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# Mobile network mergers and investment incentives: Analysing efficiencies

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## Introduction

The joint venture between Vodafone Group plc (Vodafone) and CK Hutchison (Three) may mark a shift in how mobile mergers are assessed. In approving the deal in 2024, the UK's Competition and Markets Authority (the CMA) diverged from the traditional emphasis on consumer prices and market structure, such as the number of competitors, applied to similar transactions between mobile network operators (MNOs). Instead, it treated efficiencies, particularly those linked to network integration and investment, as central to the competitive assessment. The CMA found that integration was likely to improve network quality, strengthen incentives to invest in greater capacity and performance, and thereby intensify competition on both quality and prices.

The decision emerged at a time when the role of investment in enhancing Europe's competitiveness, and the strategic importance of connectivity in particular, was at the centre of debate. The Draghi Report argued for greater consolidation across Europe's networks, on the grounds that larger operators are better placed to invest in infrastructure and innovation, and that fragmentation impedes growth. For competition authorities, that put a spotlight on the practical question of how to assess whether consolidation would stimulate investment, innovation, and rivalry, or stifle them. The CMA's review of its approach to merger efficiencies emphasises the issue's importance.<sup>1</sup>

This article describes the CMA's assessment of Vodafone/Three and explores why it considered that the transaction would generate rivalry-enhancing efficiencies. We separate the discussion into three parts:

- **Identifying potential efficiencies:** The CMA identified static and dynamic efficiencies that can result from mergers in these markets. In addition, we examine how duplicated fixed costs of investment shape outcomes in markets such as mobile networks: reducing duplication can make investment more cost-effective, allowing firms to achieve higher quality standards for a given level of aggregate investment – a dynamic efficiency of consolidation. This insight helps resolve the apparent paradox observed in econometric studies: quality can improve following a merger, even if *total* industry investment declines. In essence, avoiding duplication reduces ineffective investment that drives quality.
- **Assessing post-merger rivalry:** The merged entity's incentive to reinvest cost savings into further improvements – and its rivals' incentives to respond – depend on the intensity of

competition after consolidation. Alongside the much-discussed investment commitments, the insight from Vodafone/Three is that competitive outcomes are determined by the capabilities and incentives of the *individual* companies, not their circumstances in aggregate or on average. In the UK, *none* of the pre-merger competitors were average. Before Vodafone and Three combined, performance was widely dispersed between strong and weaker players. In simple and generalised terms, the prospect of rivalry between three capable and relatively evenly matched companies can provide better outcomes than competition between four mismatched ones – where ‘laggards’ can’t compete vigorously, and ‘leaders’ don’t have to.

- **Assessing market outcomes:** Finally, we look at potential metrics to establish how more consolidation may affect outcomes for consumers. Drawing on the insights above, we explain why aggregate performance measures – such as sector-wide investment and average returns on investment – can mislead in markets such as mobile networks. Rather, focus should be on quality metrics, which directly measure the factors that affect consumers: coverage, speed, latency and reliability.

First, however, we briefly look at the shifting context for assessing MNO mergers in Europe since the Commission’s prohibition of O2/Three.

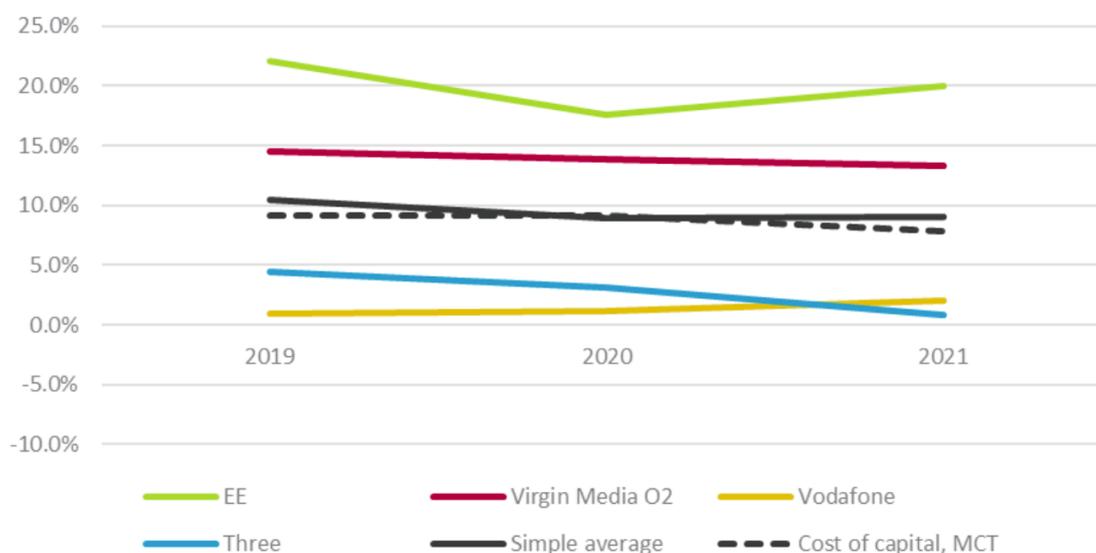
### A shift in approach and context: Changes since O2/Three

In 2016, the Commission blocked the proposed MNO merger between VMED O2 UK Limited (O2) and Three. The CMA’s approval of Vodafone/Three only eight years later therefore seems an obvious departure. The shift reflects a change in the analytic approach, but also a change in context.

The Commission’s assessment of O2/Three typified many aspects of a traditional approach to assessing mobile mergers. Primarily, it focused on a) the merger’s potential price effects and b) preserving the formal *structure* of competition in the market – i.e., number of competitors in the market. Broadly, the CMA’s approach to Vodafone/Three differed in some important ways. First, it gave more prominence to potential changes in the *quality* of services, not just prices. It also considered the likelihood of changes in the actual competitiveness of the market – particularly operators’ ability and incentive to invest in and compete on the quality of their services. Together, these changes in approach led the CMA to recognise both that Vodafone/Three would likely generate efficiencies, and that those efficiencies were specific to the merger and would likely benefit consumers.

The change in analytic approach was not the only difference. It does not necessarily follow that, had the Commission applied the same approach as the CMA eight years earlier, it would have cleared the O2/Three transaction. There are important differences. Vodafone/Three essentially proposed to consolidate the two weakest players in terms of profitability; notably, both had failed to cover their cost of capital for a prolonged period (see **Figure 1** by Ofcom below). Combining them raised the prospect of leaving three financially strong firms to compete.

**Figure 1: Economic return on capital employed (ROCE) by MNO, pre-tax nominal including 5G spectrum**



Source: Ofcom “Ofcom’s future approach to mobile markets and spectrum - Conclusions paper” (2022), Figure 4.2.

Further, Three’s standing in the market was better in 2016 than it was in 2024. The Commission considered that the relatively new entrant was a ‘maverick’ – an ‘important competitive force’ beyond what might be expected from its market share alone. By 2024, Three was better characterised as the opposite: a ‘sub-scale’, or even ‘zombie’, operator, whose competitive impact may have been weaker than was implied by its market share.<sup>2</sup>

By acknowledging the financial realities of the market, the CMA approached the Vodafone/Three merger on the premise that consolidation had scope to improve the capabilities of the merging firms to invest in network quality, thereby facilitating a transition from a low-price, low-quality equilibrium toward a more sustainable, higher-quality network.<sup>3</sup> Essentially, combining the parties raised the prospect that the market would have three strong firms competing in it, leading to better outcomes than the status quo provided.

Reaching that conclusion, however, ultimately depended on two assessments: first, whether the CMA would recognise the claimed efficiencies; and, if so, whether it would recognise that the merger was necessary to achieve them and that they would benefit consumers.

## Assessing the potential efficiencies of the merger

The CMA assessed the merger’s claimed efficiencies and concluded that network integration would improve competition on the quality of mobile services. Here, we explore why.

### Differences between price and quality competition

The distinction between price and quality competition is central to understanding the importance of the CMA’s emphasis on the potential for MNO mergers to deliver service improvements.

Price competition is relatively straightforward: firms compete by lowering prices, and consumers benefit from cheaper access to a given product or service. The effects of a merger on prices can be assessed using demand elasticities and diversion ratios. Before other considerations, a 4-to-3 concentration would be expected to apply upward pressure on prices. In Vodafone/Three, the

consolidating parties were the two smallest, so the pressure would be relatively small compared with a consolidation of parties with larger market shares as, for example, was the case in O2/Three.<sup>4</sup>

By contrast, the impact a concentration will have on quality competition is more complicated to determine. Firms compete on ‘how good’ a product or service is. In mobile markets, quality includes factors such as coverage, speed, reliability of the network, as well as customer service considerations. These attributes are multidimensional, harder to quantify, and often vary in importance across different consumer groups.

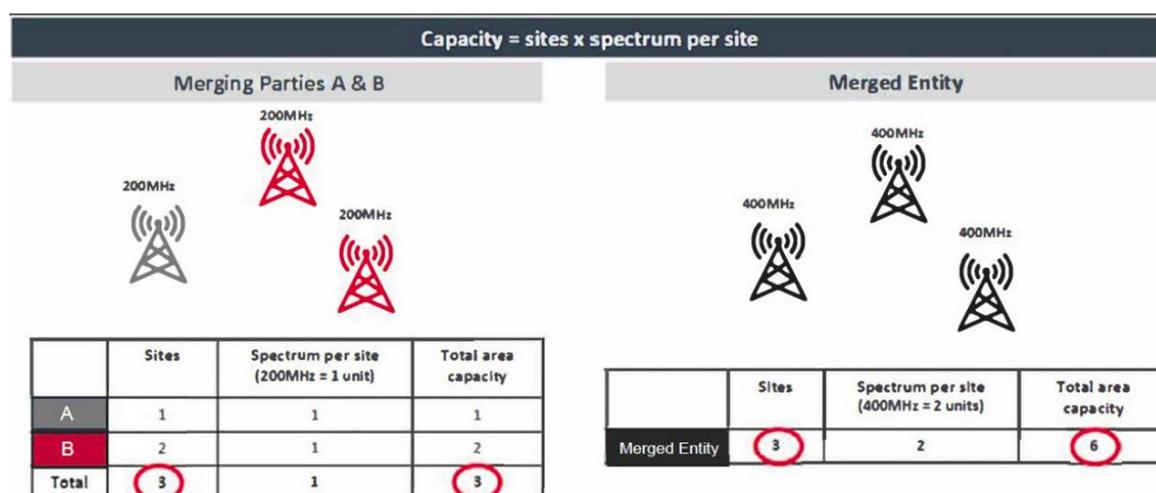
Improving (and even maintaining) network capacity and quality requires investment – for example, in R&D, infrastructure, or technology upgrades. A merger can strengthen firms’ ability and incentive to undertake such investments through efficiencies. But it can also weaken them. With fewer rivals, firms may face less pressure to invest in quality, since customers have limited alternatives – a concern that often lies at the heart of competition authorities’ analysis.

### Static efficiencies recognised by the CMA

There are two primary types of efficiencies that can arise from mergers. The first type is static efficiencies, which are captured at one point in time – a one-off.

The CMA observed that Vodafone/Three, even without additional investment, would provide a one-off step increase in capacity: a static efficiency of the merger, improving quality without further capital outlays. The reason is that network capacity is not determined by simply adding the parties’ spectrum and sites together. Rather, it is a function of the two: the amount of spectrum deployed *multiplied* by the number of sites. Consequently, as **Figure 2** illustrates, a merger of two firms’ spectrum deployment and sites has a ‘multiplicative’ effect on capacity, providing significantly more capacity than the sum of the two networks on a standalone basis.

**Figure 2: Illustrative example: capacity increase from a merger**



Source: Vodafone/ Three [2024] ME/7064/23, ‘Final report’ by the CMA, Figure 14.5, based on Parties’ illustration at FMN.

The increase in capacity automatically improves network reliability and performance for users. This is because network speed depends not only on the available spectrum, but also on the extent to which that spectrum must be shared among users simultaneously. The greater the capacity of the network, the less ‘congested’ the network is for data traffic, allowing for greater speeds – much like the congestion of road traffic.

With respect to Vodafone/Three specifically, the CMA found that the combination of sites and spectrum was expected to lead not only to an increase in capacity, but would also improve coverage. At the time, the merging parties claimed that the merger would eliminate 25% of 'not-spots' and increase geographic coverage from 88% to 91%.<sup>5</sup> While the overall improvement in geographic coverage may appear modest, the targeted reduction in 'patchiness' was considered a significant enhancement to service provision and would considerably improve network reliability, particularly in currently underserved areas.

This type of efficiency is simply a feature of combining mobile networks. The same dynamic would occur in any MNO merger. However, the *scale* of these static efficiencies depends on the specific facts, including the spectrum, the number of sites, and their locations. The evidence considered by the CMA to substantiate them in this case was *very* detailed.

#### Dynamic efficiencies recognised by the CMA: Reduced unit cost of expanding capacity

The second type of efficiencies are dynamic, which enable firms to improve their performance on a continuing basis. While static efficiencies often capture more immediate improvements in capacity and performance, dynamic efficiencies concern how a merger may reshape capacity and performance over an extended period.

In addition to the *one-off* effect on capacity, the CMA found that the merged network would likely benefit from an *ongoing* multiplicative effect on capacity: a reduction in the unit cost of expanding capacity. That was because, without the merger, investments – such as those in antennas, masts, and backhaul lines – would be required at two separate sites to achieve a given capacity increase. However, in the merged network, similar capacity gains can be achieved with investments at just one site, given the greater amount of spectrum that can be deployed at a site post-merger.

This efficiency has significant implications for investment incentives. By lowering the unit cost of capacity expansion, a merged entity can achieve more with the same level of capital expenditure, thereby freeing resources for additional quality improvements, such as broader geographic coverage or faster deployment of next-generation technologies. In this way, the merger may accelerate the rollout of higher-quality services, not merely by saving costs but by enhancing the overall effectiveness of investment.

#### Further dynamic efficiencies: Reducing the duplication of fixed cost investments

Beyond these efficiencies identified by the CMA in its Vodafone/Three decision, this article argues that another key dynamic efficiency should be considered when assessing mergers in technology-driven markets: the avoidance of duplication in fixed-cost investments.

Quality-enhancing investments can be thought of as comprising both fixed and variable components, mirroring the traditional distinction between fixed and variable costs.

The fixed component consists of those investments that must be undertaken at the network level, irrespective of the number of subscribers served. In mobile markets, this includes investments in radio access network (RAN) roll-out (masts, base stations, backhaul, and the core network) as well as in IT and core systems.<sup>6</sup> For instance, shifting from 4G to 5G requires investments in the core infrastructure, independent of how many subscribers immediately use it. Specifically, a baseline density of 5G-capable sites (antennas, backhaul, edge servers) is required to advertise 5G availability. Each operator must bear these fixed investments in full to operate a stand-alone

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network, which implies that their market-wide magnitude is determined by the number of parallel networks in the market rather than by the number of subscribers on such networks.

By contrast, the variable component of such investments scales with the number of subscribers connected to a given network. This encompasses expenditures such as the incremental upgrading of capacity (e.g. additional antennas or sectoral enhancements), software and network optimisation, and customer support systems. These are needed to maintain network and service quality as more users place demands on the network simultaneously. Variable investments therefore reflect congestion effects and the marginal cost of accommodating additional users at a given quality standard. For example, once 5G adoption accelerates, more subscribers translate directly into higher traffic volumes. This requires incremental capacity upgrades (variable investments) to maintain network quality.

The distinction between fixed and variable investments is important for merger analysis. Variable investments will remain necessary, since they scale with subscriber numbers regardless of market structure. However, the fixed component depends on the number of firms. Duplication of these fixed costs across multiple parallel networks may be inefficient, as each operator must replicate costly infrastructure even when market-wide demand does not require it. By reducing the number of networks, a merger can lower the aggregate level of fixed investment required to achieve a given quality improvement, with savings that persist on a continuing basis for each future fixed investment.

So, in a market where the fixed component of investment costs is large, the efficiency gains from consolidation that arise from reducing duplication may be large. Mobile networks are one of those markets where fixed investments account for a large part of total investments. For instance, network infrastructure roll-out and upgrades represent 40–60% of cumulative operator capital expenditure; and spectrum auctions can reach 30–50% of cumulative operator capital expenditure over a licensing period.<sup>7</sup>

### Assessing whether efficiencies are merger-specific

The relevance of efficiencies to competition authorities' merger assessments depends not only on their magnitude, but on whether they are merger-specific. While benefits relating to price, quality, or investment may be considerable, that does nothing to advance the case for consolidation if they could be achieved by more pro-competitive alternatives.

In MNO cases, competition authorities have frequently considered that network sharing agreements (NSAs) are an effective alternative to formal integration. NSAs allow operators to share network infrastructure while remaining independent and, in principle, can replicate many of the cost savings and coverage improvements claimed in merger cases. The Commission's Decision in Hutchison (Three)/WIND illustrates this logic: although acknowledging that integration could improve network quality, the Commission rejected the parties' efficiency claims as merger-specific because comparable benefits could plausibly be delivered via network sharing.<sup>8</sup>

Unlike earlier cases, however, NSAs were not actively advanced as a viable substitute for the Vodafone/Three merger. The UK market already featured two established network-sharing arrangements, with Vodafone and Three participating in different ones, and the CMA did not view an extension or reconfiguration of those arrangements as a realistic means of delivering the benefits of investment and coordination on the same *scale* as the consolidation would achieve.

This represents a change in attitude. In MNO mergers, competition authorities have – in our experience – been quick to assume that the benefit of integrating networks can be achieved equally well through integration or NSAs.<sup>9</sup>

There is an extensive economic literature that explains why that is not the case and, in fact, NSAs often struggle to achieve the same quality standards as formal consolidation would achieve. An NSA is essentially governance by contract. Where circumstances are predictable, quality depends on few decisions, and the parties' private incentives are relatively easy to align, then contracts can be an effective governance framework. Where circumstances are unpredictable, decisions are numerous, complex, and spread out over time, and the parties' incentives and priorities may deviate. Then governance by contract becomes increasingly challenging to do effectively as parties cannot contract for every possible eventuality. The literature refers to them as "incomplete contracts", subject to ambiguity and renegotiation. In contrast, a single integrated party with unified control and incentives will manage that complexity better.

The economic literature does not claim that integration is *always* superior to contracting; only when adaptation to changing, complex, or unforeseen circumstances is crucial to efficiency – as it is for MNOs – then control rights through incomplete contracts will enhance efficiency less effectively than integration.<sup>10</sup>

### Assessing the potential pro-competitive, or rivalry-enhancing, effects of the merger

By itself, the efficiencies discussed so far would not be sufficient. Consolidation from 4-to-3 networks may improve capacity and reduce duplication of costs, but similar efficiencies could also arise from consolidation from 3-to-2 networks, or even from consolidation from 2-to-1. The merger's impact on effective competition therefore remains a central element of the merger assessment.

Effective competition is essential in its own right to constrain market power and protect consumer welfare. It is also critical for assessing efficiencies, since the merged entity's incentives to reinvest cost savings into further improvements depend, at least in part, on the intensity of competition that remains in the market.

### Enhancing the market's ability and incentive to compete on quality

With sufficient rivalry, the efficiencies generated by integration should stimulate further quality improvement.

First, the efficiency strengthens the ability of the merged firm to earn its cost of capital – that is, the return required by investors to provide financing. In merger control, the cost of capital affects how authorities view the feasibility and timing of investments in network upgrades, innovation, or expansion. Accordingly, this dynamic efficiency can bolster the long-term financial viability of the merged entity, thereby reinforcing its ability to engage in quality competition.

Second, reducing the merged firm's future fixed investment requirements raises the expected return on those investments, thereby improving the merged firm's incentives to undertake quality-enhancing projects, that benefit and attract consumers.

Third, the quality gain from integration places competitive pressure on rivals, compelling them to increase their own investment in order to restore their relative quality position.<sup>11</sup> Competitors' investment responses may trigger further investment activity across the market. At the same time, the merged entity is expected to expand its investment beyond pre-merger levels, as it benefits from lower costs of achieving quality improvements – driven by the ongoing multiplicative effect on capacity from combining sites and spectrum as well as from the effect that duplication of fixed investment is avoided post-merger.

This was also acknowledged by Ofcom in its assessment of the Vodafone/Three merger. Ofcom noted that “an MNO consistently earning below its cost of capital over a sustained period, despite continuing to compete (and invest), may have reduced forward-looking investment incentives”; this could “both impact its quality of service and ability to retain or gain market share, and (ii) weaken the incentives of rival operators to invest in network improvements, ultimately leading to poorer outcomes for customers.”<sup>12</sup> Ofcom analysed “that scale is an important aspect of an MNO’s competitiveness, including as demonstrated by the relative profitability (measured by ROCE) of different MNOs.”<sup>13</sup>

The regulatory challenge, therefore, is to understand whether the consolidation both improves capacity and removes duplication, but also ensures that post-merger rivalry will discipline prices and stimulate quality competition.

### Assessing rivalry: The impact of removing laggards and repositioning services

A key feature of Vodafone/Three in this respect is that it would combine two firms that were struggling to compete. Rather than a market with competition between two “leaders” and two “laggards” – as the economic literature may term it – the integration would leave three strong firms, potentially increasing the intensity of competition. The CMA assessed the claimed efficiencies of Vodafone/Three against a record of persistent underperformance by the merging firms relative to BT (EE) and Telefonica (O2)<sup>14</sup>, which helped frame the merger as a means of restoring competitive intensity, rather than undermining it.

As a result of the efficiencies described, competition on quality *and* prices may intensify. The merged firm may have strong incentives to compete aggressively post-merger, given (a) its enhanced position: from the benefit provided by greater network capacity and lower unit costs of expansion; and (b) the strength of the two remaining competitors: O2 and EE. This can provide the merged firm with the ability and incentive to make attractive offers to customers, thereby exerting upward pressure on quality and downward pressure on prices. At the same time, its competitors may have the ability and incentive to respond, further reinforcing competitive dynamics.

An obvious point that bears emphasis is that the assessment of post-merger rivalry depends on the nature of the companies post-merger, not the nature of the companies pre-merger. We can loosely describe the UK’s situation pre-merger as two stronger players and two weaker ones. In principle, other potential circumstances could have led to a similar prospect: rivalry between three strong players post-merger. The key point is that the prospect of the post-merger scenario is the one that mattered, not the starting scenario.

### Commitments to invest

When approving the Vodafone/Three joint venture, the CMA did not rely solely on competitive forces to ensure that the claimed investment efficiencies would materialise. Instead, it imposed a behavioural remedy aimed at securing investment commitments. Specifically, it imposed a legally binding commitment for the merged entity to implement its ‘Joint Business Plan’ over the next eight years.

This approach reflects the CMA’s concern that, following consolidation, the merged entity’s incentives to deliver network improvements might weaken in the absence of sufficient competitive pressure. By making investment obligations enforceable, the CMA sought to bridge the gap between projected efficiencies and their actual realisation, ensuring that anticipated consumer benefits would not remain merely speculative but would be delivered in practice.

Additionally, the CMA introduced a cap on certain mobile tariffs and data plans for three years to ensure that retail customers and mobile virtual network operators (MVNOs) continue to benefit from competitive deals until the benefits of the Joint Business Plan are realised.

Notably, this approach contrasts with the European Commission's practice in comparable four-to-three mobile mergers, such as its most recent conditional approval of the Orange/MásMóvil joint venture in Spain. In those cases, the Commission imposed structural remedies, requiring the divestment of spectrum and network assets to facilitate the entry of a fourth independent mobile network operator, thereby addressing competition concerns through market structure rather than ongoing behavioural obligations.

## Measuring the impact of integration on market outcomes

Whether the efficiencies of integration translate into better service outcomes for consumers is ultimately an empirical question. Various studies have sought answers by analysing the impact that European MNO mergers have had on a) investment levels, b) profitability, and c) network quality indicators. However, it is important to infer the right conclusions from this evidence. The results can be misleading, which can negatively influence future merger assessments when they consider the potential impact of a proposed merger *ex ante*.

### Considering the impact on investment metrics

First, we consider metrics that address mergers' impact on investment. As a critical input for improving services, the hope is that investment metrics serve as an indirect measure of quality.

One potential indicator is investment *per operator*. For instance, using a difference-in-differences framework across 33 OECD countries (2002–2014), Genakos, Valletti and Verboven (2018)<sup>15</sup> examine how changes in market concentration affect prices and capital expenditure (CAPEX). Market structure is proxied by the HHI based on subscribers, with endogeneity addressed via an instrumental variable exploiting regulatory differences in mobile termination rates. They find that though a hypothetical symmetric 4-to-3 merger may increase prices, it would also raise investment per operator significantly – by approximately 19% relative to the pre-merger counterfactual.

However, as Ofcom (2020)<sup>16</sup> has noted, the problem with this metric is that, after a consolidation, the average size of the remaining operators is bigger, so we should expect investment per operator to increase even without any quality improvements.

A second potential metric is industry-wide investment – which Ofcom (2020) argues is the more relevant metric.<sup>17</sup> A common finding in the economic literature is that while operator-level investment may increase following consolidation, the effect on aggregate industry-wide investment is often insignificant. This result is frequently interpreted negatively, as evidence that the merger in question fails to generate efficiencies.

However, industry-wide CAPEX is itself an incomplete, and potentially misleading, indicator of competitive outcomes in markets with parallel infrastructures such as telecommunications. Aggregate investment includes duplicated costs. Removing duplication would, before other considerations, reduce overall investment in absolute terms. But it would not harm quality standards. Rather, it represents an improvement in how cost-effective firms' investment is.

Furthermore, the insignificant effect on aggregate industry-wide investment may simply reflect the relatively low variation in such investment over time. Limited variance at the industry level reduces the statistical power of the analysis and may therefore preclude a precise estimation of any underlying effect, even if one exists.

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## Considering changes in profitability metrics

Second, we consider metrics that address firms' profitability. Here, the intention is to assess firms' ability and incentive to invest in improving quality. In particular, it addresses the concern raised in the Draghi Report – and by others<sup>18</sup> – that insufficient returns may prevent European MNOs engaging in desirable strategic infrastructure investments.

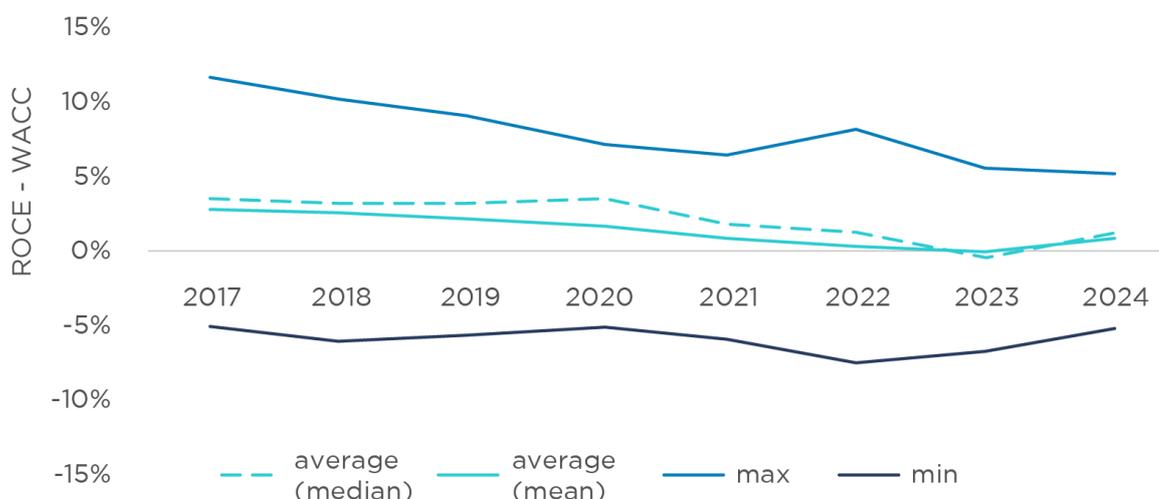
A recent analysis by economists at the Commission assesses the EU telecom sector's ability to remunerate its cost of capital.<sup>19</sup> It includes 14 large operator groups active in the EU and finds that, *on aggregate*, their return on capital employed (ROCE) covered their weighted average cost of capital (WACC) over the period 2014-2024.<sup>20</sup> Using country-level data available for seven of the 14 groups, it finds that the companies' *in-country* operations were also profitable on average, although profitability in-country declined over the same period.

On that basis, the authors conclude that the evidence does not support concerns that the EU telecommunication sector *as a whole* has been consistently underperforming its cost of capital, or that telecoms operators require consolidation to achieve the scale necessary to invest. However, the authors also note that “the wide dispersion in firm performance calls for caution when interpreting sector-level averages – an issue that becomes even more pronounced when examining in-country results.”

Regarding the observation on aggregate returns, one could temper the strength of the conclusion on the basis of the analysis presented in the article by economists at the Commission. It illustrates that average ROCE including goodwill has been at or below WACC since around 2020 and that, when looking at ROCE excluding goodwill, which exceeded WACC, the margin was minimal. In such a situation of marginal profitability, underinvestment may still arise, as narrow margins may equally constrain both the scale and the pace of investment. This is because if an operator's ROCE is close to its WACC, any *additional* investment is unlikely to generate value to its shareholders and may even yield returns lower than the cost of capital. Moreover, returns on capital investments are inherently uncertain such that companies have no incentive to tie up capital in irreversible investment unless they have a high degree of confidence that doing so will add value.

Nonetheless, the second observation presented by the economists at the Commission is the one that really matters, and it deserves more attention. The results of this more granular analysis – in **Figure 3** – show that that the dispersion around the average is wide. Further, in some national markets, there are operators that fail to earn their cost of capital; in recent years, even the median operator has barely covered its cost of capital. So, just as analysing investment at the aggregate level can be misleading, here too it is easy to misinterpret aggregate or average profitability.

**Figure 3: Return on capital employed including goodwill minus weighted average cost of capital for EU country-level operations**



Source: Emanuele Tarantino, Chiara Atzeni, Chiara Cirignaco, Dominik Erharter, and Hans Zenger, “An analysis of the EU telecom sector’s ability to remunerate its cost of capital (29 January 2026)” <https://cepr.org/voxeu/columns/analysis-eu-telecom-sectors-ability-remunerate-its-cost-capital>.

The issue is that, at the level of an individual market, average performance is not what drives quality and prices. What matters is the capabilities and rivalry between the individual firms in the market. In general terms, competition between two strong companies and two weak companies does not produce the same outcomes as competition between four “average” companies. In reality, none are average.

Vodafone/Three illustrates the point. In 2021, the four UK MNOs had an average ROCE just below 10%. That aggregate position belies the underlying picture: none of the companies reflected that position individually. The leaders’ returns were 20% and 14%; the laggards, Vodafone and Three, both returned less than 3%.<sup>21</sup> So, in this case, the prospect of three strong and more evenly matched players was considered to offer more intense competition on prices and quality than competition between four heterogenous and mismatched ones.

To see why, consider a simplified and generalised case. Companies A and B are strong, earning high profits, well above their WACC. Companies C and D are weak, earning much less than their WACC. Collectively, their returns cover their cost of capital. However, the profitability of A and B partly reflects their competitor’s inability to apply more effective competitive pressure. If C and D combined into a more effective competitive force, the profits of A and B may come down – closer to their WACC – and the firms’ dispersion around the average level could reduce, reflecting the fact that there are now three strong competitors on a more even playing field, driving quality up, and prices down.

### Considering changes in quality metrics

Quality metrics are the preferable indicator of a merger’s impact on competition, as they directly measure improvements in coverage, speed, latency and reliability experienced by consumers.

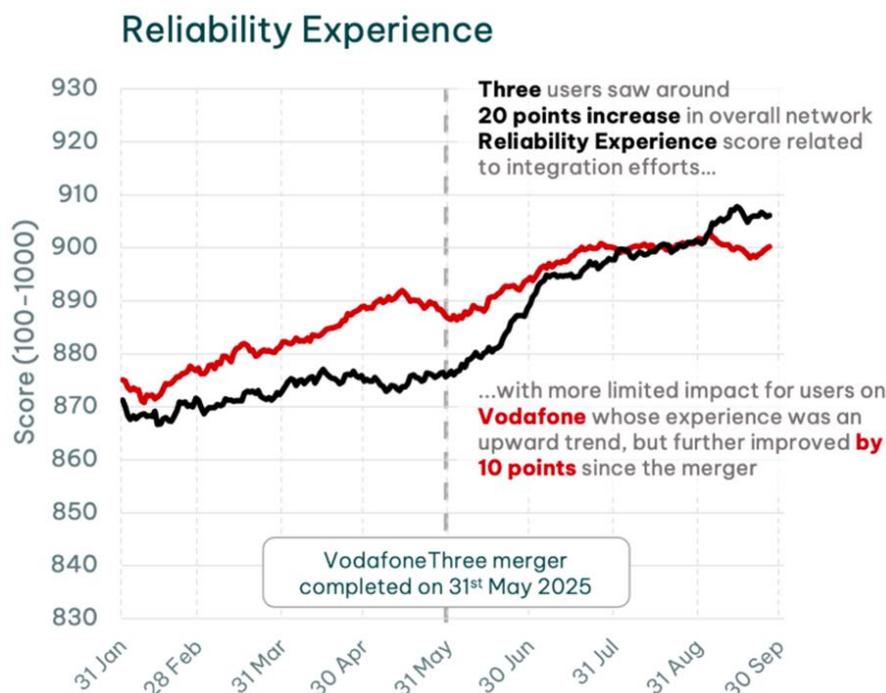
Padilla et al. (2023)<sup>22</sup> analyse the impact of past 4-to-3 mobile mergers on GSMA’s Mobile Connectivity Index<sup>23</sup>, a composite measure capturing download speeds, upload speeds and latency. They found that, between 2014 and 2022, European countries experiencing such mergers improved their relative ranking in the index – direct evidence consistent with a positive association

between 4-to-3 mobile mergers, such as Vodafone/Three, and improvements in network quality as experienced by consumers.

In the case of Vodafone/Three, some of the promised improvements have already materialised for consumers since the successful completion of the merger in May 2025. Three users reporting to Opensignal – an independent analytics company specialising in “quantifying the mobile-network experience” – indicated in October 2025 they had already seen an approximately 20-point increase, and Vodafone users a 10-point increase, in their overall network reliability since integration was initiated. Opensignal added, “we see that the merged entity’s network is not only resulting in better coverage, but better experience in already covered areas.”<sup>24</sup>

Further projections, based on user experience observed to date and assuming continued network integration, suggest that consumers will similarly see improvements in the quality they receive once integration is complete. Forecasts indicate a 13% expected improvement in general coverage experience for Three users and a 7% improvement for Vodafone users. The most pronounced gains, however, are expected in 5G coverage experience, with Vodafone users projected to see a 92% improvement and Three users a more modest, though still material, 7% improvement.<sup>25</sup>

**Figure 4: Changes in reliability before and after Vodafone/Three**



Source: Opensignal, ‘Better experience, faster speeds, wider coverage: Early impact of the Vodafone-Three UK merger’ (2025).

## Conclusion

The Vodafone/Three decision illustrates the need for an economically grounded and evidence-based approach to mobile merger investigations.

In markets shaped by high fixed costs, parallel infrastructure and uneven operator capabilities, consolidation can enhance rather than weaken competition by improving incentives and ability to invest in better networks. The task for competition authorities is therefore to assess whether a transaction is likely to strengthen firms’ capabilities and the intensity of rivalry between them, which improves the outcomes that matter to consumers.

In mobile markets, those outcomes are best measured not by aggregate investment or average profitability or investment metrics, which can be misleading. The capability of specific companies and the competitive rivalry between them determines outcomes, not industry-wide averages. Rather, tangible improvements should be measured directly, looking at changes in coverage, quality, reliability, and network performance.

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1 Competition and Markets Authority, 'CMA launches review of its approach to merger efficiencies', 15 January 2026, available at <https://www.gov.uk/government/news/cma-launches-review-of-its-approach-to-merger-efficiencies>.

2 Opensignal, 'Better experience, faster speeds, wider coverage: Early impact of the Vodafone-Three UK merger' (2025), available at <https://insights.opensignal.com/2025/10/better-experience-faster-speeds-wider-coverage-early-impact-of-the-vodafone-three-uk-merger/dt>.

3 Vodafone/ Three [2024] ME/7064/23, Final report by the CMA, para. 44.

4 The CMA's merger simulation predicted average price rises of 5.5% for Three and 2.6% for Vodafone (see the CMA's final report on the Vodafone/Three merger, para. 42). By contrast, the Commission's merger simulation predicted price increases of 15.4% for Three and 10.7% for O2, based on diversion ratios aggregated at the network level (see Hutchison 3G UK/Telefónica UK [2016] M.7612, Commission Decision, Figure 115).

5 Competition and Markets Authority (2024), "Vodafone/Three merger decision, Final Report", 5 December, para. 14.29.

6 The efficiencies identified by the CMA in Vodafone/Three – stemming from the multiplicative effect of combining sites and spectrum – share with the avoidance of fixed investment duplication the feature that less investment is required to achieve a given quality improvement. However, while the CMA's efficiencies relate mainly to variable investments in capacity expansion, the avoidance of fixed investment duplication reflects a broader systemic efficiency: it concerns the elimination of duplicative fixed investments in core infrastructure and technology that each stand-alone network would otherwise have to bear.

7 See, e.g., GSMA/ PwC, 'Comparison of fixed and mobile cost structures' (2012) available at: <https://www.gsma.com/solutions-and-impact/connectivity-for-good/public-policy/wp-content/uploads/2012/09/Tax-Comparison-of-fixed-and-mobile-cost-structures.pdf>; STL Partners, 'Telco economics: Network sharing in a 5G world' (2020) available at: <https://stlpartners.com/research/telco-economics-network-sharing-in-a-5g-world/>.

8 Case COMP/M.7758 – Hutchison 3G Italy / WIND, paras 1448, 1465 and 1630.

9 Roman Fischer and Elena Zoido, 'Developing an innovation defence in European merger control' (2025) available at <https://www.compasslexecon.com/insights/publications/developing-an-innovation-defence-in-european-merger-control>.

10 Philippe Aghion, "Incomplete Contracts and the Theory of the Firm," *Journal of Economic Perspectives* 25(2) (2011). See also: Hart & Moore, "Incomplete Contracts and Renegotiation," *Econometrica* 56(4) (1988); Sanford J. Grossman & Oliver Hart, "The Costs and Benefits of Ownership: A Theory of Vertical and Lateral Integration," *Journal of Political Economy* 94(4) (1986); and John Moore & Oliver Hart, "Property Rights and the Nature of the Firm," *Journal of Political Economy* 98(6) (1990).

11 Competitors may also respond by lowering prices, increasing investment, or by doing both.

12 Vodafone/ Three [2024] ME/7064/23, Final report by the CMA, chapter 8, para. 117.

13 Vodafone/ Three [2024] ME/7064/23, Final report by the CMA, chapter 8, para 119.

14 Vodafone/ Three [2024] ME/7064/23, Final report by the CMA, para. 35.

15 Genakos, Valletti and Verboven, 'Evaluating Market Consolidation in Mobile Communications' (2018) 33 (93) *Economic Policy* 45, 100.

16 Ofcom, 'Market structure, investment and quality in the mobile industry' (2020) *Economics Discussion Paper Series*, Issue Number 1, para. 2.4.

17 Ofcom further notes as key limitations of the study by Genakos and others its failure to control for factors such as lagged investment and technology cycles, which are important for isolating the effect of market structure changes.

- 18 Letta, Enrico 'Much More Than a Market - Speed, Security, Solidarity; Empowering the Single Market to deliver a sustainable future and prosperity for all EU Citizens', 2024, available at <https://www.consilium.europa.eu/media/ny3j24sm/much-more-than-a-market-report-by-enrico-letta.pdf>.
- 19 Tarantino, Emanuele, Chiara Atzeni Chiara Cirignaco Dominik Erharter Hans Zenger, 'An analysis of the EU telecom sector's ability to remunerate its cost of capital', 29 January 2026, available at <https://cepr.org/voxeu/columns/analysis-eu-telecom-sectors-ability-remunerate-its-cost-capital>.
- 20 The author notes that there are a few exceptions: On aggregate, in the period 2014-2015 and 2021-2021 ROCE with goodwill and in 2021 ROCE excluding goodwill was below WACC.
- 21 Ofcom "Ofcom's future approach to mobile markets and spectrum - Conclusions paper" (2022), Figure 4.2, which shows Economic ROCE by MNO, pre-tax nominal including 5G spectrum between 2019 and 2021. Available at: <https://www.ofcom.org.uk/siteassets/resources/documents/consultations/category-3-4-weeks/232279-ofcoms-future-approach-to-mobile-markets/associated-documents/conclusions-mobile-spectrum-demand-and-markets.pdf?v=328882>.
- 22 Jorge Padilla, Thilo Klein, Paul Reynolds and Martin Wickens, 'Do four-to-three mobile mergers harm consumers?' (2023) available at <https://www.compasslexecon.com/insights/publications/do-four-to-three-mobile-mergers-harm-consumers>.
- 23 GSMA's Mobile Connectivity Index is available online at: <https://www.mobileconnectivityindex.com/index.html>.
- 24 Opensignal, 'Better experience, faster speeds, wider coverage: Early impact of the Vodafone-Three UK merger' (2025).
- 25 Opensignal, 'Better experience, faster speeds, wider coverage: Early impact of the Vodafone-Three UK merger' (2025).