavil (2008), ab.cit., p. 139 and Alexander Italianer ab.cit., p. 2.

\textsuperscript{11} Italianer, ab.cit. p.5. Note that the word “capable” in EU decisions is very often replaced by the word “likely” or the word “probable”: here we interpret these terms as synonyms to identify a middle ground between purely hypothetical effects and actual effects.

enforcement). Existing literature has examined this question by using a minimization-of-costs of decisions errors framework and, more recently, a more general maximization-of-welfare framework (that incorporates the former). The main factors that then need to be taken into account and have been discussed quite extensively in the literature can be summarized as follows:

- the cost of decision errors (of Type I and Type II) under the alternative standards
- the deterrence or indirect (or incentive) effects of the standards
- predictability and legal certainty
- other enforcement costs (including administrative costs of enforcement and costs to firms of self-assessing their position or of reducing legal uncertainty).

In a series of papers, Katsoulacos and Ulph (2009, 2011, 2015 and 2016) have attempted, by using a maximization-of-welfare framework to provide answers on how the factors above, in conjunction with other aspects of enforcement, affect the choice of the (optimal) legal standard and hence, indirectly, about the appropriate role and extent of economic analysis in CL enforcement. Below we provide a brief summary of the main conclusions.

A formal analysis of decision errors under alternative legal standards suggests that this involves a comparison of the quality of the model/analysis available to the CA in undertaking an effects-based investigation of a specific conduct type with the strength of presumption of legality/illegality of that conduct type. The quality of the model/analysis depends on the propensity to make Type I (false convictions) and Type II (false acquittals) errors. The strength of the presumption of legality/illegality depends on the frequency with which actions are anticompetitive, the degree of harm they cause if they are, and the degree of benefit they create if they are pro-competitive. It is certainly not true in general that under effects-based legal standards the welfare costs of decision errors will be lower than under Per Se legal standards but this is likely to be true in a large number of cases. Specifically, there will be an improvement in the overall welfare effect by lowering the costs of decision errors of enforcement whenever the type of potential law violations is such that actions of this type cannot be a priori considered as overwhelmingly harmful or overwhelmingly benign to the welfare of those

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13 Extensive references and reviews of the literature related to these issues are contained in these papers. See also J Padilla (2013), page 435.
15 A measure of how far conduct is from being borderline legal/illegal – Katsoulacos and Ulph (2009).
16 Such as explicit horizontal price fixing agreements. For this type of actions a Per Se Illegality legal standard should be (and, indeed, it is) used – that is, a standard according to which all such agreements are deemed as Per Se violating the law, without a need to examine, using economic analysis, the welfare implications of each case detected and investigated.
17 Such as certain information exchanges between firms which by their very nature and characteristics are highly unlikely to have adverse effects and hence a Per Se Legality legal standard should be used -
affected. Then, relying on legal standards that identify liability on the basis of the estimated effects on welfare of each case examined, where the estimated effects are assessed on the basis of economic evidence and economic modeling of the specific case, rather than on object-based or Per Se legal standards, will lower the costs of decision errors.

A full welfare analysis of the choice of standards makes clear that it is not just decision errors that must be taken into account. Decision errors affect only the welfare consequences of the CA’s procedures on the cases that come to its attention and investigated. A CA’s procedures could also affect firms, which do not come to its attention, for example by influencing the decision of a firm to engage in potentially efficiency enhancing or anticompetitive actions. These indirect/deterrence effects could potentially have much more significant welfare effects than the direct/decision error effects. So the indirect effects of different decision procedures adopted by a CA on the behavior of firms, when the latter are deciding whether or not to take a business action, should be a very important consideration when selecting among alternative procedures. A welfare analysis of these indirect effects shows that Effects-based procedures by discriminating better between harmful and benign conduct can improve deterrence relative to Per Se procedures and this is most likely to be the case when the strength of the presumption of legality or illegality is not large (i.e. exactly for the type of conduct we have in mind here which cannot be a priori considered as overwhelmingly harmful or overwhelmingly benign). It also shows that it is important to take account of certain other procedural features of a CA’s operations—the coverage rate (i.e. the fraction of actions investigated by the CA), delays in decision-making, and the penalty regime. These procedural factors enter explicitly into the welfare comparison of different legal standards.

Finally, the argument that economics or effects-based procedures are inferior because they generate Legal Uncertainty does not seem to stand-up well to...
analytical scrutiny (Katsoulacos and Ulph, 2015 and 2016). Effects-based does not necessarily imply Legal Uncertainty\textsuperscript{22}, Per Se does not always guarantee Legal Certainty\textsuperscript{23} and, especially when the CA can adjust its penalty policy under alternative information structures, the superior deterrence effects of effects-based standards will make them the optimal choice even if they involve Legal Uncertainty whilst Per Se does not.

Given the above brief review, it may come as a surprise that in many jurisdictions including those of the EU (DGCOMP) and of many EU Member States the preferred legal standard for many practices continues to be much closer to Per Se than effects-based even though the economics literature in the last twenty years or so has shown that while these practices\textsuperscript{24} can be anti-competitive the circumstances for this to be true cannot be considered as very common and, most importantly, they often generate substantial efficiencies that can also enhance consumer welfare. While Competition Authorities and policy makers did show signs in the previous decade of greater sympathy for moving towards effects-based procedures\textsuperscript{25}, the actual implementation practice shows that infringement decisions still (and even increasingly in recent years) are nothing but effects-based, as testified by the arguments put forward on the one side by Wils (2014), favoring Per Se, and on the other side by Rey and Venit (2015), favoring effects-based, in the context of the recent European Intel decision\textsuperscript{26}.

In the meantime, the importance of effects-based procedures and of the role of economic evidence and relying on the predictions of sound economic analysis in CL enforcement has been stressed by OECD not just in the context of developed countries but equally and perhaps more importantly in developing ones. For example, in its recent report evaluating the Russian competition authority, that has in the last few years become the largest competition authority in the world, the OECD (2013) makes as its top recommendation that the authority must “improve the quality of economic analysis and its application to competition enforcement throughout the competition authority and in support of improved judicial decisions”.

The primary objective of this paper is to propose an alternative framework for examining the choices between legal standards that CAs make that does not associate these choices with error-cost minimization or welfare maximization.

\textsuperscript{22} Katsoulacos and Ulph (2015).
\textsuperscript{23} Rey and Venit (2015), p. 18.
\textsuperscript{24} Practices that have been associated with this debate are mainly those associated with article 102 in EU (abuse of dominance), or concerted practices and information exchange or some vertical restraints.
\textsuperscript{26} The decision concerned Intel’s practices involving exclusivity contracts and rebates.
Rather, we propose a framework in which the CA maximizes its utility, which depends positively both on the expected benefits that its activities bring to society but also on its public image or reputation. Within this framework we are able to identify the fundamental role of the judicial review process\(^{27}\) in explaining why the extent of economic analysis and evidence used by CAs, can be severely limited, even though the CAs have access to suitable expertise.

More specifically, in our framework the CA’s public image and reputation is measured by an indicator of “Enforcement Success” which is affected negatively when the number of cases that the CA opens and brings to conclusion falls and when the reversals of its decisions in Courts of Appeal are increased. Using this framework, we analyze the CA’s optimal application of economic analysis and evidence in Competition Law investigations and its optimal choice regarding the number of investigations undertaken and decisions reached. Our main result is that the CA may well find it optimal to use standards of proof that are well below those associated with full effects-based, thus applying economic analysis and evidence that is significantly less than the analysis and evidence associated with full effects-based, even though the latter can reduce decision errors and can be optimal in terms of its deterrence effects. Also, we show that increasing the standard of proof in investigations of a specific conduct may lead to the CA choosing to investigate less cases of that specific conduct type. Our conclusions are useful for drawing lessons and making recommendations for improving the extent to which economic analysis is applied and hence the performance of CAs in terms of the quality of CL enforcement.

The explanation behind our main result is that increasing the standard of proof and the extent of economic analysis and evidence utilized can lead, after a certain point, to an increase in the probability that infringement decisions will be annulled in Courts of Appeal. Moving towards more effects-based standards can increase the probability of annulment (or decision reversal) by Courts, because this move may well imply that the CA and Courts cannot devise decision rules for assessing conduct that are based on a succinctly defined pre-specified set of easily identifiable and unanimously (or, more or less unanimously) accepted criteria or conditions on the basis of which the assessment determines conclusions that are very difficult to dispute\(^{28}\). This implies an increase in the disputability of the conclusions reached by the CA – as the Courts can consider appropriate to take into account less or additional or different criteria, tests, models and interpretations to those used by the CA. It also implies an increase in the misalignment in perceptions between the

\(^{27}\) For other important attributes of this process see Katsoulacos and Ulph (2011) and Shavell (1995).

\(^{28}\) Irrespectively of whether these criteria are right or wrong, sufficient or deficient, and thus satisfactory or not in discriminating truly harmful from truly benign conduct. Such well defined pre-specified sets of criteria are, on the other hand, associated with object-based standards. The example of information exchanges discussed below illustrates the point.
CA and Courts about what is, or exactly how to specify in detail, the right decision rule.\footnote{Differences between the CA and Courts can be of two kinds: (a) Courts may agree with the Standard of Proof (SoP) of the CA but to disagree or consider mistaken at least parts of the CA's analysis, something that becomes much more likely with effects-based standards. Also, (b) Courts may disagree with the SoP used by the CA. In this last case there are a number of sub-cases: (i) The Court finds the SoP too high (as in the EU Intel case) but does not annul decision because it considers that with a lower standard of proof the decision would be the same (ii) The Court finds the SoP too high (as in many cases involving the Russian Authority's decisions – see below and Katsoulacos et. al (2016)) but annuls decision because it considers that with a lower standard of proof the decision would not be the same – this case may be hard to distinguish from case (a) in practice, since under (b)(ii), the Court will usually be disagreeing with the significance assigned to, or with the interpretation given to, the additional economic analysis and tests of the CA (as under (a)). And, (iii) the Court finds the SoP too low (as in the US Leegin case) and annuls the decision. In this article we concentrate on instances of annulment that are related to (a) and (b)(ii). It is also worth mentioning here that Courts may well request a higher standard of proof (as in Leegin) even though it is expected that this may increase decision reversals.}

It is important to note that the extent to which the judicial review process will be associated with this effect will be dependent on the conditions related to the institutional and legal/cultural context of the country considered. Thus, the effect is expected to be strong in jurisdictions in which there is no tradition in the application of economic analysis and evidence in legal proceedings and, specifically, in competition law enforcement, especially when the latter surpasses a certain amount of sophistication and complexity. Also, in jurisdictions or legal traditions in which judges lack any formal training in economics and the necessary relevant experience in assessing economic arguments. These will certainly tend to hold in the relatively new jurisdictions like those of for example the BRICS and other developing countries but may well hold too, at least to some extent, in more mature jurisdictions (e.g. of the EU) in which the legal tradition is not one that is receptive to economic arguments in substantive evaluations of CL cases.

The structure of the paper is as follows. Section 2 sets out the model while Section 3 derives our main results concerning the optimal application of economic analysis and choice of legal standards and the optimal choice regarding the number of investigations/decisions reached. Section 4 provides concluding remarks offers some recommendations and discusses opportunities for future research.

2. The Model

Our model of CA behavior is based on the basic premise that the CA is a government agency and as such it will typically have a certain freedom to choose among different possible courses of action. Its objective (or, the CA head’s objective) is concerned with society's benefits from the agency's overall performance, but also
with the organization’s public image or reputation. Thus, while the head is concerned with the expected benefits that the CA’s activities bring to society directly, she is also attaching value to how the CA’s activities impact on its reputation. We formalize this objective through a utility function that depends on a composite indicator of Enforcement Success (S) that in turn depends positively on the benefits that society derives from CA’s activities, and on the number and type of cases that the authority opens and brings to conclusion in any given period and negatively on the number of the CA’s decisions that are reversed (or annulled) by Courts of Appeal.

Thus, we consider a CA that maximizes a utility function (U) where utility depends on the reputation (R) of the CA, specifically we assume that utility $U = U(R)$ is a monotonically increasing strictly concave function of $R$. Below, we start with a discussion of the factors that affect reputation.

The reputation function

We assume that the fundamental indicator of the CA’s performance in terms of benefits to society and public image, which determines its reputation (R), is the Enforcement Success (S) of the CA, which is influenced by two factors:

(i) The difference between the Decisions (D) that the CA expects to reach in each period on cases opened and investigated and the expected (final) reversals (r) of its decisions in Courts of Appeal. Decisions can be reached on the basis of some variant of Per Se (PS, or object-based) or effects-based legal standard (EB) and they concern conduct that is not deterred, by firms anticipating the enforcement procedure and sanctions that they will face if investigated and convicted. Parties found to violate...

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30 See for an extensive discussion of these assumptions and of empirical evidence, as well as for a review of related theoretical work, Schinkel, et. al. (2014). They construct a model to examine the behavior of government agencies by assuming the same overall objective as we advocate here.

31 This is also the assumption made in Harrington (2011), in the context of anti-cartel policy enforcement.

32 Leaver (2009) considers distortions imposed by negative external assessment on public officials’ incentives – the more they are exposed to the risk of such assessment the more they refrain from actions with a risk of making a mistake as judged by the external assessor. Schinkel et.al (2014) point to a number of contributions in the area of objectives of government agencies and their behavior starting from Niskanen (1968). In our model the CA’s utility function depends on the welfare effects of intervention and also on public image and career concerns.

33 Appeals will normally be made to a Court of First Instance and then to a Higher (up to Supreme) Court. Note that the specification in (1) assumes, we believe reasonably, that appeals do not have a direct influence on the CA’s reputation though they of course have an indirect influence through their effect on reversals. That is, we assume that the CA’s reputation is damaged from appeals only to the extent that these appeals lead to reversals of its decisions by the courts of appeal.

34 We assume that the probabilities of detection and of conviction are common knowledge.
the law can appeal against the CA’s decisions. If they do, the CA will have to defend its decisions in the Courts of Appeal.\(^{35}\)

(ii) The impact of the CA’s decisions, on society – i.e. on the welfare of those affected adversely by the law violations in the cases investigated.

So assuming that the CA’s enforcement efforts concern \(K\) potential conduct types, the enforcement success \((S)\) of the CA is a function of enforcement success in investigations of these different conducts:

\[ S = S(S_1, S_2, \ldots, S_K) \]

and

\[ R = R(S), R_{S_k}(S) > 0 \] \(^{(1)}\)

that is reputation increases as enforcement success \(S_k\) increases. Further the increase in reputation may depend on \(k\): this captures that fact that investigation regarding different conduct types may affect differently the CA’s public image – e.g. because investigations of conduct \(k\) is more likely to involve high-profile cases than investigations of other ones.

Enforcement success from decisions on conduct \(k\), \(k = 1, \ldots, K\), is given by

\[ S_k = [D_k - r_k(e_k, y)]\bar{w}_k, k = 1, \ldots, K \]

(2)

with

\[ \bar{w}_k = \text{CA's estimate of the size of the average identifiable welfare impact (or gain in welfare) of non-reversed decisions}^{37} \text{ on conduct } k, \text{ which is assumed to be positive.} \]

The size of \(\bar{w}_k\) will depend on:

(i) the true welfare impact on average of non-reversed decisions,

(ii) the extent to which the true welfare impact can be identified and estimated by the CA.\(^{38}\)

Again, the size \(\bar{w}_k\) can be thought of as a measure of how high-profile are the cases investigated and hence of the extent to which they will affect the CA’s public image.

\(e_k\) = indicator of the extent of economic analysis and evidence used in investigations of conduct of type \(k = 1, \ldots, K\). For an approach to constructing these indicators see Katsoulacos et.al (2016).

\(y\) = other factors that affect reversals of the CAs decisions (e.g. the experience of judges in courts of appeal and type of violation etc).

\(^{35}\) It is important to bear in mind here that this defense has to be undertaken by the Authority’s Legal Service, though if the CA has used an effects-based legal standard, the decision could be based on sophisticated economic arguments and evidence prepared by the CA’s economics team of experts.

\(^{36}\) For the simple cases we will use subscripts to indicate derivatives, otherwise we will write them explicitly.

\(^{37}\) Or average harm avoided.

\(^{38}\) This point and the point (iii) that follows essentially make explicit the presumption that a CA’s reputation (and “rewards”) will depend on observable measures of performance. See Harrington (2011), p. 40, making the same point in the context of anti-cartel policy enforcement.
Reversals by Courts of Appeal of decisions reached by the CA will be a fraction of the expected Appeals (A) against decisions. Assuming for simplicity and without loss of generality that appeals are just against decisions in which there is conviction by the CA\textsuperscript{39} and that convictions are a fraction of the cases investigated and a decision is reached, we have:

\[ r_k(e, y) = \phi_k^r(e, y)A_k(e, x), \quad k = 1, \ldots, K \]  

where

\[ \phi_k^r(e, y) = \text{probability that a decision reached on conduct } k \text{ that is appealed is finally reversed in Courts of Appeal.} \]

\[ A_k(e, x) = \text{expected appeals per period against decisions reached on conduct } k, \text{ in which there is conviction, where:} \]

\[ x = \text{other factors that affect appeals (e.g. level of penalties etc) - see for further discussion below.} \]

Allowing also for the factors that affect the number of convictions, we have:

\[ A_k(e, x, z) = \phi_k^a(e, x)N_k(e, z), \quad k = 1, \ldots, K \]

where

\[ N_k(e, z) = \text{convictions in decisions on conduct } k. \]

\[ z = \text{other factors that affect convictions, and:} \]

\[ \phi_k^a(e, x) = \text{probability that a conviction leads to an appeal in decisions reached on conduct } k. \]

Finally:

\[ N_k(e, z) = \beta_k(e, z)D_k, \quad k = 1, \ldots, K \]

where

\[ \beta_k(e, z) = \text{probability that an investigation leads to conviction in cases concerning conduct } k. \]

Note that given (4) and (5) we can write (3) as:

\[ r_k(e, y, x, z) = \phi_k^r(e, y)\phi_k^a(e, x)\beta_k(e, z)D_k, \quad k = 1, \ldots, K \]

That is, expected reversals for decisions reached on conduct \( k \), depend on three probabilities: the probability that a decision will be one of conviction, the probability that a conviction will be appealed against and the probability that an appealed decision will be reversed by an appeal court.

Letting

\[ \Phi_k = \phi_k^r(e_k, y)\phi_k^a(e_k, x)\beta_k(e_k, z), \quad k = 1, \ldots, K \]

(6) can be re-written as

\textsuperscript{39} Including decisions in which non-conviction is subject to the adoption of remedies. This is a very realistic assumption – appeals do tend to come almost entirely from parties whose conduct has been condemned.
\[ r_k(e, y, \bar{x}, \bar{z}) = \Phi_k(e, y, \bar{x}, \bar{z})D_k, \quad k = 1, \ldots, K \]  
\hspace{1cm} (6')

So, using (6'), we can also write (2) as:
\[ S_k = D_k(1 - \Phi_k)\bar{w}_k, \quad k = 1, \ldots, K \]  
\hspace{1cm} (2')

**The cost function**

Coming to the CA’s cost constraint, we assume that the CA utilizes its resources to detect and investigate cases and reach decisions and to defend its decisions in the Courts of Appeal. In practice the authority will use resources for a number of other activities, such as advocacy and preventing recidivism, but we will not model these other activities here and we will also assume for simplicity that the CA will always be able to implement the optimal number of decisions and utilize the optimal amount of economic evidence per case, as determined below, and just allocate the rest of its resources to these other activities.\(^{40}\)

The cost constraint can be written as:
\[
\sum_{k=1}^{K} C_k + C_{\text{other}} \leq \bar{C}
\]  
\hspace{1cm} (8)

\[ C_k = C_k(D_k, A_k(e_k, \bar{x})), \quad k = 1, \ldots, K \]

where

\[ C_{\text{other}} = \text{cost of all “other” activities} \]

\[ \bar{C} = \text{total resources available to the CA} \]

More specifically, we assume that:
\[
C_k = D_k c_k^D(e_k, l) + A_k c_k^A(e_k, l)
\]  
\hspace{1cm} (9)

Given (4) and (5), we can also write (9) as:
\[
C_k = D_k c_k^D(e_k, l) + \Phi_k(e_k, \bar{x})\beta_k(e_k, \bar{z})D_k c_k^A(e_k, l)
\]  
\hspace{1cm} (9')

where

\[ c_k^D(e_k, l) = \text{cost per decision reached on conduct } k \]

\[ c_k^A(e_k, l) = \text{cost per appeal against decisions reached on conduct } k \]

\[ l = \text{indicator of the “other” (non-economic, e.g. legal and other) resources used by the CA to carry out investigations and to defend its decisions in appeal courts.} \]

We will take it that:
\[
\left( \frac{\partial c_k^D}{\partial e_k}, \frac{\partial c_k^A}{\partial e_k} \right) > 0, \quad k = 1, \ldots, K
\]  
\hspace{1cm} (10)

that is, the cost per decision increases with the amount of economic evidence used in reaching the decision and the cost per appeal also increases with the economic evidence used in reaching the decision.

---

\(^{40}\) This is essentially the same assumption as that made by Harrington (2011, p. 2), who considers the number of cartels successfully prosecuted by a CA, neglecting the issue of the allocation of resources to this relative to other activities that the CA undertakes. See his footnote 2 for a justification of not endogenising the amount of resources allocated to different activities.
From (9'), the marginal cost (MC) of decisions of type k are equal to the cost per decision (AC) of type k, or:

\[ AC^D_k = \frac{C_k}{D_k} = MC^D_k = c^0_k(e_k,l) + \phi^A_k(e_k,z) \beta_k(e_k,z) \xi^A_k(e_k,l) \quad (11) \]

Having described the CA’s reputation and cost functions we can proceed to examine its optimal choices.

3. Optimal economic evidence and optimal choice of decisions

3.1 Optimal economic evidence

3.1.1 The optimality conditions

From (2') i.e.

\[ S_k = D_k (1 - \Phi_k) w_k, \quad k = 1,...,K \quad (2') \]

and also from

\[ \Phi_k = \phi^A_k(e_k,y) \phi^A_k(e_k,x) \beta_k(e_k,z), \quad k = 1,...,K \quad (7) \]

the (unconstrained) optimality condition with respect to the economic evidence per case is, given (1):

\[ \frac{dR}{de_k} = -R_s D_k \frac{\partial \Phi_k(e_k,y)}{\partial e_k} w_k = \frac{dC_k}{de_k}, k = 1,...,K \quad (21) \]

so given (9'), i.e.

\[ C_k = D_k \xi^A_k(e_k,l) + \phi^A_k(e_k,x) \beta_k(e_k,z) D_k \xi^A_k(e_k,l) \quad (9') \]

the optimality condition can be written as:

\[ -R_s \frac{\partial \Phi_k(e_k,y)}{\partial e_k} D_k w_k = \frac{\partial C_k}{de_k} D_k + (\phi^A_k \beta_k) \frac{\partial C_k}{de_k} D_k + \frac{\partial (\phi^A_k \beta_k)}{\partial e_k} D_k \xi^A_k, k = 1,...,K \quad (22) \]

or, simplifying:

\[ -R_s \frac{\partial \Phi_k(e_k,y)}{\partial e_k} w_k = \frac{\partial C_k}{de_k} D_k + (\phi^A_k \beta_k) \frac{\partial C_k}{de_k} D_k + \frac{\partial (\phi^A_k \beta_k)}{\partial e_k} \xi^A_k, k = 1,...,K \quad (23) \]

where assumptions (10) hold. We can re-write (23) as:

\[ -R_s \frac{\partial \Phi_k(e_k,y)}{\partial e_k} w_k = \frac{dMC_k}{de_k}(e_k), k = 1,...,K \quad (23') \]

In order to determine the optimal value of e, we need to investigate further the expressions (23) or (23'). The second partial derivative on the LHS of (23') measures how e affects the probability that a decision is finally reversed by a court of appeal.

If \( \frac{\partial \Phi_k(e_k,y)}{\partial e_k} > 0 \) then, given \( R_s > 0 \), the LHS of (23) is negative and (unconstrained) optimal e would of course be zero. But, for e sufficiently small we
would expect that increasing \(e\) will affect negatively all of \(\varphi', \varphi^4\) and \(\beta^{41}\), so we will have:

\[
\frac{\partial \Phi_k(e_k)}{\partial e_k} = \frac{\partial (\varphi_k \varphi_k^4 \beta_k)}{\partial e_k} < 0 \quad (24)
\]

and therefore the LHS of (23) will be positive and the unconstrained optimal \(e\) would be positive. We will, however, assume that as \(e\) increases the partial derivative in (24) will become smaller i.e.

\[
\frac{\partial^2 \Phi_k(e_k)}{\partial e_k^2} < 0 \quad (25)
\]

and therefore,

\[
\frac{d^2 R}{de_k^2} < 0 \quad (25')
\]

More specifically, it is reasonable to assume that for any conduct type \(k\) there is a value of \(e_k = \tilde{e}_k\) for which \(\frac{\partial \Phi_k(e_k)}{\partial e_k} = 0\), so (24) becomes zero and turns positive for higher \(e\), and hence for \(e_k > \tilde{e}_k\) the value of \(\frac{dR}{de_k}\) becomes negative. That is:

\[
\frac{dR}{de_k} = \begin{cases} 
> 0, & 0 \leq e_k < \tilde{e}_k \\
\leq 0, & e_k \geq \tilde{e}_k 
\end{cases} \quad (26)
\]

That, after some point, increasing economic analysis and evidence may increase the probability that decisions are annulled in Courts of Appeal can be explained as follows. Increasing the standard of proof (shifting the legal standard towards more effects-based) in investigations of conduct of some type \(k\), will require increasing the amount and, usually, the complexity and sophistication of economic analysis and evidence used by the CA. As was noted in the Introduction, this can increase the probability of annulment by Courts, because it may well imply that the CA and Courts cannot devise decision rules for assessing the conduct that are based on a succinctly defined pre-specified set of easily identifiable and, more or less, unanimously accepted criteria or conditions on the basis of which the assessment determines conclusions that are very difficult to dispute. This implies an increase in the disputability of the conclusions reached by the CA – as the Courts can consider appropriate to take into account less or additional or different criteria, tests, models and interpretations to those used by the CA. It also implies an increase in the misalignment in perceptions between the CA and Courts about what is, or exactly how to specify in detail, the right decision rule. Note that this is in no sense contradicted by the fact that historically Courts have sometimes asked for an

\[\text{footnote}^{41}\text{At least for presumptively illegal conduct. For details on the effect of } e \text{ on these probabilities see discussion below.}\]
increase in the standard of proof in assessing specific conducts.\footnote{A famous recent example is that concerning RPM in the Leegin case in which the US Supreme Court asked that a Per Se assessment cannot be accepted and a more \-based approach should be applied.} Increasing the standard of proof – i.e. the degree of evidence required in order to establish proof, or for the Authority to discharge its contention that welfare will be adversely affected – does not mean that the increased economic evidence will not be challenged with a higher probability than the evidence associated with a lower standard of proof.

The value of \(\tilde{e}_k\) is expected to be small in jurisdictions, in which there is no tradition in the application of economic analysis and evidence in legal proceedings and, specifically, in competition law enforcement, especially when the latter surpasses a certain amount of sophistication and complexity. Also in jurisdictions or legal traditions in which judges lack any formal training in economics and the necessary relevant experience in assessing economic arguments. These will certainly tend to hold in the relatively new jurisdictions like those of for example the BRICS and other developing countries but may well hold too, at least to some extent, in more mature jurisdictions (e.g. of the EU) in which the legal tradition is not one that is receptive to economic arguments in substantive evaluations of CL cases.\footnote{It is worth stressing that there is significant variation even between countries within each of these two categories. Thus in the jurisdictions in which enforcement of competition law is quite new the above argument is likely to hold less in a country like South Africa where the legal institutions and traditions have been under Anglo-Saxon influence for a long time and, among mature jurisdictions, it is more likely to hold in European countries than in the USA or Canada.} In these cases we expect that as \(e\) is raised this will tend to lead to an increase in the probability of appeal reversals quite quickly, that is, we expect that \(\tilde{e}_k\) will be small.

Concerning the expression on the RHS of (23), i.e. of

\[
\frac{dMC^D_k}{de_k}(e_k) = \frac{\partial c_k^D}{\partial e_k} + (\phi_k^A \beta_k) \frac{\partial c_k^A}{\partial e_k} + (\phi_k^A \beta_k) c_k^A
\]

the first two terms are positive (from (10) above). The third term depends on the effect of economic evidence on the probability that a decision leads to conviction that is appealed against. This depends on whether an increase in \(e\) increases the expected reversals of appealed decisions. If the latter holds, then appeals will also increase with economic evidence and the third term will reinforce the effect on \(MC\) of the first two terms on the RHS of the above expression. Even for values of \(e\) for which the third term is negative we will assume that the first two positive terms outweigh this and so, as we would expect, \(dMC^D_k / de_k\) is unambiguously positive. Though not important for the analysis that follows we also assume that \(dMC^D_k / de_k\) is increasing in \(e_k\), that is, we assume that an increase in the application of economic analysis when this is already high will produce a greater effect on the marginal
impact of $e_k$ on the MC of investigation and reaching a decision. Given these remarks, we have:

**Lemma 1:** The unconstrained optimal value of $e = \hat{e}_k, k = 1, \ldots, K$ is determined by (23’) and is given by $\hat{e}_k < \tilde{e}_k$.

We illustrate the LHS and the RHS of (23’) and the optimal (unconstrained) choice of $e_k = \hat{e}_k$ in Figure 1.

![Figure 1. The optimal choice](image)

Of course, the optimal choice of $e_k$ will be constrained by the minimum (but positive) amount of economic analysis and evidence that will have to be used if a strict Per Se standard is used. We will indicate this by $e = \xi_{k,PS} > 0$. When the CA chooses to apply a strict Per Se (or object-based) procedure it will be able to reach decisions without applying economic analysis and evidence beyond this limited threshold. This will depend on the type of conduct under consideration - the minimum level of economic evidence will have to be consistent with the law or what is specified in Guidelines that may exist (and may have even been incorporated into the law\textsuperscript{44}), concerning the economic considerations that the CA will address in making its strict object-based assessment for different conduct types\textsuperscript{45}. $\xi_{k,PS}$ will be positive given that in all cases a certain amount of economic evidence will be needed.

\textsuperscript{44} Even when this is not true, as for the European Commission, the Authority will still be taking seriously into account its own Guidelines in its assessment procedures. In new jurisdictions, such as that of Russia, with a very active CA, important Guidelines are incorporated into the Law (see Awdasheva et.al., 2015).

\textsuperscript{45} This will include economic evidence relating to whether the conduct could be potentially satisfying exemptions, e.g. under “objective justification”.
in order to investigate, for example, the market power (or dominance) requirement, to define markets and assess market shares etc, though in certain cases, such as herd-core cartels, the economic evidence required will be very limited. So we assume that 

\[ e_k \geq e_{k,PS} \]

The optimal choice of \( e_k \) will also be constrained by the maximum amount of economic analysis and evidence that the CA would need to apply under a full-blown EB legal standard in investigations of conduct \( k \). As noted already, the fundamental difference between EB and PS procedures or legal standards is that the former set a higher threshold to the CA for discharging its burden of proof. In order to do so, the CA will have to apply additional, often significantly greater, economic analysis and evidence. Below we will indicate by \( \tilde{e}_{k,EB} > e_{k,PS} \) the amount of economic evidence that the CA will have to apply in order to discharge properly its burden of proof under an EB procedure, having utilized in the best possible way economic thinking and evidence on the matter under investigation. We can assume too that the CA will not have incentives to increase \( e \) beyond \( \tilde{e}_{k,EB} \) as additional evidence beyond this level is unlikely to affect the Court’s decision to annul or not to annul the CAs decision. That is, we assume that:

\[ e_k \leq \tilde{e}_{k,EB} \]

The values of \( e_{k,PS} \) and of \( \tilde{e}_{k,EB} \) are shown also in Figure 1 above where it is assumed also that \( \tilde{e}_{k,EB} > e_k \). According to the discussion above:

**Lemma 2:** The probability, \( \Phi_k = \Phi_k(e_k, y) \Phi_k(e_k, x) \beta_k(e_k, z) \), \( k = 1, \ldots, K \), that an investigation on conduct of type \( k \) will lead to a decision that will be reversed in Courts of Appeal decreases for \( e_{k,PS} \leq e_k < \tilde{e}_k \) and increases for \( \tilde{e}_k \leq e_k \leq \tilde{e}_{k,EB} \).

### 3.1.2 Optimal \( e \) for conduct of type \( k \)

Using Figure 1 and the Lemmas above, we can now determine the optimal choice of \( e_k \) for conduct of type \( k \).

**Proposition 1:**

(i) Given that \( e_{k,PS} \leq e_k \leq \tilde{e}_{k,EB} \) and that \( \hat{e}_k < \tilde{e}_k \) the optimal amount of economic evidence and hence of the standard of proof that the CA will apply in investigations of conduct \( k \) is given by:

\[ e_k^* = \max \{ e_{k,PS}, \min(\hat{e}_k, \tilde{e}_{k,EB}) \} \]

We can distinguish three cases:

(a) \( e_{k,PS} < \hat{e}_k < \tilde{e}_{k,EB} \Rightarrow e_k^* = \hat{e}_k \) as in Figure 1.

(b) \( e_{k,PS} < \tilde{e}_{k,EB} < \hat{e}_k \Rightarrow e_k^* = \tilde{e}_{k,EB} \)
(c) \( \hat{e}_k < \hat{e}_{k,PS} < \hat{e}_{k,EB} \Rightarrow e_k^* = e_{k,PS} \)

Thus, it is clear that the CA may well find it optimal to apply economic analysis and evidence that is well below \( \hat{e}_{k,EB} \), the analysis and evidence associated with full effects-based, even though the latter can reduce decision errors and can be optimal in terms of its deterrence effects. A sufficient condition for this is given by (ii):

(ii) \( e_k^* < \hat{e}_{k,EB} \) if \( \hat{e}_k \leq \hat{e}_{k,EB} \), that is, a sufficient condition for the application of economic analysis and evidence to be less than that associated with effects-based is that \( \hat{e}_k \leq \hat{e}_{k,EB} \), i.e. \( \hat{e}_{k,EB} \) is greater than the critical level of \( e \) beyond which increasing economic evidence increases the probability of decision annulment. In principle, it could also be that \( e_{k,PS} > \hat{e}_k \) which implies that \( e_k^* = e_{k,PS} \).

**Corollary:** When, as is often likely to be the case, increasing the standard of proof requires discrete (often significant) increases in the amount of economic evidence, the CA will be reluctant to increase the standard of proof as this may result in a level of \( e_k \) to the right of \( \hat{e} \) that increases the probability of decision annulment. For example, we may have that \( e_{k,PS} < \hat{e}_k \) for strict Per Se but for Modified Per Se (MPS) we have that \( e_{k,MPS} > \hat{e}_k \). The CA may be reluctant to move from PS to MPS because this move increases the likelihood that its decisions will be reversed (if \( e_{k,MPS} \) is sufficiently to the right of \( \hat{e} \)). Similarly for comparisons of, for example, \( e_{k,MPS} \) and \( \hat{e}_{k,EB} \).

### 3.2 Optimal choice of decisions in investigations of type \( k \)

#### 3.2.1 Optimality conditions

To examine the optimal choice of investigations of, or decisions on, conduct \( k \) we start by noting that optimality requires that:

\[
\frac{dR}{dD_k} = \frac{dC_k}{dD_k} = MC_k^D(e_k) = AC_k^D(e_k), k = 1, \ldots, K
\]

that is, at the optimum, the marginal cost of investigations / decisions reached on conduct \( k \) must equal the marginal impact of the decision on the reputation of the CA. After simplifying notation (not using the full functional expressions for the probabilities and the average costs), from (1), (2’) and (11):

\[
R_k(D_k)(1 - \Phi_k)w_k = c_k^D + c_k^A\Phi_k\beta_k = MC_k^D(e_k) = AC_k^D(e_k), k = 1, \ldots, K
\]

where \( R_k = (\partial R / \partial S_k) > 0 \), and we assume that:

\[
\frac{\partial^2 R}{\partial S_k^2} < 0
\]

i.e. diminishing “marginal utility” as decisions (D) and, hence, S increase.
We can use (13) to obtain and compare the optimal choice of investigations and decisions reached on conducts of type k. The optimal number of decisions depends on a number of factors that influence the marginal impact on reputation of additional decisions reached on conduct k and the marginal cost of these. These factors may pull in opposite directions. Thus:

(i) The higher the probability of reversals $\Phi$ for decisions reached on conduct k, the lower the marginal impact of decisions on reputation and hence, *ceteris paribus*, the lower the optimal number of decisions reached on conduct k.

(ii) The higher the average identifiable welfare impact of decisions the higher the marginal impact of decisions on reputation and hence the higher the optimal number of decisions.

(iii) The higher the marginal cost of decisions and appealing, as determined by $(c_k^D, c_k^A)$ the lower, *ceteris paribus*, the optimal number of decisions of this type. The values of $(c_k^D, c_k^A)$ will depend on the value of e and the other resources required to reach decisions and, as noted above, will of course increase with e.

(iv) The higher the probability $(\varphi_k^A \beta_k)$ that investigations into decisions of conduct k lead to convictions and appeals, the higher the marginal cost of these investigations and the lower, *ceteris paribus*, the number of decisions of this type.

Figure 2 below illustrates the optimal (unconstrained) number of decisions reached on conducts of type k ($\hat{D}_k$).
Proposition 2: The optimal number of investigations on conducts of type $k$ will be greater:

(i) The smaller the probability that decisions on these investigations will be reversed in Courts of Appeal.

(ii) The greater $\underline{w}_k$, that is, the greater the anticipated identifiable impact of decisions on welfare.

(iii) The greater the impact on the CA public image of increasing investigations on conducts of type $k$ – which we capture through $R_{w_k}$ and also $\underline{w}_k$.

(iv) The lower the cost per investigation of conduct of type $k$.

(v) The lower the expected cost per appeal of conduct of type $k$.

Proof: Obvious from condition (13) – which can also be written as (13’):

\[ R_{w_k}(D_k)(1-\Phi_k(e_k))\underline{w}_k = MC_k^o(e_k) \]  

(13’)

The next question we wish to investigate is the following: how does the CA’s choice of standard of proof in type $k$ decisions, captured by the extent of economic analysis and evidence applied in investigations of conducts $k$, affect its optimal choice of the number of investigations of this type?

Proposition 3: increasing the standard of proof by increasing the extent of economic analysis and evidence between $\underline{e}_{k,P_S}$ and $\bar{e}_k$ when $\underline{e}_{k,P_S} < \bar{e}_k$ has an ambiguous effect on the optimal number of investigations.
Proof: increasing the extent of economic analysis and evidence between $e_{k,PS}$ and $\hat{e}_k$ when $\hat{e}_{k,PS} < \hat{e}_k$ reduces the probability of annulment $\Phi_k(e_k)$ hence shifting upwards to the right the LHS of (13') and tending to increase the optimal number of investigations of conduct k. However this also increases the marginal cost of investigations, shifting up the RHS of (13'). The potential effect is illustrated in Figure 2a.

In Figure 2a, it is assumed that economic evidence increases from $e_{k,1}$ to $e_{k,2}$, $e_{k,PS} \leq e_{k,1} < e_{k,2} \leq \hat{e}$. Thus $\Phi_k(e_{k,2}) < \Phi_k(e_{k,1})$ and this would increase optimal investigations from $D_{k,1}$ to $D_{k,2}$ if marginal costs do not increase very much but would reduce optimal investigations from $D_{k,1}$ to $D_{k,2}$ if marginal costs increase quite a lot.

Figure 2a

Proposition 4: When $e_{k,PS} \geq \hat{e}_k$, or, more importantly, when there are increases in the mandatory (minimum) standard of proof for conduct k (by Courts), requiring discrete increases in the amount of economic evidence, this may well reduce the optimal number of investigations of conducts k by the CA.
**Proof:** In some cases $e_k$ will be so low that $e_{k,PS} \geq \tilde{e}_k$ and $e_{k,PS}^* = e_{k,PS}$ (from Proposition 1(ii)). In this case increasing the amount of economic analysis and evidence increases the probability of decision reversals. Also, as noted above, in many cases (see also for an example below) increasing the standard of proof from, for example, strict Per Se to Modified Per Se, requires a discrete often substantial increase in economic analysis and evidence. This may lead to a shift in the value of $e_{k,PS} < \tilde{e}_k$ for strict Per Se to a value, for Modified Per Se (MPS), that is $e_{k,MPS} > \tilde{e}_k$. If $e_{k,MPS} > \tilde{e}_k$ becomes the minimum mandatory amount of economic evidence, at this level of economic evidence the probability of reversal may be higher than at $e_{k,PS} < \tilde{e}_k$.

In both of these cases, we get the situation shown in Figure 2b below. Increasing economic evidence from $e_{k,1}$ to $e_{k,2}$, $e_{k,PS} \leq e_{k,1} < \tilde{e} < e_{k,2}$ leads to a significant reduction in optimal decisions of conducts $k$ from $D_{k,1}$ to $D_{k,2}$, as both the increase in $MC$ and the effect on reputation tend to reduce optimal decisions.

**Figure 2b**

- $MC_k^B(e_{k,2})$
- $MC_k^B(e_{k,1})$
- $R_s[1 - \phi_k(e_{k,1})]\bar{w}_k$
- $R_s[1 - \phi_k(e_{k,2})]\bar{w}_k$

An Example: Information Exchanges

There are three potential legal standards each with a higher standard of proof that can be used to assess information exchanges\(^{46}\). The lowest standard of proof (strict object-based assessment) requires a careful analysis of the nature and

\(^{46}\) See, for example, discussion in OECD (2011) especially papers by KU Kuhn and by J Padilla in this report.
characteristics of the information exchanged. If this involves future prices then this is considered more or less unanimously as sufficient evidence that the information exchange is part of a cartel or concerted practice. Otherwise, the CA may on the basis of all other information on the characteristics of the information exchange decide that there is object-determined violation or adopt a higher standard.

A somewhat higher standard (modified per se assessment), when the information exchanged does not involve future prices, is based on examining market characteristics in an effort to establish whether concerted practices are sustainable, even if information exchanged increased considerably market transparency.

The highest standard (effects-based assessment) involves analysis of the counterfactual: analysis of what market data would look like if there was no information exchange or examining structural breaks in data during and in the aftermath of the information exchanges.

Each increase in the standard of proof leads to a substantial increase in the amount, technical sophistication and complexity of the economic analysis and evidence that has to be used and an increase in the disputability of the conclusions reached. The latter, in turn, implies an increase in the probability of annulment.

3.2.2 Discussion: the determinants of the probability of expected decision reversal (Φ)

The probability of expected reversals of the investigations undertaken by the CA (Φ) depends on three probabilities: \( β \), \( ϕ^A \) and \( ϕ^r \). We examine each of these in turn.

3.2.2.1 The probability that an investigation leads to conviction (β)

This will depend on whether the conduct examined is presumptively legal or illegal. If, as \( e \) increases, decision errors are reduced then for:

\[
\text{Presumptively illegal conduct: } \frac{\partial β}{\partial e} < 0
\]  

On the other hand, for:

\[
\text{Presumptively legal conduct: } \frac{\partial β}{\partial e} > 0
\]

3.2.2.2 The relative probability that a conviction is appealed (ϕ^r)

The decision to appeal depends on a number of factors, the most important of which are the following:

- The probability that the decision will be reversed by a court of appeal.
- The size of penalties.
- The cost of adopting the remedies requested by the CA.
- Adverse reputation effects if there is no appeal.
The fact that appealing delays compliance with the CA’s decision and (sometimes) the payment of penalties.

The costs of appealing.

Firms will compare the expected gain from appealing (influenced by the first five factors above) against the cost (the last factor). The expected gain from appealing may differ depending on $e_k$ because of the first factor above, the probability that the decision will be reversed by the courts of appeal (discussed below too), which can be different depending on $e_k$. Concerning the expected cost of appealing this is not likely to be sharply increasing in $e_k$ for the defendants.

Thus, we have that, *ceteris paribus*, the effect of $e_k$ on the probability that a decision is appealed against is likely to have the same sign as that of the effect of $e_k$ on the relative probability ($\phi'$) that an appealed decision is reversed by the Courts of Appeal. If the latter is positive, i.e. $\phi'$ is higher the higher is $e_k$, then:

$$\frac{\partial \phi'_K(e_k)}{\partial e_k} > 0$$

(19)

3.2.2.3 The relative probability that an appealed decision is reversed by the Courts of Appeal ($\phi'$)

How does the type of legal standard used by the CA to reach its decisions affect the likelihood that decisions are reversed by a court of appeal?

As already noted, more effects-based legal standards, if properly applied, will require a significant extra amount of economic analysis and evidence and will have a significant extra element of complexity than Per Se cases, requiring the assessment of the impact of actions on competition first and then, if/when it is decided that competition is negatively affected, of whether, how and the extent to which this impacts adversely welfare (i.e., articulation of a model of harm and providing supporting economic evidence). As discussed above, this implies that there is much greater opportunity and scope with effect-based legal standards to challenge the CA’s analysis as there is greater opportunity and scope by the court to reformulate, re-interpret and evaluate differently any economic analysis and evidence presented or to consider that different/further economic evidence was required in order for the CA to discharge its burden of proof. Thus, we expect that, after some point, or for sufficiently large $e_k$:

$$\frac{\partial \phi'_K(e_k)}{\partial e_k} > 0$$

(20)

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47 See eg. Azevedo (2014) for case of Brazil. It is not clear how important this is more generally. It is clearly not important for the case of Russia, for example (Avdasheva et.al, 2015), because the overall length of judicial review is quite short.

48 During appeals the defendants have to argue that the economic analysis, already proposed by them to the CA during the latter’s investigation, was appropriate and sufficient for a conclusion of no violation.
4. Concluding remarks, recommendations and future research

The model presented in this article can be used to explain how factors related to the judicial review process can lead utility maximizing competition authorities to apply economic evidence in antitrust investigations to a limited extent\textsuperscript{49} and to favor legal standards closer to Per Se than to effects-based. This in turn, reconciles evidence indicating the unpopularity of standards with significant economic analysis content, with the fact that such standards seem likely to be best on the basis of traditional error-cost minimization or welfare-maximization arguments.

In our framework where CAs make choices in order to maximize their utility, given that the reputation of an authority depends negatively on the extent to which its decisions are annulled by the Courts of Appeal, if after a point the use of additional economic evidence affects positively the probability of annulment then the CA will have incentives to restrict its use. The main reason for this impact of economic analysis is that it limits the indisputability of correctness of the decisions made. Indeed, the ambiguity often introduced by assessing potential liability in competition cases on the basis of economic arguments and models is responsible for the uneven utilization of economics over the last 100 years in US antitrust enforcement (Kovacic and Shapiro, 2000). Even modern economics will usually provide competing explanations and assessments depending on the context characterizing the facts on any given case (Fisher, 1989). This is particularly true when trying to interpret the implications of conduct using an effect-based approach.

It is important to note here that, often, explicit performance assessment of competition authorities relies on indicators measured by the ratio of non-reversed decisions to the overall number of decisions made. This is the case in younger jurisdictions such as, for example, that of Russia (currently with the largest CA in the world) where the share of infringement decisions of competition authorities coming to legal force is explicitly included in the performance measurement of regional CAs.

Our model highlights that important features of competition law enforcement, such as the type of legal standards applied by CAs, are a result of interrelations between different institutional and legal preconditions, the motivation of CAs to satisfy performance criteria, substantive law provisions related to Guidelines, and the background and the experience of judges that review the decisions if appealed.

Institutional adjustments and other measures could facilitate the expansion in the use of modern economic and econometric analysis and techniques in competition law enforcement. Among these we would put priority on the following:

(i) Providing incentives to CAs through appropriate performance criteria to make assessments of the welfare effects of the decisions on the basis of the state-

\textsuperscript{49} Even though they are well-staffed with trained scientific personnel.
of-the art theories of harm proposed by the recent economic literature and to provide empirical substantiation of the predicted effects.\textsuperscript{50}

(ii) Setting up \textit{specialized tribunals} for dealing in the first instance with competition infringement appeals, some of the members of which should be, ideally, economists.\textsuperscript{51} The Competition Appeals Tribunals of UK or of South Africa provide good examples of such tribunals.

(iii) Even when specialized tribunals are not set-up, taking measures to improve the expertise of judges in handling economic evidence through \textit{training programs} (similar to the programs that have been advocated for EU countries by the European Commission recently)\textsuperscript{52}. Also and most importantly, these programs should aim to develop commonly recognized and accepted standards of proof and evidence by Court judges and the Competition Authority.

The paper offers a conceptual framework for thinking about the choice of legal standards by utility maximizing Competition Authorities. The basic conditions for reaching our predictions can be empirically tested using information on decisions made by Competition Authorities that went through the appeal process. This information allows the testing of whether increasing economic analysis and evidence is associated with an increase in the probability that appealed decisions are reversed by Courts of Appeal. Indeed, a statistical analysis of this condition has already been undertaken using a large data set of Russian decisions made by the Russian CA (FAS) between 2008 – 2012. The conclusion of the statistical analysis is that there is a statistically significant strong positive impact of economic analysis on the probability of reversals\textsuperscript{53}. Available data sets of appealed decisions of DGCOMP, other EU countries and of other BRICS can be utilized in the future to test whether the Russian results can be generalized.

\textbf{References}


\textsuperscript{50} At least in cases where the perceived anticipated welfare impact of pursuing such investigations is likely to compensate for the extra enforcement costs.

\textsuperscript{51} This would reduce the degree to which decisions are reversed on appeal because the judges are unable to discriminate, in terms of their quality, between sophisticated economic or econometric arguments.

\textsuperscript{52} See also Baye and Wright (2011) and Avdasheva et.al. (2015).

\textsuperscript{53} See Avdasheva et.al (2015) and Katsoulacos, Avdasheva and Golovanova (2016). The level of economic analysis applied is measured by a number of different indicators constructed on the basis of the information contained in the decisions.
Developing Countries”, Springer, edited by Frederic Jenny and Yannis Katsoulacos.


