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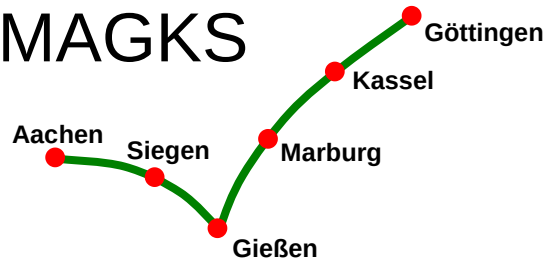

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Optimal Structuring of Assessment Processes in Competition Law: A Survey of Theoretical Approaches

Jürgen-Peter Kretschmer [*]

Abstract: In competition law, the problem of the optimal design of institutional and procedural rules concerns assessment processes of the pro- and anticompetitiveness of business behaviors. This is well recognized in the discussion about the relative merits of different assessment principles such as the rule of reason and per se rules. Supported by modern industrial organization research, which applies a more differentiated analysis to the welfare effects of different business behaviors, a full-scale case-by-case assessment seems to be the prevailing idea. Even though the discussion mainly focuses on extreme solutions, different theoretical approaches do exist, which provide important determinants and allow for a sound analysis of appropriate legal directives and investigation procedures from a 'Law and Economics' perspective. Integrating and examining them in light of various constellations results in differentiated solutions of optimally structured assessment processes.

JEL-Classification: K21, K40, L40, L49, D81

Keywords: Law Enforcement, Competition Law, Competition Policy, Antitrust Law, Antitrust Policy, Decision-Making

1. Introduction

The problem of optimally designing institutional and procedural rules is generally part of the various legal assessment processes of specific behaviors. Deciding between 'lawful' and 'unlawful' is also relevant in competition law, where the assessment concerns the pro- and anticompetitiveness of business behaviors, which is associated with the assessment of welfare effects. Useful theoretical approaches questioning the optimality of different kinds of assessment principles can be found in the general field of 'Law and Economics'. In the special field of competition law, the discussion is about the relative merits of per se rules versus rule of reason.

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The choice between these two possible assessment principles for the effects of business behaviors (e.g., horizontal and vertical agreements, mergers or abuse of market power) considers the advantages of generalizing effects for classes of cases or case-specific analyses. With the support of modern industrial organization research, which has questioned the welfare effects of many up to now undisputed business behaviors and has recommended a more differentiated analysis, the defenders of the per se rule have been pushed more and more into a minority position. It seems that the rule of reason has found the right solution, because it is able to react to the (maybe: unique) circumstances of business behaviors, thereby taking notice of the claimed differentiated welfare effects. Such a development is well recognized in fundamental case decisions of the US Supreme Court; thereby overturning many hitherto existent per se rules (up to the latest fundamental decision in the 'Leegin' case in 2007,[1] in which the per se prohibition of resale price maintenance was overturned). In the EU, the question might be raised whether the 'more economic approach' can also be interpreted as a 'more rule of reason approach'.

Even though the discussion has mainly focused on these two extreme assessment principles, some authors and practitioners also emphasized that intermediate solutions within the two extremes might function as possible alternatives; and this is in fact what we observe in practice through various examples: e.g., safe harbor rules, structured or truncated rule of reason. These solutions neither examine business behaviors in an extremely short way, as the per se rule does, nor react to single circumstances in a detailed and exhausting way, as the rule of reason might suggest. The justifications are very different, ranging from saving institutional and financial resources, over lack of competence, to more advanced theoretical justifications (e.g., the error cost approach); thereby uncovering circumstances allowing for the determination of preferred assessment principles.

However, the underlying thinking can – in a way – be understood as increased rule orientation or optimal structuring within antitrust and competition law, because it overcomes the widespread development toward more specific case-by-case assessments. This paper examines and surveys different theoretical approaches, addressing the topic of 'optimal structuring' and related questions that are associated with the optimal design of institutional and procedural rules from a 'Law and Economics' perspective. Starting from a broader 'Law and Economics' view (section 2), the analysis and theoretical approaches focus on questions related to antitrust and competition law issues (sections 3 and 4). In section 5, the presented results are discussed and conclusions are drawn.

[1] Leegin Creative Leather Products, Inc. v. PSKS, Inc., 551 U.S. (2007), Supreme Court (USA), No. 06-480.

2. Rules versus standards

When talking about assessment principles, the well-known ‘rules versus standards’ discussion works as a kind of starting point to emphasize conditions for the optimality of specific assessment processes (of business behaviors). The general legal and philosophical discussion is limited to an economics perspective in the following analysis.[2]

In the way that law can be understood as reflecting and enforcing fundamental social norms (Posner 2003: 26), the terms ‘rules’ and ‘standards’ describe the translation of those social norms or superior principles into two different forms of law formulation and enforcement. Sullivan (1992: 57) states: „Law translates background social policies or political principles such as truth, fairness, efficiency, autonomy, and democracy into a grid of legal directives that decisionmakers in turn apply to particular cases and facts.“ Consequently, rules and standards are two possible forms of those legal directives being alternatives of equal rank. The dichotomous distinction characterizes a continuum of solutions lying in between (Kennedy 1976: 1701; Sullivan 1992: 61) and only serves as an analytical consideration of main distinguishing features.

Legal directives are said to be ‘rules’ if a decisionmaker is tied in advance to a particular way of finding a (terminating) decision, i.e. “intervening in a determinate way” (Kennedy 1976: 1687-1688). On the other hand, ‘standards’ are characterized as the direct application of superior principles in individual cases. In this sense, standards „refer directly to one of the substantive objectives of the legal order“ (Kennedy 1976: 1688) and consequently give the decisionmaker more discretion (Sullivan 1992: 58-59).[3] The distinction thus simply refers to the point of time when “law is given content” Kaplow (1992: 559-560; 2000: 508); the latter is done by the definition of criteria to be considered in the assessment of individual acts. Hence, rules give the law content and specify outcomes before (ex ante) and standards after (ex post) individuals act or particular cases arise (Kaplow 1992: 560; Sunstein 1995: 961; Parisi 2004: 510). A finer distinction – which correlates to Kaplow’s one – is done by Schlag (1985: 2) when he distinguishes two parts of legal directives: a ‘trigger’ (being either empirical or evaluative) identifies a particular fact and a ‘response’ (being either determined or guided) ties a legal consequence to the existence of that fact. While a rule is characterized by an ‘empirical trigger’ and a ‘determined response’, the opposite is true for a standard.

Different dimensions and determinants do exist, which make rules or standards (i.e. an ex ante or ex post determination of the law’s content) appear more advantageous and are examined in detail in the following sections.

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[2] For the general legal and philosophical discussion see, for example, Hart (1961), Dworkin (1967), Kennedy (1976), Schlag (1985), Kelman (1987), Schauer (1991) and Sullivan (1992).

[3] Two standard examples might illustrate the difference in the formulation of rules and standards: whereas a rule would prohibit driving in excess of 50 kilometers per hour within cities or prohibit the disposal of the hazardous substance XY, a standard would prohibit driving in excessive speed within cities or generally prohibit the disposal of hazardous substances (Kaplow 1992: 559-563). Deciding on children’s first names offers another example (Schäfer 2006: 114-115): requiring that names should “reveal the child’s sex and should not violate the child’s wellbeing” (standard) contrasts to the explicit specification of a closed list of names (rule).

2.1 Decision level

Choosing between the ex ante and ex post determination of the law's content corresponds to choosing between the responsible decision level (Kaplow 1992: 562). On the one hand, rules shift such a determination towards the legislative level; in this case, the application and specification of legal outcomes by courts and enforcement authorities is ex ante determined and proceeds mechanically (Sullivan 1992: 58; Sunstein 1995: 962). On the other hand, courts and enforcement authorities determine the law's content for each individual case if standards are chosen as the legal directive; this is combined with more discretionary power – compared to rules – in the hand of the decisionmakers (Sullivan 1992: 58-59; Mahoney/Sanchirico 2005: 329). Therefore, the decision-making is pushed up the hierarchy by rules and down the hierarchy by standards (Crane 2007: 77).

The greater discretionary power of standards is associated with the problem that the concrete application of a standard might not mirror the underlying (political) principles or social values. Essentially, both rules and standards should reflect the same underlying principles (Diver 1983: 67; Sullivan 1992: 57); merely the determination of the law's content – in the form of considering specific criteria – should be either before or after individuals act. By passing the determination of criteria onto the decision level of courts and enforcement authorities, the legislative level risks the forming of different (than intended) criteria, which might reflect divergent underlying principles. The legislative level thus finally decides over "questions of substantive value" by means of rules (Sullivan 1992: 67), while courts and enforcement authorities' responsibility is to find out the facts and not the law (Sunstein 1995: 962); standards, in contrast, risk shifting the former fundamental decisions down to the court and enforcement authority level, which risks the latter "making law in interpreting" (Sullivan 1992: 66).[4]

2.2 Types of costs

We distinguish between different types of costs associated with the decision for one or the other form of legal directives. Even though the distinction primarily follows Kaplow (1992: 568 et seqq.), it is wide-spread in the literature and is found in equal or similar form in many works.[5]

[4] See McCubbins et al. (1987) for an analysis of discretionary policy making and a discussion of how internal procedures might bind such decision making. Furthermore, greater discretionary power might also enable a higher rate and danger of rent seeking activities (Tullock 1981: 165; and more generally Tullock (1967) or Krueger (1974)). However, a similar danger is given at the level of rule formulation. Even though the latter might not appear that frequently, the particular impacts might be greater. The problem of rent seeking is therefore accompanied by the appropriate selection of responsible institutions (Kerber 2008: 494).

[5] See, e.g., Ehrlich/Posner (1974: 262 et seqq.), Diver (1983: 73-74), Schäfer (2006: 116 et seqq.) and Fon/Parisi (2007: 148 et seqq.).

Promulgation

Promulgation costs reflect the information gathering process, i.e. the "costs of acquiring information on the relevant area of law" (Ogus 1992: 414), as well as the political process of determining law. According to Diver (1983: 73), these costs accrue due to "obtaining and analyzing information" and "securing agreement among participants". Additionally, it might not be clear ex ante which way the law should be given content (Kaplow 1992: 569).

Choosing a rule as legal directive requires gathering and analyzing much information about the behavior under consideration and the associated design of law (Schlag 1985: 3; Fon/Parisi 2007: 149). Moreover, the process of negotiation and formulation will take longer (Sunstein 1995: 973; Parisi 2004: 511). Therefore, rules can be characterized as being more costly than standards with respect to this type of costs, simply based on the process of how law is given content.[6]

This also refers to a possible flexibility in reacting to changing environments (Kerber 2008: 494). If the social, economic or technological environment changes more frequently, standards become advantageous because the determination of assessment processes and legal consequences can be adapted more easily (Schäfer 2006: 117; Sullivan 1992: 66). In the case of rules, a costly process of changing those rules is required because the law's content might not fit to the new environment anymore (Ehrlich/Posner 1974: 278). Rules thus "become obsolete at a faster rate" than standards (Fon/Parisi 2007: 150) and the inherent feature of "less consistency" (Parisi 2004: 510) allows for short-time reactions under standards, which turns out to be advantageous, especially when changes are unanticipated. Accordingly, the relative merits of rules appear under stable environments (Parisi 2004: 514).

Investigation and compliance

Costs associated with investigation and compliance accrue due to individuals' uncertainties of the exact content of law. On the one hand, this involves the necessity and extent to which legal advice as well as self-information must be acquired (investigation costs); on the other hand, socially beneficial activities might be prevented and socially harmful activities might not be prevented due to such uncertainties (Kaplow 1992: 569). Investigation costs are higher the more uncertain the law's content and the associated assessment of legal consequences are.

In the case of standards, the law's content is determined after individuals act, which requires the anticipation of the final decision about legal consequences – which is already done ex ante in the case of rules (Fon/Parisi 2007: 149-150; Kaplow 1992: 569). Thus, it seems plausible that individuals can comply with the law more easily and effective in the case of rules, while the need to interpret standards generates higher investigation costs (Ehrlich/Posner 1974: 275; Sunstein

[6] See Ehrlich/Posner (1974: 267), Kaplow (1992: 569; 2000: 510), Schäfer (2006: 116-117) and Fon/Parisi (2007: 149).

1995: 974; Posner 1997; Kaplow 2000: 510; Parisi 2004: 512-513; Schäfer 2006: 117).[7] This is also important in regard to the "forward-looking and deterrent function of law" (Fon/Parisi 2007: 150). Regarding this fact from a different point of view, rules may increase the probability that individuals' activities follow a stated "desired pattern" (Kennedy 1976: 1688).

Enforcement

Enforcement is the determination of consequences with respect to the assessment of particular acts (Kaplow 1992: 570), which requires determining the concrete criteria to be considered. Consequently, these costs accrue at the level of courts and enforcement authorities. As we defined rules and standards according to the point of time at which the law is given content, the enforcement costs (i.e. implementation and decision-making costs) associated with standards are higher compared to those associated with rules (Sunstein 1995: 973; Parisi 2004: 511; Fon/Parisi 2007: 149); the latter are characterized by a merely 'quasi-mechanical' decision-making.

The different types of costs can be brought together as: "Rules are more costly to promulgate than standards because rules involve advance determinations of the law's content, whereas standards are more costly for legal advisors to predict or enforcement authorities to apply because they require later determinations of the law's content" (Kaplow 1992: 562-563). The aggregate (economic) evaluation is characterized by a central feature: the frequency of application.

In doing so, we first refer to Schäfer (2006: 117) according to which the costs of promulgation can be seen as fixed costs (arising at one time), whereas the costs of enforcement can be seen as variable costs (arising from every assessment process). Therefore, rules (standards) are characterized by high (low) fixed costs and low (high) variable costs.[8] In this sense, a rule is more advantageous if a law is applied frequently to equal or similar activities; even though the fixed costs are high, the variable costs of enforcing the law are low compared to the application of a standard to a large number of equal or similar activities. Therefore, predominantly homogenous categories of behavior justify the quasi-mechanical decision-making of rules, whereas heterogeneous categories require exploiting the inherent flexibility of standards, which also increases variable costs.[9] The latter raises the question of whether variable costs of implementation and decision-making decrease by the frequent application of a standard, which

[7] Contrarily, Ehrlich/Posner (1974: 270-271) mention the possibility that rules may increase the demand for legal advice and self-information: "Many standards, […], have a large intuitive element which makes them comprehensible without special training, while most legal rules are not understood unless studied". These notions point to another feature of rules and standards we have not analyzed so far: namely, the complexity of each legal directive. Ehrlich and Posner indirectly compare a more complex rule with a less complex standard.

[8] See also Sunstein (1995: 972-973) and Parisi (2004: 513)

[9] See Ehrlich/Posner (1974: 266 et seqq.), Kaplow (1992: 577; 2000: 510), Parisi (2004: 511-512), Black (2005: 89), Crane (2007: 54), Schäfer (2006: 117-118), Fon/Parisi (2007: 149) or Kerber (2008: 493-494).

might lead to lower total costs compared to a rule because of lower one-time fixed costs. This can be seen under the aspect of learning within the process of decision-making and determination of legal consequences, which will be examined in more detail below.

Next to the possibility of comprising solutions in between the described extreme forms, practiced legal directives may also allow for the combination of the relative advantages in different aspects of a law (Kaplow 1992: 584). This describes an optimal combination of rules and standards within legal directives – depending on the frequency of particular aspects of a law.

2.3 Information, flexibility and adaptation

Determining the relative advantage of gathering information before or after individuals act is important because this depends on the characteristics of the process of information gathering and the analysis of information. If information is used more frequently (in form of aligning behaviors) and if economies of scale exist in gathering this information, it is more advantageous to collect and analyze this information before individuals act (Kaplow 1992: 585). The delegation of decision-making and thus information gathering onto the level of courts and enforcement authorities seems to be important when referring to decentralized learning (Schäfer 2006: 118). Information about specific activities is gathered at the relevant point of time in the relevant scale and allow for a more precise fine-tuning with respect to a possible variety of activities. In this sense, rules call for a coordination of centralized information, with the result that costs of gathering and processing information might turn out to be much higher with respect to such a variety of activities (Ogus 1992: 414).

Taking a different view with a similar conclusion, Schlag (1985: 7) denotes standards as "standbys" if the knowledge is insufficient to form a rule.[10] Rules presume a (more) complete knowledge about the regulated activities. According to Kennedy (1976: 1705-1706), the experience and learning process when applying a standard might lead to the accumulation of knowledge, which suffices to formulate a rule; thereby indirectly arguing for standards delegating the power of decision-making towards courts and enforcement authorities (Kerber 2008: 493-494).

The frequent application of a standard thus might transform the latter into a de facto rule (Kaplow 2000: 511); in this respect, "a rule is a standard that has reached epistemological maturity" (Sullivan 1992: 62). The delegation of the learning process to a decentralized level can also be considered with respect to some kind of labor division (Schäfer 2006: 118), whereas the

[10] This point refers to the 'Incomplete-Law Theory', whereas the focus is "on the allocation of residual lawmaking and enforcement functions to courts and regulatory agencies" (Dari-Mattiacci/Deffains 2007: 631). Also relevant is the analysis of optimally timing the introduction of new legal directives (Parisi/Fon/Ghei 2004); delaying the introduction of a legal directive turns out to be more appropriate if the uncertainty about its future benefits, the costs of its implementation and the expected growth of its value or importance are high (ibid.: 144).

legislative determines the political principle into a standard, which is (gradually) transformed into a rule at the level of courts and enforcement authorities describing how to apply a standard (Kerber 2008: 493).[11] This suggests that rules and standards might not be seen as alternatives (Kerber 2008: 493 et seqq.), rather standards are used to develop necessary rules, which allow for the application of that standard later on. Using the example of competition law, such a tendency can also be demonstrated for practical applications, in which explicit rules are used within guidelines to substantiate standards determined at an upper legal level (Ehrlich/Posner 1974: 274; Kerber 2008: 493). This can be justified – with respect to the above mentioned results – because guidelines have to be applied to more specifically delineated (and, therefore, more homogeneous) activities.

2.4 Complexity and errors

The specification of possible forms of legal directives as giving the law content either before or after individuals act, means that these directives have either a more specific or unspecific design. A specific formulation of legal directives gives individuals as well as decisionmakers a clear (ex ante) understanding of the behaviors and circumstances the law refers to; this specific formulation, which is characterizing and required for rules, allows for the quasi-mechanical decision-making.[12] However, unspecific and vague formulations (characterizing for standards) delay such determinations of the law's content to a later point of time; thereby allowing for a case-by-case assessment of behaviors depending on the concrete situational circumstances.[13]

Even though the two aspects have to be distinguished (Kaplow 2000: 509), the question of whether legal directives are specific or unspecific seems related to the question of how many features of behaviors or circumstances should be distinguished. The latter characterizes the complexity of legal directives and refers to "the appropriate level of detail" or "the extent to which different […] contexts should be distinguished" (Kaplow 1992: 567); in other words, how many different criteria should be considered to assess individual acts. According to Kaplow (2000: 502), this includes the definition of a legal directive's scope, the provision of exceptions and the adjustment of sanctions due to aggravating and mitigating circumstances. To preserve their specific character, rules have to provide a definitive assessment that is not open to reconsideration (Kaplow 2000: 509); thereby, a small number of criteria might function better than a high number, which automatically refers to a lower degree of detail (Ellinghaus/Wright 2005: 399-400). In contrast, standards do not underlie such a limitation of permissible considerations (Kaplow 1992: 589). The unspecific formulation of standards "allow the

[11] Kaplow (1992: 564) describes this process as "the creation of a precedent", whereas the fixed costs are lower and the variable costs the same in comparison to the formulation of a rule (Kaplow 2000: 512).

[12] See Kennedy (1976: 1685), Parisi (2004: 510), Schäfer (2006: 116), Fon/Parisi (2007: 148) and Jacobi/Tiller (2007: 326-327), Kennedy (1976: 1685), Parisi (2004: 510) and Schäfer (2006: 116)

[13] See Schlag (1985: 2-3), Sunstein (1995: 973), Fon/Parisi (2007: 148) and Jacobi/Tiller (2007: 326-327),

decisionmaker to take into account all relevant factors or the totality of the circumstances" (Sullivan 1992: 59). This inherently characterizes standards as highly complex.

However, the mere possibility to consider behaviors on a case-by-case assessment does not automatically support the conclusion that all possible circumstances are actually considered when applying a standard. In fact, decisionmakers "may well consider far less than all conceivably relevant factors" (Kaplow 2000: 509). The power of discretion may be used to develop a restricted number of actually applied criteria when assessing behaviors falling under a given standard (Kaplow 1992: 566; 2000: 511), which again refers to the inherent tendency of standards being transformed into rules by repeated applications. Thus, even though "[r]ules may be simple or complex" (Sunstein 1995: 962),[14] the practical relevance of (more) simple rules seems apparent. Furthermore, a general conclusion that standards are inherently highly complex seems unjustified. Their exact degree of complexity depends on the rules by which they are actually implemented.[15]

The degree to which different features of behaviors are distinguished is also combined with the possibility of making errors (Kaplow 1992: 596). If not all possible criteria are applied, errors may arise because some activities are subsumed under the determination of legal consequences, which actually should not be, whereas others are not (yet) subsumed, which actually should be. These errors of over- and underinclusiveness, respectively, arise because of insufficient distinctions and differentiations, i.e. as the result of a too simplified situational characterization. A more complex legal directive can reduce these errors by taking into account more relevant factors and circumstances of given activities. In the sense that rules restrict the consideration of different features and standards (at least) allow for a more detailed consideration, the former are characterized by more errors due to over- and underinclusiveness,[16] which is a "sacrifice […] in the achievement of the objectives lying behind the rules" (Kennedy 1976: 1689). Moreover, the problem of making these errors carries more weight when legal directives are applied to heterogeneous categories of behavior (Ehrlich/Posner 1974: 270 et seqq.), which therefore may require a more complex decision-making process carried out by standards.

However, the improved differentiation between activities by a more detailed (complex) legal directive comes at a cost: increasing the number of criteria requires gathering more information both by individuals who contemplate particular behaviors and by decisionmakers who apply the legal directive in order to achieve a correct classification. Furthermore, complex directives may require the investigation of complex information, which may not be easy to understand and to apply. First, some facts may be interpreted differently at different points of time (Sullivan 1992: 59); secondly, this may increase errors due to wrong interpretation of information and wrong

[14] Schäfer (2006: 116) provides an example for a simple rule by referring to speed limits whose violations lead to predetermined fines; whereas guidelines for tax assessment may provide examples for complex rules.

[15] In this respect, Kaplow (1992: 586) mentions the possibility to develop a "rule equivalent" to every standard. The over time developed assessment process of applying a standard can also be determined ex ante by rules.

[16] See Ehrlich/Posner (1974: 268), Fon/Parisi (2007: 149), Kaplow (1992: 591) and Sullivan (1992: 58-59)

application of particular criteria. The latter are described as "error[s] from institutional incompetence or bias in the application of a standard", which can be reduced by rules when limiting the number of considered features (Sullivan 1992: 58). Such simplifications of the decision procedures are also well known in behavioral economics (see, e.g., Simon (1955; 1979), Heiner (1983; 1986; 1988a; 1988b; 1990), Vanberg (1993)), where decision rules are used to overcome the discrepancy between the difficulty of a decision situation and the competence of a decisionmaker. Limiting the decision-making to some (easily) interpretable information may sometimes reduce errors due to wrong applications. This approach has also been applied, for example, to the decision-making of institutions (Heiner 1988a; Dequech 2001) or the development of legal precedent (Heiner 1986). Making the process of decision-making more 'rule-oriented' and developing 'simple rules of thumb' – also for the area of law – tries to overcome the ambition of reaching 'perfect' decisions (Epstein 2006). To summarize, simple rules cause errors through a "mechanical over- and underinclusion", whereas standards cause errors through a certain "biased arbitrariness" (Kennedy 1976: 1695).[17]

Thus, when applying specific rules the benefits of lower investigation, misinterpretation, compliance, and enforcement costs have to be compared to higher promulgation and error costs due to over- and underinclusiveness (Ogus 1992: 420). Complex directives are thus advantageous if the information costs (and difficulties) are low and the individuals' activities are heterogeneous (Kaplow 2000: 504-505).

2.5 Extension: Kaplow's notion of the optimal complexity of rules

Being the first addressing the problem of the optimal complexity of (legal) rules, Kaplow's (1995) seminal and formal work is worth investigating in more detail. Complexity of (legal) rules is defined as "the number and difficulty of distinctions the rules make" (ibid.: 150) concerning the sanctioning of individual behavior, which is costly to detect. Analyzing the optimality of complex rules from a social point of view, more complexity allows to better distinguish between different behaviors, but only at the expense of a more costly ex ante understanding of the individuals as well as ex post application by an enforcement authority

[17] In this respect, Schäfer (2006) argues that the relative advantage of standards and rules depends on the qualification of judiciary and other regulatory authorities, which differ between high- and low-income countries. High-income countries are characterized by higher qualifications and may therefore rely on unspecific legal directives, which require a more complex interpretation and decision-making process; on the other hand, it may be more advantageous for low-income countries "having a more rule-based legal system, which allows for relatively simple decisions" for (lower) judiciary and regulatory decision levels (Schäfer 2006: 114). However, according to Parisi (2004: 515), the argument depends heavily on the assumption that the legislation is "less corrupt and better informed than the judiciary" in low-income countries. Furthermore, "the regulated environment in developing countries may be more volatile than those of industrialized countries" (Parisi 2004: 515), why one should take advantage of a standard's inherent flexibility in reacting to unanticipated changes of the environment.

(ibid.: 151). The latter "chooses sanctions to maximize social welfare, defined as the benefits from individuals' acts minus the harm they cause, individuals' information acquisition costs, and social differentiation costs" (ibid.: 153). As mentioned at the beginning of the article, Kaplow models "the effects of complexity on individuals' decisions to acquire information, choices about whether to act, and reports of their actions to an enforcement authority" (ibid.: 150). Self-reporting of the individuals is one option of the model, which includes cases like tax or environmental law, whereas the finally chosen sanctions depend on these reports (ibid.: 151-152). The enforcement authority, however, carries out an examination only for those individuals who report being of the less harmful type (ibid.: 156).

Complexity is modeled very simple rather than gradual and complete: an enforcement authority tries to (imperfectly) distinguish between more and less harmful behaviors, whose fractions are ex ante unknown, by choosing a more complex legal rule. Starting point is the situation of no complexity, i.e. without any effort of an authority to distinguish those acts. The enforcement authority must spend some amount k to distinguish the two acts, whereas the detection of harmful acts is probabilistic. Individuals, however, can determine their type of act with certainty ex ante by spending an amount c. The positive continuous density of their benefits (b) from acts is common knowledge. Finally, the enforcement authority optimally specifies a sanction for both acts. This, in turn, will determine whether different individuals act or not.[18]

The simple comparison of a situation without differentiation of the two values of harmful acts and a situation with differentiation determines characteristics for when the transition towards a more complex legal rule is beneficial. Thereby, two settings are examined: with and without self-reporting of individuals. In the case of self-reporting, the individuals additionally must pay an ex ante fine that depends on their report. The subsequent comparison between these two settings and the determination of respective advantages is important as well.

In the case of no differentiation, the enforcement authority aligns the optimal sanction (both acts are sanctioned equally) with the expected harm and individuals act if their respective benefit exceeds the expected sanction. The effect of more differentiation in a setting without self-reporting is simply to induce individuals with benefits in the 'average' part to determine the type of their act and act only if it is of the less harmful type. This is reached by sanctioning behaviors accordingly, i.e. both acts are sanctioned differently. Individuals with very high benefits will act anyway, regardless of the type of their act, and individuals with very low benefits will choose not to act according to the specified sanctions. The total effect of differentiation on welfare can be decomposed into several partial effects (ibid.: 154-155):

(1) the positive effect is that some individuals who chose not to act without differentiation now acquire information and act only if their act is of the less harmful type;

[18] See Kaplow (1995: 152-153) for the model's definitions and assumptions.

(2) the negative effect is that the enforcement authority actually differentiates (some of) the high-benefit individuals who choose to act regardless of their type of harm;

(3) the ambiguous effect concerns the differentiation of individuals who act in the case of no differentiation and now acquire information: the gain for individuals who learn that their act is of the more harmful type and accordingly choose not to act unlikely offsets the aggregated information costs if individuals' benefits are high.

Turning to the setting with self-reporting, the same effects of differentiation (but to a different degree) can be ascertained. Additionally, individuals use informational activities to determine the reports that minimize the expected sanctions (ibid.: 157).

Crucial characteristics of a more valuable differentiation and thus transition towards more complexity are given by (ibid.: 155 et seqq.):

(i) greater harm of the more harmful type of behavior,

(ii) lesser harm of the less harmful type of behavior,

(iii) increased uncertainty as to the type of harm,

(iv) disproportionately many individuals have benefits in the 'average' part [see (1)-(3) above],[19] and

(v) lower ex ante determination costs for individuals as well as lower ex post detection costs for the enforcement authority.[20]

By comparing the differentiated legal rules between the two settings (with and without self-reporting), some further results are obtained. First, as one can expect, self-reporting is more efficient only if private ex ante information costs are substantially lower than the enforcement authority's ex post differentiation costs (ibid.: 157); the latter may increase due to a higher probability of enforcement (ibid.: 159). Secondly, given equal ex ante information and ex post detection costs, it may be more costly and thus inefficient to induce individuals (by sanctioning accordingly) to learn their type of act because costs are borne ex ante with certainty; individuals with high benefits act anyway and the costs of differentiating their acts will be borne ex post probabilistically (ibid.: 157-158).

Referring to the above analysis, it is important to mention that optimal complexity is not analyzed with respect to an optimal degree of differentiation. Kaplow's analysis of optimal complexity does not answer questions like "How complex should a legal rule optimally be?", but

[19] Kaplow (1995: 155) describes this as follows: "the shape of the distribution $f(\cdot)$ [of individuals' benefits] will affect the relative desirability of differentiation. For example, if most individuals have very high benefits, and thus act regardless of the type of their act when sanctions are optimal, a regime with no differentiation will be more efficient because it avoids the ex post cost of determining the type of individuals' acts."

[20] This effect is described as follows (ibid.: 156): "if aggregate expected information costs are sufficiently high […] differentiation is unambiguously inefficient". In this case, the enforcement authority aligns the optimal sanction with the expected harm and individuals act if their respective benefit exceeds the expected sanction.

rather questions like “Is the introduction of complexity within legal rules optimal compared to no complexity within those rules?” The analysis highlights some very important characteristics of when it is worthwhile to replace a less differentiated legal rule by a more differentiated one [see (i)-(v) above]. Some of them will turn up in a similar situation when dealing with optimally differentiated rules (see section 3.3).

3. Rules in competition law

3.1 Per se rules and rule of reason

The classification of certain business behaviors as compliant or non-compliant with competition law (i.e. as pro- or anticompetitive) has long been seen as made by either one of two possible alternatives: per se rules or rule of reason. Both alternatives differ in the way and extent with which they assess concrete business behaviors. As described below, the ‘per se rules versus rules of reason’ discussion contains many of the points already mentioned within the discussion about ‘rules versus standards’ and some conclusions drawn refer to the conclusions of section 2.

A rule of reason takes into account the specific circumstances of each case by regarding different factors (Piraino 1991: 690; Black 2005: 63). Basically, a rule of reason encompasses all relevant factors of a case:[21] for example, the current and future market structure or directly and indirectly involved actors (firms and consumers). Due to the specific circumstances the characteristics of each factor may differ, which the rule of reason tries to take into account by assessing the resulting (net) welfare effect for each individual case (Krattenmaker 1988: 166). This requires weighing the different factors (Easterbrook 1984: 155; Piraino 1991: 690).

In contrast, per se rules carry out the assessment of particular business behaviors in a categorical manner (Kerber/Schwalbe 2008: 384), i.e. based on the declaration of specific behaviors as belonging to a certain category for which a specific decision has already been determined (Krattenmaker 1988: 166).[22] The specific information about circumstances and effects are not taken into account.[23] Such per se determinations are based on theoretical analyses and experience (Krattenmaker 1988: 166; Miller 2007: 40); therefore, per se rules are (often) not the result of one-time decisions, but rather the result of evolving principles shaped by experience and decisions (Piraino 1991: 692; Leary 2008: 1). This characterizes them as being the result of frequently applied rules of reason, whereas different kinds of behaviors might be added and removed from the set of per se assessed categories (Black 2005: 71-72). Always or almost

[21] See Tom/Pak (2000: 391) with reference to the US Supreme Court decision *Chicago Board of Trade v. United States*, 246 U.S. 231 (1918).

[22] By analyzing competition rules from an institutional-evolutionary perspective, Mantzavinos (2006: 286-288) claims the formulation of per se prohibitions as the best solution because these leave the possibilities for innovative actions open and provide for high operationability and legal security.

[23] See also Northern Pacific Railway Co. v. United States, 356 U.S. 1, 5 (1958).

always observing a specific effect when applying a rule of reason, might justify the assessment of future behaviors with equal or similar characteristics by means of a per se rule (Ehrlich/Posner 1974: 266; Piraino 1991: 711; Miller 2007: 41). The information value won by dealing again with 'specific' circumstances and gathering additional information would be negligible with respect to the cost of acquiring it (Ehrlich/Posner 1974: 266; Black 2005: 71).[24] A similar reasoning is also carried out in the grounds for the judgment of the Leegin case (551 U.S. 2007: 6) about resale price maintenance: "the *per se* rule is appropriate only after courts have had considerable experience with the type of restraint at issue, […], and only if courts can predict with confidence that it would be invalidated in all or almost all instances under the rule of reason".[25] This also makes clear that not every new insight should immediately change existing law.

Following Crane (2007: 84), such confidence in a prediction is justified only for very few categories of business behavior; especially concerning per se prohibitions, only "[r]elatively few categories of conduct are unambiguously harmful and can be prohibited in equally categorical terms". Krattenmaker (1988: 178) doubts the existence of any category of business behavior indicating the appropriateness of a strict and categorical prohibition. However, with reference to the economic literature we can assume this for so-called *Hardcore* cartels like, for example, price cartels; in every other case, the rule of reason then seems to be the right solution (Kolasky 2008a: 86). Such a development can be well recognized in fundamental case decisions of the US Supreme Court;[26] thereby overturning many hitherto existent per se rules. At the end of a sequence of the US Supreme Court's central decisions (like 'Colgate' (1919), 'GTE Sylvania' (1977), 'BMI' (1979) and 'Independent Ink' (2006))[27], the nearly hundred years old per se prohibition of resale price maintenance – established in 'Dr. Miles' (1911)[28] – was overturned in the 'Leegin' case (2007) and replaced by a more case-specific assessment of pro- and anticompetitive welfare effects. Such a development can be assigned to all kinds of business practices, including vertical and horizontal agreements as well as mergers (Baker 1999: 191-192; Heyer 2005: 379). A similar development may be associated with the 'more economic approach' in EU competition law. This becomes apparent in the consideration and application of modern

[24] The identification of behaviors with similar effects leads to a more unambiguous shape of the distribution of possible effects. However, the expected value of an additional informational search is higher, the higher the variance of possible effects, and vice versa (Stigler 1961: 215).

[25] The required confidence (of the US Supreme Court) is not given in the case of resale price maintenance due to theoretical and empirical insights, which does not justify a general assessment by means of a per se prohibition (Carlton/Heyer 2007: 135). Even though, different views about the welfare effects of resale price maintenance are possible, depending on the specific assumptions and the set up, "few would support the proposition that it is almost always anticompetitive" (Hay 2007: 35). For an overview of pro- and anticompetitive welfare effects of resale price maintenance see, e.g., Mathewson/Winter (1998), Kneepkens (2007), Motta (2004: 302 et seqq.) and Scherer/Ross (1990).

[26] Gellhorn/Tatham (1984) survey important decisions until 1985 characterizing this development.

[27] U.S. v. Colgate & Co., 250 U.S. 300 (1919); Continental T.V., Inc. v. GTE Sylvania, Inc., 433 U.S. 36 (1977); Broadcast Music, Inc. v. Columbia Broadcasting System, Inc., 441 U.S. 1 (1979); Illinois Tool Works, Inc. v. Independent Ink, Inc., 547 U.S. (2006).

[28] Dr. Miles Medical Co. v. John D. Park & Sons Co., 220 U.S. 373 (1911).

industrial economic insights and empirical methods by the formulation and enforcement of competition law, which apply a more differentiated analysis to different business behaviors due to the specific market structure and conditions (Tom/Pak 2000: 398; Neven 2006; Roth 2007: 37-38; Kerber/Schwalbe 2008: 382); this can be seen as influencing the assessment of welfare effects toward more case-specificity (Hovenkamp 2001: 268; Röller 2005; Carlton/Salinger 2007: 293; Schmidt/Voigt 2007: 50) by referring to a "more effects-based system" instead of strongly formalized legal rules (Röller/Stehmann 2006: 304; Roth 2007: 37; Kolasky 2008a: 86).

However, the inclusion of differentiated effects into the assessment process does not seem to be the only important factor. Increased legal uncertainty contradicts the usefulness of the rule of reason with regard to its power in recognizing differentiated welfare effects of certain business behaviors (Piraino 1991: 690-691; Van den Bergh/Camesasca 2006: 12; Schmidt/Voigt 2007: 37). If the outcome of an assessment process depends heavily on the specific characteristics of each assessment factor, this also aggravates a clear ex ante assignment of consequences, which firms often need before entering into specific business activities.[29] Furthermore, going into the details of each specific case requires the inclusion of more and (often) complex information, for which only imperfect knowledge and data do exist and which may be anything but easy to interpret (Katsoulacos/Ulph 2009: 412).[30] This may increase errors due to wrong interpretation and inference (Bok 1960: 295). Even if the danger of such misinterpretation is negligible in some situations, the relative importance of the involved individual factors is not always obvious (Bok 1960: 292). Additionally, case-specific decisions are also accompanied by more discretionary power of the decisionmaker (Schmidt/Voigt 2007: 38). Per se rules, on the other side, are characterized by a high ex ante certainty because behaviors merely need to be classified as belonging to a particular category of business behaviors for which the resulting consequences are already predetermined (even though, the classification may not always be self-evident). On the one hand, this provides guidance to firms and reduces administration, litigation and adjudication costs; on the other hand, this causes high formulation and adaptation costs (Popofsky/Goodwin 1987: 194-195; Black 2005: 74-76).

3.2 Error cost approach

The above analysis reveals relative merits of both per se rules and the rule of reason. Given the rule of reason's ability to recognize differentiated welfare effects – by taking into account all specific circumstances of particular cases – it reduces decision errors resulting from an inappropriate categorization of business behaviors. Such decision errors are accompanied by

[29] This also relates to the question of an optimal frequency of investigations, which has direct deterrence effects on proposed activities; see, e.g., Sørgard (2009) and Katsoulacos/Ulph (2009).

[30] Budzinski (2010b) provides a comprehensive analysis of imperfect knowledge about certain issues in modern industrial economics.

welfare losses (error costs) and can be distinguished into two types: costs resulting from erroneous permissions of truly anticompetitive behaviors (so-called 'false positives') and costs resulting from erroneous prohibitions of truly procompetitive behaviors (so-called 'false negatives').[31]

The strict categorical assessment of per se rules automatically results in the appearance of these decision errors (Popofsky/Goodwin 1987: 196; Joskow 2002: 99-100) – except for rare categories always revealing the same welfare effect. Accordingly, the number and probability of erroneous decisions will be reduced by taking into account case-specific information and tailoring the decision to case-specific facts (Black 2005: 75-76). Even if such differentiation is best reached when all possible information is considered, the elimination of decision errors seems unattainable with respect to the remaining uncertainties in practical decision situations. A transition towards more frequent applications of a rule of reason is thus justified only when regarding the reduction of decision errors. However, trying to assess the specificity of cases is also accompanied by higher costs of information, administration and adjudication, higher set-up and compliance costs as well as higher costs due to increased legal uncertainty (Black 2005: 74-76; Christiansen/Kerber 2006: 223-224). The latter can be summarized within the notion of 'regulation costs'.

As a result, the replacement of per se rules by a rule of reason (and vice versa) is characterized by a tradeoff between reduced decision error costs and increased regulation costs (and vice versa). This tradeoff constitutes the objective function of the so-called 'error cost approach' (see, e.g., Ehrlich/Posner 1974; Easterbrook 1992; Beckner/Salop 1999; Tom/Pak 2000; Hylton/Salinger 2001; Joskow 2002; Heyer 2005), which aims at minimizing the sum of welfare costs due to erroneous permissions of anticompetitive behaviors, erroneous prohibitions of procompetitive behaviors and upcoming regulation costs. By taking into account these effects, it is no longer questioned whether legal rules decide each particular case correctly, but rather if they work well with respect to the totality of cases (Easterbrook 1992: 129; Joskow 2002: 99-100; Heyer 2005: 376), i.e. if they maximize social welfare.

This way of thinking argues in favor of breaking up a strict dichotomy between per se rules and rules of reason. The argument is similar to the 'rules versus standards' discussion, namely to combine advantages of both alternatives, which then only form the extreme points of a continuum (Piraino 1991: 688; Black 2005: 77; Leary 2008: 4). The combination of the core ideas of both, i.e. to inquire specific facts of cases versus restricting such inquiry (Areeda 1986: 573), makes the comprehensive case-specific investigation of *all* relevant factors only one possible solution of a rule of reason inquiry.[32] Other intermediate solutions exist besides a full-

[31] This determination of the possible error types follows Polinsky/Shavell (1989), Joskow (2002) and Christiansen/Kerber (2006); a different notation can also be found in the literature (see, e.g., Besanko/Spulber (1993) and Heyer (2005)).

[32] In respect of practical applications, Carrier (1999) has undertaken an empirical inquiry of "all of the Rule of Reason cases in the modern era" in the United States, comprising the whole range of US Antitrust Law. He finds

scale rule of reason, which have evolved in practice over time: for example, a ‘quick look’, truncated rule of reason or ‘rebuttable presumptions’ with approved offsetting exceptions (Popofsky/Goodwin 1987: 196; Areeda/Hovenkamp 1989: 378-392; Klein 1996: 4-5; Tom/Pak: 2000: 405; Heyer 2005: 417-418; Stucke 2009: 136; Budzinski 2010: 467). These limit the magnitude and range of incorporated factors (Black 2005: 84) – as their examinations are too expensive without making an appreciable differentiation (Tom/Pak 2000: 427) or too complex to interpret them correctly (Hovenkamp 2005: 47) – and may be characterized as some kinds of ‘rules of thumb’ by which decisionmakers get rid of cases more quickly (Scherer 1987: 229).

In this regard, the degree of confidence must be mentioned, which is central when deciding on early terminations of investigations. The full-scale rule of reason does not indicate a limited number of factors whose characteristics are sufficient to meet a required degree of confidence (Neven 2006: 765); in contrast, shortenings of the full-scale examination predominantly do indicate such limitations with the per se rule as the most extreme form. Even though it seems disputable what the optimal solution in concrete application situations is, limiting the full-scale examination aims at making the rule of reason simpler and more rule-like for suitable behaviors. Consequently, such argumentation can also start from the opposite direction to try to make the strict per se rules more flexible and take into account (some) case-specific facts. Therefore, rule of reason investigations may incorporate the limitation of per se rules and per se rules may incorporate some flexibility of rules of reason (Areeda 1986: 573). Whereas the former results from sufficient decision certainty or unjustified costs, it is the other way around for the latter.

3.3 Optimally differentiated rules

Christiansen/Kerber (2006) offer a framework for resolving the dichotomy between per se rules and the rule of reason by analyzing the optimality of different investigation solutions. They combine the core idea of the error cost approach with Kaplow’s notion of the complexity of legal rules as “the number and difficulty of distinctions” (Kaplow 1995: 150). Referring to the latter, different solutions of assessing business behaviors are defined by a specific degree of complexity or differentiation, which is characterized by “the number of assessment criteria and the extent of information that are taken into account” (Christiansen/Kerber 2006: 221).

A higher degree of differentiation equals a higher number of assessed criteria and a higher amount of information, which on one hand reduces costs of erroneous categorizations due to a better differentiation of the welfare effects of individual behaviors, but on the other hand increases the raised regulation costs (ibid.: 223).[33] The reduction of error costs must be

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that in 96% of these cases courts do not balance pro- and anticompetitive effects in the way the rule of reason analysis would suggest.

[33] Christiansen/Kerber (2006: 234) also mention the possibility that error costs might at some point increase with a higher degree of differentiation due to rent-seeking activities.

understood as a net effect: the more assessment criteria used and the more information taken into account, the more exceptions must be applied, though the possibility of being incorrectly applied increases. A higher degree of differentiation therefore reduces one type of error, while at the same time increases the other type of error (Christiansen/Kerber 2006: 228); the exact determination of the types of error depends on the actually applied rule, i.e. including more permissive or prohibitive exceptions. A simple example of a per se prohibition may clarify this argument: If there exist some procompetitive behaviors within the class of horizontal agreements, a transition towards a more differentiated rule that exempts some of them due to a specified feature, reduces the number of erroneous prohibitions; those exceptions may nevertheless be applied to truly anticompetitive behaviors because the assessed feature works imperfect in distinguishing pro- and anticompetitive behaviors. The number of erroneous permissions thus increases.

More differentiation makes sense as long as the net effect of an error cost reduction is greater than the associated regulation and information costs. The optimal degree of differentiation is then given by the equality of the marginal benefits (lower error costs of the one type of error) and the marginal costs (higher regulation and information costs as well as higher error costs of the other type of error) of more differentiation (Christiansen/Kerber 2006: 228).[34] This is the point at which total costs (i.e. the sum of error and regulation costs) are at their minimum (ibid.: 226-227). As rules aim at assessing classes (or categories) of behavior, optimally differentiated rules minimize total costs on the average of all cases and do not try to decide each case correctly (ibid.: 224; Heyer 2005: 376), i.e. they maximize total welfare. Decisions on categories of behavior thus work "at the level of rules, not of cases" (Easterbrook 1992: 129).

The optimal degree of differentiation varies between different classes of business behavior. Full-scale examinations, per se treatments as well as intermediate procedures like truncated rules of reason may turn out to be optimal solutions, depending on the specific characteristics of each class (ibid.: 230-231). These characteristics refer to the following determinants: (1) the distribution and magnitudes of possible welfare effects – for both being essential in establishing an optimal approach to antitrust and competition issues (Heyer 2005: 376); (2) the amount of information and regulation costs; and (3) the ability of different criteria to reduce error costs (in net), which is called 'separation effectiveness'. The framework allows for a sound analysis of which combinations of characteristics call for which optimal degree of differentiation.

Benefits of more differentiation are smaller for behaviors, which are characterized by more uneven distributions of welfare effects (ibid.: 231). Therefore, those behaviors should be assessed by less complex legal rules compared to behaviors with a more even distribution of welfare effects. The intuition behind is that benefits of distinguishing between cases are higher, the more different the cases are. Differentiation aims at reaching clear distributions (by filtering

[34] This result follows general economics of information and optimal stopping rules (see, e.g., Stigler (1961) and McCall (1965)), where the optimal amount of information equates marginal costs and marginal benefits.

out subclasses of similar cases); therefore, the optimal degree must be higher for evenly distributed classes because these benefits are already reached for originally unevenly distributed classes. Additionally, it may be more costly to filter out the few activities with the minor welfare effect or the minor welfare effects are also low in magnitude. As a direct implication, lower information and regulation costs as well as higher separation effectiveness of assessment criteria make the differentiation more worthwhile and the expected degree of differentiation will be higher. These results are more or less also given in Kaplow (1995: 155), i.e. see points (iii) – (v) of section 2.5.

The central conclusions of the error cost approach and of optimally differentiated rules are that possible solutions of assessing business behaviors may not only be applied under their originally designated circumstances, but rather depend on the specific constellation of various determinants. Per se rules, for example, may not only be optimal if anticompetitive welfare effects are always or almost always presumed; weak assessment criteria and/or high regulation costs may make them optimal also for classes characterized by other distributions of welfare effects for which the required costs of distinguishing pro- and anticompetitive cases are too high (Easterbrook 1992: 129). Vice versa, it may make sense to assess even strongly one-sided distributions by strong criteria if the amount of associated costs is defensible and/or the less probable welfare effect is high in magnitude. The same argument also holds for intermediate solutions, for which the assessment of one or more factors (e.g., the use of a market share threshold) suffices to terminate investigation of a particular class of behavior.

Of course, the optimal degrees of differentiation are not fixed for the various classes, but rather might change if decisionmakers learn more about the different characteristics and determinants due to frequent application, (new) theoretical insights and/or ex post analyses of certain case-decisions. Even though this may contribute to an objective refinement, a less than secure understanding always offers space for beliefs (and maybe political concerns) about the exact values of the important determinants, which in turn affect the (optimally) applied solutions. This uncertainty may result from the complexity of particular cases or the disagreement about correct interpretations (Heyer 2005: 378). If, for example, decisionmakers pay more attention to one of the two types of errors (i.e., overestimating the probabilities of the respective welfare effects or assigning higher values to the magnitudes of the respective welfare effects), this inherently affects the choice of legal rules; the same is true for restraints or concerns on decisionmaking costs (Tom/Pak 2000: 424; Heyer 2005: 382). Furthermore, all else being equal, differing beliefs and assignments of probabilities to welfare effects simply lead to different preferred investigation procedures (Heyer 2005: 417-418; Neven 2006: 765). The model of Christiansen/Kerber (2006) allows for an integration of those modifications and the analysis of their implications.

4. Specific approaches to the optimal structuring of assessment processes

The implications of the error cost approach and optimally differentiated rules are also used and extended by (formally) more ambitious approaches to analyze the optimal design of rules in competition law. Two research directions are worth mentioning, whose connection will be discussed later: the first direction embeds the notion of differentiated rules into the framework of sequential investigation processes (sections 4.1 and 4.2), the second direction focuses on deterrence and legal uncertainty effects of different rules on business actions (section 4.3).

4.1 Sequential investigation process

While the approach of optimally differentiated rules can be seen as analyzing the optimal depth of investigation for a given class of business behaviors, a next step would be to incorporate the understanding of investigations and legal processes as procedures of "sequential fact-finding" (Scherer 1987: 230). This refers to the work of Beckner/Salop (1995; 1999), who study the legal process as "the approach of breaking a complex legal question into a series of discrete, and often independent, legal and factual issues" (Beckner/Salop 1995: 1). The main paper of 1999 contains crucial results and implications of the mathematical analysis done in the unfinished working paper of 1995.

Beckner and Salop integrate this description of a legal process into a general decision-theoretic framework. The underlying calculus within such a multi-stage (or sequential) decision process is mentioned as follows: "Decision theory sets out a process for making factual determinations and decisions when information is costly and therefore imperfect. It formulates a methodology for determining when to make decisions on the basis of current information and when to gather and consider further information before making a decision" (Beckner/Salop 1999: 41-42). Even though the analysis of Beckner and Salop focuses primarily on the specific adversarial US antitrust litigation process (with plaintiffs and defendants and burden of proof problems on each stage), the general principles of sequential investigations can also be transformed to a more European type of unilateral investigation and decision process – carried out by a public competition authority. The latter is done in the paper of Kerber et al. (2008).

The basic idea of the decision-theoretic approach of Beckner/Salop (1999; 1995) is to improve initially held presumptions about the likelihood and magnitude of specific competitive issues (for example, welfare effects). Gathering information about these addressed issues leads to a more accurate decision about the true effects of business behaviors, but increases information costs. This tradeoff between reducing the likelihood of erroneous decisions, which result in losses and therefore error costs, and the costs of gaining this necessary information, is optimally solved – as already known – by the minimization of total welfare costs, i.e. the sum of error and information costs (Beckner/Salop 1999: 46). The advantage of a multi-stage sequential investigation process

is the opportunity to base the decision on the outcome of first issues and save the costs necessary to gather information about the remaining issues because in many cases "the value of information in terms of a more accurate decision falls short of the cost of gathering the information" (Beckner/Salop 1995: 4). This constitutes the first problem of sequential investigations, the stopping problem, which deals with the question of *how much* information should be gathered and considered in making a decision.

Beckner/Salop (1995) analyze and consider the optimal stopping problem in their formal model in the following way. Particular cases are characterized by a specific level of the two competitive issues 'benefits' (x) and 'harms' (y), for which there exists a social utility function. A court has information about the probability distributions of both, which represent "preliminary presumptions that the court holds about the two issues for the entire class of cases" (ibid.: 9). Given a specific case, the court can decide for one of two options: First, it can opt for a summary disposition based solely on its presumptions; this summary disposition is two-sided, i.e. the court may decide in favor of both defendant and plaintiff (ibid.: 11).[35] Alternatively, the court can gather case-specific information on one of the two issues by spending c_x and c_y, respectively; this case-specific information is assumed to be perfect, i.e. it yields the true value of x, respectively y (ibid.: 12). The replacement of imperfect presumptions with better information based on facts (ibid.: 24) is the marginal value of information, namely the increased accuracy of the outcome. After gathering information on one of the two issues, the court has again the option for summary disposition. If, instead, the court decides to continue investigation and gather case-specific information on the second (remaining) issue, it finally has to decide based on all available information.[36] Consider the case, e.g., in which the court has already gathered information about issue X, i.e. it knows the true value of x. Terminating the investigation process by summary disposition would risk erroneous decisions: either because the true value of y outweighs the value of x and the court has decided in expectation of a higher (weighted) value of x (erroneous permission), or either because the true value of y does not outweigh the value of x and the court has decided in expectation of a lower (weighted) value of x (erroneous prohibition). The marginal benefits of gathering information about issue Y are thus given by "the reduction in

[35] Beckner/Salop (1999: 59-60) mention that one-sided disposition is more typical in "most standard antitrust rules". Despite the incomprehensibility from a decision-theoretic point of view, those per se restrictions can be derived as the optimal solution for specific "assumptions regarding the probability distributions for the two issues and the social losses from erroneous outcomes" (Beckner/Salop 1995: 11).

[36] Due to the perfect improvement of the underlying presumptions (in the form of distinct probability distributions) about the true value of the two issues, the initial presumptions stop carrying some weight once the court decides to gather case-specific information about the issues (Beckner/Salop 1995: 36, at fn. 33). Even though the authors allow for the integration of imperfect information (in the form of exogenously given amount and accuracy), they exclude the consideration of endogenously determined information quality because this would create a second optimal stopping problem (ibid.: 12, at fn. 6). This occurs within the investigation of every single issue: If a court decides to gather, now imperfect, information about the first issue, it stops collecting if it is not worthwhile anymore; given the improved decision basis, the court then has to decide on collecting information about the second issue, and if so, the next optimal stopping problem occurs in determining how much information about this second issue should be gathered. Second stopping problems exclude switching between information gathering about benefits and harms, which may be worth considering and may become the optimal strategy yet.

expected error costs at that value of x" (ibid.: 19), i.e. the lost utility from the potential that the weighted sum of *x* and *y* is negative (wrong permission) or positive (wrong prohibition). This also expresses the importance of the underlying utility function in determining expected error costs. The optimal stopping values of *x* at that decision stage, which determine optimal stopping decisions either in favor of permission or in favor of prohibition, set marginal benefits equal to marginal costs (ibid.: 19). Obviously, values lying in between these two stopping values make further information gathering about issue *Y* profitable; in contrast, very high (low) values of *x* make summary disposition profitable in favor of permission (prohibition). Optimal balancing works in the following way (ibid.: 18): increasing the upper value (or decreasing the lower value) raises the likelihood that the costs of the second issue will be borne; at the same time error costs will be reduced because the potential that the true value of the second issue erroneously outweighs the known value of the first issue decreases. The characteristics of the second issue, *Y* in the above explanation, also play a crucial role in determining the advantage of summary disposition over gathering information about that second issue: the higher the cost of information c_y, the lower the weight of issue *Y* and the lower the uncertainty (variance) regarding issue *Y*, the more probable summary disposition without gathering case specific information on issue *Y* will become (ibid.: 20-21).

The second problem of sequential investigations is given by determining the (optimal) sequence with which the relevant issues should be addressed because this may determine the final decision accuracy and realized total welfare costs (Beckner/Salop (1999: 44).[37] The formal model describes determinants in the way that the issue with the higher potential for summary disposition, i.e. saving the information costs of the second issue, and lower error costs in the case of summary disposition should be investigated first (Beckner/Salop 1995: 22). These determinants are given by lower information costs, higher uncertainty and more weight in determining social utility (ibid.: 23).

The efficiency of sequential investigations may certainly be questioned. It implicitly assumes that investigation costs for several issues are independent from each other, which excludes economies of scope for simultaneous fact-gathering on multiple issues, and also excludes the possibility that the knowledge about several issues is simultaneously improved by the same facts (Beckner/Salop 1995: 24; 1999: 47). Recognizing that these effects truly may exist – to one degree or another – in realistic investigation procedures of antitrust law, the possibility of enabling a terminate decision prior to complete knowledge accumulation with the potential to avoid costs of gathering knowledge about further issues emphasizes a powerful motivation for sequential information gathering (Beckner/Salop 1999: 48). To exploit the advantages, the

[37] The model is purely decision-theoretic and ignores any game-theoretic impacts; in particular, this excludes the consideration of involved parties' incentives to affect the fact-finding process (Beckner/Salop 1995: 8). Another interesting aspect is the burden of proof, which is not analyzed directly, though two possibilities for taking account of that problem are mentioned: first, the burden is assigned to the party with the actually lower information costs; secondly, the burden may shift endogenously at each stage to the party that must overcome a presumption adverse to its position (Beckner/Salop 1995: 35-36).

sequential information gathering should indeed be done *before* evidence about specific issues are presented, which may not be confused with sequential evaluation of already collected evidence (ibid.: 59).

This kind of sequential thinking about investigation processes in antitrust and competition law is also envisaged by other authors, even though it often relates to specific behaviors and a formal framework is missing. For example, Easterbrook (1984: 157 et seqq.) argues for a 'filter approach' in assessing different factors relevant for vertical arrangements; Klein (1996) characterizes the assessment of horizontal agreements by the US Department of Justice as a 'stepwise approach'; Katz/Shelanski (2007) emphasize the necessity of stage-procedures with clear decision-theoretic foundations for merger analysis; and Kolasky (2008a) discusses a generally stepwise approach for the rule of reason.[38] All approaches have in common that they allow for a termination prior to a full-scale examination of all relevant factors. As discussed above, this closes the insufficient dichotomy between per se rules and rules of reason also within a sequential framework. Beckner/Salop (1999: 62 et seqq.) examine certain decisions in the US Antitrust Law with the help of their model: the simple extreme forms of per se rules and full-scale examinations can be justified, e.g., on the grounds of sufficiently high confidence in the initial presumptions and sufficiently high benefits of additional information, respectively. These decision-theoretic justifications for the virtues of different legal rules are already well-known from the above analysis.

Furthermore, due to the fact that sequential investigation problems also have to deal with the structuring of investigations in the form of ordering the assessed factors, the idea of a more structured rule of reason (Kolasky 2008b: 20-21) is answered more completely within such a sequential framework. As Beckner/Salop (1995: 26) mention "the struggle over the use of the *per se* rule rather the *rule of reason*, and the recent *quick look synthesis*, represent questions of optimal sequencing and optimal stopping". Solutions like a truncated rule of reason or 'quick look' standard require such a structuring by specifying the sequence with which relevant issues are addressed (Beckner/Salop 1999: 67 et seqq.).

4.2 Optimal sequential investigation rules

While the investigation process of Beckner/Salop (1995; 1999) – especially the model of 1995 – considers information gathering at each stage about either harms or benefits and leaves aside imperfect information, the approach of Kerber et al. (2008) focuses very much on the latter. Additionally, the sequential investigation process focuses on unilateral investigation and decision

[38] The Supreme Court decision *NCAA v. Board of Regents* [National Collegiate Athletic Association v. Board of Regents of the University of Oklahoma, 468 U.S. (1984), Supreme Court (USA), No. 83-271] works as a practical example of introducing a stepwise approach (named truncated rule of reason) for the investigation of horizontal price fixing situations (Sims 1985).

processes carried out, for example, by a competition authority; the question of the right burden of proof is not directly considered.

Combining the approach of optimally differentiated rules with the idea of sequential investigation processes, the model of Kerber et al. (2008: 5-11) starts with some prior belief about pro- and anticompetitive welfare effects of a given class of behavior. The sequential investigation of different possible criteria reveals imperfect information, which is interpreted as signals (e.g., the market share of firms, the existence of market entry barriers or the initiation of agreements). According to which signals are exactly observed, cases are sorted into different subclasses characterized by different beliefs about pro- and anticompetitive welfare effects. Formally, this represents a sequential Bayesian updating process of some prior probability distribution of welfare effects – which is based on experience and theoretical analyses – according to the investigation of criteria imperfectly related to these welfare effects. The true values of harms and benefits will remain unknown; the investigation of criteria only improves the distributions step-by-step and sorts cases into smaller subclasses, depending on their specific characteristics of investigated criteria. This describes a so-called multi-branched decision process with different possible investigation paths and different assignments of probability distributions.

Deciding on the pro- or anticompetitiveness of certain subclasses is always associated with some probability of error – including the magnitudes of these adverse cases. Investigating another criterion and differentiating the probability distribution a bit more will reduce these error costs, but only by incurring some amount of investigation costs. The quality (or conclusiveness) of investigation criteria will affect the expected benefits of improving the decision basis, which have to be compared with the expected costs.[39] This determines the already known optimality calculus of sequential investigations with respect to entire classes of behaviors and minimizes total welfare costs on the average of all cases.

Generally, the effect of observing specific characteristics of certain criteria on the benefits of investigating other criteria must be taken into account, which is done by solving the whole investigation procedure in a backwards manner, i.e. starting with the last possible criterion out of a given number of criteria. On the one hand, this determines the sequence in which the possible criteria should optimally be investigated; on the other hand, this also determines the (multiple) stopping points in such a multi-stage decision process. The resulting investigation procedures can be understood as optimal sequential investigation rules, assigning to each individual

[39] Just like the model of Beckner/Salop (1995; 1999), the model of Kerber et al. (2008) is purely decision-theoretic. The above-mentioned incentive problem of involved parties to affect the fact-finding (investigation) process is addressed indirectly by having an impact on the conclusiveness and/or costs of investigation criteria. Even though, a correct integration requires a game-theoretic approach, the conclusiveness of a criterion is simply assumed to be lower and/or its investigation costs to be higher if parties' incentives to affect some information of this criterion are high. Furthermore, the burden of proof problem is not addressed directly. Analogously to the model of Beckner/Salop (1995), depending on which party's information costs are actually lower the burden may be assigned to involved firms or remain with the competition authority.

behavior the optimal action to be taken if certain characteristics are observed (i.e. which criterion to consider next or which final decision to take).

Unfortunately, as is the case in general statistical decision problems, no general solution exists with which to determine the optimal sequence of criteria. This makes it impossible to generally argue in favor of gathering least expensive or high-conclusive criteria first – like in Beckner/Salop (1999: 48 and 54). The model rather highlights the necessary information inputs and determinants of every class of business behavior for deriving optimal sequential investigation rules; these are (1) the probabilities of pro- and anticompetitive behaviors within such classes, (2) the (associated) magnitudes of positive and negative welfare effects, and (3) the investigation costs as well as capability of investigation criteria in discriminating between pro- and anticompetitive cases (Kerber et al. 2008: 18-19). However, an increase of both the quantitative welfare effects as well as a decrease in investigation costs tends to deepen the investigation of any class; the relative magnitudes (or assigned losses) of the welfare effects influence the probability threshold when optimally deciding in favor of pro- or anticompetitiveness (ibid.: 11).[40] Furthermore, the necessary information inputs to derive optimal rules can be reduced if the procedure is applied by heuristic solutions. These also allow for the preceding conclusions.[41]

Optimal sequential investigation rules are justified by a sound decision-theoretical framework, which captures the notion of Whinston (2006: 18-19) that optimal legal rules are the application of optimal statistical decision making. This also includes any practically applied investigation rules (e.g. per se rules, quick look standards, truncated rule of reason and full-scale examinations) as well as potential new forms of investigation rules, which help to structure antitrust and competition assessments in an optimal way (Kerber et al. 2008: 4). Of course, the resulting rules do not remain fixed for all time, but rather will underlie some necessary changes because frequent applications as well as (new) theoretical insights (also based on ex post analyses of certain case-decisions) make it possible to learn about the different characteristics and determinants. This, in turn, reveals how to optimally replace a given legal rule by another (for example: more differentiated) one.

4.3 Deterrence effects and legal uncertainty

Katsoulacos/Ulph (2009b) provide another interesting formal decision-theoretic analysis of the optimal improvement of legal rules. The decision-theoretic framework does not only focus on the frequencies of pro- and anticompetitive behavior, the quantitative effects and informational aspects, but also includes (indirect) deterrence effects and procedural or administrative aspects

[40] These thresholds may be interpreted as optimal degrees of proof required for terminating decisions at given stages.

[41] See Kretschmer (2011a) for a general analysis of the sequencing problem in sequential investigation processes.

such as delays in reaching decisions and incomplete coverage of effectively investigated actions by competition authorities.

The choice between legal standards is modeled simply by allowing for the three alternatives of (1) per se illegality, (2) per se legality and (3) an effects-based discriminating rule. The discriminating rule describes an investigation process of a competition authority by which it can gather further information and perform analyses about certain actions (business behaviors) before it decides to either permit or prohibit. Because the type of action is modeled dichotomously, i.e. actions are either procompetitive (socially beneficial) or anticompetitive (socially harmful), the quality of the information is given by the two probabilities of correctly identifying the type of action (ibid. 418). Starting with similar assumptions about the occurrence of both pro- and anticompetitive (beneficial and harmful) behavior, deterrence effects are also modeled by including the private benefits of firms when undertaking a business behavior. Given that the type of action, the applied legal standard, the procedural aspects of decision-making delay, coverage rate and fines are common knowledge, firms only take an action if the expected value of profits is positive (ibid.: 419-420). Due to different characteristics of different legal standards, this leads to different (indirect) deterrence effects of those legal standards. Furthermore and as a consequence, the traditional decision-theoretic understanding of false convictions and false acquittals is defined more widely by including decision, procedural and deterrence effects (ibid.: 421-422):

- False convictions arise from erroneously deterring beneficial actions, investigating too many actions of the remaining firms and erroneously prohibiting some of these, or doing so too quickly;
- False acquittals arise from failing to deter harmful actions, not investigating enough actions, and failing to prohibit investigated actions, or taking too long for their prohibition.

A discriminating rule is thus more advantageous (more effective) than a per se rule, if the decision error costs are lower, which is the case when the quality in discriminating between the different types of actions is greater than the strength of the presumption about legality, respectively illegality, which is given by the frequency and severity of pro- and anticompetitive welfare effects (ibid.: 424). The framework also allows for the analysis of how a discriminating rule can be further improved: because a discriminating rule increases false convictions and reduces false acquittals, compared to per se legality, reducing false convictions makes the discriminating rule more effective in this case. On the other hand, because a discriminating rule increases false acquittals and reduces false convictions, compared to per se illegality, reducing false acquittals makes the discriminating rule more effective in that case (ibid.: 415, 425).

However, the framework does not fully capture the idea of different degrees or various types of discriminating rules, because it ignores the costs accrued for collecting and analyzing additional information (ibid.: 419). Even though, the authors mention that the competition authority always chooses the ‘best’ available model (i.e. available information and analysis), this is not self-

evident if different models are associated with different costs. Due to the different welfare standard, which ignores information costs, the paper does not provide many results for varying the (degree or type of a) discriminating rule; instead, by taking up (indirect) deterrence and procedural effects for the debate, about the choice of optimal legal standards for competition policy, the paper fills a long standing gap in the literature and allows for important results concerning their determinants.[42] Consequently, the discriminating rule's power in lowering decision error costs is alleviated by the (*absolute*) *deterrence difference*, after which the discriminating rule deters too many beneficial actions and too few harmful actions, compared to a per se rule, and strengthened by the *differential deterrence effect*, after which the discriminating rule deters more harmful than beneficial actions (ibid.: 426-427).

The framework also allows for analyzing the effect legal uncertainty has on the choice of optimal legal standards. Even though, legal uncertainty is to some extent incorporated in a discriminating rule (ibid.: 424-425), the authors formulate this idea more clearly and extend the framework accordingly in another discussion paper. The paper of Katsoulacos/Ulph (2010a) is the first one trying to theoretically determine what is meant by 'legal uncertainty' and what are its welfare effects, when comparing different legal standards. Legal uncertainty means the uncertainty of firms about how courts and/or competition authorities decide on a particular action. It is defined by different degrees, depending on the information available to the competition authority about firms' characteristics and the type of their action, as well as on the information available to firms about these characteristics, and the competition authority's adopted assessment criteria and models (ibid.: 1-3). This distinguishes legal uncertainty from 'variability' in treating firms' actions (ibid.: 4). Whereas the latter inherently characterizes a discriminating effects-based rule compared to per se rules, the former fails automatically to do so. By including legal uncertainty into the discussion about optimal legal standards, important conclusions can be drawn: first, some degree of legal uncertainty might be welfare-improving, due to generated deterrence effects, if the deterrence of harmful actions is sufficiently higher than the deterrence of beneficial actions (ibid.: 16-17); and secondly, the decision in favor of a discriminating effects-based rule compared to a per se rule, in case of sufficiently high quality of the competition authority's information, which allows to effectively discriminate between harmful and beneficial actions, can be upheld even if legal uncertainty to some degree exists (ibid.: 33).

Another interesting analysis concerns the impact of appeals and (internal) review processes, which are formally examined in Katsoulacos/Ulph (2009a) and outlined in Katsoulacos/Ulph (2010b). Obviously, judicial reviews do not affect decision errors in case per se rules are applied; in case of effects-based discriminating rules, judicial reviews affect decision errors asymmetrically, in that they increase false acquittals, but decrease false convictions (ibid.: 98). This rests on the assumption that reviews are only undertaken for actions that are prohibited in

[42] Katsoulacos and Ulph also apply their framework to two case-decisions of the US Supreme Court and the European Court of First Instance by identifying errors and inaccuracies in the lines of argument (Katsoulacos/Ulph 2009b: 432-434).

the first place, which increases the probability that truly harmful actions are erroneously reviewed as yet being benign, and decreases the probability that the prohibition is upheld for truly benign actions. Therefore, the more likely reduction of decision errors for presumptively legal than for presumptively illegal practices can be explained, because false convictions matter more than false acquittals for presumptively legal actions, while it is vice versa for presumptively illegal practices (Katsoulacos/Ulph 2009a: 12-13). Furthermore, allowing for appeals processes reduces the effect of a discriminating rule: actions are undertaken for lower expected private profits because appeals processes increase false acquittals and reduce false convictions (ibid.: 10), i.e. the probability of prohibition has decreased for those actions. This improves welfare for presumptively legal practices, because up to that point, too many actions have been deterred, and reduces welfare for presumptively illegal practices, because up to that point, too few actions have been deterred (ibid.: 15-16); this follows from the (absolute) deterrence difference, which characterizes discriminating rules (see above). Further decision errors and deterrence effects are analyzed for internal review processes, involving several panels, which are also assumed to examine only actions proposed to be disallowed. When decisions are reached by a majority rule of several panel reviews, instead of being reached unanimously, false convictions increase and false acquittals decrease (Katsoulacos/Ulph 2010b: 99): both are the result of a lower approval requirement. Given unanimity, deterrence effects are reduced for internal reviews by lowering the probability of actions being disallowed and increasing the decision-making delay, wherefore actions are taken for lower expected private profits (Katsoulacos/Ulph 2009a: 18) and welfare tends to be improved (reduced) for presumptively legal (illegal) practices (Katsoulacos/Ulph 2010b: 99). Conversely, a majority rule for internal reviews usually increases deterrence effects and thus tends to improve (reduce) welfare for presumptively illegal (legal) practices (Katsoulacos/Ulph 2009a: 19).

5. Discussion and conclusions

Competition law aims at appropriately assessing the pro- and anticompetitiveness of different business behaviors, which applies the general distinction of lawfulness and unlawfulness of specific behaviors to this special field of law and is well recognized in economic as well as legal literature. Based on general problems of the optimal design of institutional and procedural rules in various legal fields, the special competition law discussion focused on the relative merits of per se rules and the rule of reason for a long time. Next to these extreme solutions, different approaches and frameworks exist, which allow for a sounder analysis of appropriate legal directives and investigation procedures.

Supported by the results of modern industrial organization research, many business practices are assessed according to their specific welfare effects, which hitherto were subject to per se rulings; thereby taking more account of the specifics of single cases. With the US Supreme Court

decision in the ‘Leegin’ case in 2007, hard-core horizontal cartels remain the only business practices in the US underlying a per se approach (Katsoulacos/Ulph 2009: 411). A similar tendency towards more case-specific assessments is recognized in Europe under the so-called ‘more economic approach’, even though it has not (yet) implied a termination of the de facto prohibition of resale price maintenance, for example.

By focusing on the ability to identify differentiated welfare effects and not (or only to some degree) taking notice of other important determinants, one risks the implementation of unstructured assessment principles. Besides avoiding erroneous decisions, which heavily depend on the competence as well as available theoretical and practical analysis tools, important determinants are, for example, the provision of legal certainty, the costs of implementation and information gathering or the frequency and magnitude with which different activities occur. The totality of determinants allows for a total welfare analysis and questions the sometimes stated obvious advantage of case-by-case assessments.

Starting with the famous discussion about ‘rules versus standards’, different approaches out of the ‘Law and Economics’ field are presented, which provide sound analyses of these determinants and their impact on the right choice of legal directives and assessment procedures in given situations. It becomes apparent that it is not a question of either full-scale case-by-case assessments of welfare effects or per se treatments. Referring to (many) different possible constellations of the determinants, it rather becomes a question of the optimal structuring of assessment processes with different (so far maybe unknown) kinds of solutions, which somehow also fulfills the idea of the “rule of law” by providing structured and legally certain procedures to involved economic parties (Roth 2007: 50).

This is the main contribution of assessment approaches developed from the famous error cost approach: overcoming the unstructured openness towards ‘more rule orientation’ of legal directives and their inherent investigation processes in competition law. The necessary information inputs for designing optimal rules are highlighted; however, practical implementation also requires empirical knowledge about these inputs. One first step in that direction would be to also focus research on other questions than demonstrating circumstances under which differentiated effects may occur. The implementation of optimal rules in competition law primarily requires knowledge about the relative importance and severity of those effects. One might question if gathering knowledge about all the information inputs is possible in practice. Of course, starting at a point, where existing empirical studies about all determinants are scarce, does not allow for making fast and great leaps forward. Besides using the necessary information inputs and knowledge about their characteristics to derive optimal rules, a first step may be to analyze existing applied rules and proposed assessment approaches on the basis of the surveyed status of current research. The sample of decision-theoretic approaches allows for focusing future research on the right starting points when trying to provide competition policy with the needed studies and results to yield optimal rules for the various classes of business behavior. Even small advances help developing a better and maybe optimal

design as well as performance of rules. This concurrence of theoretical and empirical analysis will be a promising approach.

Furthermore, reasonable application is strongly linked to the availability of adequate assessment criteria, both with respect to their power in discriminating between the welfare effects of different behaviors and with respect to the associated regulation and investigation costs. This is another topic research has to pay more attention to. When applied to certain classes of business behavior, the definition of meaningful assessment criteria constitutes the first and major part of rule designs. Empirical research has to give advice about the relevant and adequate set of assessment criteria so that competition policy can be applied appropriately. Focusing on the class of minimum resale price maintenance, Kretschmer (2011b) analyzes the empirical literature about the relevant set of assessment criteria to examine a number of existing and proposed assessment approaches; furthermore, the paper derives a new decision-theoretic assessment approach towards resale price maintenance based solely on the existing empirical results. Unfortunately, empirical research has not attracted much attention to this topic. Nevertheless, this way of analysis may be worth proceeding when analyzing different kinds of business behavior.

However, the sound analytical framework provided by different theoretical approaches has to be seen in totality since only in combination they may yield a nearly or more complete picture about the appropriateness and optimal design of investigation rules in competition law. The evolutionary character of these approaches is obvious. Starting with the error cost approach, optimally differentiated rules uncover basic features and determinants rules have to meet when optimally applied in practice. The derived requirements overcome pre-existing shortcomings within the discussion about appropriate competition rules. Based on these findings, optimal sequential investigation rules (Kerber et al. 2008) and differentiated rules incorporating legal uncertainty and deterrence effects (Katsoulacos/Ulph 2009) can be seen as the most developed existing approaches, though these approaches have struck different paths. However, taken itself, every approach reveals a shortcoming whose consideration is important for practically applied rules. On the one hand, it is the nonobservance of legal uncertainty and deterrence effects in optimal sequential investigation rules of Kerber et al. (2008). These effects play a crucial role when establishing or changing existing rules, which should guide and judge behaviors. On the other hand, differentiated rules incorporating legal uncertainty and deterrence effects of Katsoulacos/Ulph (2009) lack consideration of sequential fact-finding, which characterizes most investigation and legal processes in practice (see Scherer 1987: 230). Furthermore, the idea of different degrees or various types of discriminating rules is captured only incompletely, which makes it difficult to refer to in-between solutions. These crosswise shortcomings reveal that the two most ambitious theoretical approaches should be seen as being complementary and that it is not a question of deciding between both of them when setting up optimal investigation rules in competition law. However, the task is not completed yet because some aspects are still missing in the complementary view as well.

The first missing aspect concerns the application of rules in practice, which is also characterized by interaction processes and involved information asymmetries (e.g., between competition authorities and firms). This is particularly important for merger control and remains a task to incorporate in optimal investigation rules. The surveyed structuring approaches are (purely) decision-theoretic and do not include a game-theoretic interaction process, while such an extension seems to be worth contemplating in future research projects.

There exists a body of literature worth mentioning that looks solely on this topic by incorporating internal review processes as well as incentive designs, e.g. for disclosing sensitive internal information by firms. Interactions between competition authorities and firms are especially relevant for merger review processes when the terminating decision possibilities comprise another alternative: permission under remedy, which tries to restore the level of pre-merger competition. In practice, often only parts of a merger raise competitive concerns (Coate et al. 1995: 539), which can be remedied by divestiture of certain assets or behavioral restrictions (Lyons/Medvedev 2007: 1). Thereby, firms and the competition authority come together to settle competitive concerns via negotiations,[43] whose result may either be a strong or weak (compromise) settlement. The first involves divestitures of assets that are linked to the competitive concerns, while the latter does not allow for restoring the level of pre-merger competition, either due to unsuccessful or deficient relief (Coate/Kleit 2004: 980-981).[44] Firms would prefer weak settlements because of higher profitability, while competition authorities would prefer strong settlements generating positive publicity (ibid.: 983). The negotiation process is characterized by a strong information asymmetry between firms and the competition authority concerning the expected amount of a merger's efficiency gains, which are important for the determination of optimal remedies (Cosnita/Tropeano 2009: 188-189; Lyons/Medvedev 2007: 2; Yao/Dahdouh 1993: 23-24). However, the competition authority (or the authorized rule maker) can take advantage of the appropriate design of the framework in which negotiations take place (Lyons/Medvedev 2007: 2). This allows overcoming the information asymmetry at least partially with a couple of instruments: First, the timing of information disclosure and remedy offers by firms and/or the competition authority may play a crucial strategic role (Yao/Dahdouh 1993: 25). Second, the competition authority may employ a so-called 'crown jewel provision', whereby valuable assets of the merging parties are withheld to induce firms to divest less valuable assets within a specified period (Yao/Dahdouh 1993: 26). Third, the competition authority may hold 'hostage' parts of the transaction unrelated to competitive concerns to block (small) parts of the transaction raising competitive concerns (Coate/Kleit 2004: 980; Coate et al. 1995: 539). Normally, firms have a strong desire to resolve the problem quickly, which

[43] See, e.g., Chopard et al. (2008) and Lyons/Medvedev (2007) for formal analyses of settlement processes.

[44] It may be questioned if a third type of compromise is relevant. At least theoretically, settlements may be 'overly strong' in that they not only restore but temporarily increase the level of pre-merger competition. Rational firms may accept such settlements if the remaining part of the transaction is excessively valuable, for example in dynamic efficiency concerns.

strengthens a competition authority's negotiation position (Coate/Kleit 2004: 980).[45] And fourthly, the burden of proof of efficiency gains may be placed on firms due to the fact that they have control over this information (Yao/Dahdouh 1993: 32); partial withholding of information (if legally not required) may thus be interpreted as negatively affecting information (ibid.: 25).

The relevance of all these facets is unquestioned and a complete design of competition rules should take them into account at least partially. However, the decision-theoretic approaches allow for overcoming the problem of having to deal with incomplete information about ex ante uncertain effects of business behaviors. Trying to establish rules allowing for optimal investigations in consideration of these characteristics is the main part of optimal structured competition law rules. This does not rule out establishing rules on a secondary level, which refer to interaction processes but are only relevant for specific fractions of certain business behaviors and only come into play supportively under certain circumstances. The provision of optimal structured assessment processes remains unaffected.

Another missing aspect of the surveyed approaches concerns the burden of proof, which has to be assigned to one of the involved parties (i.e. competition authorities or firms) in practical investigation and legal processes. This remains unconsidered in all but one of the surveyed approaches. Though Beckner/Salop (1995: 35-36) do not analyze this aspect directly in their sequential model, the authors account for two interesting possibilities: First, the burden may be assigned to the party with the lower information costs; second, the burden may shift endogenously (at each stage) to the party that has to overcome a presumption adverse to its position. However, the appropriate assignment of the burden of proof has to be separated from the right assignment of the standard of proof. The latter is already answered implicitly in the decision-theoretic approaches. Pursuing the goal of (total) welfare cost minimization determines the benefit of further differentiation (at each stage of the sequential model), which depends on the characteristics of quantitative welfare effects and their probabilities as well as the discrimination ability and investigation costs of the associated assessment criteria. This process does not only determine the optimal degree of differentiation or optimal discriminating rule, but also takes into account certain thresholds of error probabilities; which is just the mirror image explanation of the involved standard of proof.

Certainly, the so far existing approaches miss some interesting aspects and their implementation in the foreseeable future may only be possible for certain kinds of business behavior, unless more substantiated empirical analyses and results are available. However, the present survey makes clear that ambitious approaches do exist, which provide for sound economic analyses. The

[45] The investigation and settlement process can also be driven by other aspects like politics and incentives of the competition authority. Accordingly, Coate et al. (1990) found empirical evidence for political (legislative) pressure influencing merger review processes in the US. By accepting weak settlements, the competition authority may increase the number of successful cases to avoid litigation processes before courts with ex ante uncertain outcomes (Coate et al. 1995: 540), which is supported by empirical evidence (Coate/Kleit 2004: 993). Furthermore, litigation processes may generate opportunity costs in regard to a firm's reputation when dealing with the competition authority, which is linked to the expected number of future interactions (ibid.: 988).

broader ‘Law and Economics’ perspective makes great demands on these approaches in order to establish optimal legal rules that enhance the performance of competition and antitrust law. Even though a number of possible future research projects have been identified, the present results should not be underestimated because they demonstrate a big step forward towards the provision of practically applicable frameworks characterizing rules as optimal structured assessment processes.

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