MERGER CONTROL - DOES IT MATTER FOR SOUTH AFRICA? A REVIEW OF THE IMERYS SOUTH AFRICA (PTY) LTD AND ANDALUSITE RESOUCES (PTY) LTD MERGER

(ECON7052A)

A Research Report submitted in partial fulfilment of the Degree of
Applied Development Economics Master Programme (CCA01)
in the School of Economic and Business Sciences,
University of the Witwatersrand

by

Beverley Shongile Chomela
Student No: 461577

Supervised by Professor Liberty Mncube

Word count: 18 845

Date: 03 August 2022

Abstract

In April 2015, the Competition Commission of South Africa ("Commission") prohibited the merger wherein Imerys South Africa (Pty) Ltd ("Imerys SA") intended to acquire Andalusite Resources (Pty) Ltd ("AR") ("the Imerys SA and AR merger"). Mergers happen quite often and sometimes in industries that are strategic for the development of a country. It is therefore important that the decisions taken by the competition authorities are the correct ones, and to understand the impact that these merger decisions have on the industries affected. Using the Critical Loss Analysis ("CLA") technique, this research paper has evaluated whether the decision by the South African competition authorities to prohibit the Imerys SA and AR merger was correct. Using the CLA, this research tests whether the economic arguments relied upon by the authorities are internally consistent. The paper finds that the authorities were correct in prohibiting the merger between the two firms. This research finds that that the entire premise which the merging parties were basing their arguments on for the approval of the merger was not true. The merging parties were arguing that they would be capacity constrained in the next two to five years following the merger, which meant that even absent the merger, prices of andalusite would increase. This paper finds that Imerys SA and AR are still not capacity constrained and that the decision to prohibit the merger was correct. If the merger had not been prohibited prices of andalusite would have increased by at least five times more than the pre-merger price levels. This shows that merger control proved to be a good tool for promoting competition and protecting consumer welfare in this case. Therefore, merger control of the kind that South Africa has does matter for the South African economy since it ensures that authorities are able to assess and prevent mergers that lead to build up of market power and ensures that consumers (and small and medium sized firms) are able to get competitive prices.

Acknowledgements

All glory to Jesus my Lord and Saviour who makes me able and through whom all things are possible!

A big thank you to my family and friends, especially my then boyfriend and now husband (this is how long it has taken to complete this report). For always making time to hear my thoughts and exchange ideas, thank you. This is for you too LOML.

A special thanks to my colleagues at the Competition Commission for their support, especially my manager Tamara Paremoer. Your support and understanding has made this possible.

Lastly and importantly, to my supervisor Professor Liberty Mncube, thank you for your constant guidance and invaluable expertise. Thank you for always being understanding and available.

Table of Contents

1. INTRODUCTION

1.1 Background to the study

In April 2015, the Competition Commission of South Africa ("Commission") prohibited the merger wherein Imerys South Africa (Pty) Ltd ("Imerys SA") intended to acquire Andalusite Resources (Pty) Ltd ("AR") ("the Imerys SA and AR merger"). Imerys SA and AR are firms involved in the manufacturing of andalusite in South Africa. Andalusite is a natural mineral that falls within the alumina-silicates group of compounds which possess heat resistant properties and is mainly used in refractories for high temperature industrial processes. Through its subsidiary, Calderys South Africa (Pty) Ltd ("Calderys"), Imerys SA was also vertically integrated and involved in the downstream market for the manufacturing of refractories. The Commission prohibited the merger for numerous anticompetitive findings which led the Commission to believe that an approval would result in lessening and prevention of competition in the South African andalusite market to the detriment of the main users of andalusite, being refractory makers and their customers (i.e., iron and steel industry, ceramic and cement industry, glass industry). In particular, refractory makers and their customers were concerned that, if the merger was approved, they would be disadvantaged of the competitive choice between Imerys SA and AR that they had pre-merger, and that the prices of andalusite would be increase post-merger and/ or that andalusite sales would be diverted from South Africa to export markets.

On 04 May 2015, Imerys and AR, unsatisfied with the findings of the Commission, referred the matter to the Competition Tribunal ("Tribunal") for reconsideration.

On 21 September 2016, the Tribunal also prohibited the proposed merger. According to the Tribunal, the proposed acquisition represented a so-called "two to one" merger, i.e., it would result in a monopoly in the manufacturing of andalusite in South Africa. The Tribunal also held that it would lead to a near-monopoly position by the parties in the international sale of andalusite. Barriers to entry in the manufacturing of andalusite in South Africa were high and there was no credible prospect of new entry in the immediate future in this area.

Further, the transaction involved a permanent structural shift in the andalusite market decreasing the number of suppliers from two to one, resulting in a substantial prevention or lessening of competition. Moreover, the merger raised serious concerns on public interest

grounds, specifically from a small and medium sized business, and an industrial sector perspective.

Unhappy with the Tribunal's decision, Imerys SA and AR then appealed the decision of the Tribunal with the Competition Appeal Court ("CAC") and maintained that the merger should have been approved subject to the remedies they proposed. On 02 March 2017, the CAC upheld the decision of the Tribunal to prohibit the merger. This became the second case where the CAC agreed with the decision of the Tribunal to prohibit a merger out of the five prohibition cases the CAC has considered. The first case was the Mondi Ltd and Kohler Cores and Tubes (a division of Kohler Packaging Limited merger).[1]

The merger described above constitutes the basis for which this research is undertaken. In this report we will conduct the Critical Loss Analysis ("CLA") technique to determine whether the conclusion taken by the competition authorities was correct. CLA is used to measure the incentive of the hypothetical monopolist to impose a small but significant and non-transitory increase in price ("SSNIP"). We provide details of this technique in Section 3 below.

1.2 Merger control

The Competition Act prohibits mergers that are likely to substantially prevent or lessen competition unless outweighed by efficiency gains or justified on certain public interest grounds. Mergers happen when two or more firms combine their assets, control, or ownership of one or more firms. This can have benefits to both the firms merging and customers, because of scale economies, expansion and growth and efficiencies, among other things. Mergers accordingly have the potential of improving the performances of the firms integrating as well as benefitting the economy at large by ensuring that firms' assets are efficiently used (Lyons, 2009; and Barzeva & Grimbeek, 2016).

Merger control is used to ensure that this consolidation of firms that alters the structures of the sectors wherein the merger occurs does not alter firms' incentives to compete. As part of merger control, South African competition law has a mandatory notification requirement for mergers and acquisitions.[2] Merger control, unlike the other components of competition law such as enforcement[3], is forward looking. It seeks to guard against mergers that might result in firms having market power, thereby enabling them to act anti-competitively to the detriment of

[1] Refer to the CAC case No: 20/CAC/JUN02

[22] For firms' whose revenue exceeds a certain threshold that is determined by the Minister of the Department of Trade, Industry and Competition.

[3] Enforcement entails the litigation and prosecution of abuse of dominance and cartel cases. Enforcement is backward looking in that cases are considered once the abuse or cartel conduct has occurred.

competition and consumers in future. Merger control is one of the tools used by competition authorities to ensure that competition is not prevented or lessened through these acquisitions and consummations of firms, and that firms do not build up market power to the detriment of competition and consumers in the various markets.[4]

In South Africa, the objectives of merger control go beyond the preservation of healthy competition to also addressing developmental goals through ensuring that a merger does not negatively impact on public interest. Public interests refer to issues of national interest. The Competition Act requires competition authorities to consider the following public interests when assessing mergers: the impact the merger will have on "a particular industrial sector or region; employment; the ability of small and medium businesses, or firms controlled or owned by historically disadvantaged persons, to effectively enter into, participate in or expand within the market; the ability of national industries to compete in international markets; and the promotion of a greater spread of ownership, in particular to increase the levels of ownership by historically disadvantaged persons and workers in firms in the market" (Competition Act, 1998). It was the view of the competition authorities that if they approved the merger between Imerys SA and AR, there would be negative effects on public interests in that the ability of refractory manufacturers to be competitive (and by extension on their customers, i.e., the various users of andalusite based refractories) would be negatively impacted as they would get andalusite at higher prices and in limited volumes (as will be discussed in detail in the next section).

Economic analysis plays a critical role in the analysis of the potential likely effects of mergers. According to the OECD (2020), "the economic framework for merger analysis provides the scaffolding on which to hang both quantitative and qualitative evidence and analysis of data, documents and witnesses, in order to build an integrated picture of how competition and efficiency are likely to be affected by a merger" (p.2). There are a number of quantitative techniques that may be used in assessing the likely effects of a merger on competition. The choice of the relevant technique will be influenced by various factors, including the availability of relevant data, the resources required and time frames to conduct assessments (OECD, 2020).

1.3 Motivation for the study

In an economy such as that of South African, with highly concentrated markets and markets controlled by a few individuals, it is important to know what impact merger control has,

[4] The Competition Act No.89 of 1998 (as amended) gives the Competition Authorities statutory powers to regulate competition in South Africa.

especially in markets that may be critical for the growth and development of the country. The Imerys SA and AR merger was between the only two companies that mine, process, and supply andalusite. Andalusite itself is an important input for production of refractories. Andalusite based refractories are essential in the steel making process (among other high temperature industrial processes). Iron ore and steel are some of the essential minerals for local and regional growth, industrialisation, and job creation (Jourdan, 2012). Mergers happen quite often and sometimes in industries that are strategic[5] for the development of a country. It is therefore important to understand the impact of the merger decision and to assess whether the decision achieved the intended objectives.

It is well accepted among competition practitioners and policy makers that ex-post evaluation of merger decisions is an important tool for assessing the accuracy of previous decisions taken by competition agencies, for measuring the impact of mergers, as well as for improving on the tools and techniques used by the competition agency when assessing mergers (Kwoka, 2015 & OECD, 2012). In South Africa however, little to no ex-post reviews have been conducted, with the exceptions of those conducted by the Commission[6]. This paper seeks to contribute to the literature by assessing the impact of the decision of the competition authorities in prohibiting the Imerys SA and AR merger. This is done through the application of the CLA technique. This paper uses the CLA technique to test whether the decision that was taken by the authorities was correct, in other words to check if the decision is supported in terms of the CLA technique. Hence, the study also adds to the literature by suggesting whether or not the CLA tool can be a useful tool in predicting the future likely effects of a merger.

1.4 Objectives of the study

The primary aim of this paper is to evaluate whether the decision by the South African competition authorities to prohibit the Imerys SA and AR merger was the correct one. Sufficient time has lapsed since the prohibition of the merger, meaning that the impact of the decision on competition may have already materialised and can be observed.

In conducting this evaluation, the study seeks to fulfil the following objectives that essentially constitute the key question of the study:

- To apply the CLA technique to the Imerys SA and AR merger to evaluate whether the decision to prohibit merger was the correct one. This assessment aims to determine

[5] Strategic in the sense that they are earmarked for the country's development agenda because they have strong forward and backward linkages into other sectors, having job creation potential etc.
[6] For example, in 2011 the OECD (2012) reported that the Commission had undertaken several merger reviews of cases they selected specifically because of the issues raised in such cases and to learn from same.

whether the economic arguments relied upon by the authorities (and thus predicted outcomes) are supported by the prediction of the CLA and economic theory;

- To assess how useful the CLA is as a quantitative tool for assessing the likely future impact of mergers; and
- To assess developments in the andalusite market since the prohibition of the merger, specifically as it relates to capacity constraints that the merging parties were contesting would occur, and whether such changes or lack thereof are attributed to the prohibition of the proposed merger.

The rest of the paper will be divided into the following sections, ii) a summary of the competition authorities' reasons for prohibiting the Imerys SA and AR merger, iii) a literature review on the CLA tool for assessing mergers, iv) the application of the CLA on the Imerys SA and AR merger and findings, v) the developments in the South African andalusite market post the prohibition of the merger, and lastly vi) the conclusion.

2. BACKGROUND SUMMARY OF ISSUES ON THE IMERYS SA AND AR MERGER

2.1 Market Conditions of the Andalusite industry before the merger was proposed

Imerys SA and AR were the only firms involved in the mining, processing, and supply of andalusite in South Africa at the time of the application of the merger. This is still the case to date.

Andalusite is a mineral classified under the aluminosilicate group of compounds. It has an alumina content of roughly 60%. Chamotte[7] and andalusite are the only aluminosilicates mined in South Africa. All others are imported from countries such as China, France, and Brazil. Other aluminosilicates include various clays (with about 45% or less alumina content), silianite and kyanite (with 60% alumina content) and bauxite (with 90% alumina content).

According to the Department of Mineral Resources (2019) andalusite has some advantages over other aluminosilicates because it requires no calcination[8] which makes it a cost-effective raw material. It also has a high thermal shock resistance, good creep resistance and high resistance to chemical attacks. Aluminosilicates are compounds that have heat resistant properties and are primarily used in the manufacturing of refractories.

According to The Refractory Institute (2021) "refractories are ceramic materials designed to withstand the very high temperatures (in excess of 538°C) encountered in modern manufacturing". Refractories are primarily used in the metallurgical industry (i.e., iron and steel industries) to line surfaces that are exposed to heat in numerous industrial processes, such as furnaces and boilers. Refractories are also used to protect production equipment from the high temperatures required for the manufacturing processes (The Refractory Institute, 2021). Refractories are generally categorised into bricks (also called shapes) or monolithic (unshaped) products (dry material in a bag which can be mixed with water and applied to the surface).

[7] According to the CAC Chamotte is the refractory substance obtained from flint clay. It is made by firing and sintering the clay. Chamotte is generally not used on surfaces that will have direct contact with metal or liquid slag, this is due to its relatively low alumina content (around 40%).

[8] According to Encyclopaedia Britannica (2021) calcination refers "to the heating of solids to a high temperature for the purpose of removing volatile substances, oxidizing a portion of mass, or rendering them friable. Calcination, therefore, is sometimes considered a process of purification."

Refractory markets are the largest consumers of andalusite, while the iron and steel industry is the largest consumer of the refractories.[9]

There are vast arrays of sub-categories of different andalusite-based products (especially among monolithic), each of which is specifically formulated and produced by highly skilled refractory product manufacturers ("refractorists") for use in the various linings of vessels designed for specific "applications" (such as ladles, runners, and furnaces) in high temperature industries (such as steel, aluminium, and cement) where molten metal and other materials are manufactured. Andalusite therefore is not an "off-the-shelf" type of product (Tribunal, 2016, p.13). "Demand for refractory minerals is determined by demand for refractories which is in turn driven by the demand for the goods manufactured by processes requiring refractories. Iron and steel typically constitute the major demand at the third level (about 60% in South Africa)" (CAC, 2017, p.3)

According to the CAC (2017), before 2012 there was similarity in the ex-works prices paid by local and foreign buyers of andalusite. However, the total price paid by international customers, which included delivery was significantly higher. As a result of depreciations in the South African Rand, export sales became more profitable. The CAC states that a gap of between 9% and 46% thus emerged between the ex-works prices paid by domestic customers and foreign customers. It was the view of the competition authorities that the export parity price ('EPP') was the price which domestic customers would have to pay if Imerys SA and AR charged them the same prices as the export market.

2.2 A critical assessment of the merging parties' rationale for the merger

Imerys SA and AR argued that they wanted to merge so they could share expertise and know how, share fixed costs and operational efficiencies, and optimise their sales channels. The two firms believed that this could enable them to compete more effectively in the exports markets (Tribunal, 2016). Imerys SA and AR were expecting that there would be a growth in the demand for andalusite exports and that the efficiencies brought by their consummation would enable them to capture a larger share of this demand.

The Tribunal found that this rationale was flawed, stating that the degree to which the merger would enhance the merged entity's competitiveness in the export market is not clear, as both parties were already, before the merger, some of the biggest suppliers in the global andalusite

[9] The Department of Mineral Resources (2019) reports that approximately 73% of refractories are used by the iron and steel industry. Other industries that use refractories include, cement and lime sector, non-ferrous metals, glass industry, cement industry, etc.

market. The Tribunal also noted a critical issue to take cognisance of regarding the rationale for the merger. This was the issue of where local andalusite consumers and users would be left without supply if Imerys SA and AR wanted to increase exports post-merger. This was particularly important in light of the contention that the two firms were making that they would soon be capacity constrained.

The Tribunal also held the view that the two firms' rationale for the merger was in contradiction to their claim that they would be capacity constrained. According to the Tribunal, if these firms would imminently and permanently be capacity constraint, then there would unlikely be any scope for growing export sales, unless the local customers will not be supplied. The Tribunal believed that in the merger enabling the firms to increase exports, then the local andalusite industry would be adversely affected, which would be tantamount to a negative effect on public interest (Tribunal, 2016).

The Tribunal considered the two firms' internal documents to understand the real rationale for the acquisition. The Tribunal found that the market for andalusite had a weakened demand and that there was overcapacity in the production of andalusite which was a problem for Imerys SA as it resulted in price pressure for Imerys SA. To solve the problem of overcapacity and the fierce competition Imerys SA was facing it sought to reduce its own capacity and to consolidate with AR. Therefore, the Tribunal found that Imerys SA's real rationale for the acquisition of AR was to remove the fierce competition that they were facing from AR both in South Africa and the global market and for it to consolidate and reduce capacity in the market for the mining and supply of andalusite.

2.3 The Commission's reasons for prohibiting the merger

The Commission prohibited this merger on the basis that it raised significant competition and public interest concerns in South Africa. With regard to competition concerns the Commission found that the merger would likely result in unilateral effects. Unilateral effects are the negative effects of a merger that come as a result of the merger granting the merged firm the ability to profitably increase prices or degrade quality to the detriment of customers. Customers of the two parties that use andalusite in their manufacturing of refractories would be forced to pay these higher prices because they did not regard other aluminosilicates as substitute products for their processes. Further, imports of andalusite into South Africa would be significantly more expensive, and as such imports would not be an option for customers. The Commission also found that the merger resulted in the removal of an effective competitor, AR, from the

andalusite market, thereby removing the choice customers had in purchasing andalusite. According to the Commission, customers lacked countervailing power to discipline any anti-competitive behaviour by the merged firm. Barriers to entry in the market for mining, processing, and supplying andalusite were also found to be significantly high, suggesting that it was unlikely that new firms would enter the market and discipline the merged entity after the merger. These factors would place the merged firm in a position to be able to profit from increasing prices post-merger without retaliation from customers.

The Commission found that the proposed merger would likely result in input foreclosure, where the merged firm would likely profit from refusing to supply downstream rivals (other firms manufacturing refractories) of Calderys with the important input, andalusite. The rivals of Calderys in the downstream market would then be forced to either stop manufacturing as they do not have the main input and/ or import the andalusite at significantly higher prices, which would lead to them subsequently increasing their prices and thereby enabling the merged entity's downstream firm, Calderys, to profit significantly.

On the public interest grounds, the Commission found that the merger would negatively impact on the refractory manufacturers, specifically the smaller firms with no bargaining power and their customers, specifically the ones in the steel industry, as the primary consumers of refractories. This was because as suppliers of refractories increase prices because of the merger, steel manufacturers (and other customers) would also increase prices and ultimately the consumers of steel (and glass or cement) which are important inputs into other sectors would be negatively impacted.

According to the Commission, the anticompetitive effects brought about by this proposed acquisition of AR by Imerys SA, substantially outweighed any efficiency or public interest benefits. Thus, the Commission proposed for the merger to be prohibited.

2.4 Tribunal's reasons for prohibition

Imerys SA and AR referred the proposed merger to the Competition Tribunal ("Tribunal") for a reconsideration of the decision by the Commission. In assessing the likely effect of a merger on competition, competition authorities must conduct the substantially lessening or prevention of competition test ("SLC test"). This test entails a comparison of the competitive situation with the approval of a merger against the competitive situation without the approval of the merger. In the Imerys SA and AR merger, the Tribunal pointed out the merging parties' case before it hinged on what they believed was the relevant counterfactual absent the proposed

merger and some remedies that were proposed based on the relevant counterfactual. Imerys SA and AR were contending that even absent the proposed merger they would both become capacity constrained, and consequently increase the local prices of andalusite to the levels of export parity pricing ("EPP"). This effectively meant that prices of andalusite would increase in any case, not because of the removal of an effective competitor, but as a result of the capacity constraints in the market.

The parties further contended that when the transaction is considered in line with their relevant counterfactual and the remedies that they were proposing, then the merger was not likely to result in substantial prevention or lessening of competition in the andalusite market and that no negative public interest concerns would arise. The remedies that the merging parties were proposing were in two parts. The first remedy was for the merging parties to conclude a supply agreement with local andalusite buyers for a period of 8 years, with stipulated prices and volume commitments by the merging parties. The second part would be applicable when the initial 8 year period lapses, provided the parties were not capacity constrained yet. This second part also entailed price and volume commitments.[10] According to the Tribunal, Imerys SA and AR based their counterfactual on a number of factors such as their combined highest capacity, that the growth in export demand would increase by between 2.5% and 4.5% annually in the next coming years, and that the two firms would be bound by the constraints in capacity from the next 2 years (starting around 2017) to 5 years (to 2020/2021). The parties to the merger implored the Tribunal to approve the transaction subject to the remedies they were proposing.

The Tribunal had to determine whether both Imerys SA and andalusite would become capacity constrained as per their contention as well as determine by when this would happen. In addition to this, the Tribunal had to determine whether the binding capacity would be permanent over the life of the mine. The Tribunal requested the Commission and the merging parties to narrow down the areas which were in dispute between them. This resulted in a theoretical economic framework for the assessment of the likely effects of the proposed merger on competition depending on the potential counterfactual scenario applicable.

The Commission and the merging parties presented four counterfactual scenarios. Scenario one was where neither Imerys SA and AR is capacity constrained without the merger; scenario two was one where only one firm is capacity constrained without the merger (the status quo);

[10] Customers would be supplied volumes at least equal to their annual volumes in the last three years, price increases would not exceed merged firm's producer price index from the previous year, customers could purchase additional volumes of up to 5% more than previous year's annual volumes, new customers could only purchase up to 14% of merged entity's combined sales.

scenario three was one where both firms are capacity constrained without the merger (This was the counterfactual proposed by the merging parties); and scenario four was one where both parties are capacity constrained, but the market is comprised of strategic buyers. [11] Both the Commission and the merging parties were in agreement that when one of both parties have space capacity to mine, process and supply andalusite then there were incentives to be competitive and win sales from each other, while when both firms are capacity constrained there would no longer be incentives to compete for domestic andalusite customers.

The Tribunal found that the question of whether or not without the proposed transaction the two firms would be capacity constrained mainly depended on two issues. The first being the likely future production capacity, which is dependent on investments of improving the mining and production processes and yields of the parties' andalusite deposits. The second factor was the likely future growth rate in the international demand for andalusite. This, the Tribunal found, would largely depend on future steel production levels given that it was the main driver for andalusite (Tribunal, 2016). The Tribunal concluded that there was no evidence to show that both Imerys SA and AR would become capacity constrained in the future and that they would continue to be constrained into the future for the life of the mine. The Tribunal also held that even if both parties were to be constrained, there was no reason to conclude that it would be permanent over the life of the mine. According to the Tribunal, the factors that impact capacity are not stagnant and are not predictable over a long period. These factors include the "future global demand for andalusite over the long term, future potential investments to increase capacity over the life of mine period and future yields stemming from andalusite deposits with authorisations as well as pending mining rights applications" (Tribunal, 2016, p.72).

Given the lengthy life of the mines absent the merger, that one cannot foresee the future investments of increasing capacity by the parties over the lengthy life of the mines, and the volatile nature of the drivers of andalusite demand over such long periods, the Tribunal found that there was no reason to conclude that both Imerys SA and AR will be capacity constrained and remain so over the life of the mines. The Tribunal added that pre-merger, Imerys SA and AR were effective competitors supplying andalusite at significantly different prices and that the merger would change this. The Tribunal held that they do not expect that the prices of the two firms will be the same even absent this merger unless the parties would be colluding.

[11] Scenario four was advanced by the Commission and later abandoned.

The Tribunal held that the likely and most fitting counterfactual for assessing the competitive effects of this proposed merger was one where one or both Imerys SA and AR are not capacity constrained. The Tribunal noted that both the Commission and the merging parties agreed that accepting this counterfactual would mean that the merger would likely result in anticompetitive unilateral effects. The Tribunal concluded that the proposed merger would substantially lessen or prevent competition in the market for mining, processing, and supplying andalusite in South Africa.

The Tribunal also found that the proposed transaction would have significant negative impact on the entire South African andalusite value chain, specifically on smaller firms. The Tribunal received testimony from the users of andalusite, the refractory makers and their end consumers - the steel makers. These customers all indicated that should the acquisition of AR by Imerys SA be approved, they will be deprived of quality, innovation, customer assistance, and service levels that they have been receiving before the merger as a result of the effective competition between Imerys SA and AR.[12] The Tribunal argued that this proposed merger was not simply a matter of the merging parties being able to compete in the andalusite export markets, but that it also concerned the ability of refractory manufacturers and their customers to compete in their several markets. The Tribunal also noted that the anticompetitive effects of the merger would significantly impact on the smaller businesses that do not have bargaining power.

According to the Tribunal, the merging parties had tendered a set of remedies which were all on the basis of their counterfactual, which was erroneous as discussed above. In addition to this, the Tribunal concluded that the remedies proposed by the merging parties were inefficient and lacking in addressing the anticompetitive and negative public interests that were likely to arise because of the proposed merger. The Tribunal also found that the remedies had considerable costs accompanying them as well as significant specification and evasion risks. From a monitoring and compliance side, the Tribunal found that the remedies were not practical and would unduly burden the Commission. Based on the above, the Tribunal prohibited the merger on 21 September 2016.

[12] According to the Tribunal, customers of the merging parties submitted that AR was a significant competitive constraint to Imerys SA, that prices of Imerys SA's products are much higher than those of AR, sometimes up to 20-30% higher. Customers also stated that Imerys SA become more cautious of its pricing when AR entered the market. Ultimately, the customers held that if the two firms merge, the rivalry between them will be lost and prices will increase.

2.5 CAC's reasons for prohibition

Imerys SA and AR proceeded to appeal the decision of the Tribunal to the Competition Appeal Court ("CAC") arguing that the merger should have been approved subject to the remedies they proposed. After considering the remedies proposed by the merging parties, and its basis that the merged firms would both be capacity constrained by earliest 2018 and latest 2022, as well as rigorously testing the justifications that were offered by the Tribunal in arriving at its decision to prohibit the merger, the CAC held that the appeal should be dismissed. The CAC was of the view that the Tribunal had legitimate reasons to conclude that the remedies proposed by the merging parties could not sufficiently address all the substantial lessening of competition which the merger would give rise to. The CAC was also of the view that there was reasonable possibility that public interests would be significantly disadvantaged once the supply agreement period lapsed. On 02 March 2017, the CAC dismissed the appeal by the merging parties, upholding the decision of the Tribunal to prohibit the merger.

Section 4 employs the critical loss analysis ("CLA") technique to investigate whether the ruling by the competition authorities to prohibit the merger was correct. Before doing so, Section 3 below provides literature on the CLA technique, defining what it is and how it is used in merger control.

3. LITERATURE REVIEW

This section will briefly consider some literature on conducting post-merger evaluations then turn the focus to the literature of the CLA technique.

3.1 EX-POST EVALUATIONS

There is a consensus among scholars and competition practitioners that ex-post reviews of merger decisions are necessary for several reasons, including, evaluating accuracy of previous decisions taken, for measuring the impact of mergers, as well as for improving on the tools and techniques used (Barzeva & Grimbeek, 2016; Kwoka, 2015; & OECD, 2012). There are several techniques for evaluating merger control decisions that may be applied. These include both qualitative and quantitative methods. According to the European Commission (2022) quantitative techniques are those that provide a numerical estimate of whether the competion policy objectives (decisions) are achieved, whereas the qualitiatve technicques do not result in a numerical approximation. The Eurpean Commission (2022) states that quantitatives methods are primarily about determining whether the predicted outcomes by the authorities when making their decicisions have materialised, whereas the quantitatvie techniques focus on determining the causal relationship between the decision of the authority and their intended policy objective. Quantitative techniques include model estimations & simulations, event studies and quasu experimental methods.[13] Qualitative studies include surveys and court judgements.

All the ex-post evolution techniques have their relative strengths and weaknesses, and none of them is perfect. As a result, ex-post evaluation studies tend to use a mix of the techniques to achieve robust results. As Buccirossi et al (2008) argue, ex-post evaluation "techniques cannot be ranked, as each has its advantages and drawbacks". Where possible, a combination of the techniques should be used to ensure that the results obtained are robust. This paper will only focus on surveys and court judgements as the ex-post evaluation method. This is because these are most applicable for the case at hand, the other quantitative methodologies are not applicable due to extensive data requirements and the fact that they are appropriate for instances where the merger actually happens (in our case it was prohibited).

Surveys are a technique where the researcher collects mostly qualitative information through interviews or questionnaires (Huschelrath & Leheyda, 2010). Surveys can either gather the

13

opinions and perceptions of industry players, such as the merging parties, supplier, customers, and competitors, or can target industry experts, competition law and economic experts, and specialised academics (Budzinski, 2010). According the Bunzinski (2010) surveys are conducted because different groups of market participants have varying degrees of knowledge about the impact of a merger control decision, hence, surveys serve to capture all this information. As such, surveys can capture all types of competitive effects arising from the merger control decision, whether qualitative or quantitative (Budzinski, 2010).

However, the disadvantage of using surveys lies in the danger of a respondent bias as market participants may be inclined to give responses or information that may influence future merger control decisions to favour them (Budzinski, 2010; Buccirossi, et al., 2006). In addition, surveys may suffer low response or participation rates (Huschelrath & Leheyda, 2010). These issues affect the reliability of survey results, but the risk can be minimised by drawing a sufficiently large sample size (Budzinski, 2010). One of the main advantages of surveys is that they can also "be applied when virtually no "hard" data is available" … and can be employed to generate qualitative empirical data about non-quantifiable competition dimensions" (Budzinski, 2010, p. 217).

Court judgements are part of the competition policy systems in many countries because the decisions by the authorities are appealed in courts. The courts not only deal with the legal issues of the decision but are also obligated to evaluate the economic arguments underpinning the assessment and decisions of the competition authorities (European Commission, 2022).

Ex-post reviews on mergers are not only aimed at assessing whether the market structures that remain (or result) were accurately predicted, they also consider the accuracy of the analysis (economics and law) that is relied upon by the authorities in arriving at these decisions. This is what Buccirossi, et al. (2006) refer to *"the assessment of the analysis".* The assessment of the analysis is centred around verifying the accuracy and completeness of the set of inferences and assertions made by the Competition Authorities in arriving at their decision (Buccirossi, et al., 2006).

This paper uses surveys to condutct the ex-post evaluation of the Imerys and AR merger, and then applies the CLA technique to ascertain the internal consistency of the decisions by the authority and the courts (the court judgement method). Below we discuss the CLA.

3.2 CRITICAL LOSS ANALYSIS

3.2.1 Definition of the critical loss analysis

In order to assess the competitive effect that a merger between two (or more) firms will likely have on the competition dynamics in the markets where the firms compete/operate, an understanding of the competitive constraints faced by the merging firms is important. Market definition is a framework used in merger assessment to identify the competitive constraints that the merging parties' products or services face in a specific geographic location. In merger assessment, a market comprises of the group of products/services that compete (i.e., are viewed by customers to be substitutes for each other) with each other in a geographic area (ICN Merger Working Group, 2006).

The Hypothetical Monopolist Test ("HMT"), also known as the SSNIP Test (SSNIP stands for Small but Significant Non-transitory Increase in Price) is one of the most used approaches in defining the relevant markets in competition analysis. The HMT considers whether a hypothetical monopolist of a certain product/service would be able to maximise its profit by consistently charging a higher price (i.e., an increase between 5 and 10 per cent).[14] If this hypothetical monopolist will not profit from the increase in price because its customers would switch to alterative products/services, then the relevant market to assess will include all those alternative products/suppliers that customers would switch to. This process is repeated until the point where the hypothetical monopolist would be able to maximise its profit by increasing prices (Motta, 2004; ICN Merger Working Group, 2006; Katz & Shapiro, 2003; and Daljord, Sorgard, & Thomassen, 2007). The merging parties' products and all the alternative products that customers would switch to will then constitute the relevant market. (Motta M. , 2004)

Numerous authors have described approaches to market definition for the purposes of competition assessment. For example, Langenfeld and Li (2001) explain that for the purposes of assessing a merger, a market is defined as "the smallest geographic area and group of products in which a hypothetical monopolist of the relevant products could impose a small but significant non-transitory price increase." (Langenfeld and Li, 2001; p.302). The authors further explain that market definition is employed to identify the main companies that competitively interact with the merging parties.

[14] According to the ICN Merger Working Group (2006) the most common benchmark used for the size of the small but significant non-transaitory increase in prices is the 5 to 10 percent range.

The process of defining the markets in merger assessment is very critical. According to Katz and Shapiro (2003) market definition is important in merger assessments because it enables one to determine the shares of the merging parties in the relevant market, as well as how the proposed merger will impact on the level of concentration. Similarly, Kokkoris (2005) states that the precision of how a market is defined is critical in the assessment of competition harm because the degree of competitiveness of any given market depends on the boundaries of that market.

As important as the market definition process is, it is merely the first step in assessing how a proposed merger will impact on that specific market. Once all the products and geographic areas that place a competitive constraint on the merging parties have been identified (in other words, when the market has been defined), an assessment of whether the merged entity would find it profitable to increase prices is conducted. The consideration of whether the merged entity would find it profitable to increase prices post-merger must take into account the reaction of rival firms in that market.[15] The Critical Loss Analysis ("CLA") is a technique that may be used to both define the relevant market to be assessed and to determine whether a merger would result in the merged entity unilaterally increasing the prices of its goods/services to the detriment of competition (Langenfeld & Li, 2001; O'Brien & Wickelgren, 2003; Harris & Veljanovski, 2003; and Epstein & Rubinfeld, 2004).

The CLA comprises of three steps. The first is calculating the "Critical Loss"; the second step is estimating the "Actual Loss"; and the third and last step is comparing the Critical Loss with the Actual Loss. The Critical Loss can be explained as the percentage of sales that the merged entity can afford to lose following a significant price increase (between 5-10%). Put differently, this is the amount of sales that the merged entity can lose without its profits being reduced following the merged entity increasing its prices post-merger. The Actual Loss, as suggested by its name is the sales that the merging parties will indeed lose following the significant increase in prices.

According to Kokkoris (2005) when a firm increases prices there are two effects that happen. The first effect is that the firm earns a higher margin on the products it continues to sell at the

[15] If prices are increased by this hypothetical monopolist, then the number of products it sells would decrease, however the profit it makes on the products that it does sell would be higher. A price increase by the hypothetical monopolist is only profitable if the higher profits that are made from the fewer products it continued to sell exceed the profit lost in the products not sold (as a result of price increase).

higher price and the second effect is that the firm loses sales because of the higher price. In defining the critical loss, Kokkoris (2005) explains that:

> "critical loss is the percentage reduction in quantity such that these two effects just balance. If the reduction in unit sales is greater than the critical loss, then the price increase will reduce profits. If the reduction in unit sales is less than the critical loss, the price increase will increase profits for the hypothetical monopolist, and the relevant market must not be expanded." (p.2).

Similarly, Langenfeld and Li (2001) state that the CLA "estimates the amount of lost sales that would make a price increase unprofitable, and then asks whether such a price increase would lead to such a loss of sales" (p.301).

In the same vein, O'Brien and Wickelgren (2003) define the CLA as follows: "…given a price increase of X percent, what would the percentage loss in unit sales have to be to make the price increase unprofitable? This loss is referred to as the Critical Loss for an X percent price increase." (p.161). O'Brien and Wickelgren (2003) further explain that if the Actual Loss in sales that would result from the X percent price increase is less than the Critical Loss, then it would be profitable to increase prices.

Similarly, Harris and Veljanovski (2003) describe the CLA as "…the loss in sales or output necessary to make a given price increase unprofitable, and thus it determines the amount of substitution needed to expand a provisional relevant market definition" (p.213). According to Epstein and Rubinfeld (2004) CLA asks: "for a given price increase, what is the smallest loss of sales (in percentage terms) that would make the price increase unprofitable for a hypothetical monopolist? This loss is termed the Critical Loss…" (p. 28). Once the Critical Loss is calculated, the next step is to determine the Actual Loss (Epstein and Rubinfeld, 2004). If the Actual Loss is found to be greater than Critical Loss, then the price increase is unprofitable, which implies that the market is broader that the products of the merging parties and that there would unlikely be unilateral effects or coordinated effects concerns.

Several authors have concluded that the CLA is the tool that makes the HMT/SSNIP test practical. For example, Scheffman and Simons (2003) as well as Kokkoris (2005), explain that the CLA operationalises the SSNIP Test. Kokkoris (2005) states that the CLA calculates how much sales the hypothetical monopolist needs to lose in order for the hypothetical price increase to be unprofitable. Farrell and Shapiro (2008) provide a similar explanation.

3.2.2 Conducting the Critical Loss Analysis

This section explains how the CLA is conducted and essentially outlines the methodology employed in this paper to answer the research question.

As explained above, the CLA is comprised of three steps. The first step is calculating the Critical Loss. This step includes estimating the hypothetical monopolist's initial margin and calculating the volumes of sales that the hypothetical monopolist must lose for the price increase to be unprofitable. The second step is calculating the Actual Loss that will result because of the price increase. The third step of the CLA is assessing whether the Actual Loss exceeds the Critical Loss. If the Actual Loss is greater than the Critical Loss then it suggests that the hypothetical price increase would be unprofitable, thus indicating that the market must be expanded to include the alternative products or suppliers that customers would switch to. For the competitive effects analysis, specifically the unilateral effects, if the Actual Loss is greater than the Critical Loss it indicates that the merged entity would not find it profitable to increase prices post-merger. Below each of the steps of undertaking the CLA is considered in greater detail.

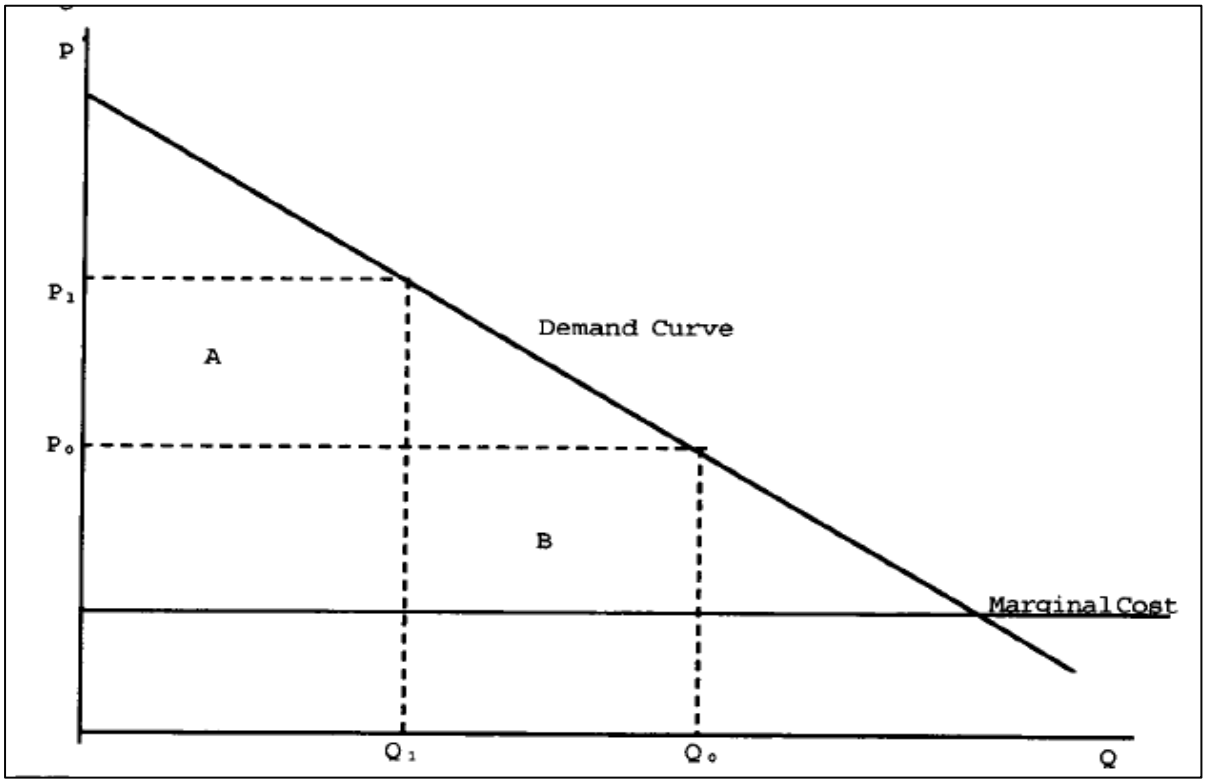
Calculating the Critical Loss

As discussed above, when a hypothetical monopolist increases its prices two things happen. First it will receive higher profits on those products which it will proceed to sell at the higher price and, second, it will lose profits on the sales which it will lose because of the higher prices. The Critical Loss is that point where the higher profits earned from increasing prices and the lost sales are just equal such that the profit of the hypothetical monopolist is in equilibrium, i.e., neither increases nor decreases. Put differently the Critical Loss is the percentage in sales that the merging parties can afford to lose following a significant price increase without reducing or increasing their profits.

The Critical Loss can also be explained graphically as shown in Figure 1 below. According to Langenfeld and Li (2001) when the merged entity increases prices (from P_0 to P_1) it will get a higher profit on the units that it will keep selling, which is depicted as area A. The area B depicts the profit that will be lost from the products not sold. The increase in prices is only profitable if area A is greater than area B. According to the authors, how profitable an increase in price will be depends on (i) the extent of the reduction in sales, that is the difference between Q_0 and Q_1 in the figure, and (ii) the variable cost of output, which is the height of the Marginal

Cost line in the figure. Based on the figure below, the Critical Loss is the percentage reduction in the sales ((Q0-Q1)/Q1) such that area A and B are just equal.[16]

Figure 1: Graphic depiction of the Critical Loss



The merged entity will only find a price increase profitable when the total profit at the increased price exceeds the profit at the initial price. Langenfeld and Li (2001) show this algebraically as follows:

$$(P0 + \Delta P - MC)(Q - \Delta Q) > (P - MC)Q \ldots \text{(Equation 1)}$$

Where P is the initial price, while ΔP is the increased price. MC is the constant marginal cost. Q is the initial quantity sold, while ΔQ is the decreased quantity sold resulting from the price increase. When Equation 1 above is rearranged and combined the following equation is obtained (Langenfeld & Li, 2001):

$$\frac{\Delta P}{P+\Delta P-MC} = \frac{x}{m+x} > \frac{\Delta Q}{Q} \ldots \text{(Equation 2)}$$

[16] Langenfeld and Li (2001) make a distinction between two concepts of critical loss, the profit maximization and break-even critical loss. According to these author "profit-maximization critical loss gives the upper limit on the percentage of sales a firm could afford to lose, if a firm wants to impose the increase to maximise profit" while "break-even critical loss is the upper limit on the percentage of sales a firm could afford to lose before a give price increase becomes unprofitable" (Langenfeld and Li (2001;p303). In their paper, Langefeld and Li (2001) focus on the break-even critical loss analysis for various reasons, including that its easier to assess.

Where x is the percentage price increase $\Delta P/P$; m is the initial margin (P- MC)/P; and $\frac{x}{m+x}$ is the Critical Loss. At the Critical Loss the profits of the hypothetical monopolist will not change as a result of an increase in prices. This is where the two effects of higher profits and loss in sales are in equilibrium. In order for an increase in prices to result in increased profits, the hypothetical monopolist must lose less than the break-even critical loss. Using various groupings of price increases and initial margins one may calculate the Critical Loss. The Critical Loss formula intuitively suggests that the higher the initial margin the smaller the sales that a hypothetical monopolist can afford to lose before a price increase in unprofitable. However, as will be discussed later this may not simply be taken as is, but evidence is required to support whether high margins do indeed indicate a firm can only afford to lose a small amount of sales before a price increase is unprofitable. This is because in some instances high margins indicate that a firm faces an inelastic demand, meaning that its customers are unlikely to switch to alternatives.

There is consensus in the literature that the Critical Loss may be calculated using the equation below (Langenfeld & Li, 2001; Harris & Veljanovski, 2003; O'Brien & Wickelgren, 2003).

$$\mathrm{x}/(\mathrm{x}+\mathrm{m}) \times (100 \text{ per cent}) \ldots (\text{Equation 3})$$

Where x represents the hypothetical price increase (e.g., 5% or 10% and expressed as a proportion 0.05 and 0.10) and m is the contribution margin.

In calculating the Critical Loss, the firm's initial margin prior to an increase in prices is required. The initial margin is the difference between the price that is charged for the last product sold and the marginal cost of producing that product (Langenfeld & Li, 2001). Marginal costs are calculated to include variable costs, which are the costs that change as output changes, and should not include fixed costs.[17] Similarly, Harris and Veljanovski (2003) explain that the margin is the difference between the original price and the average variable cost, as a proportion of the initial price. When estimating the marginal cost in practice, the margin can be overestimated when some variable costs are treated as fixed costs (excluded from the margin estimation), and this will result in the Critical Loss being underestimated or the margin can be underestimated by including some fixed costs as part of the variable costs which may result in the Critical Loss being overstated.

[17] This is as fixed costs do not change when output changes. Firms do not regard fixed costs when determining the profitability of a change in its output (Langenfeld & Li, 2001).

Estimating the Actual Loss

The Actual Loss is the actual sales that will be lost by the hypothetical monopolist after increasing its prices. Estimating the Actual Loss is said to be the most challenging part of the CLA and that it requires extensive data (Harris & Veljanovski, 2003; Epstein & Rubinfeld, 2004; Farrell & Shapiro, 2008; Ezrielev & Simons, 2011). The Actual Loss estimation is difficult because it requires an analysis of how competitors and customers in the market will react following a price increase (Harris & Veljanovski 2003; Scheffman & Simons, 2003). Data on how customers or competitors have previously reacted when prices increased, as well as other qualitative evidence is critical in conducting this estimation of the Actual Loss. Farrell and Shapiro (2008) note that the Actual Loss needs to be linked to the historical pre-merger market dynamics.

The Actual Loss may be estimated in different ways depending on the data and information that is available. These methods include measuring how demand would respond following a price increase. Various econometric models are employed in conducting this analysis. One such model is the Residual Demand Analysis as proposed by Harris and Veljanovski (2003). The Actual Loss can also be estimated by conducting empirical studies of merging parties' and industry data, or by using the linear demand framework (Ezrielev and Simons, 2011).

Another method is conducting natural experiments and considering customers' past purchasing behaviour following price increases. Coate and Williams (2008) suggest that estimating the Actual Loss can be done through natural experiments, where the purchasing patterns in the market are observed and compared with time periods where there were significant price increases, or by considering the purchasing patterns in response to predictions that are made by market players. Actual Loss can also be inferred from evidence when necessary (Coate & Williams, 2008).

Surveying competitors and customers in the market, as well as considering evidence in the merging parties internal documents[18] is another method of obtaining information to estimate the Actual Loss. Langenfeld and Li (2001) suggest that evidence on customers' purchasing and switching behaviour and other competitive variables (such information may be obtained from the merging parties internal documents, market studies and surveys of market participants) and

[18] Internal documents may indicate how the merging parties' customers have previously reacted following price increase etc.

econometric analysis of sales and price data where available may be collected to estimate the Actual Loss.

Another method of estimating Actual Loss is using pre-merger margins to make inferences about the Actual Loss. As will be discussed in the section below, economic theory shows that firms with high margins generally face an inelastic demand compared to firms with lower margins, and that because they face an inelastic demand this indicates their Actual Loss following a price increase will likely be smaller compared to firms with smaller margins. This suggests that pre-merger pricing of the parties provides insightful information relating to substitution by customers and the incentives of the hypothetical monopolist.

Langenfeld and Li (2001) believe that firms that earn high margins have some degree of market power (or are coordinating their conduct with competitors). Similarly, Katz and Shapiro (2003) and O'Brien and Wickelgren (2003) also believe that pre-merger margins indicate important information about the Actual Loss. These authors use the Lerner Index to estimate the sales that will be lost following a price increase. They use the formula:

$$x/m \ldots \text{(Equation 4)}$$

where *x* is the percentage price increase and *m* is the margin.[19] Farrell and Shapiro (2008) find that this methodology of estimating the Actual Loss based on a firms pre-merger margins is correct because firms know their markets and chose the most optimal prices to make profit and that prices chosen during the ordinary course of business are unlikely biased. Coate and Simons (2010) explain that using the Lerner Index and diversion ratios to estimate the Actual Loss may be misleading because the Lerner Index used the marginal cost, which is the cost of producing the last unit while the CLA uses incremental costs, which are the costs related to the output lost as a result of the increase in price. Coate and Simons (2010) state that the elasticity of demand will not be accurate unless the marginal cost can be accurately estimated.

Since estimating the Actual Loss is the most challenging step in the CLA technique, its ability to produce reliable results is affected by the information, data and evidence that is available in the specific case. If evidence from customers and competitors can be gathered, it can always be used to support any estimated Actual Loss. Actual Loss must be determined in consideration

[19] Building on the theory that high margins indicate that the merging parties' products face an inelastic demand, O'Brien and Wickelgren (2003) propose a way to estimate the Actual Loss where the merging parties' products are substitutes. O'Brien and Wickelgren (2003) propose the following formula to estimate the Actual Loss: Actual Loss = $x[1/m\text{-}E^{Cross}]$ Where x is the hypothetical price increase, m is the contributing margin and E^{Cross} is the cross elasticity of demand between the merging parties' products.

of all the evidence on how the sales volumes of the merging parties respond following a hypothetical increase in prices and not on theory-based assumptions only (Scheffman & Simons, 2003)

Comparing the Critical Loss with Actual Loss

The final step in conducting the CLA is comparing the Critical Loss with the Actual Loss. If the Actual Loss is greater than the Critical Loss, it suggests that a hypothetical price increase will not be profitable. For the purposes of defining a market this indicates that the relevant market is broader than the products of the merging parties because when the merged entity increase its prices customers will have alternative suppliers/products to switch to thus making the price increase by the parties unprofitable. Regarding the likely impact of the merger on competition, the Actual Loss being greater than the Critical Loss indicates that the merged entity is not likely to profitably (or unilaterally) increase prices (O'Brien & Wickelgren, 2003; Epstein & Rubinfeld, 2004). This is, if the reduction in sales (the Actual Loss) is larger than the Critical Loss, then the increase in prices will not be profitable. Contrary, if the decrease in sales is smaller than the Critical Loss, then the price increase will be profitable (Katz & Shapiro, 2003).

3.2.3 Criticism of the Critical Loss Analysis

The CLA like numerous other models and techniques is not without criticism. It has been criticised by several authors for varying reasons, of which criticism ultimately puts into question the integrity of the CLA in making complete and accurate conclusions on market definition or competition effects of mergers. This paper discusses some of the main criticism of the CLA below.

The first criticism discussed in this paper relates to the types of products that the CLA is applied to. Some authors believe that the CLA is not accurate when applied to differentiated products because when it was developed it was applied to homogenous product markets with assumptions of competitive markets having the same prices, costs, and margins. The criticism is that where these variables (prices, costs, and margins) vary between firms then it is difficult and/ or impossible to employ the CLA in its original form. Langenfeld and Li (2001) argue that the CLA is often incorrectly or incompletely applied in merger assessments involving differentiated products as the methodology was developed using homogeneous products. Likewise, Coate and Williams (2008) agree that the CLA is a suitable technique for markets where the products are homogeneous while it becomes more complicated where products are

differentiated as the CLA is based on the industry margin and in differentiated products markets the margins will be different.[20] The CLA is found to be most suitable for homogenous product markets and that it may require generalization when applied to markets with differentiated goods (Coate & Simons, 2010).[21] In this instant paper, this criticism is not a concern because the andalusite supplied by the two parties is homogeneous and it was agreed by both the parties and competition authorities that other alumina silicates were not substitutes for the andalusite, thus one product, andalusite is what is being considered and the margins and costs are not expected to vary substantially.

A second criticism relates to the percentage change in the price, Kokkoris (2005) states that the Critical Loss formula is dependent on the degree of the price increase. In some instances, applying a 5% SSNIP may not be profitable while a higher percentage could be profitable. This has been found to have resulted in an underestimation of the merged firm's ability to profitably increase prices. Related to this, is the criticism that the CLA does not account for the different elasticities that a firm faces from different groups of customers because the use of a product may have different substitution possibilities and thus the demand for the said product may be inelastic for some customers while elastic for others. A firm may be in a position to increase prices and forego the customers with an elastic demand while it exploits those customers with an inelastic demand (Kokkoris, 2005).

Thus, in such instances where products face different elasticities, the CLA may produce misleading results (Kokkoris; 2005). Similarly, Pittman (2018) argues that the CLA approach may miss that the merged entity may find it unprofitable to increase prices by a small SSNIP, and rather find it profitable to increase by a large SSNIP to exploit those customers with an inelastic demand, while sacrificing the elastic demand customers. Therefore, the application of the CLA on a small SSNIP and not considering higher price percentages may lead to incorrectly classifying the markets broader than they actually are. Some proposals that are offered to address this limitation include considering the CLA on more than one hypothetical price percentage increase (i.e., SSNIP) and that a consideration on the dynamics of the market and specifically whether customers all face the same elasticities, and whether those with inelastic demand could make a SSNIP profitable (Pittman, 2018). This research paper applies the CLA on various SSNIPs (as will be seen in Section 4) to ensure that the findings are wholistic.

[20] "Each firm faces a demand curve for its unique product (dependent, of course, on prices of other goods in the market, along with exogenous control variables), and no single market-wide price or output level exists." (Coate and Williams, 2008; p.1005)

[21] The generalisation will depend on the SSNIP prices and how they impact on the Actual Loss.

The third and most publicised criticism of the CLA relates to high pre-merger margins which, because of the way the CLA formula is constructed (as seen in Equation 3), suggest a smaller Critical Loss. The CLA formula is constructed to suggest an inverse relationship between pre-merger margins and the Critical Loss. Therefore, a smaller Critical Loss indicates that the merged firm will only afford to lose a small number of sales and still find it profitable following a price increase. As explained above, if the hypothetical monopolist can only afford to lose a small number of sales it means customers have alternatives to turn to and that the markets will be broader, thereby suggesting that a unilateral price increase post-merger is unlikely.

Several authors, including Langenfeld and Li (2001), Katz and Shapiro (2003), O'Brien and Wickelgren (2003), and Kokkoris (2005), argue that merging parties have incorrectly argued for broader markets because of having high pre-merger margins. The merging parties' position would be that any loss of profit has a significant effect on their profitability. These authors criticise the CLA approach stating that it is not complete nor is it in line with economic theory because it ignores the fact that high margins are also an indication of a firms' inelastic demand. This criticism is primarily premised on the Lerner Index, that a firm that maximises its profits will set prices such that there is a negative inverse relationship between margins and its elasticity of demand (Pittman, 2018).[22] Relying on the principle of an inverse relationship between margins and elasticity of demand, Katz and Shapiro (2003) and other authors argue that high gross margins indicate that firms are faced with an inelastic demand, which suggests that the Actual Loss will be small because customers are not likely to switch products following a SSNIP increase.[23] Similarly, O'Brien and Wickelgren (2003) explain that where parties have set their pre-merger prices to maximise their profits, higher margins indicate that customers are not sensitive to price because if customers were sensitive to current prices, then firms would have implemented price cuts to increase sales and the current prices would therefore not be profit maximising.

[22] These criticism of the CLA are themselves criticised for having some limitations, for example, Scheffman and Simons (2003) believe that the CLA is purely arithmetic and does not provide any information about the Actual Loss and that the determination of Actual Loss should be evidence based. Scheffman and Simons (2003) belive that authors like Kats/Shapiro and O'Brien and Wickelgren are misten in imposing pricing theories to make assumptions about the Actual Loss as they move the CLA from being arithmetic. Coate and Simons (2010) state that the Lerner Index and firm level assumptions/approaches proposed to make the CLA better always result in narrow markets, they consider firm level outcomes while CLA is at industry level and the use of aggregate diversion ratios and Lerner Index to estimate elasticies imply that all horizontal mergers result in price increase.

[23] Katz and Shapiro (2003) argue that firms set the prices they do because they are the most profitable and therefore inferences about customers price sensitivity can be made and inferences about the likely actual loss. Katz and Shapiro (2003) argue that economic theory states that rational firms set prices such that there is an inverse relationship between margins and its elasticity of demand (i.e., CM=1/E, where cm is the margin and E the elasticity of demand)

Similar to the authors above, Kokkoris (2005) believes that high margins may provide information about the amount of sales a firm would lose following a price increase. However, Kokkoris (2005) recognises that high margins are not only a result of a firm facing an inelastic demand but may also be attributed to efficiencies in production processes, economies of scale and scope, etc (factors not related to price sensitivity). Kokkoris (2005) finds that "…no accurate conclusions can be drawn regarding the relationship and link between high margins and low elasticity as well as between high margins and low actual loss." (p.6). The author also suggests that in markets that have anticompetitive structures, the efficiency and accuracy of the CLA may be limited by the cellophane fallacy.[24] This is because the high margins may be a result of the dominant firms charging monopoly prices (using their market power) and therefore the conclusions made about the Actual Loss resulting from the price increase may be inaccurate (Kokkoris, 2005). Farrell and Shapiro (2008) also explain that the use of pre-merger margins to estimate Actual Loss can be misleading because firms do not always set prices to maximise profits for various reasons, including accounting for their complementary products, loyalty of their customers, reputation, network effects etc., such factors are not accounted for in the Lerner Equation. Therefore, when estimating Actual Loss, it may be better to not place too much weight on the pre-merger prices and rather find evidence of the price sensitivity of customers. As will be discussed in greater detail in Section 4 below, in this paper we will not only rely on the firm's pre-merger margins to estimate the Actual Loss. We also consider the views of customers regarding substitutability and alternative supplies.

When conducting the CLA, competition practitioners should not merely conclude that because there are high pre-merger margins it implies that the Critical Loss will be small and therefore the merged entity will unlikely find increasing prices profitable. Practitioners should instead be cognisant that high pre-merger margins may indicate that the merged entity faces an inelastic demand and that customers are unlikely to switch to alternative products or suppliers even if prices increased, and therefore that the Actual Loss may likely also be small. Evidence of the market dynamics is what needs to inform the conclusions made about what high margins mean.

A fourth criticism of the CLA is that it does not take into account that there may exist substitutability within the portfolio of the merging parties' products - what the critics term the "diversion ratios or cross elasticities of demand". The arguments here are that because the merged firms' other products could retain the sales that would be lost when one product's price

[24] The cellophane fallacy is the idea that if a firm has market power and is already abusing its market power by charging high/monopoly prices, applying a SSNIP test (significant price increase) may not provide an accurate indication of what would happen in the market because prices are already exorbitant.

increases, the CLA undermines how profitable the lost sales may be by not considering the gain to the other products of the parties. Katz and Shapiro (2003) make use of aggregate diversion ratios to correct this and estimate the Actual Loss. The aggregate diversion ratio is defined as the sales lost by a specific product as a result of a price increase that is gained by other products in the market. Katz and Shapiro (2003) argue that the merged entity will still retain a fraction of the aggregate diversion ration through its other products in the market. Katz and Shapiro (2003) state that when the aggregate diversion ratio exceeds the Critical Loss, then the Actual Loss will be less than the Critical Loss, meaning that a merged entity would find significantly increasing prices to be profitable.

Similarly, O'Brien and Wickelgren (2003) introduce cross elasticities in the Actual Loss calculation to account for the sales captured by the merged entities' other products. According to O'Brien and Wickelgren (2003), the greater the degree of substitutability between parties' products the more likely that the merged entity will profit from a price increase in one product because the lost sales will be captured by its other products. These authors argue that if margins are high then the diverted sales (as a result of the price increase in the one product) will be very profitable and thus incentivising the merged entity to increase prices[25] (O'Brien & Wickelgren, 2003). This criticism of cross elasticity does not apply in this instant case because the merging parties did not have other products in their portfolios that are substitutes of andalusite, as already discussed above there were no economic substitutes for the andalusite supplied by Imerys SA and AR. The CLA is still applicable in its original form.

Similar to the criticism about accounting for substitutability between the merging parties' products, Langenfeld and Li (2001) criticise the CLA for not accounting for the reaction of other firms (non-merging parties) in the market, who in line with economic theory will also unilaterally increase their prices when the merged entity increases its own. This unaccounted unilateral increase of prices by rival firms in the market then results in the CLA overstating the Actual Loss, which then leads to very broad market definitions.[26] Imerys SA and AR were the only two suppliers of andalusite in South Africa, therefore there are no other firms that would need to be accounted for. This means that the CLA will still be a good technique in this case.

Another criticism of the CLA relates to the calculation of the marginal costs that forms part of the margin as shown in section 3.2.2 above. According to Pittman (2018), in practice firms do

[25] Where there are no new entrants, products being repositioned or gains from efficiencies.
[26] Langenfeld and Li (2001) propose that the residual demand elasticity be used to estimate the Actual Loss because it accounts for the rival firms unilateral price increase following the merging parties price increase. While the Marshallian does not.

not calculate marginal costs in their ordinary undertakings of their businesses, instead they calculate variable cost. The variable costs are what is mainly used to proxy for the marginal cost in the CLA which may impact on the accuracy and accordingly conclusions drawn from the CLA (Pittman, 2018).[27]

Some of these criticisms of CLA have themselves been criticised by others, for example, Scheffman and Simons (2003) criticise the 2003 papers by (Katz & Shapiro, 2003) and (O'Brien & Wickelgren, 2003) for imposing pricing theories to make assumptions about the Actual Loss, while the CLA is purely arithmetic. Scheffman and Simons (2003) believe that these two papers assume that parties make assertions about high margins and therefore small Critical Loss without any evidence or proof, which is inaccurate.

3.2.4 Benefits of using the critical loss analysis in merger assessment

The CLA is applauded for being a straightforward, easily applicable, and very useful technique that adds rigour to the exercise of defining markets and the analysis of the effects on competition in merger assessment (Harris & Veljanovski, 2003; Kokkoris, 2005; Scheffman & Simons, 2003). In the traditional way of defining markets a lot of focus was placed on the characteristics and the price differences in the products. The CLA added to this by providing a way of actually determining whether increasing the prices of these products will be profitable post-merger. As such, literature (including Harris & Veljanovski, 2003; Scheffman & Simons, 2003; Kokkoris, 2005) finds that the CLA corrects several shortcomings in the traditional market definition approach which is largely focused on the characteristics of the products and absolute price differentials while ignoring the profitability resulting from an increase in price. In essense they believe that the CLA operationalised the HMT as well as giving rigor to the process of defining markets. In addition, these authors also find that the CLA is useful not only in assessing unilateral effects, but also in assessing coordinated effects.

Another advantage of the CLA is that it is purely arithmetic and can be applied to any case. According to Daljord, Sorgard, and Thomassen (2007) the CLA is not premised on strong economic assumptions which renders it general and applicable while also requiring a small number of variables, namely, margins, and demand sensitivity to price changes.[28] As also

[27]There are also challenges in how accountants treat fixed and variable costs, which may also impact on the estimations of the CLA. Another measurement issue relates to costs that are shared between different products that a firm produces that are not apportioned to specific items in recording them (Pittman, 2018).

[28] Scheffman and Simons (2003) also find that the "significance and generality of CLA lies in its ease of practical application and from the fact that it is merely *arithmetic* based on the assumption that a rational firm will not change price unless it expects, as a result, that its profits will not fall."

explained by Coate and Williams (2008) the main advantage of the CLA is that it is straightforward and only the industry profit margins are required to calculate the Critical Loss as well as an estimation of the Actual Loss in sales.

3.2.5 Conclusion on the Critical Loss Analysis

The CLA has been widely applied in many merger cases and across different jurisdictions. It is a widely accepted, easy and useful quantitative technique for defining markets and assessing unilateral price effects of proposed mergers. The CLA is not very data intensive, and it adds rigour to the market definition process. Like numerous other techniques, it does also have some shortfalls and limitations as discussed above. Notwithstanding the challenges that the CLA may have, when correctly applied it provides competition practitioners with the correct answer on the likely incentives of the merging parties as it relates to post-merger pricing. Importantly, for the current study, several of the shortcomings of the CLA such as product differentiation, using one SSNIP, and not accounting for cross-price elasticity of demand are not applicable as explained above. As such, the CLA can be applied in this paper without concerns about some of the shortcomings identified in literature.

4. APPLICATION OF THE CRITICAL LOSS ANALYSIS ON THE IMERYS SA AND AR MERGER

4.1 Critical Loss

The merging parties financial data used in this section is obtained from AR's and the Competition Commission's records. Other data on prices and the views of customers is obtained from the Tribunal's report.[29]

The first step in conducting the CLA entails calculating the Critical Loss value using the following formula *x/(x+m)* as shown in section 3.2.2 above. Where *x* is the hypothetical percentage that prices will increase by. In our calculation of the Critical Loss, we considered several hypothetical percentage price increases, namely 5, 10, 15, 20 and 30 % increases respectively. This is to ensure that the criticism as detailed in the previous section of the Critical Loss formula depending on the magnitude of the price increase is addressed. To calculate the industry margin (*m*), we have used Imerys SA and AR's revenue and cost of sales data as reflected in their financial statements for the years 2013 and 2014.[30]

Table 1 below shows the different percentages of andalusite sales volumes that the merged entity would be able to forego without losing any profit should they increase the prices of their andalusite products by between 5 and 30% post-merger. The table considers both 2013 and 2014.[31]

Table 1: Critical Loss for 5, 10, 15 and 20% SSNIP

Industry Critical Loss	5%	10%	15%	20%	30%
2013	18%	30%	39%	46%	56%
2014	13%	23%	31%	38%	48%

Source: Own calculations based on merging parties 2013 and 2014 annual financial statements

[29] The data and therefore actual calculations cannot be presented as they are confidential and subject to the confidentiality undertakings signed as part of obtaining the ethical clearance. See clearance certificate Protocol Number: CBUSE1800.

[30] In using the merging parties' financial statements to estimate the margin there are some drawbacks, specifically as it relates to Imerys SA data because this firm's andalusite activities are conducted by two of its subsidiaries, one of which is also involved in mining of products other than andalusite which may impact on the revenue and costs that are associated with the andalusite activities which are the product of concern in this merger.

[31] The reason for using 2013 and 2014 data is that the merger was notified to the competition agencies in January 2015.

From the table above we see that based on 2014 data, if the merged entity increased its andalusite prices by 5% it could afford to lose at least 13% sales before the price increase become unprofitable. Whereas if it increases its prices of andalusite by 15% it could afford to lose at least 31% of its sales before the price increase become unprofitable. As explained in the literature review section, the Critical Loss figures on their own do not tell us anything, they must be compared with the Actual Loss to determine whether the merged entity would find increasing the prices of andalusite profitable. Below we estimate the Actual Loss.

4.2 Estimating the Actual Loss

The Actual Loss is the amount of sales that the merged entity will actually lose following a significant price increase. As explained above, literature proposes several ways in which the Actual Loss may be estimated depending on the data available. These range from employing econometric models, such as residual demand analysis, empirical studies of merging parties and industry, conducting natural experiments and considering customer past purchasing behaviour following price increases.

In essence, estimating the Actual Loss requires an understanding of how the consumers of andalusite would react in the event that the merged entity increased its prices of andalusite. In estimating the Actual Loss, we considered customers' views[32] on switching to other products or suppliers in the event of a price increase by the merging parties. We found that, in the merger in question, Imerys SA and AR were the only suppliers of andalusite in South Africa. They both mined and supplied fine to medium sized andalusite primarily to producers of refractories.

The customers of the merging parties, specifically the refractory manufacturers, were only using locally sourced andalusite in the manufacturing of refractories pre-merger. At the time of the merger, none of these customers were importing any alternative aluminosilicates raw materials for use in manufacturing refractories. The refractory manufacturers testified before the Tribunal that other products such as bauxite and chamotte that may be considered substitutes of andalusite in producing refractories are not economically viable alternative inputs that these customers could switch to in producing refractories. For example, chamotte contains a lower percentage of alumina and would need to be combined with other higher containing aluminosilicates, which has implications on the final product and performance of such a

[32] The views of customers in this section are as obtained from the Tribunals report.

refractory.[33] Bauxite, which has an even higher alumina content than andalusite as described in section 2.1 is significantly more expensive and not mined in South Africa. The price of bauxite was estimated to be 30% or higher and added to that were challenges of a volatile exchange rate and a consistently weaker Rand (Tribunal 2016). Some of these customers had previously tried switching from andalusite to other raw materials and faced significant switching costs that go beyond the price of the alternative raw material and include costs of reengineering the products and running trials to see how they perform. These are also compounded by refractory users that are resistant to the smallest variation in the characteristics of the products.[34]

Post-merger the merged entity would be the only supplier of andalusite. Imports were not a readily available substitute because they are at least 30% more expensive than andalusite, are subject to a volatile exchange rate and require substantial modification (which also adds to the costs of imports). Therefore, the merged entity could be able to increase the price of andalusite by more than 30% before customers would consider switching to imports. In other words, because customers stated that imports are at least 30% more expensive than andalusite (not considering the other costs associated with trialling products using other inputs), the merged entity could afford to increase prices by up to at least 30% before it loses sales from local customers. Based on this, the Actual Loss would be 0% for up to at least a 30% price increase in andalusite. Table 2 below illustrates this point.

Table 2: Estimate of Actual Loss based on import prices of substitute products

	5%	**10%**	**15%**	**20%**	**30%**	**>30%**
Actual Loss	0%	0%	0%	0%	0%	≥ 0%[35]

Source: Own estimation based on Tribunal and CAC reports

[33] One of the customers the Tribunal interviewed explained that *"the chamotte will be inferior in the amount of alumina that's in it. So it will … you will have to compensate for that with having to add something with a higher alumina value in your matrix, to make it to compensate for that and that's also imported stuff that's very expensive. And also the density of the chamotte is lower again, than the Andalusite and there's a lot of other properties that's different. So it definitely changes the characteristics of the products and lots of times your customers are buying the product for the current characteristics that it has, because that's why it works for them and that's why it works well in their application"* (Tribunal, 2016; p. 36). Another customer submitted to the Tribunal that *"To upgrade chamotte to that acceptable level, you have to use bauxite which is imported, which has to be treated and comes in Dollars. So it's impossible to get it landed for the same price. I would assume the price difference would be in the order of 30% plus if not closer to double and from our experience and trials we did, unlikely you will get any performance increase"* (Tribunal, 2016; p.36)

[34] Some of these refractory manufactures were also stating that their customers are very sensitive to variations in the products, that even when the products have a slightly different colour perhaps because of using raw material from a different supplier the customers do not think it's the same product and complain that it does not perform.

[35] At a price increase greater than 30% the Actual Loss may be greater than zero for the reasons explained above.

The other way to estimate Actual Loss is by considering the submission that the merging parties were making that they would be capacity constrained in the next couple of years (from approximately 2015). Because of this capacity constraint, the merging parties were arguing that prices of andalusite would increase to export parity levels.[36] The local prices of andalusite were pre-merger significantly below the export parity prices. According to the CAC (2017), from around 2012, the difference between local ex-works prices (prices that exclude transport costs) and foreign ex-works prices for andalusite ranged from 9% to 46%. The merging parties' contention of capacity constraints and consequent increase in prices to export parity levels indicated that they would be able to profitably increase the prices of andalusite from between 9% to 46% and not lose any sales (at least from the international customers). The South African domestic customers were not able to consume all the andalusite produced, a substantial amount of it was exported to China and Europe (CAC, 2017). From this we can conclude that from a 9% to 46% increase in price the Actual Loss that the merged entity would incur would be 0%, as depicted in the table below.

Table 3: Estimate of Actual Loss based on export parity prices

	9%	**46%**	**> 46%**
Actual Loss	0%	0%	≥ 0%

Source: Own estimation based on Tribunal and CAC reports

4.3 Comparing the Critical Loss with the Actual Loss

The final step of the CLA is comparing the Critical Loss with the Actual Loss. As detailed in the section 3.2.2 above, when the Actual Loss is greater than the Critical Loss it indicates that the merged entity will not find it profitable to increase the prices of andalusite. In our assessment (as summarised in Table 4 below) the Actual Loss is less than the Critical Loss (whether we consider the 2013 or 2014 Critical Loss) for all hypothetical price increases including the 30% and 46%.

Table 4: Comparison of Actual Loss and Critical Loss

	5%	**10%**	**15%**	**20%**	**30%**	**46%**	**>46**
Actual Loss	0%	0%	0%	0%	0%	0%	≥ 0
Critical Loss (2014)	13%	23%	31%	38%	48%	58%	≥ 58%

Source: Own calculations based on Tables 1, 2 and 3 above.

[36] As explained by the CAC, at this point where the merging parties would be capacity constrained they would not have any incentives to supply local customers at prices lower than the export parity if they could supply all their andalusite to international customers.

The Actual Loss being less than the Critical Loss at the price increases of between 5 and 46% suggests that the merged entity would find it profitable to increase the prices of andalusite for local customers. For the purposes of defining the market these results indicate that the relevant market to be assessed would be the narrower market for the mining and supply of fine and medium sized andalusite products supplied by Imerys SA and AR. The merged entity would find it profitable to significantly hike prices because their local customers would not have alternative suppliers or input products to switch to even if the merged entity were to increase its prices by up to 46%. These results also suggests that the geographic market is likely the narrower South African market. This is in line with the submissions of the customers of the merging parties to the Tribunal which suggested that they do not import any andalusite or substitute products even pre-merger as the import prices are substantially higher.

The Actual Loss being less than the Critical Loss also provides important information that the merged entity would likely profitably unilaterally increase prices of andalusite post-merger. The merged entity would be able to do this because local customers do not have alternative suppliers, and should they stop purchasing the merged entity's products, the merged entity will simply supply the foreign customers which it already supplied at a significantly higher price.

4.4 Conclusion on the application of the CLA

The above application of the CLA is consistent with the findings of the South African competition authorities in this case. The CLA showed that the merging parties could profitably significantly increase prices. This indicates that the relevant market for consideration was the narrower South African market for the manufacturing and supplying of fine and medium grade andalusite (the products that overlapped in the parties' activities). Because customers would not have alternative suppliers/products to switch to. This market definition is in line with how the authorities had defined the markets in this case. The application of the CLA also suggests that the merged entity would be able to unilaterally increase prices of andalusite for the South African consumers without any constraint from imports or other inputs. The results of the CLA indicate that the competition authorities were correct in prohibiting the merger between Imerys SA and AR on the grounds that the merger would likely lead to unilateral price increases for andalusite.

The CLA also reveals that customers were correct to be concerned that the proposed merger would remove competition between Imerys SA and AR in South Africa, and that the merged

entity would increase the prices of andalusite and channel all its sales from South Africa to the export market as exports were at higher prices compared to the local customers.

From the above application of the CLA, it is evident that it can be an easy and useful quantitative tool for defining markets and assessing the likely future impact of mergers. This is especially so, for markets where the products are homogenous and the industry margin can be easily estimated, as was the case in this instant transaction. The CLA may be a more useful tool when used together with other quantitative or qualitative techniques. In the Imerys SA and AR case the qualitative evidence from customers on the lack of substitutions for andalusite for example, were critical in estimating the Actual Loss.

5. POST-PROHIBITION DYNAMICS IN THE ANDALUSITE MARKET

The data and information that has been used in conducting this section of the dynamics of the andalusite market after the prohibition of the merger have been obtained from surveys that were done for this research. The surveys were in the form of written requests for information and interviews with customers; an international competitor; the merging parties, specifically AR as Imerys refused to participate; and an industry expert. These stakeholders were the main stakeholders that testified in the Imerys and AR merger before the Tribunal.[37]

The previous section conducted an application of the CLA, and the analysis has indicated that the competition authorities made the correct decision in prohibiting the Imerys SA and AR merger. It is not enough to only consider whether the ruling to prohibit the merger was correct. Another important consideration is assessing how the decision (i.e., prohibition) has impacted on the market dynamics in the andalusite industry. It is challenging to attribute changes (or lack thereof) in the andalusite market solely to the decision to prohibit the merger as there are numerous events and variables that may have also impacted on the dynamics of the market. This section will however assess what has happened in the South African andalusite market post the prohibition of the merger between Imerys SA and AR. To conduct this assessment, the andalusite market participants such as merging parties and customers were contacted to obtain both qualitative and quantitative information.

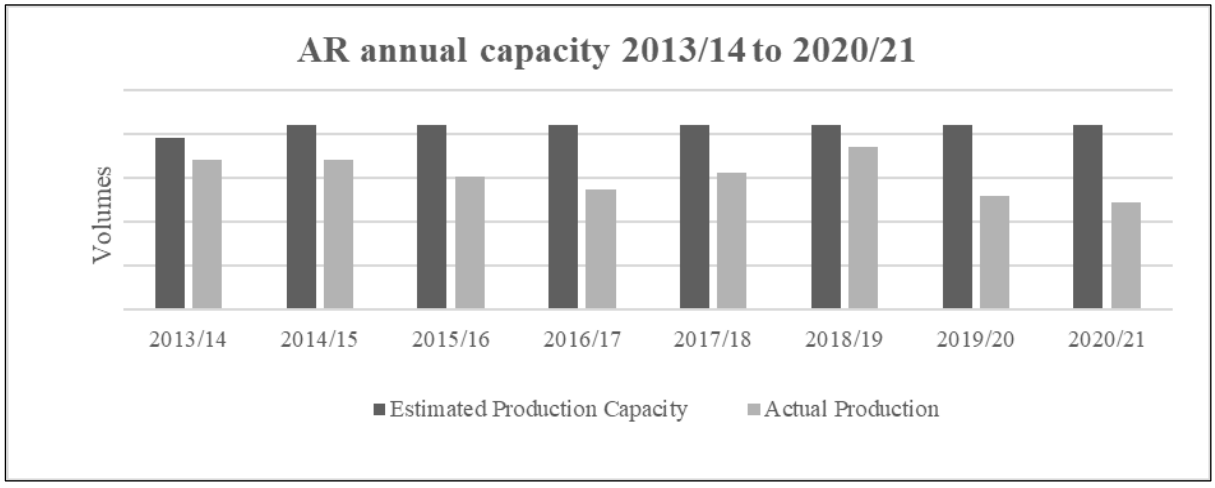
[37] Names of stakeholders and some data is not included in the report because it is confidential and subject to confidentiality undertakings signed as part of obtaining the ethical clearance. See clearance certificate Protocol Number: CBUSE1800 that has been obtained for conducting this research. The data and results of the surveys have been seen by the Supervisor.

An important issue that the proposed transaction hinged on which the parties and the competition authorities did not agree on was the issue of capacity constraints with Imerys SA and AR contending that they would be capacity constraint in 2.1 years (from around 2017) to 5.7 years (from around 2020/2021). The merging parties urged the competition authorities to assess the merger considering this counterfactual. According to what the merging parties were submitting, starting from 2017 to around 2021 at latest both Imerys SA and AR would have been capacity constrained. In other words, they would have reached their maximum capacity to mine and supply andalusite. As already explained in section 2, both parties being capacity bound would mean that even without this proposed merger the prices of local andalusite would increase to export parity levels. This would not be resulting from the removal of an effective competitor (AR), but because of the capacity constraints in the market. Below we consider whether indeed both Imerys SA and AR reached full capacity from 2017 to 2020/2021. We then move on to consider changes in the local prices of andalusite as well as the general views of market participants relating to the prohibition of the merger.

5.1 Capacities of the parties

Figure 2 below depicts AR's annual maximum production capacity (shown by the dark grey bars) and the actual production for the financial year 2013/14 to 2020/21.[38] The graph below shows that AR did not reach its full capacity in producing andalusite in the period 2015 to 2020/2021.

Figure 2: AR's annual capacity for periods 2013 to 2021



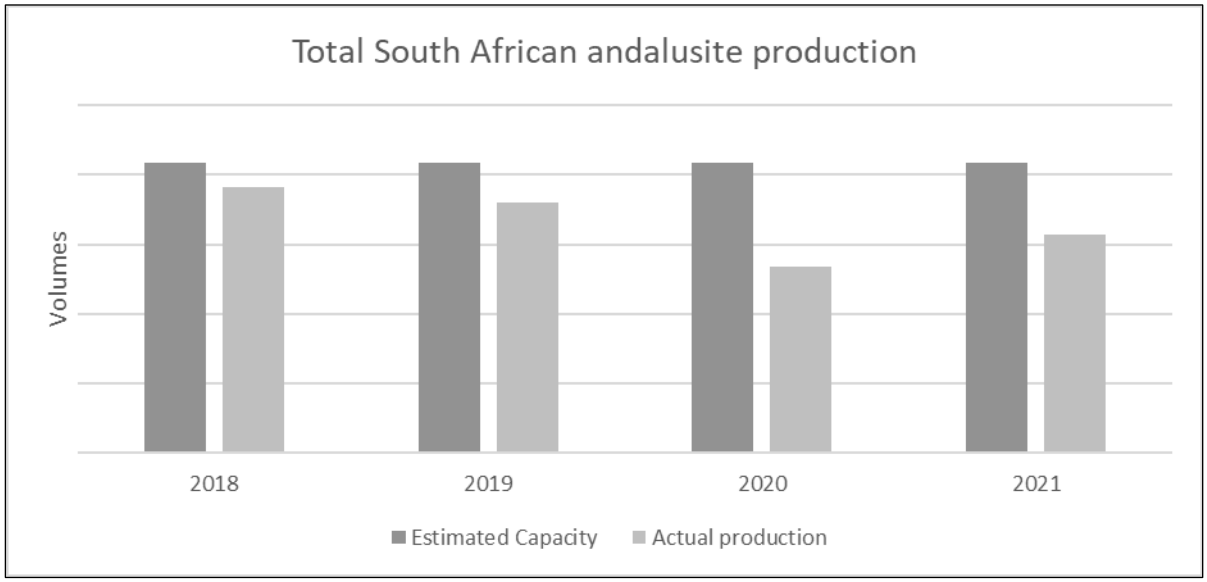
Source: Own calculations based on AR's submission

[38] The 2020/21 figures run from March 2020 to February 2021, however at the time of submitting the information AR did not have its February figures yet, we have therefore calculated February using the average of the preceding 11 months March to January.

From the figure above, it is evident that the claim by the merging parties that they would be both capacity constraint from around 2017 was incorrect and that their contestation to have the competition authorities consider the impacts of the proposed transaction under the counterfactual that both of them would be capacity constrained was not correct.

Figure 3 below depicts the total estimated maximum capacity and actual production in South Africa for period 2018 to 2019. Similar to the picture depicted above, maximum capacity was not reached by the South African producers between 2018 and 2021.

Figure 3: Total capacities and production of andalusite in South Africa for period 2018 to 2021



Source: Own calculations based on AR's submission

These two figures (Figure 2 and 3) show that the competition agencies were correct in not accepting what the merging parties were suggesting about capacity constraints in this case. The Tribunal was indeed correct in stating that considering numerous factors such as the lengthy life of a mine, potential future investments, and the volatile nature of the drivers of andalusite demand over such long periods it found no reason to conclude that both Imerys SA and AR would be capacity constrained and remain so over the life of the mines. Considering that Imerys SA and AR are both still not capacity constrained, and that the merger was prohibited, the local prices of andalusite charged by these two firms are expected to still be different and competitive (being below the export parity levels).

From the diagrams above it is evident that the competition authorities were correct in assessing the competitive effects of this proposed merger considering a counterfactual where one or both Imerys SA and AR are not capacity constrained. The competition authorities were correct in

concluding that the merger would result in a substantial lessening of competition to the detriment of consumers (especially the small medium refractories with no bargaining power) and their customers in the steel industry.

At the time of the merger application in 2015, AR's prices were lower than Imerys SA's prices as reported by the consumers of andalusite in South Africa. Because the merger was prohibited this remained the case. Customers that were contacted during the undertaking of this research indicate that AR is still cheaper compared to Imerys SA. Customers believe that had the competition authorities approved this proposed merger, the prices of andalusite would have increased and it would have had a knock-on effect on the steel industry. The prohibition of this merger was especially important for the small and medium sized refractories that dependant on the lower prices offered by AR for them to participate and compete in the refractory market. The small firms are still able to have competitive choice and competitive prices because the merger was prohibited.

5.2 General views on the prohibition

The consumers of andalusite that we contacted all believe that the decision taken to prohibit the merger between Imerys SA and AR was the correct one. Customers were asked about their views pertaining to the decision taken by the competition authorities to prohibit the Imerys SA and AR merger. One customer submitted that it was the correct decision to prohibit the merger because Imerys SA was a significant stakeholder in the andalusite industry, and the merger presented a threat to the industry because the merged entity would be able to charge whatever prices they wanted and would be able to dictate what volumes are supplied to specific customers. This is because AR presented an effective competitive constraint to Imerys SA and thus it had to offer better pricing and quality. This is in line with the findings of the Tribunal (2016) the significant competitive constraint that AR placed on Imerys SA. In its decision, the Tribunal noted internal documents of Imerys SA indicating that AR was placing significant price competition on it and its products, and that AR was taking away market shares from it.[39] The Tribunal believed that this indicated that the merger would have taken away this competitive constraint as also noted by the customers we contacted.

[39] "The minutes of an Imerys South Africa board meeting dated 21 June 2012 record that competition from AR had resulted in a 23% reduction in local sales, and that "the main priority for the year is to be aggressive in taking back the market share that was lost to Andalusite Resources" (Tribunal, 2016; p.29).

The merging parties could not provide evidence or submissions to suggest that prohibition of the merger was an incorrect decision as regards prices. Instead, they argued how approval of the merger would have benefitted them as a company. For instance, AR believes that the merger would have benefitted the merged entity as it would have been a much stronger company.[40] AR also believes that approval of the merger would have not resulted in any changes in the global market but that the local market would have been more competitive internationally and that would have resulted in an increase in exports.

Our view on this argument is that an increase in exports of raw material does not necessarily yield much benefit to an economy compared to the raw material being supplied locally at competitive prices. As much as the merger would have resulted in the merged entity exporting more it would have also been to the detriment of the local andalusite users who use andalusite for further beneficiation and thus more value add into the South African economy. In fact, AR itself concedes that the decision taken by the authorities to prohibit was correct, however only when the price conditions that were being offered are not considered. This is because AR believes customers would have benefitted from obtaining low prices for the 8 years duration of the condition. However as already discussed, the conditions would only be applicable if indeed the were capacity constraints which this paper has found there aren't. In any event the pricing condition would only benefit customers for the 8 years as opposed to the more permanent solution which is the prohibition of the merger.

5.3 Conclusion on the post-prohibition market dynamics

From the above assessment it is evident that the decision to prohibit the merger between Imerys SA and AR by the competition authorities was the correct one. The claim that both parties would be capacity constrained did not materialised and therefore the authorities were correct in assessing the merger considering the then status quo, where not both parties were capacity constrained and thus would be able to significantly increase prices. Prohibiting the merger has ensured that AR remains a competitive alternative for customers in the market, especially the smaller customers who depend on it. Customers of the merging parties believe that the decision to prohibit the transaction was the correct one. To some extend AR has also conceded that the decision was correct, however they believe that only absent the pricing condition they were

[40] This is because AR was in a financially weak position (to a point of being placed under business rescue in 2019) which could have been sustained by the merger. However, the parties did not argue a financial distress case when applying for the approval of the merger. Even if the parties had argued an approval based on financial distress there are criteria that the competition authorities need to consider such as prove that the financially distressed firm could not find a less anti-competitive acquirer and that the firm's assets will exit the market but for the merger.

offering. As noted above, it is challenging to attribute changes in the market to a single event with certainty. We do however believe that the decision to prohibit the merger played a vital role in preserving competition in the South African market for andalusite and in keeping prices in the market relatively competitive. We therefore conclude that the decision to prohibit the merger between Imerys SA and AR was the correct one.

6. CONCLUSION

Mergers happen quite often and sometimes in industries that are strategic for the development of a country. It is therefore important that the decisions taken are the correct ones, and to understand the impact that these merger decisions have on the industries affected. This research paper, using the CLA technique, has evaluated whether the decision by the South African competition authorities to prohibit the Imerys SA and AR merger was internally consistent and whether it was the correct one. The application of the CLA has indicated that the market that the competition authorities assessed was indeed the correct relevant market (the narrower South African market for the manufacturing and supply of fine and medium grade andalusite). The application of the CLA also reveals that the competition authorities were correct in their findings that the proposed merger between Imerys SA and AR would result in the merged entity having the ability to unilaterally increase prices of andalusite for the South African consumers without any constraint from imports or other inputs. The results of the CLA therefore indicate that the competition authorities were correct in prohibiting the merger between Imerys SA and AR.

This research has also assessed the developments in the andalusite market since the prohibition of the merger specifically as it relates to capacity constraints that the merging parties were contesting would occur. We find that the claim by Imerys SA and AR that they would both be capacity constrained from around 2017 was incorrect and accordingly their contestation to have the competition authorities consider the impacts of the proposed transaction under the counterfactual that both firms would be capacity constrained was not correct. This research finds that Imerys SA and AR are at least not both capacity constrained, which indicates that they would have been able to increase prices post-merger as a result of the proposed merger. The application of the CLA indicates that had the merger been approved, the merged entity would have been able to profitably increase the prices of andalusite by up to 46%. In other words, because the merger was prohibited consumers of andalusite, especially the small refractory makers are able to have competitive choice and competitive prices.

Overall, based on the findings above, we conclude that merger control is a good tool for promoting competition and protecting consumer welfare. This paper finds that merger control like the kind that South Africa has is important. South Africa has a compulsory notification regime. This is important because it provides the authorities with an opportunity to assess and address market power build up before it happens, as opposed to having to regulate abuse of dominant positions by firms after the fact. Merger control matters for the South African economy because it also ensures that consumers are able to get competitive prices.

7. REFERENCES

Barzeva, K., & Grimbeek, S. (2016). The Effecctiveness of Merger Control In South Africa: Selected Case Studies. *Working Paper CC2016/01*, 1-45. Competiton Commission.

Buccirossi, P., Ciari, L., Duso, T., Fridolfsson, S.-O., Spagnolo, G., & Vitale, C. (2006). *Ex-Post Review of Merger Control Decisions: A study for the European Commission* . Retrieved April 14, 2020, from https://ec.europa.eu/competition/mergers/studies_reports/lear.pdf

Buccirossi, P., Ciari, L., Duso, T., Fridolfsson, S.-O., Spagnolo, G., & Vitale, C. (2008). A Short Overview of a Methodology for the Ex-Post Review of Merger Control Decisions. *De Economist, 156*(4), 453-475.

Budzinski, O. (2013). Impact Evaluation of Merger Control Decisions. *European Competition Journal, 9*(1), 199-224.

Coate, M. B., & Simons, J. J. (2010). Models, Mathematics and Critical Loss. *SSRN*, 1-42. Retrieved from https://ssrn.com/abstract=1346067

Coate, M. B., & Williams, M. D. (2008). A Critical Commentry on the Critical Comments on Critical Loss. *The Antitrust Bulletin, 53*(4), 987-1025.

Competition Commission. (2019). *Unleashing More Rivalry: 20 Years of Enforcement by the South African Competition Authorities.* Pretoria: Competition Commission.

Daljord, O., Sorgard, L., & Thomassen, O. (2007). The SSNIP Test and Market Definition with The Aggregate Diversion Ratio: A Reply To Katz and Shapiro. *Journal of Competition Law and Economics, 4*(2), 263-270.

Daljord, O., Sorgard, L., & Thomassen, O. (2007). The SSNIP Test and Market Definition With the Aggregate Diversion Ratio: A Reply to Katz and Shapiro. *Journal of Competition Law and Economics, 4*(2), 263-270.

Davies, S. W., & Ormosi, P. L. (2012). A Comparative Assessment of the Methodologies Used to Evaluate Competition Policy. *Journal of Competition Law and Economics, 8*(4), 769-803.

Department of Mineral Resources Republic of South Africa. (2019). *Update of the South AfricaN Andalusite Industry, 2019.* Mineral Economics. Pretoria: Department of Mineral Resources Republic of South Africa.

Encyclopaedia Britannica. (2021, January 15). *technology*. Retrieved from Britannica: https://www.britannica.com/technology/calcination

Epstein, R. J., & Rubinfeld, D. L. (2004). *Technical Report: Effects of Mergers Involving Differentiated Products.* European Commission.

European Commission. (2004). Guidelines on the assessment of horizontal mergers under the Council Regulation on the control. *Official Journal of the European Union, 5*(2), C31/5-C31/18.

European Commission. (2022, July 18). *Ex-post economic evaluation of competition policy enforcement: a review of the literature.* Retrieved from European Commission Web site: https://ec.europa.eu/competition/publications/reports/expost_evaluation_competition_policy_en.pdf

Ezrielev, J., & Simons, J. J. (2011). The 2010 Merger Guidelines, Critical Loss, and Linear Demand. *Journal of Competition Law and Economics, 7*(3), 497-522.

Farrell, J., & Shapiro, C. (2008). Improving Critical Loss Analysis. *The Antitrust Source*, 1-17.

Harris, B. C., & Veljanovski, C. G. (2003). Critical Loss Analysis: Its Growing Use in Competition Law. *E.C.I.R*, 213-218.

Huschelrath, K., & Leheyda. (2010). A Methodology for the Evaluation of Competition Policy. *European Competition Journal, 6*(2), 397-424.

ICN Merger Working Group. (2006). ICN Merger Guidelines Workbook. *Fifth Annual ICN Conference in Cape Town* (pp. 1-102). Cape Town: ICN.

Imerys South Africa (Pty) Ltd, Andalusite Resources (Pty) Ltd and Competition Commission of South Africa, IM013May15 (Competition Tribunal of South Aftica September 21, 2016).

Imerys South Africa (Pty) Ltd, Andalusite Resources (Pty) Ltd and The Competition Commission, 147/CAC/Oct16 (Competition Appeal Court March 2, 2017).

Imerys South Africa (Pty), Andalusite Resources (Pty) Ltd and Competition Commission of South Africa, CT CASE NO: IM013May15 (Competiton Tribunal of South Africa October 31, 2013).

Jourdan, P. (2012). State Intervention in the Minerals Sector: Maximising the Development Impact of the People's Mineral Assets. *III CONFERÊNCIA INTERNACIONAL DO IESE. Conference Paper No 18*, pp. 1-58. Mozambique: Instituto De Estudos Sociaise Economicos (IESE).

Katz, M. L., & Shapiro, C. (2003). Critical Loss: Let's Tell the Whole Story. *Antitrust Magazine*, 49-56.

Kokkoris, I. (2005). Critical loss analysis: critically ill? *European Competition Law Review*, 1-9.

Kwoka, J. E. (2013). Does Merger Control Work? A retrospective on U.S. Enforcement Action and Merger Outcomes. *Antitrust Law Journal, 78*(3), 619-650.

Kwoka, J. E. (2015). *Mergers, Merger Control, and Remedies: A Retrospective Analysis of U.S Policy.* Cambridge, Massachusetts, London, England: The MIT Press.

Langenfeld, J., & Li, W. (2001). Critical loss analysis in evaluating mergers. *The Antitrust Bulletin*, 299-337.

Lianos, I., & Geradin, D. (2013). *Handbook on European Competition Law.* Northampton: Edward Elgar Publishing Limited.

Lyons, B. (2009). Mergers. In B. Lyons, *Cases In European Competition Policy* (pp. 283-482). Cambridge: Cambridge University Press.

Motta, M. (2003). *Competition Policy: Theory and Practice.* Cambridge University.

Motta, M. (2004). *Competition Policy: Theory and Practice.* Cambridge: Cambridge University Press.

O'Brien, D. P., & Wickelgren, A. L. (2003). A Critical analysis of critical loss analysis. *Antitrust Law Journal*, 161-184.

OECD. (2012). OECD Policy Round Tables: Impact Evaluation of Merger Decisions 2011. *Competition Law and Policy OECD,* (pp. 1-193).

OECD. (2020). *Economic analysis in merger investigations-Background note by Dr Jill Walker.* OECD. doi:http://www.oecd.org/daf/competition/economic-analysis-in-merger-investigations.htm

Organisation for Economic Co-operation and Development. (2010). OECD Policy Roundtables, Standard for Merger Review. *OECD Competition Policy Roundtables.* OECD.

Pittman, R. (2018). Three Economist's Tools for Antitrust Analysis: A Non-technical Introduction. In B. Begovic, & D. V. Popovic, *Competition Authorities in South Eastern Europe: Building Institutions in Emerging Markets* (pp. 155-162). Springer Open.

Republic of South Africa. (1998). *Competition Act, No.89 of 1998 (as amended).*

Scheffman, D. T., & Simons, J. J. (2003). The State of Critical Loss Analysis: Let's Make Sure We understand the Whole Story. *The Antitrust Source*, 1-9.

Statistics South Africa. (2019). *STATISTICAL RELEASE P0142.1, Producer Price Index December 2019.* Pretoria: Statistics South Africa.

Statistics South Africa. (2021). *STATISTICAL RELEASE P0142.1, Producer Price Index January 2021.* Pretoria: Statistics South Africa.

The Refractory Institute. (2021, January 18). *Home: About Us: What Are Refractories*. Retrieved from Refractories Institute: https://www.refractoriesinstitute.org/tri-pages/tri-what-are-refractories.asp

Theron, N. (2001, December). The Economics of Competition Policy: Merger Analysis in South Africa. *The South African Journal of Economics, 69*(4), 614-658.

Vita, M., & Osinski, D. F. (2018). John Kwoka's Mergers, Merger Control, and Remedies: A Critical Review. *Antitrust Law Journal, 82*(1), 361-388.