NERA
ECONOMIC CONSULTING

Public version

AlphaTheta Corporation/Serato: unilateral effects and foreclosure theories of harm

MinterEllisonRuddWatts

27 November 2023

SCI[Serato confidential information]

ATCI[ATC confidential information]

JCI[Joint confidential information]

Project Team

Will Taylor, PhD

Jono Henderson

Asahi Koizumi

Phoebe McKellar

Contents

1. Introduction

1. On 10 October 2023, AlphaTheta Corporation ("ATC") applied to the Commerce Commission for clearance of its proposed acquisition of Serato Audio Research Limited ("Serato"). On 26 October 2023 the NZCC published at Statement of Preliminary Issues ("SOPI").[1] In the SOPI the NZCC sets out that it is considering whether the proposed acquisition will give rise to unilateral effects in the software market, vertical/conglomerate effects as a result of the relationship between DJ software and hardware, and co-ordinated effects in the software market.
2. ATC and Serato both operate in the DJ software segment of the music industry. Both ATC and Serato supply DJ software to end-users globally, including in New Zealand. ATC also supplies DJ hardware to customers all over the world, including in New Zealand. Our understanding is that DJ software is used together with DJ hardware but generally acquired by end-users separately.[2] The proposed acquisition therefore involves some horizontal aggregation regarding DJ software and vertical aggregation given DJ software and hardware can be characterised as vertically related products.
3. We have been asked by MinterEllisonRuddWatts, counsel for ATC, to assess the unilateral and vertical questions outlined in the SOPI.
4. A summary of our findings is as follows:
    a. At a general level, **Barriers to entry/expansion** into the DJ software market are likely to be low due to:
        i. Switching costs for end users being relatively low;
        ii. The nature of the product meaning that brand/reputation, while being an important dynamic in the market, are unlikely to constitute an economic barrier to entry; and
        iii. The costs of developing DJ software not being particularly high.
    b. Regarding the constraints on **unilateral behaviour**, the merged entity will face the following constraints if it attempted to increase price, reduce quality and/or reduce innovation:
        i. There are existing providers of desktop DJ software who could easily expand and reposition their product offering, given the low marginal cost of software, the similar feature set of the alternative providers and low switching costs for end-users;
        ii. Mobile app providers, who often (but don't exclusively) target beginners could also expand/reposition given mobile apps often have the same functionality, mobile hardware has the computing power to run all the features required for DJ software, mobile devices are more convenient, switching costs for a desktop to mobile transition are likely to be low and it would be relatively low cost for a mobile-only developer of DJ software to develop a fully featured desktop app (and indeed there are already cross platform developers of both mobile and desktop DJ software, with Algoriddim being a prominent example).
        iii. DJ hardware providers already provide a degree of constraint through their devices with embedded software, which blurs the lines between software and hardware and do not require stand-alone DJ software to perform. DJ hardware providers who don't have their own stand-alone performance software would also have the ability and incentive to enter DJ software, given they often already have their own desktop library management software (which is how

[1] NZCC, Statement of preliminary issues – AlphaTheta/Serato (Oct 2023),

[2] See para 5.21 of the Clearance Application

rekordbox started before adding performance functionality) and also often have their own embedded performance software on their high-end devices.

iv. Music production software providers, while unlikely to provide a material constraint in terms of direct demand side substitution, would be well-positioned to expand their offering to include DJ software, given music production software is in some sense a more complicated version of DJ software.

c. Regarding the questions in the SOPI about whether the merged entity could **leverage ownership of Serato to foreclose the DJ hardware market**, we find there is likely to be limited *ability* or *incentive* to foreclose**:**

i. 'Ability' requires evidence that Serato has substantial market power/is a "must have" input for non-ATC providers of DJ hardware. While Serato is undoubtedly a very popular DJ software, it is unlikely to be "must have"/have market power as there are many substitutes for Serato and barriers to entry appear to be low. There is also evidence that Serato's ability to **SCI**[ ], the royalties it earns form hardware sales **SCI**[ ], its stand-alone software pricing has been flat in nominal terms and therefore falling in real terms since it was first launched.

ii. Nonetheless, we consider the *incentive* that would exist if the merged entity had the ability, by performing vertical arithmetic. This involves calculating the "critical diversion ratio", which is the proportion of Serato customers that have non-ATC hardware that would need to switch to ATC hardware instead of other software, for the strategy to be profitable. The results of this analysis are that the merged entity is unlikely to have the incentive to foreclose users of lower-end hardware, **SCI**[ ]and the group most relevant to an assessment of foreclosure incentives:

a. At an aggregate level, DJ hardware sales are higher margin than DJ software. This mechanically leads to a low critical diversion ratio and thus high incentive to foreclose.

b. However, margins vary widely depending on the type and specification of the hardware. Specifically, all-in-ones, CDJs and high-end controllers have much higher margins than entry to mid-level controllers. Thus the critical diversion ratio is much higher for basic controllers than it is for high-end hardware, suggesting less of an incentive to foreclose lower-end hardware.

c. High-end hardware is the segment where there is a lower ability to foreclose as high-end hardware (e.g. all-in-ones) generally has embedded software. In addition, the cost to switch hardware would be particularly high, making users more likely to switch software instead of buying new hardware.

d. Serato data suggests that **SCI**[ ], and thus the diversion ratio for lower-end hardware (which is much higher) is more relevant.

e. In addition, Pioneer DJ hardware is generally more expensive than other hardware providers,[3] and thus this foreclosure strategy would likely be reliant on users being willing to purchase more expensive hardware to keep using Serato. To the extent that Serato customers who use non-ATC hardware are using lower-end hardware from less expensive providers, this suggests they are likely to be relatively price sensitive. Given it will be cheaper to change to software (in many cases they can save money), it seems more likely that these consumers will switch software than buy more expensive hardware.

[3] Though we understand that it is difficult to make like-for-like pricing comparisons, see ATC's cross submission on the SOPI.

d. Regarding the questions in the SOPI about whether the merged entity could **leverage its position in the hardware market to foreclose the software market** we find there is likely to be limited *ability* or *incentive* to foreclose**:**

   i. The use of the MIDI protocol means there is limited practical ability to stop ATC hardware from working with non-ATC software.

   ii. This is evidenced by the fact that today Pioneer DJ has a very strong position in hardware market and is vertically integrated into software (and therefore could theoretically foreclose the software market through leveraging its hardware position if it had the ability to do so), yet non-ATC software providers pre-map and market their software as being plug and play compatible with the majority of Pioneer DJ's most popular hardware.

   iii. We have also conducted vertical arithmetic, which by nature of the fact that DJ hardware generally has higher margins than DJ software, suggests it is unlikely to be profitable to implement such a foreclosure strategy.

5. In the rest of this report we:

   a. Assess horizontal competition in the provision of DJ software, including barriers to entry/expansion and the constraint provided by different suppliers and potential suppliers of DJ software (Section 2); and

   b. Assess the potential vertical effects of the proposed transaction, including whether the merged entity would have the ability/incentive to foreclose either the DJ hardware or DJ software market (Section 3).

2. Competition for the provision of DJ software

6. ATC and Serato are both suppliers of DJ software. We understand that ATC's primary software offering is rekordbox, which is available on both desktop and mobile devices. Serato's primary software offering is Serato DJ, which is desktop-only. ATC also supplies the mobile-only app WeDJ.[4]

7. As set out in the SOPI,[5] the NZCC is considering whether the merged entity will gain the ability to profitably raise prices (or lower quality) unilaterally in the DJ software market due to the horizontal aggregation of rekordbox and Serato DJ.[6]

8. In particular, the NZCC is considering whether:

    a. ATC and Serato are close competitors in the provision of DJ software in the counterfactual (which is lost as a result of the merger)[7]; and

    b. the merged entity will be sufficiently competitively constrained by other sources in the factual.[8]

9. As already described above, both Serato and ATC are providers of desktop DJ software, and thus the key area of overlap between the merging parties is in the provision of desktop DJ software. Accordingly, our starting point is to evaluate the remaining sources that might constrain the merged entity from raising its desktop software prices.

10. We assess whether the merged entity's desktop DJ software pricing, quality, and incentives to innovate will continue to be constrained by:

    a. low barriers to entry and expansion (section 2.1);

    b. other existing desktop DJ software (section 2.2);

    c. developers of mobile DJ software (section 2.3); and

    d. the incentives of hardware manufacturers to promote software competition, including by producing their own software offerings (section 2.4);

    e. music production software developers (section 2.5).

11. We discuss each source of constraint in more detail below. Our discussion of barriers to entry and expansion is relatively generic (i.e. mostly in the context of a hypothetical new entrant), while our discussion of other constraints focuses on specific competitors and cross refers to this more general discussion. While our focus in this section of our report is on the NZCC's consideration of horizontal effects, our views will also be informative for the analysis of "ability" in the analysis of vertical effects discussed in section 3.

[4] See Section 4 of the Clearance Application.

[5] SOPI at 21.2.

[6] And, to a lesser extent, WeDJ.

[7] SOPI at 31.

[8] SOPI at 32.

2.1. Barriers to entry and expansion

12. We would expect the threat of entry by new players or expansion by existing/adjacent players to constrain the merged entity from raising its prices unless there are barriers to entry and expansion. By barriers, we mean features of the market that would create additional costs (or some other disadvantage) which an entrant must face but an incumbent can avoid.[9]

13. In our view, there are unlikely to be such barriers in the provision of DJ software. Therefore, if the merged entity were to attempt to unilaterally raise software prices, it would risk inducing expansion by a rival or new entry.

14. First, we note that the market appears to be characterised by dynamic competition and innovation.[10] Economic theory suggests that high innovation levels can lower barriers to entry by making any incumbency advantage less sustainable and generating faster replacement of incumbents by newcomers.[11]

15. We divide our discussion of the topic into four key points:

    a. Switching costs are likely to be low for DJ software users (section 2.1.1);

    b. The DJ software market is unlikely to be susceptible to reputational barriers (2.1.2);

    c. DJ software development costs are relatively low, especially for existing developers of adjacent software (section 2.1.3); and

    d. Marginal costs for software are close to zero once developed (section 2.1.4).

2.1.1. Switching costs are low for DJ software users

16. An entrant software developer might face barriers to entry if it is difficult or expensive for users to switch to the entrant's product (i.e. if users face high switching costs). However, switching costs are likely to be low for users of DJ software for the following reasons:

    a. **Switching software does not require switching hardware;** our understanding is that in general, switching software does not require switching hardware.[12] An entrant can even take measures to enhance controller compatibility. For example, the entrant could pre-map its software to popular pieces of hardware such that they are plug-and-play, which is what existing competing software providers do already. Indeed, Virtual DJ markets itself as having plug and

[9] We adapt this definition from Carlton and Perloff (2015): "Only by having some advantage over new entrants can a firm earn persistently higher profits than other actual or potential firms. Because long-run profits can only persist if a firm has an advantage over potential entrants, a logical definition of a long-run barrier to entry is a cost that must be incurred by a new entrant that incumbents do not (or have not had to) bear." We note that the authors distinguish between "instantaneous" barriers to entry (which includes any cost of entering) and long-run barriers to entry (which the definition above relates to, and which we think is more relevant to a merger assessment). Carlton, D., and J. Perloff. "Modern industrial organization, global edition." *Higher education* 4 (2015).

[10] See para 6.12-6.16 of the Clearance Application.

[11] For example, see the background note for the OECD's 2023 best practice roundtable on competition and innovation. We note that the relationship between competition and innovation is complex, and in some cases innovation can generate first-mover advantages or persistent cost advantages that could be seen to raise barriers to entry. The remainder of this section covers why we do not think DJ software customers would necessarily stick with a "first-mover" (at 2.1.1 and 2.1.2) and why entrants are unlikely to be disadvantaged by their sunk and marginal costs faced (at 2.1.3 and 2.1.4). OECD (2023), Competition and Innovation: A Theoretical Perspective, OECD Competition Policy Roundtable Background Note, www.oecd.org/daf/competition/competition-and-innovation-atheoretical-perspective-2023.pdf, section 2.4.

[12] See para 6.22 of the Clearance Application.

play support for 300+ controllers.[13] This approach of pre-mapping can further reduce any technical frictions for users who might want to switch software while retaining their existing DJ hardware.[14]

b. **Music libraries/data can be easily transferred:** there is limited scope for users to lose saved data, purchases, or any other sunk investment when switching software. The music itself is not purchased, produced, or stored on the software, so users will continue to be able to access the same music library on a new piece of software.[15]

   The main data that might be lost when switching is any saved user configurations or preparatory work, such as playlists and cues, since these are saved in different formats for each software.[16] However, in some cases (such as with Virtual DJ[17]) DJ software can directly import libraries from other software and there are third-party library management and conversion utilities that will convert libraries from one format to another and preserve this information.[18]

c. **All DJ software performs similar functions and is laid out similarly and thus there will be limited frictions with learning an alternative software:** the user interfaces of competing DJ software products tend to be very similar visually, which we would expect to minimise upskilling frictions when switching software. For example, Figure 2.1 below presents screenshots of (in clockwise order from top-left) Serato DJ Pro, rekordbox, Traktor Pro 3, and Virtual DJ. As an additional step, Virtual DJ includes an official guide on how to customise its user interface to appear and behave more similarly to Serato.[19] In addition, most DJ hardware is laid out similarly and performs similar functions, and thus it seems unlikely that customers would have specialised hardware that has a layout that does not easily translate to the functions and layout of an alternative software provider. Figure 2.1 shows ATC's best selling controller against comparable offerings from its main hardware rivals.

[13] See https://www.virtualdj.com/manuals/virtualdj/settings/controllers.html

[14] See https://www.dangerousdjtech.com/2023/07/what-is-dj-controller-mapping.html

[15] See para 6.22 of the Clearance Application

[16] See https://www.digitaldjtips.com/3-ways-to-convert-your-dj-library-between-platforms/

[17] https://www.virtualdj.com/manuals/virtualdj/interface/database/playlists/index.html#crates

[18] Third-party conversion utilities include DJCU, Rekordcloud, and Mixio. See, e.g. https://www.digitaldjtips.com/3-ways-to-convert-your-dj-library-between-platforms/.

[19] See https://www.virtualdj.com/wiki/seratosettings.html.

Figure 2.1: Comparison of UI for different DJ software

Source: Serato DJ Pro image: https://serato.com/dj/pro/downloads; rekordbox image: https://rekordbox.com/en/; Traktor Pro 3 image: https://www.beatportal.com/technology/how-to-use-traktor-pro-3-with-beatport-streaming/; Virtual DJ image: https://apps.microsoft.com/detail/virtualdj/XPDC1LX9VNW7Z7?hl=en-US&gl=US.
Note: Clockwise from top-left: Serato DJ Pro, rekordbox, Traktor Pro 3, Virtual DJ. Screenshots taken from a Google Image search.

Figure 2.2: Comparison of layout of popular controllers

Source: Pioneer DJ hardware image: https://www.pioneerdj.com/en/product/controller/ddj-400/black/overview/, Native Instrument hardware image: https://www.native-instruments.com/en/products/traktor/dj-controllers/traktor-kontrol-s2/, Hercules hardware image: https://www.hercules.com/en-us/product/djcontrol-inpulse-500/, Dennon DJ hardware image: https://www.denondj.com/products/dj-controllers.html
Note: Clockwise from top left, Pioneer DJ DDJ-400, Native Instrument Kontrol S2 MK3, Dennon DJ MC 4000, Hercules DJ Control Inpulse 500

2.1.2. The DJ software market is unlikely to be susceptible to reputational barriers

17. An existing software developer having a strong reputation and/or a widely recognised brand can be a natural outcome of a successful competitive process where a firm produces a high-quality product, provides reliable maintenance and support, and markets it well. For example, Xero is widely seen as having built a strong reputation on the back of an innovative and useful accounting software product which displaced established providers with strong brands (e.g. MYOB).[20]

18. However, reputation and branding could create a barrier to entry if it impedes the uptake of a potentially-more-efficient entrant product.[21]

[20] For example, see https://www.stuff.co.nz/business/the-monitor/127849170/xero-the-15b-wellington-startup-that-revolutionised-global-accounting and https://www.businessinsider.com/the-untold-story-how-xero-took-a-band-name-and-changed-accounting-for-a-million-companies-2017-9.

[21] By potentially-more-efficient, we mean a product that could provide a greater amount of surplus to consumers at the same cost, or the same amount of surplus at a lower cost. Our discussion of entry assumes that the hypothetical entrant product meets this threshold. Reputation and branding would not be a competition issue if it only impeded uptake of *inferior* entrant products.

19. The OECD's 2005 best practice roundtable on barriers to entry discusses two separate, but interconnected, effects:
    a. reputational effects; and
    b. brand loyalty induced by advertising.
20. The background note argues that reputational effects can arise when acquiring information about products is not costless and so consumers perceive there to be risk when trying a new product. It notes that new firms often have to invest in promotional pricing to compensate consumers for this risk, with a higher perceived risk requiring higher discounts and/or evidence of other customers trying the product first, which can in some cases make profitable entry extremely difficult. [22]
21. On brand loyalty, it observes that advertising is a sunk cost that can be more expensive per-unit for an entrant than for an incumbent, though notes that entrants can use advertising to *erode* barriers relating to brand loyalty and customer inertia.[23]
22. According to the CMA's 2021 merger assessment guidelines, common examples of barriers to entry include high brand loyalty and customers placing a high value on the reputation and track record of a supplier. It commented that the latter is most likely to occur when the product or service is important to the customer, and where its quality is difficult to ascertain in advance.[24]
23. The economic concepts of "search" and "experience goods" are relevant to assessing situations in which brand/reputation might be a barrier to entry. The quality of a "search good" can be ascertained *before* purchasing it, if consumers incur the search costs to find the good. By contrast, the quality of an "experience good" can only be accurately evaluated after consumption. Accordingly, consumers tend to have more information at the time of purchase of a search good than they do for an experience good, but they must also incur search costs to acquire that information.[25] A strong brand/reputation might reduce search costs for a search good and provide quality signals for experience goods.
24. The search and experience framework thus suggests that if search costs are high or DJ software is an experience good and there are limited ways to "consume" the good before making a purchase decision, then a provider with a strong brand might have an advantage over entrants/rivals who do not.
25. To generalise slightly, we therefore consider reputational barriers to entry are most likely to emerge if users have a strong preference for familiar products and do not (or cannot) correctly anticipate the benefit they would receive from the new product. We refer to this as "familiarity bias".
26. At a high level, familiarity bias might arise in a software market if:
    a. users are unwilling to invest time and effort into searching for new software (**"search costs are high"**);
    b. users have limited information about the new software (or limited ability to ascertain its quality) before purchasing it (**"information disadvantage"**); and

[22] Organisation for Economic Co-operation and Development (OECD). Best Practice Roundtables on Competition Policy: Barriers to Entry, 2005, pp.31-32.

[23] Organisation for Economic Co-operation and Development (OECD). Best Practice Roundtables on Competition Policy: Barriers to Entry, 2005, pp.36-38.

[24] Competition and Markets Authority (CMA). Merger Assessment Guidelines, March 2021, p. 74.

[25] This framework was introduced in Nelson, Phillip. "Information and consumer behavior." *Journal of political economy* 78, no. 2 (1970): 311-329.

c. there are high negative consequences for the user if the new software fails (**"failure severity"**).

27. For the reasons set out below, our view is that none of these criteria apply to the DJ software market, and therefore we would not expect familiarity bias to arise. This minimises the risk that Serato's "industry-standard" reputation and branding will create a barrier for potential entrants.

2.1.2.1. Search costs do not appear to be high for DJ software users

28. Buyers can incur search costs in identifying/finding sellers, and in ascertaining information about the sellers' goods (e.g. price and quality).[26] Economic literature tells us that buyers search for information until the marginal cost of the search (i.e. the extra time, monetary expense, and cognitive effort of conducting one more search) exceeds the marginal benefit (i.e. the buyer's expected information gained from one more search, and the extent to which that information improves overall purchase utility).[27]

29. An incumbent's strong brand/reputation might be a barrier for an entrant if it is costly for buyers to search/find other products. This is because buyers might default to known options if the marginal benefit from identifying and evaluating unknown products does not exceed the marginal cost of search.

30. For example, regulators have identified markets with high search costs and implemented measures to reduce them. For example:

    a. In New Zealand, the Electricity Authority's 2011 "What's My Number?" campaign was aimed at raising consumer awareness of the potential savings they could make with a different electricity provider. It included a price comparison tool to help them search for a new provider (which has since been merged with Consumer NZ's Powerswitch).[28]

    b. Following the NZCC's 2022 market study into the retail grocery sector, the New Zealand Government introduced standards for mandatory unit pricing to allow consumers to more easily compare items on the shelf.[29]

    c. The UK telecommunications regulator Ofcom conducts consumer satisfaction surveys of different mobile, broadband, and landline providers and publishes the results on its website to help consumers compare quality.[30]

    d. Following the CMA's 2016 market study into the legal services sector, it recommended a requirement on legal service providers to display information of price, service, redress, and regulatory status for the purpose of lowering consumer search costs. It noted that, absent this requirement, only 17% of legal service firms published pricing information online.[31]

31. DJ software is a digital product where browsing and comparison primarily takes place online. As evidenced by our price comparison at Table 2.3 below, DJ software websites consistently include

[26] Sellers can also incur search costs in finding buyers, but we do not focus on this scenario here. For example, see Dahlman, Carl J. "The problem of externality." *The journal of law and economics* 22, no. 1 (1979): 141-162.

[27] For example, see Smith, Gerald E., Meera P. Venkatraman, and Ruby Roy Dholakia. "Diagnosing the search cost effect: Waiting time and the moderating impact of prior category knowledge." *Journal of Economic Psychology* 20, no. 3 (1999): 285-314.

[28] See https://www.powerswitch.org.nz/whatsmynumber

[29] See https://www.mbie.govt.nz/business-and-employment/business/competition-regulation-and-policy/market-studies/market-study-into-supermarkets/

[30] See https://www.ofcom.org.uk/phones-telecoms-and-internet/advice-for-consumers/quality-of-service

[31] See https://www.gov.uk/government/news/cma-demands-greater-transparency-from-legal-service-providers

pricing information (unlike, perhaps, legal services) and although there are different pricing structures, there is no immediate time pressure to evaluate the optimal choice (unlike, perhaps, in a grocery store).

32. We also note there are many websites and articles available that facilitate comparison of different DJ software.[32] This provides many of the benefits of an online marketplace, albeit the transactions themselves are decentralised.[33] Online marketplaces have been found to reduce search costs by providing buyers with accurate and accessible information about seller prices and product characteristics. This gives them greater ability to compare seller offerings without physically travelling, which reduces external search costs.[34]

33. Importantly, as we discuss in section 2.2.1, the underlying product appears to be relatively homogeneous, and thus consumers of DJ software will not have to incur high search costs comparing the different features of the products to work out which best suits their needs.

34. Furthermore, we consider that DJs (or even prospective DJs) are more likely to be knowledgeable about DJ software than average consumers are about (e.g.) electricity or telecommunications. And as Smith et al (1999) discuss:[35]

> ***"[K]nowledge has advantages that lower cognitive costs of search.*** *Knowledgeable buyers know where to obtain information, have superior ability to ask questions, have more confident preference structures, and a more refined cognitive structure in which to store incoming information. They are better able to adjust and moderate search in response to differences in external search costs partly because they have lower cognitive search costs. Low knowledge buyers may find this more difficult to do because they have higher cognitive search costs. Instead, they approach purchase decisions with incomplete heuristics and simple rules of thumb (Bettman & Park, 1980). Thus, low knowledge buyers may not only search less than high knowledge buyers, but the form of search response also may be different, an interaction effect of prior knowledge (cognitive search costs) and waiting time (external search costs) […]"*

35. Even for less knowledgeable buyers, DJ software websites commonly provide detailed feature descriptions and product demonstrations/tutorials.[36] This further reduces cognitive search costs for users and provides opportunities for detailed inspection.

36. No search is costless, and reputation/branding can still play an important role even in markets with relatively low search costs. However, we note that a new entrant can use marketing to raise consumer awareness of its products, thereby lowering search costs. Accordingly, in our view, any search costs in the DJ market do not seem insurmountable to the extent that there would be a material consumer bias towards familiar products.

---

[32] For example, see https://www.digitaldjtips.com/best-dj-software/ and https://www.musicradar.com/news/best-dj-software-apps.

[33] Not all DJ software is transacted through app stores or third-party websites; some appears primarily available on first-party websites. For example, see https://serato.com/dj/pro/buy-dj-pro and https://rekordbox.com/en/plan/.

[34] Bakos, J. Yannis. "Reducing buyer search costs: Implications for electronic marketplaces." *Management science* 43, no. 12 (1997): 1676-1692.

[35] Smith, Gerald E., Meera P. Venkatraman, and Ruby Roy Dholakia. "Diagnosing the search cost effect: Waiting time and the moderating impact of prior category knowledge." *Journal of Economic Psychology* 20, no. 3 (1999): 285-314.

[36] For examples of feature descriptions, see https://www.virtualdj.com/products/virtualdj/features.html, https://serato.com/dj/pro, https://www.native-instruments.com/en/products/traktor/dj-software/traktor-pro-3/, and https://rekordbox.com/en/feature/professional/. For examples of demonstrations/tutorials, see https://www.virtualdj.com/help/videotutorials.html?view=gettingstarted, https://serato.com/dj/pro/tutorials, https://www.native-instruments.com/en/products/traktor/dj-software/traktor-pro-3/learn-traktor-pro/, and https://rekordbox.com/en/video/.

2.1.2.2. Information disadvantages are limited as consumers can try before buying

37. Difficulties in obtaining information about a product's quality before purchase, even after searching, can increase the risk to users of trying a new product. This risk could materialise in the form of product failure (and is therefore amplified by high failure severity, as discussed in the following section), or it can simply reflect customers not receiving their expected utility (and is therefore amplified if the product is expensive/unreturnable). This is the case for what economists refer to as "experience goods".

38. In a 2014 market investigation into statutory audit services, the CMA found that *perceived* quality was important because an audit is an experience good where quality cannot be observed until after the audit has occurred, and even then it is difficult to judge the *actual* quality of an audit (especially for third parties including potential clients). The CMA observed that the large audit firms' reputations were acting as a proxy for this unobservable information about quality. Accordingly, the CMA concluded that mid-tier audit firms faced a reputational barrier.[37]

39. Relevantly, the search-experience-credence (SEC) classification framework adds a third category under which reputation/branding may be even more important: the credence good (or "post-experience" good) which is difficult to evaluate even after consumption.[38] The difficulty of even an ex-post evaluation of audit services suggests they could be characterised as a credence good under this extended framework.

40. To give another example, the ACCC's 2023 interim report on its childcare inquiry found that childcare services have experience good characteristics because it may be difficult to know if a child likes a service until they have experienced it, and credence good characteristics because parents/guardians do not personally attend the service and so will never acquire complete first-hand information about it. The ACCC observed that parents/guardians are therefore more likely to rely on a service's reputation and the recommendations of friends and family to overcome the information asymmetries.[39]

41. DJ software bears more similarities with "search goods" than experience goods or credence goods (and as already noted, search costs do not appear high). Even users that rely on consumption to evaluate the quality of DJ software can do this prior to purchasing the product.

42. Specifically, DJ software commonly includes a free tier and/or a free trial. For example, as shown below in Table 2.3:

    a. rekordbox offers both a free tier (rekordbox Free) and a 30-day free trial of rekordbox Core and rekordbox Creative;

    b. Serato offers both a free tier (Serato Lite) and a 14-day free trial of Serato DJ Suite;

    c. Traktor offers both a free tier (Traktor DJ 2) and a free demo of Traktor Pro 3; and

    d. Virtual DJ offers a free tier (Virtual DJ Home).

[37] Competition and Markets Authority (CMA). Statutory audit services market investigation – Barriers to entry: reputation and experience, 2014.

[38] For example, see Mitra, Kaushik, Michelle C. Reiss, and Louis M. Capella. "An examination of perceived risk, information search and behavioral intentions in search, experience and credence services." Journal of Services Marketing 13, no. 3 (1999): 208-228.

[39] ACCC, Childcare inquiry – interim report, September 2023.

43. This allows prospective users to gain hands-on experience with the product before committing to a purchase. Free tiers are likely to have some feature limitations,[40] while free trials are usually time limited, but both are designed to provide DJs with sufficient information to make their purchase decision. Relevantly, there is no requirement for users to give up their existing subscription while trialling the new software.

44. Moreover, DJ software is certainly not a credence good. The utility provided by a DJ software product should become clear after a certain period of usage. It is common for DJ software to be available on a subscription model which limits the size of the purchase commitment should the user decide not to continue with the new product.[41]

2.1.2.3. Failure severity

45. In a 2018 merger inquiry involving two cleaning chemical suppliers, the CMA found that there was a reputational barrier to entry because of the high consequences of product failure for customers (who were food and beverage manufacturers). Specifically, the very high cost of having production disrupted due to an issue in the cleaning process, and further the reputational and public health risk of a potential food hygiene incident, caused customers to be risk-averse. In its discussion of possible remedies, the CMA observed that the merging parties having well-recognised and well-established brands gave customers some assurance as to their reliability, so an effective competitor would need to have equivalent brand strength.[42]

46. In a software context, there might be high consequences of failure for software that handles sensitive personal information such as identification or banking details. Examples include online banking apps, password managers, or government service portals. We would expect users to be particularly concerned about the risk of a breach of this information, and might therefore be biased towards choosing a familiar provider. It would also take some time for any developer to establish a strong reputation since a key criterion is the long-term absence of security failures.

47. An extreme example of software that might fit this description is medical software, particularly where it is an input to surgical equipment or lifesaving devices (e.g. pacemakers), due to the life-and-death nature of the product.

48. Although we understand software reliability is important to DJs[43] and is an aspect that some DJ software providers market themselves on,[44] a software issue during a live performance would not cause serious risk to safety/security. Which is not to say there are no consequences of a failure, but rather we do not think DJ software meets the threshold of failure severity that would engender such risk aversion in users that would constitute a barrier to entry.

49. Moreover, we understand users will naturally have opportunities to practice with the software in a low-stakes environment before going in front of a live audience, in effect doing the exact thing they would be doing in a test environment that they would be doing live. Similarly, we understand that

[40] For example, rekordbox Free omits DVS control, cloud storage and some music management features, and Serato Lite omits advanced capabilities such as DVS support and video mixing – also see para 5.37 of the Clearance Application for the features offered in the free versions of software

[41] See Table 2.3 below.

[42] Competition and Markets Authority (CMA). Ecolab Inc / The Holchem Group Limited merger inquiry – final report, December 2018.

[43] See para 5.15 of the Clearance Application.

[44] For example, Virtual DJ states on its website that "Independent studies show that VirtualDJ has the lowest crash-ratio in the industry! Using highly optimized, reliable, and well-tested code, VirtualDJ runs smoother and faster than any competitor's software, and can be trusted for your gigs". www.virtualdj.com, accessed 21/11/23.

DJs will likely have a variety of different performance environments where the consequences of failure differ, such that they can also try things in a low stakes "performance". For example, trying software out on their YouTube channel as a "demo" type video would have much lower consequences than a live club performance.[45]

2.1.3. DJ software development costs are relatively low, especially for existing developers of adjacent software

50. The main sunk cost from an entrant's perspective is likely to be the upfront research and development (R&D) cost of producing the software. This could pose a barrier to entry if the sunk R&D cost was substantial and there was a high chance it could not be recouped upon entry.

51. We understand it might cost up to **ATCI**[ ][46] upfront to develop a desktop application as sophisticated as rekordbox. While this is reasonably substantial (approx. **ATCI**[ ]of ATC's FY2022 software sales of **ATCI**[ ])[47], it is a smaller proportion of Serato's annual software revenue of NZD **SCI**[ ].[48] Furthermore, ATC estimated these costs would only be **ATCI**[ ][49] to port existing mobile DJ software, or only **ATCI**[ ][50] to add DJ functionality to existing music production software. This highlights that existing developers of adjacent software could achieve economies of scope in developing desktop DJ software, lowering sunk development costs.[51]

52. Additionally, we understand Mixxx is a free desktop application that was developed using an open source model.[52] This should allow any entrant to access and refer to the source code of an existing DJ software application.

2.1.4. Marginal costs for software are close to zero once developed

53. The cost structure of software means that there is essentially zero marginal cost of producing another unit of the software. In this sense, expansion costs are limited once a provider has developed the software.[53]

54. While software must be distributed, distribution costs are negligible. Since modern software is commonly downloaded digitally, the marginal cost of distributing each additional copy of a software product is essentially zero.

55. Non-distribution expansion costs might include hiring more support staff to deal with an increasing number of customer inquiries. However, such costs are likely to scale proportionally with copies sold and there is no asymmetry between entrants and incumbents in having to face these costs.

---

[45] See para 5.34 (e) of the Clearance Application.

[46] Converted from **ATCI**[ ] at 27 Nov 2023 exchange rates of JPY 1 = NZD 0.01099.

[47] Converted from the gross sales of the DJ app sales in CY 2022 of **ATCI**[ ] (from ATC response to NZCC RFI Q6 CY 22 Annual Management Account) to NZD at Nov 2023 exchange rate of JPY 1 = NZD 0.01099.

[48] Based on Serato's revenue from software and hardware fees for FY 22. Converted from **SCI**[ ] at 27 Nov 2023 exchange rates of USD 1 = NZD 1.64337.

[49] Converted from **ATCI**[ ] at 27 Nov 2023 exchange rates of JPY 1 = NZD 0.01099.

[50] Converted from **ATCI**[ ] at 27 Nov 2023 exchange rates of JPY 1 = NZD 0.01099.

[51] See para 4 of ATC's cross-submission on the Statement of Preliminary Issues, dated 27 November 2023.

[52] See para 6.19 of the Clearance Application.

[53] Though a software provider would have a choice about what hardware it provides support for and thus may incur some fixed costs when expanding to support other hardware.

2.1.5. Conclusion

56. Overall, we would not expect an DJ software entrant to be impeded by any significant costs or disadvantages that an incumbent can avoid.

57. As we have discussed, users are unlikely to face high switching costs. The DJ software market does not fit the profile of a market that is susceptible to reputational barriers since users do not face high search costs, the consequences of failure are not as severe as markets where reputation might be considered a barrier, and users can further mitigate any risk by trialling new products for free. Finally, sunk development costs are unlikely to be prohibitive for entrants, especially those already active in adjacent markets, and the marginal costs of expansion should be low and symmetrical.

58. As a result, we expect the merged entity will continue to face competitive constraint from the threat of potential competition.

2.2. Constraint from other existing desktop DJ software

59. Next, we turn to the question of competition from existing desktop software. Table 2.2 presents our rescaling of ATC's market share estimates to focus just on providers of desktop software. We have done this rescaling by removing the mobile-only providers from Table 3 of the Clearance Applications (but retaining the cross-platform developers including the proportion of their share contributed by mobile apps). This is not to discount the constraint from mobile-only providers, whom we return to in section 2.3.

Table 2.1: Global DJ software market share if mobile only providers are excluded

Product	Software type	Estimated market share
djay	Application & App	**ATCI**[ ]
Serato DJ	Application	**ATCI**[ ]
rekordbox / WeDJ	Application & App	**ATCI**[ ]
CrossDJ / Mixvibes	Application & App	**ATCI**[ ]
Virtual Dj	Application	**ATCI**[ ]
Traktor	Application	**ATCI**[ ]
Engine Prime (currently Engine DJ)	Application	**ATCI**[ ]
Ableton Live	Application	**ATCI**[ ]
DJUCED	Application	**ATCI**[ ]

Source: NERA analysis of ATC estimates using the 2023 Global DJ Census (DJ Census 2023) and publicly available online subscription data (found here: https://www.data.ai/en/) (data.ai) as at December 2022

60. In our view, many of these competing software options are likely to provide continued constraint on the merged entity's pricing and quality. We set out our detailed reasoning below, organised into the following topics:

    a. The underlying desktop software product is relatively homogeneous;

    b. Users are most likely to substitute to similarly-positioned products; but

    c. Developers have flexibility to reposition and target any niche beyond the short-term.

61. We also note upfront that not all of these products are strictly desktop software offerings. Some are also available on mobile devices (for example, rekordbox, Algoriddim Djay, and Mixvibes CrossDJ) and some are embedded on certain hardware rather than available for separate download (for example, Engine DJ for inMusic hardware[54]). And further, we understand Ableton Live is primarily a music production software that also includes DJ functionality.[55] We discuss the constraint from developers of mobile apps, hardware manufacturers, and developers of music production software in sections 2.3, 2.4 and 2.5 respectively.

2.2.1. The underlying desktop software product is relatively homogeneous

62. We understand there is little variation in the functionality of different desktop software products. All are designed to achieve the same thing, which is to access users' music libraries (local, cloud, or streaming); mix and/or remix recorded tracks; and allow the user's laptop to interface with DJ hardware (usually a controller).[56]

63. Desktop DJ software products include very similar feature sets. To illustrate, Table 2.2 below presents a feature comparison of desktop software products. It is an abridged version of Annexure 9 from the Clearance Application focusing on the providers in Table 2.1: Global DJ software market share if mobile only providers are excluded above. Essential features, as advised to us by Serato, are highlighted in orange. Real-time stems separation ("stems"), FX, and sample player features, which Serato advised are not yet essential but are becoming increasingly popular, are highlighted in blue.

64. Almost all of the "essential" features in Table 2.2 are universal. The only exceptions are:

    a. MIDI/USB support, which Engine DJ and DJUCED place limitations since Engine DJ is embedded with inMusic hardware and DJUCED is desktop software that is only activated by Hercules hardware;[57]

    b. Sample player, which Ableton Live does not offer;

    c. Stems, a recent AI innovation which most, but not all developers have introduced;[58] and

    d. Third-party streaming access, another relatively recent advent that some developers have not added yet.[59]

65. Even non-essential features are relatively common across all products, although some products (e.g. rekordbox and Virtual DJ) seem to be positioned as being more "feature-complete".

66. Additionally, the user interfaces of different desktop products look very similar – see our discussion of switching costs at 2.1.1. This is because, fundamentally, all software needs to display track waveforms and the user's music library, and give users access to similar tools.

[54] There is a version of Engine DJ available on desktop, but it is primarily a library management tool. See 6.18 of the Clearance Application and https://enginedj.com/software/enginedj-desktop.

[55] See para 6.24 of the Clearance Application.

[56] See para 5.25 of the Clearance Application.

[57] See para 5.18 of the Clearance Application.

[58] See https://www.digitaldjtips.com/best-dj-software-for-stems/.

[59] For example, see https://www.billboard.com/music/music-news/2013-year-of-streaming-8545169/.

67. Altogether, this demonstrates that desktop DJ software is not substantively differentiated when it comes to the underlying features and functionality.

Table 2.2: Feature comparison of selected desktop DJ software products (essential features highlighted in orange)

Feature	rekordbox Desktop	Serato DJ Pro Suite	Traktor Pro 3	Virtual DJ	Engine DJ	Algoriddim Djay	DJUCED	Ableton Live	Cross DJ 4 Pro	Mixxx
Interface and connectivity										
DJ with no hardware	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
MIDI/USB support	Y	Y	Y	Y	Y (Denon OS only)	Y	Y (Hercules only)	Y	Y	Y
Digital Vinyl System control	Y	Y	Y	Y	-	Y	-	Y (with plugin)	Y	Y
Crossfader/mixing interface	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Custom interfaces/skins	-	-	-	Y	-	-	-	Y	Y	-
MIDI mapping	Y	Y	Y	Y	-	Y	Limited	Y	Y	Y
Library and music										
Library management	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Playlist/crate creation	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Cloud library access	Y	-	-	-	Y	Y	Y	-	-	-
Third-party streaming access	Y	Y	Y	Y	Y	Y	-	-	Y	-
Key analysis	Y	Y	Y	Y	Y	Y	Y	-	Y	Y
BPM analysis	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Beatgrids	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Track/library clean-up	-	-	-	Y	-	-	-	-	-	-
Playback and performance (mix mode)										
Number of decks (up to) [at least 2 decks essential]	4	4	4	2-99	4	4	4	Unlimited	4	4
Sync	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Key lock	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Key shift	Y	Y	Y	Y	Y	Y	Y	Y	-	Y
Cuepoints	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Loops	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Loop rolls	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Slicer	Y	Y	Y	Y	Y	Y	Y	Y	-	-

Sample player	Y	Y	Y	Y	Y	Y	Y	-	Y	Y
Beatjump	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Quantize	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Slipmode	Y	Y	Y	Y	Y	Y	-	-	Y	Y
Record	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
FX	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Sequencer	Y	-	Y	Y	-	Y	-	Y	-	-
Stems	Y	Y	Y	Y	Y	Y	Y	-	-	-
Broadcast/stream	Y	-	Y	Y	-	-	-	-	-	Y
Automix	Y	-	Y	Y	Y	Y	Y	-	Y	Y
Ableton Link	Y	Y	Y	Y	Y	Y	Y	Y	Y	-
Video, lighting, karaoke										
Video playback	Y	Y	-	Y	-	Y	-	Y	-	-
Play karaoke	Y	Limited	-	Y	-	Limited	-	-	-	-
Video FX	Y	Y	-	Y	-	Y	-	-	-	-
Lighting equipment control	Y	-	-	Y	Via Soundswitch	-	-	Y	-	Y (MIDI)
POI editor	-	-	-	Y	-	-	-	-	-	-
Video editor	-	-	-	Y	-	-	-	Y	-	-

Source: Annexure 9 of Clearance Application

2.2.2. Users are mostly likely to substitute to similarly-positioned (and priced) products

68. Despite the underlying homogeneity, software can be differentiated based on price and pricing structure. DJ software pricing schedules include a mix of monthly subscriptions, annual subscriptions, and one-off purchases. Each developer usually offers a free tier or trial, with the extent of the free offering varying across products.

69. In our view, this pricing differentiation is likely to reflect each developer marketing itself in a slightly different way to appeal to a particular combination of customer preferences. If faced with a price increase by the merged entity, users are more likely to substitute to a similar alternative with respect to pricing and market positioning.

70. Table 2.3 below sets out a price comparison of the software products shown in Table 2.1 above, based on pricing information available online to New Zealand consumers. We report both paid and free offerings, but we assume the paid offerings are the "full-fledged" versions (with the exception of Mixxx) and therefore focus our analysis on them.

Table 2.3: New Zealand price comparison of a selection of desktop DJ software products as at November 2023

Product (developer)	Paid desktop offering	Free desktop offering
rekordbox (ATC)	rekordbox Core (US$12 monthly or US$120 annual) rekordbox Creative (US$18 monthly or US$180 annual) rekordbox Professional (US$36 monthly or US$360 annual)	rekordbox Free 30-day free trial of rekordbox Core and Creative
Serato DJ (Serato)	Serato DJ Pro (US$10 monthly or US$249 one-off) Serato DJ Club Kit (US$12 monthly or US$299 one-off) Serato DJ Suite (US$15/monthly or US$449 one-off)	Serato DJ Lite 14-day free trial of Serato DJ Suite
Traktor (Native Instruments)	Traktor Pro 3 (US$50 one-off) Traktor Pro Plus (add-on features to Traktor Pro 3, US$5 monthly or US$49 annual)	Traktor DJ 2 Traktor Pro 3 Demo
Virtual DJ (Atomix)	Virtual DJ Home Plus (NZ$99-199 one-off) Virtual DJ Pro (NZ$39 monthly or NZ$601 one-off) Virtual DJ Business (NZ$199 monthly)	Virtual DJ Home (no hardware integration)
Engine DJ (inMusic)	N/A (embedded in inMusic hardware)	Engine DJ Desktop (library management tool)
Djay (Algoriddim)	Djay Pro (US$50 annual)	Djay
DJUCED (Hercules)	DJUCED Standard (unlocked by Hercules hardware)	DJUCED Free
Ableton Live (Ableton)	Live 11 Intro (NZ$143 one-off) Live 11 Standard (NZ$519 one-off)	One-month free trial of Live 11

	Live 11 Suite (NZ$1,039 one-off)	
Cross DJ	Cross DJ 4 (US$50 one-off)	Cross DJ 4 Demo
(MixVibes)	Cross DJ 4 Pro (US$100 one-off)	Cross DJ 4 Pro Demo
Mixxx	Free open-source software	

Source: NERA review of product websites.[60] Note: Prices are rounded to the nearest dollar in their respective currency, and where a full and promotional price were provided, the promotional price was used.

71. Rekordbox and Serato DJ are closely-positioned with regards to price structure as they are both offered on a paid monthly subscription basis with a free "lite" tier. rekordbox is also available on an annual subscription, while Serato can be purchased outright for the equivalent of 25-30 months' subscription. Both appear to be positioned as "premium" products as they are priced higher than most other software options. Rekordbox's two highest tiers are more expensive than Serato on a monthly basis, but Serato would eventually become cheaper if purchased outright.

72. The most similarly-positioned products to the merging parties appear to be Virtual DJ Pro and Algoriddim Djay – both are full-featured and available on a monthly subscription. Traktor Pro Plus is somewhat of a hybrid pricing construct as the base software is purchased outright, but there is an add-on subscription which puts it closer to Serato/rekordbox in terms of pricing construct, but still overall cheaper. Given their price points, the Virtual DJ might receive more diversion from high-end users and Djay/Traktor from low-end users.[61]

73. Other options such as Cross DJ and Ableton Live are more difficult to compare to the merging parties' pricing since they are one-off purchases. Cross DJ would be cheaper than either rekordbox or Serato DJ over the course of a year, but the highest tiers of Ableton Live would be significantly more expensive. We understand this is because, as noted above, Ableton Live is primarily a music production software and therefore includes much wider functionality than the others (which may not be required by a DJ). At the other end of the spectrum, Mixxx is entirely free and open-source.

74. Both Engine DJ and DJUCED do not have a stand-alone prices since, as noted at 64.a above, Engine DJ is embedded with inMusic hardware and DJUCED is desktop software that is only activated by Hercules hardware.

2.2.3. But developers have the flexibility to reposition and target different niches

75. As set out in the previous sections, there appear to be multiple providers of desktop DJ software who are selling a relatively homogeneous product that is positioned/marketed (and therefore priced) differently. In a differentiated product market, competitive effects would normally be assessed by looking at the closeness of competition between the merging parties.[62] As noted above, rekordbox and Serato appear to have similar positioning in the market, at least with respect to their pricing levels and structures.

[60] https://rekordbox.com/en/plan/, https://serato.com/dj/pro/buy-dj-pro, https://www.native-instruments.com/en/catalog/hardware/traktor/, https://www.virtualdj.com/buy/index.html, https://enginedj.com/software/enginedj-desktop, https://www.algoriddim.com/apps, https://www.djuced.com/, https://www.ableton.com/en/shop/live/, https://www.mixvibes.com/store, https://mixxx.org/

[61] Virtual DJ Pro is more expensive than any of rekordbox or Serato DJ's feature tiers (but can be purchased outright for less than Serato DJ Suite), on the basis that US$449 is more expensive than NZD 601 (assuming US$1 > NZD 1.34, which has been true since May 2015). Algoriddim's Djay Pro is available at US$50/year which is approximately US$4/month – significantly less than any of the merging parties' feature tiers, albeit with a higher upfront commitment.

[62] NZCC, Mergers and acquisitions guidelines (May 2022), p. 18.

76. However, as noted in the NZCC's merger guidelines (emphasis added):[63]

> *"The merged firm's incentive to increase prices also depends on competitor and customer responses, **including the ability of competitors to reposition products** or extend product lines so that competitors' products more closely compete with the merged firm's products."*

77. Each developer's product positioning is not set in stone. Economic theory tells us that relatively homogeneous products can be *intentionally* differentiated as a conscious strategic choice rather than by necessity.[64]

78. This positioning is based on the gap each supplier identifies in the *existing market*. If Serato and/or rekordbox worsened their competitive offering(s), this calculus would change and competing developers would have incentives to reposition and win customers away from the merged entity.

79. The low marginal cost of distributing software discussed in section 2.1.4gives developers a lot of pricing flexibility, including the ability to undercut the merged entity's pricing if it decreased quality and/or raised prices, including through promotional pricing.

80. In terms of any feature-based differentiation, we would generally expect adding new features to be viable and relatively low-cost for an existing software developer. Even complex features such as Algoriddim's dynamic stems separation (real-time decomposition of audio sources), first introduced in 2020, were quickly imitated by other developers (e.g. Serato and Virtual DJ in 2022, rekordbox in 2023) to compete for and retain users.[65] And as already noted, most providers already provide the same features.

81. Further, the differences between different product tiers are often relatively superficial. For example, the main differences between rekordbox Creative (US$18/month) and rekordbox Professional (US$36/month) appear to be that the latter offers additional music management tools including unlimited cloud storage, and 8 activated devices (as opposed to 4).[66] It would presumably be straightforward for a developer who does not currently offer a "premium" feature tier to add one with these features at a lower price point.

82. Therefore, while Serato and rekordbox appear to be closely positioned to each other, given the underlying homogeneity in the software offerings, we would expect other providers to reposition their products and pricing in response to a price increase/quality decrease/reduction in innovation by rekordbox/Serato.

2.2.4. Conclusion

83. Overall, we would expect the merged entity to continue to be constrained by existing competitors. If the merged entity raised its prices or lowered its quality, customers would likely divert to the most-closely-positioned rivals in the immediate term, i.e. djay, Virtual DJ and Traktor. However, all rivals would have the ability and incentive to reposition and capture sales from the merged entity even if they are currently positioned differently. This is because desktop software is largely homogeneous in terms of the underlying features, and the low marginal cost of distributing software should encourage undercutting of price if the merged entity departs from the competitive equilibrium.

[63] NZCC, Mergers and acquisitions guidelines (May 2022), p. 26.

[64] This positive association is supported by the fact that competitive environments can generate greater incentives for firms to differentiate themselves, gain a competitive advantage and earn profits (the so-called "escape effect"). See Arrow, K. J. (1972). *Economic welfare and the allocation of resources for invention (pp. 219-236).* Macmillan Education UK.

[65] See Clearance Application at 5.12.

[66] See https://rekordbox.com/en/plan/.

2.3. Constraint from mobile DJ software

84. ATC has desktop and mobile software offerings (rekordbox, which has desktop and mobile versions and WeDJ which is mobile only), while Serato's main software offering is desktop-based (Serato DJ).[67]

85. There are a number of firms that make mobile DJ apps that do not currently have a desktop application.[68] A key question for assessing the proposed transaction is therefore whether these firms can competitively constrain the desktop versions of Serato and rekordbox, either because:

    a. Desktop users would switch to mobile software in sufficient volumes to constrain a price increase by the merged entity (demand-side substitution); or

    b. Mobile developers could easily, profitably and quickly start developing desktop software (supply-side substitution).

86. In our view, the merged entity is likely to face continued constraint from mobile and cross-platform developers in addition to desktop-only developers. We set out our detailed reasoning below.

87. Our approach to addressing this question is as follows:

    a. We start by comparing the quality of desktop and mobile software, both realised quality and whether there are technical limitations to quality being comparable;

    b. We consider switching costs from the perspective of an end consumer;

    c. We consider whether pricing outcomes suggest mobile and desktop software are substitutes; and

    d. We assess supply side substitutability.

2.3.1. Quality differences between desktop and mobile apps do not appear to be material

88. First, there should be no meaningful physical or computing limitations to running DJ software on a mobile device. The gap in computing power between desktop and mobile devices has narrowed significantly over the past decade.[69] We understand that most iOS and Android devices can easily run DJ software, so mobile users and developers should face no material performance barrier relative to the desktop version.[70]

89. Second, based on Annexure 9 of the clearance application there appears to be a high degree of shared functionality between desktop and mobile software.

90. Delving into specific features, there is much similarity between the two platforms. Table 2.4 below extends our desktop feature comparison from 2.2.1 to include some mobile apps (in addition to the merging parties' desktop software). Essential features, as advised to us by Serato, are highlighted in orange, and the increasingly important stems, FX, and sample player features are highlighted in blue.

[67] There is an add-on mobile app for Serato called Serato Remote. This cannot be operated independently of the desktop application - we understand it essentially connects to the desktop application and allows that software to be controlled by the mobile app. See https://serato.com/dj/pro/expansions/remote.

[68] See Table 1 of the Clearance Application.

[69] For example, see https://insights.samsung.com/2021/08/19/your-phone-is-now-more-powerful-than-your-pc-3/.

[70] See para 5.25 of the Clearance Application.

Table 2.4: Feature comparison of selected mobile DJ software and the merging parties' desktop software (essential features highlighted in orange)

Feature	Serato DJ Pro Suite	rekordbox Desktop	rekordbox Mobile	WeDJ	Algoriddim Djay	Edjing Mix	DJ Music Mixer	DiscDJ3D	DJ It!
Compatible operating system	Mac, Win	Mac, Win	iOS, Android	iOS, Android	Mac, Win, iOS, Android	iOS, Android	Android	Android	iOS, Android
Interface and connectivity									
DJ with no hardware	Y	Y	Y	Y	Y	Y	Y	Y	Y
MIDI/USB support	Y	Y	Y	Y	Y	Y	-	-	-
Digital Vinyl System control	Y	Y	-	-	Y	-	-	-	-
Crossfader/mixing interface	Y	Y	Y	Y	Y	Y	Y	Y	Y
Custom interfaces/skins	-	-	-	-	-	Y	-	Y	-
MIDI mapping	Y	Y	-	-	Y	-	-	-	-
Library and music									
Library management	Y	Y	Y	Y	Y	Y	Y	Y	Y
Playlist/crate creation	Y	Y	Y	Y	Y	Y	Y	Y	-
Cloud library access	-	Y	Y	-	Y	Y	-	-	-
Third-party streaming access	Y	Y	Y	Y	Y	Y	-	-	Y
Key analysis	Y	Y	Y	Y	Y	Y	-	-	Y
BPM analysis	Y	Y	Y	Y	Y	Y	-	Y	Y
Beatgrids	Y	Y	Y	Y	Y	Y	Y	Y	Y
Track/library clean-up	-	-	-	-	-	-	-	-	-
Playback and performance (mix mode)									
Number of decks (up to) [at least 2 decks essential]	4	4	2	2	4	2	2	2	2
Sync	Y	Y	Y	Y	Y	Y	Y	Y	Y
Key lock	Y	Y	Y	Y	Y	Y	Y	Y	Y
Key shift	Y	Y	Y	Y	Y	-	-	Y	-
Cuepoints	Y	Y	Y	Y	Y	Y	Y	Y	Y
Loops	Y	Y	Y	Y	Y	Y	Y	Y	Y
Loop rolls	Y	Y	Y	Y	Y	Y	Y	Y	Y
Slicer	Y	Y	Y	Y	Y	Y	-	-	-

Sample player	Y	Y	Y	Y	Y	Y	Y	Y	Y
Beatjump	Y	Y	Y	Y	Y	-	-	-	-
Quantize	Y	Y	Y	Y	Y	Y	-	-	-
Slipmode	Y	Y	Y	Y	Y	-	-	-	-
Record	Y	Y	Y	Y	Y	Y	Y	Y	-
FX	Y	Y	Y	Y	Y	Y	-	Y	Y
Sequencer		Y	-	-	Y	-	-	-	-
Stems	Y	Y	-	-	Y	Y	-	-	-
Broadcast/stream	-	Y	Y	-	-	Y	-	-	-
Automix	-	Y	Y	Y	Y	Y	-	-	-
Ableton Link	Y	Y	-	-	Y	-	-	-	-
Video, lighting, karaoke									
Video playback	Y	Y	-	-	Y	-	-	-	-
Play karaoke	Limited	Y	-	-	Limited	-	-	-	-
Video FX	Y	Y	-	-	Y	-	-	-	-
Lighting equipment control	-	Y	-	-	-	-	-	-	-
POI editor	-	-	-	-	-	-	-	-	-
Video editor	-	-	-	-	-	-	-	-	-

Source: Annexure 9 of Clearance Application

91. It is clear from Table 2.4 that, on average, desktop-only software tends to have *more* features than mobile-only software. However, *essential* features tend to be present across mobile software as well, with some exceptions:

    a. DJ Music Mixer, DiscDJ3D and DJ It! do not offer MIDI/USB support to integrate with hardware;

    b. The same three apps, along with rekordbox Mobile and WeDJ, do not offer stems

    c. DJ Music Mixer does not offer third-party streaming access, BPM analysis, or FX;

    d. DiscDJ3D does not offer third-party streaming access; and

    e. DJ It! does not offer playlist/crate creation or record functionality.

92. Notably, one of the main cross-platform developers is Algoriddim, whose Djay software is available across desktop and mobile platforms. We understand Djay's mobile version is a full-fledged equivalent to its desktop version (see Table 2.4 above). Djay's functionality includes sophisticated modern features such as real-time stems separation.

93. Which is to say mobile apps can and do offer the same functionality as desktop software and that the decision by some providers to offer mobile apps more targeted at beginners (or that don't function with hardware) is simply a strategic decision, rather than something they are inherently constrained to do.

94. We return to supply side substitutability in section 2.3.4, but note here that suppliers of "basic" mobile apps could easily expand into offering more advanced apps if given the economic incentive to do so. In this regard it is less relevant whether DJing using a mobile device is currently popular, the question is whether on a forward-looking basis it would become more popular if Serato and rekordbox increased their pricing or stopped innovating.

95. A final question is whether using a mobile device or a laptop offers a different "experience" which might mean user preferences for a laptop results in mobile apps not being an economic substitute. As a starting point, we note that a degree of heterogeneity in user preferences regarding physical device attributes does not necessarily preclude competitive constraint – there can still be a "chain of substitution" with differentiated products if there are sufficient consumers at the margin who would substitute between the differentiated products based on price.[71]

96. For example, desktop DJ software may benefit from a larger screen size that displays more of a DJ's song library and waveform information; and physical keyboards that can facilitate faster navigation of the library. On the other hand, mobile DJ software may benefit from greater device portability and the unique UI interactions provided by a touchscreen (though some laptops also have touch screens). Additionally, tablets are likely to bridge some of this heterogeneity by offering similar screen real estate and computing power to a laptop in a more portable and cheaper device.[72]

2.3.2. Desktop-to-mobile switching costs are unlikely to be material

97. The switching costs for a user to change between any two pieces of DJ software (desktop or mobile) are minimal. We discuss this further in 2.1 above in the context of barriers to entry/expansion, but we note here that there are very few (if any) additional costs of making a desktop-to-mobile switch compared to a desktop-to-desktop switch.

[71] The NZCC recognises this in its merger guidelines at 3.11.

[72] See the discussion on the relevant DJ software market in para 5.21 – 5.41 of the Clearance Application.

98. For example, we expect most DJs would already own a mobile device given the widespread prevalence of smartphones in New Zealand. There may be slight frictions in shifting a local music library from a desktop device to a mobile one, but this should not be a significant cost, especially given the modern advent of cloud storage and music streaming services.[73] Moreover, in general, we consider DJs are likely to be an above-average demographic in terms of technological savvy and adaptability.[74]

99. We also understand it is typical for mobile devices to be "class-compliant" with DJ hardware (i.e. to work out-of-the-box without extra drivers) and physically able to connect using the device's charging port.[75] Therefore, even if these factors limited substitutability in the early days of smartphones, this should no longer be the case.

2.3.3. Pricing outcomes are consistent with different product positioning

100. In this section, we extend our pricing analysis from 2.2.2 above to consider the relative pricing of desktop and mobile software.

101. We have found that, on balance, mobile software appears to be slightly cheaper than desktop software. For example:

    a. rekordbox Mobile costs US$7/month while the paid tiers of rekordbox Desktop cost US$12-36/month.[76]

    b. Native Instruments provides free DJ software (Traktor DJ 2) that is compatible with both desktop and iPad, but its flagship Traktor Pro 3 is only available for desktop and costs a one-off US$50.[77]

    c. MixVibes' Cross DJ Mobile (available for iOS and Android) is free, whereas its Cross DJ 4 and Cross DJ 4 Pro software (available for Windows and Mac) costs US$50-100.[78]

    d. Popular desktop-only software such as Serato DJ Pro and Virtual DJ Pro cost US$10-15/month and NZ$39/month respectively, while popular mobile-only software such as MWM's Edjing Pro only costs US$6.67/month.[79]

    e. As a counter-example, Algoriddim's Djay software costs US$4.17/month[80] across both desktop and mobile and there exists open-source desktop software such as Mixxx which is completely free.[81]

102. This pricing pattern likely reflects:

    a. Serato DJ and Virtual DJ both being desktop only, having brand positioning (and therefore pricing) as premium products, and operating on a subscription model (which is typically more expensive over the long term). In other words, while the difference between SeratoDJ/Virtual DJ

[73] See para 6.22 of the Clearance Application.

[74] For example, paras 5.1-5.7 of the Clearance Application give some insight into the technological skillset of DJs.

[75] See para 5.5 of the Clearance Application.

[76] See Annexure 9 of Clearance Application.

[77] See https://www.native-instruments.com/en/catalog/software/dj-software/

[78] See https://www.mixvibes.com/cross-free-dj-software.

[79] Based on an annual subscription cost of US$80. See Annexure 9 of Clearance Application.

[80] Based on an annual subscription cost of US$50.

[81] See Annexure 9 of Clearance Application.

and mobile-only apps may appear relatively stark, the difference between other desktop applications such as Traktor Pro 3 is much less stark (e.g. subscribing to Edjing Pro for a year would cost US$80, compared to Traktor Pro 3's one off cost of US$50); and

b. Developers' current tendency to differentiate their mobile software as a simpler version to attract beginners.[82] However, developers could readily reposition in future in response to technological innovation, user preferences, and the positioning of other developers. Algoriddim's Djay is a key example of this.

2.3.4. Supply-side substitution

103. Consideration of supply side substitutability in this context involves assessing whether firms that are currently only supplying mobile software could easily switch to supplying desktop software.

104. Having already developed a mobile app that performs all the functions required of DJ software, it seems that the technical knowledge required to develop a desktop product is just that required to code the same functionality for a desktop operating system. This is to say, to the extent that coding DJ software requires specialised knowledge, developers of mobile DJ app already have that, so all that is required is the more generalised knowledge to code the relevant functionality for a different operating system.

105. Because of this, we understand that the time and cost involved would not be particularly large. ATC estimates that an existing mobile developer could produce a desktop application as sophisticated as rekordbox for an estimated upfront development cost of **ATCI**[ ][83], which is approximately half the cost of developing the desktop software from scratch.[84] ATC also estimates that it would take six months or less to do this.[85]

106. Furthermore, we note that there are already cross-platform developers of both desktop and mobile software, the most prominent of which is Algoriddim, whose software Djay is available on Mac, iOS, Android and Windows. Other cross platform developers include MixVibes whose Cross DJ software is available in both desktop and mobile versions, and Native Instruments whose Traktor DJ 2 software is compatible with both desktop and iPad.[86] We understand that in developing the mobile version of rekordbox, **ATCI**[ ].[87] This points to a strong degree of supply-side substitutability.

107. Relatedly, we note that desktop developers appear to have produced their software for both Windows and Mac and mobile developers appear to have produced software for both iOS and Android.[88] In practice, this suggests that most DJ software features are already written for one operating system and ported to another, and thus the requirement to port a code base shouldn't be considered a material impediment to supply-side substitution.

[82] See para 4.10 of the Clearance Application.

[83] Converted from **ATCI**[ ] at 27 Nov 2023 exchange rates of JPY 1 = NZD 0.01099.

[84] See para 4 of ATC's cross-submission on the Statement of Preliminary Issues, dated 27 November 2023.

[85] See para 6.25 of the Clearance Application.

[86] See https://www.mixvibes.com/cross-free-dj-software and https://www.native-instruments.com/en/catalog/software/dj-software/

[87] See ATC's response to Q10 of the NZCC RFI where they state that **ATCI**[ ].

[88] See Annexure 9 of Clearance Application.

2.3.5. Conclusion

108. Overall, there is more differentiation between desktop and mobile software than between different pieces of desktop software. For example, mobile apps tend to be cheaper, targeted at beginners, and include less functionality than desktop software (while still including most essential features). Accordingly, all else equal, we would expect the merged entity's desktop products to face more competitive constraints from other desktop developers than from mobile-only developers.

109. However, mobile-only developers will certainly provide some constraints, especially with the advent of cross-platform developers such as Algoriddim to bridge the gap between desktop and mobile.

110. The narrowing difference in computing power between desktops and mobile devices, and the ability of tablets to provide a middle ground between laptops and smartphones, ensures that users do not have to sacrifice utility when DJing from a mobile device. The relative lack of switching costs should further facilitate demand-side substitution.

111. And, on the supply-side, mobile developers are strong candidates to develop their own desktop software given they would have both the required audio engineering expertise, and an existing code base to be ported.

112. Therefore, if the merged entity attempted to raise its prices, it would likely face *both* demand-side diversion to mobile apps, and supply-side competition from mobile developers.

2.4. Constraint from DJ hardware manufacturers

113. We understand the relationship between DJ hardware and software is centered around mutual compatibility and flexibility across different DJ set-ups. The universal MIDI protocol helps to avoid a situation where a DJ's choice of hardware locks them into an "aftermarket" with only a subset of compatible software.[89]

114. In addition, it is our understanding that DJ hardware products can be used in conjunction with DJ software (as a complement) or instead of DJ software (as a substitute), depending on the type of hardware and the DJ's desired set-up:[90]

    a) DJ controllers are strictly complementary as they are designed to receive input from DJ software and provide a physical turntable interface for controlling it.

    b) CDJs and DJ mixers can be used together *instead of* a DJ controller. CDJs include embedded software and do not require external software input as the songs can simply be provided on a USB stick (although CDJs are capable of acting as a controller and interfacing with software when a device is connected).

    c) An all-in-one DJ system is a substitute for a CDJ/mixer set-up. It is similarly compatible with DJ software but can be operated stand-alone.

    d) DJ software can be used independently to mix tracks without any of the above-mentioned hardware.

[89] See para 7.7 of the Clearance Application.

[90] See para 5.15 of the Clearance Application.

e) DJ speakers and headphones are required to hear and play the tracks during a public performance regardless of the hardware/software combination used for mixing.

115. On the demand side, in theory, a DJ could fully substitute from using exclusively DJ software (plus speakers and headphones) to using exclusively DJ hardware (plus a USB stick with songs) for performing.[91]

116. To the extent that some users might substitute from (e.g.) a software/controller set-up to an all-in-one/USB stick set-up, hardware manufacturers and the embedded software on all-in-one systems might therefore provide some direct horizontal constraint on software manufacturers. As an example, Denon market their stand-alone systems stating *"As a preference evolution, DJs could free themselves from the previously necessary use of a laptop, connecting more organically with their DJ gear and their audience"*.[92]

117. The blurring of the boundary between hardware and software due to embedded software therefore means that for some users hardware is direct substitute for software and thus a constraint on software providers.

118. However, we understand that in practice many DJs' set-ups will include some combination of both hardware and software.[93] This may reduce the likelihood of full demand-side substitution from software to hardware.

119. On the supply side, DJ hardware manufacturers are likely to have the ability and incentive to enter the DJ software market to constrain the merged entity:

a. Ability: CDJs and all-in-one hardware tends to have proprietary embedded software,[94] which could be converted to full-fledged stand-alone software at lower cost than from-scratch entry; and

b. Incentive: Controller manufacturers (who typically also manufacture CDJs and all-in-ones)[95] rely on the existence of affordable high-quality software that is compatible with their controllers.

120. Several DJ hardware manufacturers already develop DJ software. This includes ATC and Native Instruments who develop stand-alone software offerings (rekordbox and Traktor respectively).[96]

121. It also includes inMusic and Hercules, whose software offerings (Engine DJ and DJUCED respectively) are embedded or at least strongly integrated with first-party hardware.[97] To the extent that users of inMusic and Hercules controllers presently use Serato software, any post-merger worsening of Serato's prices or quality might induce the manufacturers to enhance their own software offerings including by fleshing them out into stand-alone products.

[91] Which is to say that library management would like still be done by non-embedded software, even if performance is done using the embedded software.

[92] https://imb-web-denondj.s3.amazonaws.com/products/dj-systems.html, accessed 22/11/2023.

[93] See para 5.7 of the Clearance Application.

[94] See para 5.15 of the Clearance Application.

[95] See Table 2 of the Clearance Application.

[96] See para 7.19 of the Clearance Application.

[97] See the discussion on DJ software in para 5.8-5.19 in the Clearance Application.

122. Other hardware manufacturers might also constitute strong software entry candidates. For example, Gemini develops CDJs and all-in-ones in addition to controllers.[98] Therefore they are likely to have already developed embedded software for the CDJs/all-in-ones and already have their own music management software[99] (ability). More generally demand for controllers depends on there being competitive outcomes in the software market (incentive).

2.5. Constraint from music production software developers

123. Music production software, also known as digital audio workstation (DAW) software, is designed for creating songs. We understand this involves combining different digitised musical inputs (vocals, instruments, etc.), which in some sense is simply a more granular and sophisticated version of what DJ software does. In other words, while DJing involves mixing two songs together, music production involves mixing together a number of different musical components to create a song.

124. Given these similarities, there is a question of whether music production software developers could competitively constrain the merged entity, either because:

    a. DJ software users would switch to music production software in sufficient volumes to constrain a price increase by the merged entity (demand-side substitution); or

    b. Music production software developers could easily, profitably and quickly start developing DJ software (supply-side substitution).

125. First, we note that Ableton's music production software Ableton Live actually *includes* DJ functionality and is a popular DJ software option in its own right. Though we understand this option is most suited to electronic music where a DJ is already producing music using Ableton, and would be less suited to turntable focused styles of DJing.[100]

126. Additionally, most music production software has a performance mode for live performance (e.g. we understand FL Studio[101] and Logic Pro X[102] both have performance modes), which can be used by music producers to perform music live, often using MIDI pad controller to trigger loops and sliders/knobs to fade between song components.

127. However, in general we understand that music production software is not specialised for the type of performance in the way that DJ software is, and so it tends to be less user friendly when it comes to live DJing.[103]

128. Accordingly, we would not expect demand-side substitution to occur from DJ software to music production software unless the music production software specifically includes DJ functionality. Even then (as in the case of Ableton), demand-side substitution would largely be limited to the subset of DJs who make their own music and thus are already familiar with music production software.

[98] https://geminisound.com/collections/dj-equipment. Accessed 27/11/2023/

[99] https://geminisound.com/products/v-case. Accessed 27/11/2023/

[100] See para 5.27 of the Clearance Application.

[101] See, e.g. https://www.image-line.com/fl-studio-learning/fl-studio-online-manual/html/playlist_performance.htm

[102] See, e.g. https://support.apple.com/en-sg/guide/logicpro/lgcp23d9e3a5/mac and https://logicxx.com/blogs/news/inspiring-ways-to-use-logic-pro-for-live-performance-and-djing

[103] For example, DJ Studio advertises itself as software that has a DAW workflow but includes features that allow it to be used for DJing. It explains why typical DAWs are less suitable for DJing at https://dj.studio/blog/daw-for-djs.

129. Turning to supply-side substitution, as already noted Serato is moving into music production and there are other firms that produce both music production and DJ software. Native Instruments, which we understand leveraged its expertise in the music production software market to develop its DJ software, Traktor,[104] and still makes music production software.[105] In addition, Imagine Line software, the makers of the music production software FL Studio, previously had their own DJ software called Deckadance, before it was sold to Gibson in 2015.[106]

130. In general, there is significant overlap in what each piece of software is fundamentally doing from an audio engineering perspective. This is likely to facilitate supply-side substitution by reducing the incremental development costs for a music production software developer to enter the DJ software market. In particular, given music production software is doing something more complicated than DJ software, it should be relatively easy for a music production software developer to develop DJ software.

131. As discussed further in section 2.1.3 above, we understand that an existing music production software developer could add DJ functionality to its app for an estimated upfront development costs of **ATCI**[ ][107] and that it would 3 months to develop, which is significantly less than the estimated **ATCI**[ ][108] that it would cost to develop a DJ software application from scratch.

132. Therefore, we consider music production software developers to be strong entry candidates due to the supply-side overlap and possibility of expedited entry.

133. There are other adjacent markets whose established players could be considered entry candidates to an extent. For example, Apple has well-known music library management and music streaming software (iTunes and Apple Music respectively). It could theoretically leverage these brands, as well as its existing music production brands (Garage Band[109] and Logic Pro[110]) if it saw an opportunity in the DJ software market.

134. Other music streaming providers might also fit this description. For example, Tidal and Soundcloud already target themselves toward DJs somewhat with specific features that integrate with DJ software.[111] Additionally, there are specialised DJ streaming services like Beatport and Beatsource, both of which have DJ software web-apps.[112] These providers may be well-positioned to expand into a full-fledged software offering.

[104] See 6.28 of the Clearance Application.

[105] https://www.native-instruments.com/en/specials/music-production-software/

[106] https://www.image-line.com/fl-studio-news/gibson-acquires-deckadance/

[107] Converted from **ATCI**[ ] at 27 Nov 2023 exchange rates of JPY 1 = NZD 0.01099.

[108] Converted from **ATCI**[ ] at 27 Nov exchange rate of JPY 1 = NZD 0.01099

[109] https://www.apple.com/nz/mac/garageband/

[110] https://www.apple.com/nz/logic-pro/

[111] See https://tidal.com/djs and https://checkout.soundcloud.com/dj.

[112] See https://dj.beatport.com/home and https://dj.beatsource.com/home.

3. Vertical effects

3.1. Overview

135. In this section we analyze the issues raised by the SOPI related to vertical integration for both DJ hardware and DJ software.[113]

136. In the following sections, we will firstly go over the economics of vertical foreclosure and then move onto testing whether the merged entity could profitably:

    a. Foreclose its DJ hardware competitors by making Serato only compatible with ATC hardware; and/or

    b. Foreclose its DJ software competitors by making Pioneer DJ hardware only compatible with ATC software (Serato and rekordbox).

3.2. Economics of vertical foreclosure

137. Vertical foreclosure can occur when an integrated firm leverages its position in one market to anticompetitively foreclose rivals in another market, in a way that lessens competition. This may result in unintegrated downstream rivals being foreclosed from the input controlled by the firm that integrates.

138. Complete foreclosure occurs if the integrated firm stops supplying competing downstream firms. Partial foreclosure is when discriminatory methods that disadvantage competitors are used. An example of this is a post-merger increase in the price of the upstream input, raising costs for competing downstream firms. Non-price discriminatory practices may also be used including reduced quality or shipping delays.[114]

139. The economic literature highlights that post-merger, a firm may offer a lower price or additional benefits like design features to customers who purchase products together. This practice is particularly relevant for hardware and software firms because when integrated they could ensure hardware and software compatibility, enhancing ease of use for the consumer when compared to competitors' products. This may lead to anticompetitive effects including increased costs for competitors, limitations to gaining sufficient market demand needed to achieve competitive scale and may deter new entrants to the market.[115]

140. The framework for assessing vertical foreclosure consists of three elements:

    a. Establish if the merged firm has the **ability** to foreclose rivals. This involves asking if the firm will be able to leverage market power from one market to another? This involves defining the market, identifying key players and ultimately assessing market power to establish if it is possible for foreclosure to be attempted.

    b. Establish if the **incentive** exists to foreclose. This involves identifying a clear theoretical basis of incentive using vertical arithmetic and diversion ratio. Incentive exists if foreclosure is profitable and to calculate profitability, we use vertical arithmetic and balance the profit decrease from the

[113] SOPI para 23.

[114] Jeffrey Church, "The Impact of Vertical and Conglomerate Mergers on Competition", Church Economic Consultants Ltd., September 2004, p.v

[115] Jeffrey Church, "The Impact of Vertical and Conglomerate Mergers on Competition", Church Economic Consultants Ltd., September 2004, p.xix-xx

decrease in sales volume (of one product) vs the profit increases from greater sales volume and the recaptured volume (of the other product).

c. Establish what impact or **effect** this foreclosure would have. Evaluate the potential anticompetitive effects of the foreclosure and evaluate the broader impacts of this on consumer welfare and innovation.

3.3. Testing whether the merged entity could leverage its position in DJ software to foreclose DJ hardware

141. To test whether the merged entity could leverage its position in DJ software to foreclose other DJ hardware competitors, we test whether the merged entity has the ability and incentive to foreclose other DJ hardware providers by making their software products (Serato and rekordbox) only compatible with ATC DJ hardware. In other words, if a consumer wants to use ATC DJ software, does the merged entity have the ability and incentive to ensure that consumers will have no choice but to use an ATC DJ hardware.

142. For example, could the merged entity refuse to make Serato compatible with non-ATC hardware or make Serato less attractive to rival DJ hardware brands such as only making the free version available for non-ATC DJ hardware or being slow to update software for non-ATC hardware users.

143. For this to be the case the following would need to be true:

a. ***Ability*:** Serato is a "must have" DJ software and thus making it exclusive to ATC hardware will force users who are currently using Serato on non-ATC hardware to switch. In addition to assessing market power, there is also the question of whether it is technically/practically possible to implement a foreclosure strategy; and

b. ***Incentive*:** ATC's extra sales at the DJ hardware level exceed the loss from the reduction in Serato software sales made to other DJ hardware operators.

3.3.1. Testing whether ATC has the *ability* to foreclose other DJ hardware suppliers

144. In this section, we assess whether the merged entity would have the "ability" to foreclose other DJ hardware suppliers by making their DJ software only compatible with their own DJ hardware. We have not in this report considered the effect that any existing contractual obligations would have on the merged entity's ability to foreclose, although we recognise that contractual obligations will also be relevant to the assessment of whether ATC would have the ability or incentive to foreclose other DJ hardware suppliers.

145. We assess whether Serato is truly a "must have" DJ software that can affect an end-user's choice of hardware if it is only compatible with specific hardware. The other limb of the test is whether it is technically possible to do so and we understand this is covered in the application.

146. If Serato was in fact a must-have DJ software, we would expect that the majority of end-users would be using Serato. ATC's estimates of global market shares for all DJ software suggest that this is not the case, with Serato having an estimated market share of **ATCI**[ ]%, making it the 6th largest player. Using ATC's estimates but taking a narrower view of market share to only include firms that make desktop software (but including cross platform developers such as Algoriddim and Cross DJ) places Serato as the second largest firm (just behind Algoriddim but ahead of rekordbox) with a market share of **ATCI**[ ]% (see Table 2.1).

147. From a price and functionality perspective, Table 3.1 below summarises the feature comparison of Annex 9 of the clearance application and our pricing comparison in Table 2.3 above. This table indicates that there are other DJ software suppliers that provide products that offer the same functionality, or even more functions compared to Serato for a similar price.

Table 3.1: Pricing and functionality of other DJ software

Brand	Product	Platform	Total number of functions available	Subscription price (USD)
Serato	DJ Pro Suite	Mac, Win	28	$15/month
AlphaTheta	Rekordbox Creative	Mac, Win	34	$18/month
Algoriddim / Djay Pro	Djay Pro	Mac, Win, iOS, Android	31	$50/annum
Virtual DJ	Virtual DJ Pro	Mac, Win	37	$39/month (NZD)
Ableton	Live 11 Standard	Mac, Win	26	$519 (one-off), no subscription
Native Instruments	Traktor Pro 3/Plus	Mac, Win	29	$50 (one-off) and $5.00/month (add-on)
Xylio	Future.dj Pro	Mac, Win	29	$30/annum
Hercules	DJUCED	iOS, Mac, Windows	24	Free with Hercules hardware

Source: NERA aggregation of the functionality comparison table presented in Annex 9 of ATC's Clearance Application. For the price offered, NERA has reviewed each product's website and should match Table 2.3 above.[116] Source for Xylio (which was not covered in Table 2.3): https://www.xylio.com/pricing/

Note: Prices are rounded to the nearest dollar in their respective currency, and where a full and promotional price was provided, the promotional price was used. We understand that the functionalities listed for each provider in the Annex 9 of the Clearance Application are not an exhaustive list and that there may be more functions available than what we have counted in the table above.

148. Furthermore, as discussed above, the core functions of DJ software are relatively simple and the user interface of each DJ software is similar. The fact that there is little product differentiation, combined with the low switching costs associated with DJ software (as discussed in 2.1.1) indicates that if Serato were to limit the compatibility of their software to ATC hardware, there would be few obstacles for end users that own non-ATC hardware to just switch to a more widely compatible software. This is particularly the case for users that are paying a monthly subscription rather than owning a perpetual license, as they would face a forward-looking software cost in either scenario,[117] which **SCI[ ]**.

149. In previous sections we also discussed the blurring boundary between the function of hardware and software. For all-in-one units and CDJs/XDJs, DJ software and a separate device are not actually required for *performance* – users can prepare their library using music management software and

[116] https://rekordbox.com/en/plan/, https://serato.com/dj/pro/buy-dj-pro, https://www.native-instruments.com/en/catalog/hardware/traktor/, https://www.virtualdj.com/buy/index.html, https://enginedj.com/software/enginedj-desktop, https://www.algoriddim.com/apps, https://www.djuced.com/, https://www.ableton.com/en/shop/live/, https://www.mixvibes.com/store, https://mixxx.org/

[117] I.e. someone who has purchased a perpetual license does not face any forward looking subscriptions costs for continuing to use that software, whereas someone who is paying a monthly subscription could cancel that subscription and avoid further costs for that software.

then only need a USB drive given the devices have embedded software, which is not Serato.[118] For DJs at the top end of the hardware spectrum, Serato is therefore even less likely to be a must have.

150. In addition, as discussed in detail in section 2.1, barriers to entry/expansion in DJ software are not likely to be high, with existing competitors able to expand easily due to the similarity in their products, cost structure of software and the ability of mobile app DJ software providers and providers of music production software to reposition or enter relatively easily. Thus, while Serato appears to have been a first mover and innovator in the DJ software space, the benefits of that position are likely to have been eroded by entry and expansion by rivals.

151. As evidence of the constraint that Serato has been facing, we can look at the per unit royalty Serato earns from the sale of Serato-supported DJ hardware. **SCI**[ ]. This illustrates that Serato is facing competitive pressure.

Figure 3.1: Average Serato DJ pro hardware fee over time

SCI[ ]

Source: Serato data

152. In addition, we understand that since Serato introduced subscription pricing as an option in 2016, the monthly subscription price has been constant in nominal terms, and therefore has declined substantially in real terms.

153. Another indication that Serato is not a "must have" software is that historically, Serato negotiated to be the exclusive primary DJ software marketed/promoted in association with new DJ hardware. However, more recently, new market entrants have made the DJ software market more competitive, and Serato has been **SCI**[ ] for new DJ hardware.[119]

154. We are also informed by Serato that when we look at the DJ market as a whole (i.e. not just new releases), in the last 5 years Serato has gone from all Serato supported hardware sold being exclusive[120] to Serato[121], to **SCI**[ ]Serato supported hardware being exclusive to Serato. Further, Serato is the primary software option in **SCI**[ ] out of 11 new Serato supported hardware products sold from Oct 2023-Sep 2024, and a secondary option in the remaining **SCI**[ ].[122]

155. This illustrates the more general unbundling that has occurred whereby Serato was traditionally consumed exclusively as part of a bundle with hardware but is now increasingly purchased stand-alone. This is further illustrated by examining the sources of Serato's DJ software revenue. Figure 3.2 below shows that while in 2010 Serato's DJ software revenues were almost exclusively hardware partner revenue, this has been flat/moderately falling over time in dollar terms, while stand-alone software sales have increased dramatically, such that **SCI**[ ] of Serato's DJ software revenue was from stand-alone purchases in 2023.

[118] https://djingpro.com/dj-without-a-laptop/#The_all-in-one_DJ_controller

[119] See para 10 and 11 of Serato's submission to the SOPI. In 2017, 100% of new controllers released were promoted with Serato as the primary software option ("Primary controller") but in 2023, less than **SCI**[ ] of new controllers released are labelled in such way.

[120] Exclusive in the sense that Serato was the only DJ software that was the primary DJ software marketed/promoted in association with new DJ hardware.

[121] With the exception of Denon Controller (MCX8000) and one Reloop controller (Mixon4)

[122] See para 15 of Serato's submission to the SOPI.

Figure 3.2: Serato DJ software revenue by channel (USD)

SCI[ ]

Source: NERA analysis of Serato data

156. These figures all indicate that while Serato may have been a "must-have" product in the past, new market entrants and the fast-paced nature of the industry have diversified the market with substitutes for Serato DJ.

157. It is also important to note that DJ hardware is on average more expensive compared to DJ software. Table 3.2 lists the average, maximum and minimum retail prices for different DJ hardware categories supplied by the main manufacturers[123] and Table 3.3 shows the monthly subscription price and one-off purchase price for each of the Serato software. As the tables show, the one-off purchase price for the more expensive Serato software (Serato DJ Suite) is still cheaper than the average Controller, the cheapest hardware category in the market. Given that the end-user can potentially sell their hardware, the cost of repurchasing hardware will likely not be the retail price of the hardware but on average it would still be more costly for the user to buy another set of hardware than to change their software.

Table 3.2: Average, maximum and minimum retail price of the major supplier's DJ hardware by category (in NZD)

Product type	Average	Max	Min
All-in-one	$ 2,916	$ 6,299	$ 1,099
Player	$ 2,538	$ 4,999	$ 749
Mixer	$ 2,255	$ 6,499	$ 269
Controller	$ 1,195	$ 3,999	$ 179

Source: NERA analysis of ATC data, as set out in ATC's cross submission on the SOPI.

Table 3.3: Monthly subscription and one-off purchase price for Serato software (converted to NZD from USD)

	Monthly subscription	One-off purchase
Serato DJ Pro	$16.42	$409.20
Serato DJ Suite	$24.63	$737.87

Source: NERA analysis of Serato software prices available on Serato's website. Exchange rate as at 27 Nov 2023 from (https://www.xe.com/currencyconverter/convert/?Amount=1&From=USD&To=NZD) was used

158. Given this, for Serato users currently on non-ATC DJ hardware, the large gap in the cost to continue DJing (buying a new DJ hardware vs buying new DJ software) and the minimal product differentiations across all DJ software, it seems unlikely that Serato is a must have software or that ATC would be able to force non-Pioneer DJ hardware users to switch just so that they can continue using Serato.

[123] Data includes products from ATC, Rane, Roland, Hercules, Denon, Reloop, Native Instruments, Numark, and Allen & Heath.

3.3.2. Testing whether ATC may have the *incentive* to make Serato non-compatible with other DJ hardware

159. We employ vertical arithmetic to calculate the critical diversion ratio, which represents the percentage of recaptured sales so that foreclosure is profitable. We use this critical diversion ratio to assess whether foreclosure is likely to be profitable. Vertical arithmetic tests whether foreclosure is profitable by balancing the profit decrease from less upstream volume (on the one hand) vs. the profit increases from greater downstream volume and the recaptured upstream volume (on the other hand). The profit incentive for foreclosure can be written:

$$\overbrace{\underbrace{(m_u^v \times \delta \times \Delta q)}_{Upstrean\ gain} + \underbrace{(m_d \times \delta \times \Delta \mathrm{q})}_{Downstream\ gain}}^{Profit\ increase} > \overbrace{\underbrace{m_u^r \times \Delta q}_{Upstream\ loss}}^{Profit\ decrease}$$

Where:

- Δq = reduction in the downstream rival's sales caused by the foreclosure.
- δ = diversion ratio, which is the proportion of the other downstream rival's sales that is diverted to the merged entity's downstream provider. Note that if Serato does not have upstream market power then this value is zero, so there is no profit increase.
- There are three different margins, *m:*
  - m_d = Downstream margin earned.
  - m_u^v = Upstream margin earned on the integrated downstream supplier
  - m_u^r = Upstream margin earned on other downstream supplier.

160. Rearranging this formula leads to the critical diversion ratio. If the true diversion ratio exceeds the critical diversion ratio, then foreclosure would be profitable:

$$\delta^* > \frac{m_u^r}{m_d + m_u^v}$$

161. The critical diversion ratio is useful because we do not know the true diversion ratio. We can therefore compare this value to plausible values of the diversion ratio.

162. In this scenario, we assess the required diversion that would make foreclosure profitable (assuming *ability* exists) by comparing the profit decrease from less Serato sales made to consumers of non-ATC hardware vs. the profit increases from greater ATC hardware sales made and the recaptured Serato sales made.

163. In this scenario, the merged entity will lose the following sales they currently make:

a. Subscription fee from Serato users on non-ATC hardware ($m_{software}^{sale}$)

b. Hardware royalty fees earned on non-ATC hardware sales ($m_{software}^{royalty}$) [124]

164. In return the merged entity will capture a new:

[124] Noting that if the hardware partnership fee relates to Serato DJ pro, then the customer would be unlikely to separately purchase Serato DJ pro subscription. Thus if we assume a DJ pro subscription is lost, then that hardware either has a DJ lite royalty fee or no royalty fee.

a. ATC hardware sales ($m_{hardware}$)

b. Subscription fee from Serato users who converted to ATC hardware ($m_{software}^{sale}$)

165. Therefore the formula for the critical diversion ratio (δ^*) which compares the merged entity's margins lost with the margins earned as a result of the foreclosure can be written as:

$$\delta^* = \frac{m_{software}^{sale} + m_{software}^{royalty}}{m_{hardware} + m_{software}^{sale}}$$

166. If the critical diversion ratio (δ^*) is larger than the estimated actual diversion, then the merged entity will have the incentive to foreclose its hardware rivals.

167. Since Serato offers a number of software products, and two ways of purchasing each software, through a one-off payment or monthly subscription, we estimate the margin Serato earns on a new subscriber as an average of the margins earnt on all products by weighting the estimated margin earnt from each product by its number of users and their subscription type.

168. The hardware royalty fee that Serato earns for supporting a particular hardware product is estimated by averaging the royalty Serato earns on all non-ATC related hardware.[125]

169. ATC's margin earned on a new DJ unit being sold is estimated by averaging the gross profits of all DJ units available and weighting them by the number of units sold.

170. We do need to consider hardware sales that include a Serato Pro License and hardware sales that do not have the license separately to prevent the double counting of Serato subscription sales for hardware that already contains a license.

171. Since we know the number of units sold that did include a license and those that did not, we calculate the unit weighted average margin that ATC can expect to gain from a hardware sale that already includes a Serato software license and the combination of hardware that doesn't include a Serato license and the margins from a Serato license sale. The weighted average value of these two values is ATC's expected sales gained from this action.

172. The results of the critical diversion ratios are presented in Table 3.4 below. We have conducted a number of analyses with different scenarios of what ATC product the foreclosed end-user will buy. In the base case, we consider the foreclosed end-user will buy one of the five different DJ hardware categories[126] from ATC and the gross profit earned from that sale is the average gross profit of each category weighted by its contribution to total units sold. This scenario yields a **JCI**[ ] critical diversion ratio which means, if the merged entity can recapture more than **JCI**[ ] of the Serato users currently using non-ATC hardware, then they have the incentive to foreclose.

173. Given the diverse set of products within the five product categories, we have also estimated the critical diversion ratios with the assumption that the foreclosed end-users will all buy (1) an all-in-one DJ hardware, (2) a DJ controller, (3) two DJ player and a DJ mixer, or (4) a DJ mixer. We have also extended the analysis for each scenario by estimating the critical diversion ratios using (a) the unit weighted average from each product within the category, (b) the most expensive product within the category, and (c) the cheapest product within the category.

[125] We have only calculated the hardware royalty fee Serato earns on hardware that does not include a Serato Pro license to prevent double counting of any losses or gains made through the sale of a standalone software sale.

[126] All-in-one, DJ Controller, DJ Player, DJ Mixer, and Turntable

Table 3.4: Critical diversion ratio results for foreclosing DJ hardware suppliers

Product category	Unit weighted average (a)	Using the most expensive product (b)	Using the cheapest product (c)
All hardware category	**JCI**[ ]		
(1) All-in-one	**JCI**[ ]	**JCI**[ ]	**JCI**[ ]
(2) Controller	**JCI**[ ]	**JCI**[ ]	**JCI**[ ]
(3) 2 DJ player + mixer	**JCI**[ ]	**JCI**[ ]	**JCI**[ ]
(4) Mixer	**JCI**[ ]	**JCI**[ ]	**JCI**[ ]

Source: NERA analysis of Serato and ATC data

174. This illustrates that the critical diversion ratio varies dramatically depending on the hardware in question. In particular, for more expensive hardware, the margins are much greater and thus the critical diversion ratio is much smaller. Whereas for controllers, the critical diversion is **JCI**[ ]% on average and rises to **JCI**[ ]]% for the cheapest product. Thus, if a foreclosure strategy was premised on converting users of controllers to ATC products, it would have to convert a substantial number of users.

175. In terms of which diversion ratio is most relevant, this depends on what hardware non-ATC Serato subscribers predominantly purchase. Data from Serato on the hardware used by their subscribers shows that those who are currently using a non-Pioneer DJ hardware are **SCI**[ ].

176. Table 3.5 below presents Serato subscribers' usage of hardware that includes Serato DJ Pro vs Serato Lite (the free version of Serato) for Pioneer DJ hardware and non-Pioneer DJ hardware. The distribution of hardware type is fairly similar for Serato subscribers using Pioneer DJ hardware with **SCI**[ ]of Serato-Pioneer DJ users using a Serato Pro included hardware and **SCI**[ ] of Serato Pioneer DJ users using a Serato Lite included hardware. However, for Serato subscribers using non-Pioneer DJ hardware, this ratio is much more skewed to the cheaper Serato Lite included hardware (**SCI**[ ]).

Table 3.5: Subscriber usage by brand and product category [127]

	Hardware category		
	Serato Pro included	**Serato Pro not included**	**Not-officially-supported and miscellaneous hardware (eg, speakers)**
Pioneer DJ	**SCI**[ ]	**SCI**[ ]	**SCI**[ ]
Other hardware brand	**SCI**[ ]	**SCI**[ ]	**SCI**[ ]

Source: NERA analysis of Serato data

Note: These calculations are for active users that are also subscribers and is based on active usage from 1 Jan 2023 – 15 Nov 2023. We understand that this data may have some double counting in that the some subscriber who used multiple pieces of hardware will be counted multiple times. Serato subscribers include Serato DJ Essentials, Serato Special Plan 1 , Serato DJ Pro, Serato DJ Pro Annual, Serato Expansion Packs, Serato DJ Club Kit, Serato Producer DJ, Serato Special Plan 2, Tool Kit, and Serato DJ Suite.

177. Because Serato Lite is only included with entry level controllers, this indicates that the majority of non-ATC Serato users are using lower-end controllers, which have much lower margins. This suggests that even within the relatively cheaper non-Pioneer DJ hardware users, a large portion of the Serato users are choosing to use the products on the cheaper end of the spectrum which is the Serato Lite included hardware.

178. We also find we find that the average hardware price of a Serato user using a Pioneer DJ hardware is USD $1,356, which is much higher than the average hardware price of Serato users with non-Pioneer DJ hardware which was **SCI**[ ]. Furthermore, as the table below shows, over **SCI**[ ] of the Serato users currently using a non-Pioneer DJ hardware, use hardware that is less than **SCI**[ ]. This is much higher than the equivalent value for Pioneer DJ hardware users (**SCI**[ ]%).

Table 3.6: Price of hardware used by Serato users

		Pioneer DJ hardware	**Other hardware**
Price ranges (USD)	0-499	**SCI**[ ]	**SCI**[ ]
	500-999	**SCI**[ ]	**SCI**[ ]
	1000-1499	**SCI**[ ]	**SCI**[ ]
	1500-1999	**SCI**[ ]	**SCI**[ ]
	2000+	**SCI**[ ]	**SCI**[ ]
Overall average price (USD)		**SCI**[ ]	**SCI**[ ]
Minimum product price (USD)		**SCI**[ ]	**SCI**[ ]
Maximum product price (USD)		**SCI**[ ]	**SCI**[ ]

Source: NERA analysis of Serato data for number of active Serato users by hardware product in 2023

179. We also note that Pioneer DJ hardware is generally (with some exceptions) more expensive than hardware from its rivals, as shown in Table 3.7 below. This table shows the range of retail prices for hardware for the different categories and brands. This suggests that individuals who currently do not use Pioneer DJ hardware are likely to be relatively price-sensitive customers and that switching to

[127] Serato Pro not included hardware includes hardware that includes Serato Lite and hardware that doesn't come with a Serato license.

ATC hardware to keep using Serato would require purchasing more expensive hardware. In many cases, these consumers could save money by switching to cheaper software with comparable features (see Table 3.1) which seems a more likely outcome, particularly for a price sensitive customer purchasing entry level hardware.

Table 3.7: Comparison of the range of retail price (in NZD) of a DJ hardware product for each category offered

Product type	Maximum Price		Minimum Price	
	Pioneer DJ	Other	Pioneer DJ	Other
All-in-one	$ 6,299	$ 2,299	$ 2,999	$ 1,099
Player	$ 4,999	$ 749	$ 2,999	$ 2,699
Mixer	$ 6,499	$ 749	$ 3,899	$ 269
Controller	$ 3,999	$ 399	$ 3,799	$ 179

Source: NERA analysis of ATC data, as set out in ATC's cross-submission on the SOPI.
Note: We understand that the list of hardware models may not be complete and that ATC has not undertaken a comparison of the available features for each hardware product so the comparisons may not be like-for-like. The other DJ manufacturers include, Rane, Roland, Hercules, Denon, Reloop, Native Instruments, Numark, and Allen & Heath.

180. We also note that at the upper end, users of all-in-ones and DJ players are the consumers least likely to be foreclosed, given this hardware generally has embedded software.[128] In addition, switching hardware requires a much larger upfront investment at the top end compared to switching software, and thus users of top end hardware would likely incur a very large switching cost if they have to buy new hardware to continue using Serato.

181. In conclusion, the customers with the highest hardware margins (and thus the incentive to foreclose) are also those whom the merged entity would have the least ability to foreclose. The merged entity will require a higher diversion for customers with the lower hardware margins making a successful foreclosure more unlikely and this is amplified by the fact that customers that acquire the lower margin hardware are likely to be more price sensitive and therefore more likely to change software than be forced to upgrade to more expensive ATC hardware.

3.4. Testing whether the merged entity could leverage its position in the DJ hardware market to foreclose other DJ software suppliers

182. We now test whether the merged entity has the ability and incentive to foreclose other software providers by making their DJ hardware products only compatible with ATC DJ software (Serato, rekordbox, and WeDJ). In other words, if a consumer wants to use an ATC DJ hardware, they will have no choice but to use an ATC DJ software. For example, could the merged entity make non-ATC DJ software harder to connect with ATC hardware such as disabling plug-and-play or completely locking non-ATC software from being able to map to ATC DJ hardware?

183. For this theory to be true the following must hold:

    a. ***Ability***: ATC is a "must have" DJ hardware and thus making it exclusive to ATC software will force users who are currently using ATC hardware with non-ATC/Serato software to switch; and

[128] See para 5.6 of Clearance Application.

b. ***Incentive***: ATC's extra sales at the DJ software level exceed the loss from the reduction in ATC DJ hardware sales made to other DJ software operators.

3.4.1. Testing whether ATC has the *ability* to foreclose other DJ software suppliers

184. As noted above, for the merged entity to foreclose its DJ software rivals by making its DJ hardware only compatible with its own DJ software, not only does ATC's DJ hardware need to be a 'must have' product for end-users, but making DJ hardware exclusive to a specific DJ software must also be technically achievable.

185. To assess whether Pioneer DJ is a "must-have" product for DJ hardware, we first analyse Pioneer DJ's market share in the DJ hardware market. Figure 3.3 below is the breakdown of the retail market share in the U.S. DJ hardware industry for the last 17 years from MIST. Since 2018, Pioneer DJ's US retail market share has fluctuated between **ATCI**[ ].

Figure 3.3: US DJ hardware retail market share by sales

ATCI[ ]

Source: MIST dataset

186. While Pioneer DJ does appear to be the market leader with a very high market share, there are a number of other hardware manufacturers who make hardware that directly compete with Pioneer DJ in each of the DJ hardware categories.[129]

187. We are not aware of any DJ hardware manufacturers that currently have limited their compatibility to a specific DJ software. There may be some software that is not explicitly marketed as compatible by the hardware provider and may require some additional mapping but we understand that there aren't any technical or roadblocks that would prevent the software from being mapped.[130]

188. Because MIDI is a standardised and open communication protocol, we understand that preventing specific software from communicating with a piece of hardware is technically very difficult. Compatibility therefore relies on whether the software and hardware both adhere to the MIDI standard. Because of the compatibility, the key way foreclosure could be achieved is if the hardware provider moved away from the standard, but ATC has submitted that it would not move away from the MIDI standard due to its broad use in the music industry.[131]

189. Therefore, we have considered whether ATC would have the ability to foreclose software in other ways, such as by marketing Pioneer DJ hardware as only being compatible with Serato/rekordbox. However, we understand that this will not prevent non-ATC DJ software users from using Pioneer DJ's hardware because non-ATC DJ software developers and end-users can map their software to Pioneer DJ hardware through MIDI which is already currently done (See Table 3.8 below).[132] .

[129] See Table 2 of the Clearance Application.

[130] See Para 5.20 of the Clearance Application.

[131] See Para 5.20 of the Clearance Application.

[132] See Para 5.20 of the Clearance Application.

190. Table 3.8 and Table 3.9 below combine Pioneer DJ sales data with ATC information on what software it markets as being plug and play[133] and our own research on whether Algoriddim Djay and Virtual DJ advertise their software as being compatible with each hardware model. This shows that while Djay and Virtual DJ do not have 100% coverage of Pioneer DJ's current units, they have very high coverage on a value basis. For example, looking at controllers (the bottom row of each table), Table 3.8 shows that, in terms of the number of models, only 10% of Pioneer DJ's controller models (2 out of 20) are marketed *by Pioneer DJ* as being compatible with djay and Virtual DJ. However, the second column for each provider shows that djay and Virtual DJ advertise compatibility with 60% and 75% respectively.

191. We also note software providers tend to target the most popular hardware products, and thus focusing on the number of models that are pre-mapped understates their coverage. Table 3.9 shows that on a value basis, the % coverage is even higher. For example in the controller segment, djay and Virtual DJ advertise compatability with models that account for **ATCI**[ ] of Pioneer DJ's global controller sales.

[133] We understand plug-and-play to mean "that a USB connection is all that is needed for the hardware to communicate with the software before the DJ can start playing" https://www.pioneerdj.com/en/product/features/mixer/plug-and-play/

Table 3.8: Comparison of the % of Pioneer DJ hardware each software supplier has marketed as compatible by Pioneer DJ vs marketed as compatible by the software supplier, based on the number of models covered

	djay		VirtualDJ		Serato	
	Marketed as compatible by Pioneer DJ	Marketed as compatible by software provider	Marketed as compatible by Pioneer DJ	Marketed as compatible by software provider	Marketed as compatible by Pioneer DJ	Marketed as compatible by software provider
All-in-one (7 total products)	0%	43%	0%	71%	43%	43%
DJ Player (8 total products)	13%	63%	0%	25%	25%	38%
Mixer (15 total products)	0%	33%	0%	47%	53%	60%
Controller (20 total products)	10%	60%	10%	75%	50%	55%

Source: NERA analysis of data provided by ATC and information from the websites of Algoriddim (https://www.algoriddim.com/hardware), VirtualDJ (https://www.virtualdj.com/manuals/hardware/pioneer/index.html) and Serato (https://serato.com/dj/hardware?company=Pioneer) accessed on 27 Nov 2023. Whether the product is marketed as compatible by Pioneer DJ is based on their website (https://www.pioneerdj.com/en/product/)

Table 3.9: Comparison of the % of Pioneer DJ hardware each software supplier has marketed as compatible by Pioneer DJ vs marketed as compatible by the software supplier, based on global sales

	djay		VirtualDJ		Serato	
	Marketed as compatible by Pioneer DJ	Marketed as compatible by software provider	Marketed as compatible by Pioneer DJ	Marketed as compatible by software provider	Marketed as compatible by Pioneer DJ	Marketed as compatible by software provider
All-in-one (7 total products)	**ATCI[**	**ATCI[**	**ATCI[**	**ATCI[**	**ATCI[**	**ATCI[**
DJ Player (8 total products)	**ATCI[**	**ATCI[**	**ATCI[**	**ATCI[**	**ATCI[**	**ATCI[**
Mixer (15 total products)	**ATCI[**	**ATCI[**	**ATCI[**	**ATCI[**	**ATCI[**	**ATCI[**
Controller (20 total products)	**ATCI[**	**ATCI[**	**ATCI[**	**ATCI[**	**ATCI[**	**ATCI[**

Source: NERA analysis of data provided by ATC and information from the websites of Algoriddim (https://www.algoriddim.com/hardware), VirtualDJ (https://www.virtualdj.com/manuals/hardware/pioneer/index.html) and Serato (https://serato.com/dj/hardware?company=Pioneer) accessed on 27 Nov 2023. Whether the product is marketed as compatible by Pioneer DJ is based on their website (https://www.pioneerdj.com/en/product/)

192. Thus, even if Pioneer DJ hardware is "must have", it appears that ATC would lack the practical ability to prevent other software from working with Pioneer DJ hardware, and thus the merged entity would lack the ability to foreclose the DJ software market.

3.4.2. Testing whether ATC will have the *incentive* to make their DJ hardware non-compatible with other non-ATC DJ software

193. As we have concluded above that the merged entity does not have the ability to foreclose, there is little benefit in testing whether there will be an incentive to foreclose given that they cannot act on the potential incentive. However, for completeness, we have conducted the vertical arithmetic analysis to test whether there is an incentive for the merged entity to foreclose its rival DJ software providers post-transaction.

194. Using vertical arithmetic, we calculate whether foreclosure is profitable by balancing the profit decrease from less ATC hardware sales made to non-ATC software suppliers vs. the profit increases from greater ATC software sales made and the recaptured ATC hardware sales made.

195. In this scenario, the foreclosure will result in the ATC losing:

    a. Margins from ATC hardware sales to non-Serato users ($m_{hardware}^{non-Serato}$)

196. In return ATC will capture the following margins:

    a. Margins from Serato subscription ($m_{software}^{subscription}$)

    b. Margins from ATC hardware sales to Serato users ($m_{hardware}^{Serato}$)

197. Therefore the formula for the diversion ratio (δ^*) which compares the merged entity's margins lost with the margins earned as a result of the foreclosure can be written as:

$$\delta^* = \frac{m_{hardware}^{non-Serato}}{m_{software}^{subscription} + m_{hardware}^{Serato}}$$

198. If the critical diversion ratio (δ^*) is larger than the estimated actual diversion, then the merged entity will have the incentive to foreclose its software rivals.

199. From the data provided by the merging parties, we have the margins ATC earnt on each of their DJ hardware units and their sales for the most recent year globally.

200. We calculate the average margin ATC earns on their DJ hardware units which are sold to non-Serato users by weighting the margins of the products that do not include a Serato Pro licence by their respective sales made.

201. The margin that ATC earns on their DJ hardware from Serato users is estimated as a weighted average of the margins of all products available.

202. Again, the margin that Serato earns on a new sale is the weighted average margin of all the DJ software Serato sales for one-off and subscription type users.

203. When calculating the margins that ATC captures, we need to separately consider the hardware sold that already contains a license to Serato DJ Pro, and the hardware sold that does not come with a Serato DJ Pro license since in the latter the merged entity will also capture a DJ software sale.

204. Since we know how many units of DJ hardware were sold with and without Serato DJ Pro, we have weighted the margins the merged entity would capture in each scenario by their respective units sold to more accurately estimate the likely margin the merged entity will capture as a result of the action.

Table 3.10: Critical diversion ratios for scenarios where the merged entity foreclose its rival DJ suppliers

Product category	Unit weighted average (a)	Using the most expensive product (b)	Using the cheapest product (c)
All hardware category	**JCI[ ]**		
(1) All-in-one	**JCI[ ]**	**JCI[ ]**	**JCI[ ]**
(2) Controller	**JCI[ ]**	**JCI[ ]**	**JCI[ ]**
(3) 2 DJ player + mixer	**JCI[ ]**	**JCI[ ]**	**JCI[ ]**
(4) Mixer	**JCI[ ]**	**JCI[ ]**	**JCI[ ]**

Source: NERA analysis of Serato and ATC data

205. As the results of the critical analysis show in Table 3.10 above, depending on the scenarios we choose the critical diversion ratios varies. However, in any case, it is relatively large, and it is unlikely that the merged entity will have an incentive to foreclose other DJ software providers.

206. This is driven by the large difference in the average margins earned on a software sale and hardware sale. Since the average margins for a hardware sale is larger (in dollar terms) than that of a software sale, the merged entity will have to capture a large portion of the Pioneer-DJ hardware users that are using a non-Serato/rekordbox software.

207. The critical diversion ratio does change when we assume that Pioneer DJ users that are currently not using Serato are all using a particular category of hardware. Since each hardware category has different price ranges this affects the relative price difference between the software and hardware and as a result affects the critical diversion ratio.[134]

208. Overall, it seems that there is no clear incentive for the merged firm to foreclose other software providers through making Serato exclusive to Pioneer DJ.

[134] There are some critical diversion ratios that are estimated to be larger than **JCI[ ]**% because the sales foregone is larger than the sales gained. This happens because for some categories, the weighted average margin of products with a Serato Pro DJ license for some hardware categories are smaller than the weighted average margin of the products that doesn't include a Serato DJ Pro license from the same hardware category.

Qualifications, assumptions, and limiting conditions

This report is for the exclusive use of the NERA Economic Consulting client named herein. This report is not intended for general circulation or publication, nor is it to be reproduced, quoted, or distributed for any purpose without the prior written permission of NERA Economic Consulting. There are no third-party beneficiaries with respect to this report, and NERA Economic Consulting does not accept any liability to any third party.

Information furnished by others, upon which all or portions of this report are based, is believed to be reliable but has not been independently verified, unless otherwise expressly indicated. Public information and industry and statistical data are from sources we deem to be reliable; however, we make no representation as to the accuracy or completeness of such information. The findings contained in this report may contain predictions based on current data and historical trends. Any such predictions are subject to inherent risks and uncertainties. NERA Economic Consulting accepts no responsibility for actual results or future events.

The opinions expressed in this report are valid only for the purpose stated herein and as of the date of this report. No obligation is assumed to revise this report to reflect changes, events, or conditions, which occur subsequent to the date hereof.

All decisions in connection with the implementation or use of advice or recommendations contained in this report are the sole responsibility of the client. This report does not represent investment advice nor does it provide an opinion regarding the fairness of any transaction to any and all parties. In addition, this report does not represent legal, medical, accounting, safety, or other specialized advice. For any such advice, NERA Economic Consulting recommends seeking and obtaining advice from a qualified professional.

NERA
ECONOMIC CONSULTING

NERA Economic Consulting
Level 11
15 Customs Street West
Auckland 1010, New Zealand
www.nera.com