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WILLEM H. BOSHOFF

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WILLEM H. BOSHOFF
DEPARTMENT OF ECONOMICS
UNIVERSITY OF STELLENBOSCH
PRIVATE BAG X1, 7602
MATIELAND, SOUTH AFRICA
E-MAIL: WIMPIE2@SUN.AC.ZA



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WHY DEFINE MARKETS IN COMPETITION CASES?

Willem H. Boshoff¹

Abstract:

Competition policy investigations usually commence with a definition of the relevant product and geographic market. The relevant market provides a first evaluation of competitive conditions and allows for the calculation of market shares, which aids in the assessment of firms' market power. Given its implications for assessing market power, the market definition in a competition case is frequently contested. Critics argue that market definition is often arbitrary and should be avoided. Instead, IO scholars argue that modern econometric methods are capable of directly estimating market power and competitive effects without the need for defining markets. We argue that market definition not only offers a valuable first screen for market power, but actually involves a substitution analysis that lies at the heart of any competition case. We argue that it is suboptimal to promote a single encompassing econometric model instead of the multi-faceted empirical approach underlying most market definition exercises in practice. In addition, we note that market definition involves much more than merely the estimation of price elasticities, which are in any event difficult to estimate in most competition cases.

Keywords: market, market definition, market share, substitutability, price elasticity, antitrust, competition policy, mergers, monopolization

JEL codes: L11, L40, L41, K21

1. Introduction

The definition of the relevant market is a key first step in most competition investigations in South Africa and in other jurisdictions. Market definition involves judging which substitutes belong in the market with the product under investigation. Traditionally, market definition is seen as a means to an end: a properly defined market is necessary for the calculation of market shares, which are used as proxies for market power. Market power, in turn, is the focus of competition investigations, as authorities evaluate the effects of a merger or business practice on a firm's market power. Some scholars question this approach, arguing that advanced econometric models can provide direct estimates of competitive effects and therefore

¹ Senior Lecturer, Department of Economics, Stellenbosch University, Private Bag X1, Matieland, 7602. E-mail: wimpie2@sun.ac.za. I thank Stan du Plessis and Nicola Theron for important insights.

render the market definition exercise superfluous. While practitioners tend to favour a traditional analysis beginning with a definition of the market, some have also questioned the practice of drawing explicit market boundaries in cases of significant uncertainty about substitutability (see, for example, Keyte and Stoll (2004) and Markovits (2002)). In fact, as discussed later, even the South African Competition Tribunal has been at times unwilling to commit to a specific market when facing significant uncertainty. It is therefore important to consider the relevance of market definition to modern competition policy.

We argue that market definition is an essential first step in a competition investigation, not only for the purposes of calculating market shares, but more importantly because it involves an analysis of substitutability. Substitution patterns are central in evaluating the competitive effects of a merger or of a particular business practice. While the modern models advocated by some scholars do allow for an analysis of substitutability, we argue that a single econometric model would not be able to replace the extensive analysis of substitution usually undertaken during a market definition exercise. Therefore, the academic debate about the relevance of market definition is, at its core, a debate about the appropriate methodological approach in competition law investigations and about the role of quantitative tools in competition policy more generally.

We commence with a discussion of the market concept, showing that a market in competition policy is a concept quite different from those used by other economists or management scholars. This difference already explains why market definition can be contentious in competition cases, even when ignoring the incentives of parties to define markets in particular ways. We then explain why market definition enjoys an important position in South African competition cases and a discussion of the challenges facing market definition. Thereafter, we discuss the rationale for market definition in modern competition policy. In particular, we show that market definition is consistent with the eclectic approach in competition analysis. We also highlight the particular empirical challenges faced by econometric models in a subsequent section.

2. The market concept in competition policy

The term ‘market’ is often used colloquially as a reference to capitalism, and even economists tend to use the concept loosely when referring to a process of spontaneous exchange. But the rise of policy intervention in a variety of markets and an increased understanding of the institutional structure of production have led academic economists to view a ‘market’ as a well-defined space with clear boundaries. For example, in institutional economics, Coase (1937) and later Williamson (1975) focused on how transaction costs determine boundaries between firms and their input and output markets. In regulatory policy, interventions in telecommunications and utility markets gave rise to a need for the

explicit delineation of market boundaries (see Theron and Boshoff (2006) for a recent South African application). But it was especially in competition policy that the exact definition of the relevant market became an important topic.

Competition policy aims to constrain the market power of large firms, which refers to the ability to raise prices above the competitive level. In early competition policy, this ability to raise prices was thought to be strongly linked to its size – the larger the firm, the greater its market power. To measure size, competition authorities relied on the market shares of firms. But the calculation of market shares necessarily requires a definition of the relevant market. Therefore, during the 1970s and 1980s US and EU courts *required* the exact definition of the relevant market. In the US, this happened in the famous Brown Shoe case, and in the EU, after the merger case involving Europemballage Corporation and Continental Can Company Inc (Davis and Garcés, 2010: 161).

Market definition became increasingly sophisticated in the 1960s and 1970s, stimulating demand for the quantitative toolkit and the theoretical models of economists. In fact, one could argue that it was specifically in the field of market definition that economics started its gradual ascent in competition policy. However, the increased use of economists did not necessarily render market definition straightforward. While economics can offer significant insights into markets and their processes, the market concept in economics cannot be applied directly to competition policy. There are remarkable differences between market concepts in the various subdisciplines of economics, and these differences are particularly relevant to competition policy, where the exact definition of the market is frequently determinative.

Competition policy focuses on the artificial creation or abuse of market power so that a market is defined as the smallest product and geographic space that is worth monopolising, i.e. it will include all substitutes that constrain the market power of the firm being investigated. A strategic market, in turn, is the smallest possible space in which to be a viable competitor, where ‘viable’ refers to profitability and ‘smallest’ refers to strategic necessity (Kay, 1990). For example, while serving a global market may be a strategic option, local niches may be more attractive so that the strategic market is local despite the option of being a global competitor. An economic or trading market is yet another concept, referring to the smallest space in which the firm “will be forced to charge all consumers exactly the same price for the same good” (Geroski, 1998: 691). This definition is closely linked to the so-called law of one price. Clearly, the set of substitutes that meet the criterion for inclusion in a market for competition policy need not be the same set of products that are included in the strategic or economic market. This variety in market concepts can be a source of confusion in competition investigations. For example, testimonies of businesspeople and

economists before the competition authorities can be based on quite different market concepts (Geroski, 1998).

The difference between a market in competition policy and a strategic market is also recognised in the management strategy literature. This literature distinguishes between a ‘natural’ market and a so-called ‘enacted’ market, and the market concept in competition policy is closely related to that of a natural market (Brooks 1995). The natural market is a collective construct which assumes that firms compete in a common space that can be identified *independently* of the views of a particular firm. This definition of a market accords with the structure-conduct-performance (SCP) paradigm (Brooks, 1995: 537, emphasis added):

“Studies of the performance implications of structural relationships amongst suppliers must be conducted in the context of markets ... since performance effects are dependent on *the interactions between suppliers and customers and on the competition amongst suppliers seeking to serve the same of customers*”.

However, businesspeople may have an ‘enacted’ view of the market, where the market space is an evolutionary, firm-specific construct. In this view, the market space differs depending on the perspective of the particular organisational actor involved. This market construct is consistent with the views of Hayek, who highlighted the emergent nature of economic activity: an individual firm rarely has comprehensive knowledge of the entire market and the various players, and advances its localised knowledge of demand and supply in an idiosyncratic, piecemeal fashion. This inevitably results in different views of ‘the’ market among firms that are grouped into the same ‘natural’ market.

The variety of market concepts explains, at least in part, why market definition is contentious in competition cases. But critics would argue that, even if all players agree that the market refers to a common space of all competitors constraining the market power of the firm being investigated, there would still be significant uncertainty. This contention is important, as the exact definition of the market is an important part of competition law investigations, also in South Africa.

3. Market definition in South African competition policy

The Sherman Act, passed in 1890, and later the Clayton Act, passed in 1914, sought to prevent horizontal and vertical restraints, abuse of dominance practices, and price discrimination in the US. In addition, the Clayton Act also introduced the world’s first merger control regime. More important, this Act also explicitly required the definition of both a product and a geographic market (see the summary in Blair and

Kaserman (2009: 61)). Market definition therefore had already received explicit attention in the early parts of the twentieth century.

Over time, and especially following the rise of economics in competition policy since the 1980s, the US Department of Justice and the Federal Trade Commission (FTC) developed guidelines on how market definition is to be performed. Specifically, these agencies released the so-called Horizontal Merger Guidelines, in which they noted explicitly the type of tests and forms of evidence necessary for antitrust market definition (United States Department of Justice and Federal Trade Commission, 1992, 2010).

The US approach was adopted by other jurisdictions implementing competition policies. The EU adopted a similar approach, with Article 81 and 82 of the Treaty of Rome (like the American Sherman or Clayton Acts) describing the broad contours of competition policy and the need for market definition. Subsequent European Commission Notices (like the Horizontal Merger Guidelines) elaborated on the guiding principles for defining product and geographic markets. Market definition also enjoys an important position in South African competition policy. Policy makers consulted widely when drafting the competition policy regime for post-Apartheid South Africa², drawing on EU, US and Canadian competition policy (Organisation for Economic Co-operation and Development, 2003: 21). The subsequent Competition Act (Act No 89) of 1998 introduced *inter alia* market shares to assess market power (Sutherland and Kemp, 2000), which implies an important position for market definition.

The 1998 Act specifies in Section 7 the following market share conditions for assessing whether a firm is dominant, i.e. whether it has market power (Republic of South Africa, 1998):

- If its market share is greater or equal to 45 percent of the market, the firm is considered dominant.
- If its market share is greater than 35 percent but less than 45 percent, the firm should prove that it does not possess market power. Otherwise the firm is also assumed dominant.
- If its market share is below 35 percent but the firm is deemed to have market power, the firm is assumed dominant.

The market share conditions for inferring market power were met with fierce criticism from some economists, notably Reekie (1999), who argued that the market share thresholds are arbitrary and reflect an underlying SCP paradigm. The Reekie criticism of the Act links with the broader academic and policy

² Apartheid South Africa did have a competition policy regime, but the then Competition Board did not have the same investigative and punitive powers as those allocated to South African competition authorities under the new regime. See: Roberts, S. (2004) 'The role for competition policy in economic development: the South African experience', *Development Southern Africa*, 21(1), pp. 1-17.

debate of the nineties concerning the relationship between high concentration levels in the South African economy and their implication for economic performance. Fourie and Smith (1993) and Fourie (1996) argued that concentration was detrimental to economic performance, while others such as Reekie (1999) and Leach (1992) concluded differently. Fourie and Smith (1998, 1999) highlight the main fault lines in the debate, which has subsequently continued – recent research by Fedderke and Naumann (2009), Fedderke and Szalontai (2009) and Fedderke and Simbanegavi (2008) support the earlier Fourie and Smith findings³, whereas Du Plessis and Gilbert (2007, 2008) and Edwards and Van de Winkel (2005) find evidence to the contrary. Therefore, despite compelling evidence of more competitive conditions in and improved performance of the South African economy following the liberalisation efforts of the 1990s (Frankel et al., 2008), disagreement remains on the impact of concentration on performance in key sectors. Despite this disagreement, the prominence of concentration in the South African policy debate implies an important position for market definition.

The SA Competition Commission indicated early on that it views the SCP paradigm more as a useful organising framework and less as a suitable economic model of competition (see the discussion in Theron (2001)). The Commission highlighted that an SCP organising framework does not necessarily ignore the backward linkages from performance to concentration, as opponents of the SCP paradigm often argue. This is consistent with Smit (1999), who argues that the SCP paradigm provides a useful taxonomy for academic research on competition policy, even if concentration-profit relationships are more complex than the unidirectional form suggested by the SCP paradigm.

In sum, the discussion above suggests that competition policy practice accords market definition an important position in South Africa, as elsewhere. Yet market definition is challenging at best. If a market refers to a common space that includes all competitors that constrain the market power of the firm under investigation, it is necessary to consider exactly how these competitive constraints are measured.

4. The challenges of market definition

The SA Competition Act does not provide formal guidelines as to how markets are to be defined. In the absence of formal guidelines in the 1998 Act, practitioners have adopted a market definition approach consistent with the approach in other jurisdictions, and rely heavily on the US-based hypothetical monopolist (HM) test.

³ Although these authors find a positive relationship between concentration and mark-ups in South Africa, they are careful to point out that the relationship is unlikely to be unidirectional.

The HM test views a market as that product and geographic space that can *potentially* be monopolised by the firm(s) being investigated (Geroski, 1998). The emphasis is on identifying those firms and regions which act as competitive constraints on the firm, preventing it from using its power to raise prices profitably. In fact, the HM test is frequently phrased in terms of a thought experiment, in which the competition analyst defines the relevant geographic market by considering whether the firm under investigation is capable of maintaining a price increase of 5%-10% for a twelve-month period (for example) without a reduction in profits (referred to as a ‘small but significant non-transitory increase in price’ (SSNIP)). The SSNIP test starts with only the geographic area in which the firm under investigation is operating. If the firm’s profits are ultimately adversely affected by the price increase, the geographic market is too narrow. Consequently, a broader geographic market can be defined by including that region from which competition is most likely to originate following the price increase. The thought experiment is repeated and other regions are added until a broad enough geographic market has been defined in which the firm under investigation could raise prices on a profitable and sustainable basis. A similar exercise can be carried out to delineate the product market.

The SSNIP test is a thought experiment and, in practice, empirical measures are required to operationalise the test. In the US, measures related to demand-side substitutability are employed (United States Department of Justice and Federal Trade Commission, 2010: 7):

“Market definition focuses solely on demand substitution factors, i.e. on customers’ ability and willingness to substitute away from one product to another in response to a price increase or a corresponding non-price change such as a reduction in product quality or service.”

Measures of demand-side substitutability usually employed in the US include direct econometric estimates of own- and cross-price elasticity of demand or, as is usually the case, indirect estimates inferred from price relationships, product flows, consumer surveys, industry expert opinions and other qualitative information (see Baker (2007) for a recent survey).

Supply-side substitutability is also important to market power assessment, but receives less attention during the market definition stage. For supply-side substitutability to influence market definition, substitution must be “easy, rapid and feasible” (Motta, 2004: 105), which are stringent conditions in a variety of market settings. Nevertheless, there are conditions where even the threat of entry will constrain price (see, for example, the work on contestability by Baumol, Panzar and Willig (1982)). Notwithstanding this strand of literature, the focus in market definition has remained on demand-side substitutability, and most jurisdictions assign a secondary role to supply-side substitution (Davis and Garcés, 2010).

Theron (2001) notes that South African competition analysts focused mostly on demand-side substitutability in the years immediately following the adoption of the Act. Nevertheless, the Act does not require market definition to be based exclusively on demand-side substitutability and both demand and supply substitution have been important in market definition (Corbett et al., 2010: 7). Even so, measuring substitutability remains a difficult task.

The HM test is a broad concept by intention. In the US, substitutability is broadly defined in terms of 'price constraints', while the EC emphasises price relationships and use. Competition authorities do not wish to be too specific about exactly which characteristics should matter for substitutability, as these characteristics may well be different for different products. Apart from the uncertainty associated with the substitutability concept itself, there is also uncertainty associated with the models used to measure substitutability. The non-experimental data used to infer substitutability and the fact that models often rely only on a subset of information typically create significant uncertainty about empirical assessments of substitutability (Boshoff, 2011).

Given these challenges, critics often suggest that the market definition exercise should be avoided, as the inclusion or exclusion of products may well reflect the preferences of the decision-maker rather than strong empirical evidence. As an alternative, IO scholars propose that econometric IO models can be used to directly assess competitive effects without the need to engage in complex market definition. This proposed strategy may be appealing, given the increased focus on competitive effects in competition policy. Yet the following section shows that market definition provides important information on substitutability central to an analysis of effects. In other words, market definition is relevant to modern competition analysis.

5. Is market definition still relevant to modern competition policy?

An assessment of the relevance of market definition should be sensitive to the type of competition investigation involved. The practice of defining the relevant market first developed in the area of merger investigations. A merger investigation traditionally involves a prospective analysis of the power likely to be created by the merger in the relevant market, and market definition featured centrally in the measurement of such market power. As the competition policy literature developed, the likely effects of a proposed merger (split between so-called 'unilateral' and 'coordinated' effects) have received increasing attention. Nevertheless, market definition retained its importance, as power in the relevant market is often seen as informative in an analysis of merger effects; as noted earlier, practitioners continue to view the SCP paradigm, even if only implicitly, as a useful framework for competition analysis.

As discussed later, the retention of market definition in merger assessment is strongly influenced by a preference for an eclectic empirical strategy. Practitioners prefer to use a range of models and tools and a variety of qualitative and quantitative evidence rather than to rely on a single encompassing model. Market definition is a useful first step to frame such a broad-based analysis. In contrast, some IO scholars insist that a fully-specified econometric model is best placed to predict the effects of a merger. In addition, critics have argued that market definition is an inefficient way of assessing market power, as it is possible to directly measure market power using these models (original work is by Baker and Bresnahan (1985, 1988); Davis and Garcés (2010) offer a more recent discussion). While practitioners have taken note of the empirical criticisms of market definition and increasingly employ advanced econometric techniques in merger assessment, market definition remains the preferred first step.

Competition policy analysis and tools in South Africa are influenced by approaches and quantitative tools in other jurisdictions, but, as noted above, practitioners seem to prefer an eclectic approach that combines a variety of quantitative and qualitative evidence. While modern game-theoretic oligopoly models can be used to directly simulate competitive effects without recourse to market definition, South African practitioners prefer that sophisticated models form part of a broader analysis that also includes the traditional market definition and market power assessment. An example from the literature is Mncube and Ratshisusu (2010), who note that “merger simulation models do not necessarily allow merger analysts to avoid the competitive effects analysis relating to the relevant market, nor do they necessarily provide greater precision to merger control”. This emphasis on broad analysis is further supported by the practical problems of capacity, data and time constraints in the South African context.

Apart from merger evaluation, investigations related to anti-competitive conduct, including abuse of dominance and vertical restraints, also commence with market definition. Market definition in these investigations usually follows the principles of market definition for merger cases. However, in recent years, market definition in abuse of dominance investigations has received particular attention, driven by the shift towards a so-called ‘effects-based’ approach to abuse of dominance cases⁴. Even if such an effects-based approach has not yet been fully or formally implemented, competition cases now focus much less on traditional form-based analysis and more on the economic effects of particular conduct (Gual et al., 2005; Kovacic and Shapiro, 2000; Roeller and Stehmann, 2005). In step with this development, some critics have argued that market definition is less useful under an effects-based approach: dominance inferred from market share is argued to be an inappropriate measure of market

⁴ This follows an earlier shift to an effects-based approach to vertical restraints. Theron and Boshoff (2011) summarise these developments and their relation to South African competition policy.

power and, even if it is, there is not necessarily a causal link between dominance and the competitive effects of particular conduct (see, for example, Niels and Jenkins (2005), and the discussion in Arezzo (2008) and Fisher (2007)).

Proponents of market definition and also legal scholars opposed to breaking with established legal precedent have held that market definition for abuse of dominance cases should be retained, as market shares may provide a useful screen to economise on the efforts of the courts. These proponents concede that market shares are, at best, a very rough proxy for actual market power, but that they are nevertheless useful: if the firm under investigation is not dominant in the relevant market (according to market share thresholds) it is less likely that that firm's conduct could have significant anti-competitive effects (Carlton, 2007). Competition authorities appear to support this view of market definition as a useful screen in abuse of dominance investigations and have retained market definition as the first step in preventing the abuse of market dominance (European Commission, 2008; Office of Fair Trading, 2001).

Practitioners retain market definition as a first step in abuse of dominance and merger investigations because they view market definition as a first screen for assessing market power. But this view ignores that market definition offers a significant other benefit: during market definition, the analyst *identifies and ranks substitutes* for the product sold by the firm(s) under investigation. By treating market definition solely as a means to calculate market share, the analyst foregoes a large chunk of substitution information relevant to an analysis of the competitive effects of either mergers or allegedly anti-competitive practices. Put differently, the best strategy in responding to uncertainty in market definition is not to eschew the drawing of boundaries, but to provide more information to accompany a particular boundary choice.

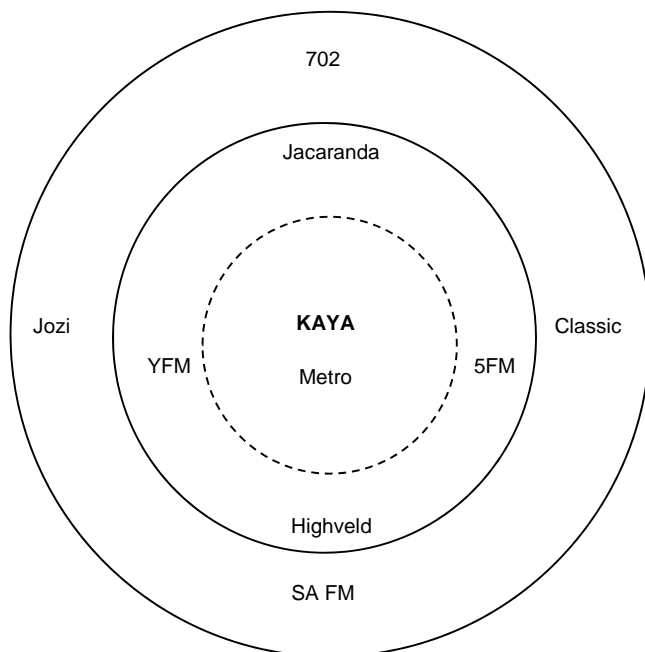
Market definition can be useful under an effects-based approach to abuse of dominance, which requires the analyst to link supposedly anti-competitive behaviour with market effect. Substitution patterns are central to this link: anti-competitive behaviour requires the use of market power, which only exists in the absence of meaningful competitors or the threat of their entry. Market definition therefore assists in assessing the feasibility and possible effects of an allegedly anti-competitive practice – the heart of a competition investigation.

Substitution patterns, and the ranking of substitutes in particular, are also directly useful to a merger investigation. The criticism of market definition as a means of assessing market power usually centres on the fact that market share (i.e. size) is only one factor determining market power. Instead, there is a need for assessing *effective* competitive constraints, i.e. also controlling for countervailing power and the presence or absence of barriers to entry – as these factors can significantly alter the extent of market power, regardless of the size of the firm. But when seen as a ranking of substitutes, rather than an exercise

in drawing explicit boundaries, market definition can also contribute in assessing the efficacy of constraints. For example, by ranking substitutes, market definition can help to keep track of the elasticity of the ‘fringe supply’ – those firms that lie towards the outer boundaries of the market. Fringe supply, in turn, is useful in predicting the likely effects of a market (Blair and Kaserman, 2009: 108).

The challenge is to communicate the ranking of substitutes more effectively in competition cases. The approach of the South African Competition Tribunal in the Primedia/Kaya merger case provides some guidance in this respect. The case involved the acquisition of a partial stake in the Kaya radio station by the Primedia group, which already owned the Highveld and 702 radio stations. In the original judgment, the Tribunal approved the merger without formally defining a market. The lack of a formal market definition led intervening parties to appeal the decision. Following a successful appeal, the Tribunal, in its second judgment, defined markets explicitly but did so flexibly: instead of defining a close set of competitors, it identified sets of closer and less close substitutes, ruling that “it is easier to ask whether A and B are more or less meaningful competitors in a market than, say, B and C than to ask which competitors must be regarded as in the market and which outside of it” (Competition Tribunal, 2008: 18). The Tribunal’s market definition, following the HM thought experiment with Kaya as starting point, can be represented as follows:

Figure 1: The market for Kaya as hypothetical monopolist



This approach is quite useful for the merger analysis. Not only does it allow for a calculation of market shares, but it also provides information about the importance of Highveld and 702 as competitive

constraints for Kaya, allowing the Tribunal to assess the likely effects of the proposed acquisition. Most market definitions reported in competition cases would only report a list of competitors. By also reporting information about the strength of their substitutability, the Tribunal enhanced the utility of the market definition exercise.

Market definition, then, is relevant to both merger cases and investigations related to anti-competitive conduct. Apart from offering a means of assessing market power, market definition is also a first step in organising substitution information central to the evaluation of competitive effects. Proponents of a direct econometric approach would argue that the ranking view of market definition actually supports their argument: if the ranking of substitutes, and not the drawing of boundaries, is the main concern, econometric models can easily perform the task. Econometric models provide cross-price elasticity estimates that allow an analysis of substitutability. We disagree with this and argue that there are significant empirical challenges facing these models, which would prevent their wide-spread use in practice. We deal with this in the following section. But it is important to emphasise here that the criticism of market definition often has less to do with the difficulty of drawing market boundaries than with a preference for a narrow econometric approach to antitrust analysis. The problem is that an approach that seeks to shun market definition in favour of a direct estimation of competitive effects is an empirically inferior strategy, however sophisticated the econometric modelling.

To see why the traditional analysis offers a superior empirical approach it is useful to view competition analysis as a forecasting exercise: practitioners are required to predict the likely effects of a merger or of a particular business practice. In econometric terms, one could say that practitioners are required to generate conditional forecasts, say, of the output effects of a merger. But conditional forecasting opens up a range of empirical identification problems, including the need to establish whether price in any particular case can be viewed as strictly exogenous (Hendry, 1995). It is therefore remarkably difficult to utilise a single econometric model for forecasting – an issue that is recognised by Coate and Fischer (2011) when they evaluate structural model forecasts in merger analysis.

Forecasting performance can be improved when a number of models are collated or when information from a variety of sources is combined (Granger and Jeon, 2004; Pesaran and Timmermann, 2005). The improvement follows because even the best performing forecasting model does not necessarily encompass all other models, so that a combination of models usually outperforms a single model. This suggests that market definition, as an exercise relying on multiple tools, is superior to an approach that seeks to reduce analysis to a single encompassing model.

The classification literature sheds further light on the inherent advantage of a market definition exercise considering different types of quantitative and qualitative evidence. One can interpret a court's task as a classification exercise, where it must classify a merger or business practice as pro- or anti-competitive. The statistical classification literature finds that unobserved variables lead to suboptimal classification rules (i.e. incorrect weighing of probabilities due to incorrect underlying theories) and incorrect classifications (Hastie et al., 2001; Urbakh, 1971). This outcome is likely in the case of many differentiated product markets, as only a portion of the characteristics driving substitutability is usually measured and/or considered. These problems show the need for a range of data and evidence when classifying objects. The problem of limited information has led to the development of model averaging and boosting methods to improve on the decision rule suggested by a *specific* classification model (Hastie et al., 2001: 250). Therefore, similar to forecasting, a combination of classification models outperforms a single model. This lends further support to an approach that maximises the amount of evidence instead of one relying on a single econometric model.

More generally, the use of a single econometric model builds on a social science philosophy that researchers can adequately model economic behaviour and devise improvements in markets⁵. Even if one supports this position, one must concede that knowledge is frequently outdated in the light of continuous change in the economy. Continuous change is important in analysing the dynamic effects of mergers. For example, mergers can upset existing market structures and lead to changes in behaviour, which are not reflected in econometric models built on historical data. Price elasticity estimates of historical consumer behaviour may therefore only offer partial guidance when defining markets. Continuous change in markets requires the use of a variety of sources and tools to collect sufficient and representative information. This preference for variety supports the criticism of 'monocultural' competition policy by Budzinski (2008), who notes the limits of any one paradigm in explaining innovative activity and argues for diversity in economic paradigms, including those of Hayek (1946 [1984]) and Schumpeter (1934). Competition analysis in general is therefore best served by commencing with a market definition exercise employing a variety of tools and evidence.

If market definition frames a broad-based analysis of competition that is superior to a narrow econometric approach, it is useful to also explore the particular limitations of econometric models for the purposes of

⁵ There appears to be a divide in economics between those favouring a rationalist position according to which social science has achieved adequate insights to motivate policy interventions that will effect social change, and those who are optimistic about the capacity of the decentralised process to solve social problems du Plessis, S.A. (2007) "Two optimistic traditions in the dismal science: rationalism and the 'invisible hand'", *Inaugural lecture delivered on 28 February 2007*, Stellenbosch University, Stellenbosch.

market definition. This helps us to understand why market definition is a necessary first step in competition analysis, by showing us that there is more to market definition than simply obtaining estimates of price elasticities. Furthermore we also note that practical considerations in most cases prevent the estimation of such elasticities, which poses a significant challenge to the wide-spread use of direct econometric models rather than the traditional analysis.

6. The empirical challenges facing substitution analysis using econometric models

Quantitative tools for market definition are relatively recent innovations in competition policy (for recent surveys see Baker and Bresnahan (2008), Coate and Fischer (2008) and Carlton (2007)). The first significant use of quantitative techniques in market definition in the EU occurred in the 1992 Nestlé/Perrier case (Neven, 2006). In this case, economists used simple price correlation statistics to test whether the relevant market was limited to still water, or should be extended to include all types of bottled water and perhaps even all non-alcoholic drinks (Davis and Garcés, 2010: 171-172). This quantitative technique was introduced for the specific purpose of using an objective criterion for the definition of the relevant market. Of course, the price correlation statistic (as any other single quantitative technique) is not necessarily flawless, but served to “inform and improve the decision-making process” (Lexecon, 1994). The “Notice on Market Definition” in the late nineties dramatically accelerated the use of a range of quantitative techniques in the EU, holding that “the systematic identification of the competitive constraints faced by ... firms [is] the precise scope of market definition” (Arezzo, 2008: 16).

In the US, quantitative tools have been used relatively longer and a range of quantitative tools have been developed. During the 1980s, quantitative tools for market definition became more sophisticated, mostly due to two developments. Firstly, the rise of cointegration and error-correction models motivated the use of more sophisticated time-series tests of price co-movement. Seminal contributions in this regard include Horowitz (1981), who suggested the use of long-run equilibrium concepts in a partial adjustment model for market definition, and Slade (1986), who pioneered the use of Granger-causality tests for market definition. Secondly, at about the same time, Scheffman and Spiller (1987) developed the concept of residual demand, which allowed a direct, and arguably more accurate, estimation of price elasticity. Residual demand laid the foundation for the increased use of fully-specified IO models for market definition and other purposes.

While both promoted the use of quantitative tools, the two developments contributed to the development of two distinct strands in the literature on market definition tools. The first strand is concerned with extending less data-intensive methods and implicitly promotes the use of a range of quantitative tools – an approach favoured by practitioners. In South Africa too, practitioners have experimented with some of

these less data-intensive tools⁶. Table 1 summarises academic papers explicitly dealing with quantitative tools for market definition, mostly time-series tests of price co-movement.

The second strand is concerned with finding a single encompassing tool for market definition in the form of a correctly-specified empirical IO model. These IO models can provide a direct estimate of price elasticity that is useful in defining markets, as discussed below, and the models have been applied in a range of competition cases. However, there are challenges to models emanating from this second strand and it is useful to consider the main practical and theoretical challenges facing IO models in practice.

Table 1: Quantitative tools for market definition studied in the South African literature

Paper	Quantitative technique	Case applied (if applicable)
Mncube, Khumalo, Mokolo and Nijisane (2008)	Price correlation and univariate stationarity tests on price ratios	Merger between South African steel manufacturers (anonymous)
Boshoff (2007)	Univariate and panel stationarity tests on price ratios	Abuse of dominance complaint against South African dairy processor (anonymous)
Holden (2007)	Armington elasticities for geographic market definition	Range of industries, not specific competition cases
Lexecon (2003)	Stationarity tests on price ratios	Merger between (then) wax producer Schümann Sasol and candle manufacturer Price's Daelite

6.1 Challenges facing econometric models in market definition

Some practitioners argue that price elasticity estimates are the *most appropriate* forms of evidence for market definition purposes (see Hosken and Taylor (2004: 465)). However, econometric IO models also face important challenges if these are to be used for market definition.

⁶ The introduction of the Act in 1998 stimulated interest in economic analysis and tools in competition practice, which is also reflected in growing scholarly interest in competition matters (see, for example, the special section on competition policy in the *South African Journal of Economic and Management Sciences* See: Roberts, S., Klaaren, J., Moodaliyar, K. (2008) 'Introduction to special section on competition law and economics', *South African Journal of Economic and Management Sciences*, 11(3), pp. 247-248).

Firstly, the claim that IO models correctly implement the HM test is incorrect. The problem with using elasticity estimates for market definition is that one is implicitly comparing elasticities to some critical threshold. Bishop and Walker (1998: 70) note this tendency and ascribe this to the “precise language in which the test is described”, which may be interpreted by econometricians as indicating that markets should be defined by the size of a quantitative estimate of cross-price elasticities alone. The SSNIP thought experiment was never intended to be a technical statement about a critical level of price elasticity, but was intended to describe the importance of evaluating competitive constraints when defining markets. This requires a diverse set of evidence, which can include own- and cross-price elasticity estimates.

Secondly, and perhaps more important to practitioners, there are practical constraints facing competition investigations that favour the use of less sophisticated tools: empirical IO models have significant data, time and capacity requirements that are frequently not met – especially in a developing country context such as South Africa. These constraints are not fully appreciated in the industrial organisation literature, even though competition practitioners have flagged them.

Thirdly, and perhaps less important, the use of price elasticity estimates for market definition purposes face the so-called ‘cellophane fallacy’ problem in abuse of dominance cases (Forni, 2004). The name ‘cellophane fallacy’ is derived from the famous US case in which Du Pont, a manufacturer of cellophane, argued, on the basis of a high price elasticity for cellophane, that the material competed with aluminium foil and other packaging in a single market (see Forni (2004: 445-446) and Bishop and Walker (1998: 49)). Typically, the price elasticity of demand is less than unity for lower prices and greater than unity for higher prices. But at which price should elasticity be evaluated for market definition purposes? Usually current market prices are used. However, in a market where firms possess pricing power, the prevailing price will be above the competitive price. Consequently, the corresponding higher elasticity (compared with the competitive situation) will indicate incorrectly that the firm does not have market power. Analysts foreseeing the problem may opt to use a lower price, but such an action leads to circular reasoning. When the purpose of the analysis is to evaluate the possible abuse of market power by a firm, the very goal of defining the market is to ultimately *assess* such market power. Hence, any assumption that the prevailing price is too high indicates that the analyst holds a prior view of market power, before it has been confirmed. Therefore, the use of price elasticity in non-merger competition investigations may be theoretically problematic.

7. Conclusions

Competition policy is concerned with market power and this implies a central role for the market concept. Specifically, competition policy views the market as a common space including all substitute products

exercising competitive constraints on the product(s) under investigation. The first step in most competition investigations is therefore the exact definition of the relevant market, i.e. the identification of all competing products. This allows analysts to calculate market shares, which are seen as proxies for the market power of firms. Indeed, South African competition law, as elsewhere, assigns an important role to market share. Its legal prominence implies that market definition is often contested.

Critics of formal market definition argue that disagreement about market definition is likely to occur quite often in differentiated product markets: the substitutability concept is broad in scope, while the measurement of substitutability faces significant challenges. Therefore, critics argue that the inclusion or exclusion of products may well reflect the preferences of the decision-maker rather than strong empirical evidence. We agree that it is limiting to treat market definition as a binary decision, where a product is either in or out of the market, without any consideration of the weight of evidence for any particular product. Nevertheless, proponents of market definition would argue that market shares still provide a first screen that economises on the efforts of the court or competition authorities. Therefore, despite the difficulties, market definition serves to filter the most problematic cases.

While we agree with the first screen defence, we argue that market definition involves more than a mechanistic exercise for the purposes of market share calculation. Underlying market definition is an analysis and ranking of substitutes based on a broad set of evidence. Such an analysis is directly relevant to understanding the effects of mergers and anti-competitive conduct.

The challenge is to better communicate the ranking of substitutes. Therefore, the approach taken by the Competition Tribunal in the Primedia/Kaya case is an important innovation. While the Tribunal at first refrained from even defining a market, its subsequent decisions contained both a well-defined market and enough information about the relative strength of substitutability. This explicit discussion of a ranking of substitutes is important, as it reflects the underlying substitution analysis that is so often missed by those seeing market definition merely as a mechanistic exercise for market share calculation.

Opposition to formal market definition is often borne out of a methodological preference for a single encompassing econometric model that can be used to model competitive effects. We argue that such an approach faces practical challenges, including significant data constraints in the South African context (and probably also in other jurisdictions), and is suboptimal, given that multiple tools and forms of evidence ensure better decisions.

IO scholars wishing to avoid the market definition step often see it as a step where price elasticities are estimated. But there is more to market definition than simply the estimation of price elasticities. Market

definition in South Africa is often based on the SSNIP thought experiment, which was never intended to be a technical statement about a critical level of price elasticity that determines whether a product should be included or excluded from the market. Instead, the SSNIP thought experiment describes the importance of evaluating competitive constraints when defining markets. This requires a diverse set of evidence. Price elasticity estimates may, in any event, be misleading when dealing with abuse of dominance cases, given the cellophane fallacy. Furthermore, practical constraints facing competition investigations favour the use of tools other than econometric models that do not provide direct estimates of elasticities.

In sum, it is not necessarily correct to argue that market definition involves more uncertainty than other parts of a competition analysis. For example, the competition literature remains far from settled on the competitive effects of a range of vertical matters. Ultimately the uncertainty is best managed by considering a range of tools (including econometric models) – the type of eclectic approach that in any event underlies most market definition exercises. Of course, the field remains open for the further development of tools, especially tools that can add information under conditions of limited data and time. But none of these suggests that we should not think hard about the relevant market in a competition case.

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