Review of the Economics Literature on the Pros and Cons of Vertical Integration and Vertical Separation in Electricity Sectors

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His research outputs include books, book chapters for edited volumes, peer-reviewed journal articles, academic working papers, and commissioned studies. He regularly presents his research to academic and practitioner/policy audiences. Studies in which he formally analyses or discusses vertical integration issues in electricity sectors include:

- Evans, L. and R. Meade, 2005, *Alternating Currents or Counter-Revolution? Contemporary Electricity Reform in New Zealand*, Victoria University Press.
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Executive Summary

New Zealand's electricity sector is organised in a way that is very similar to how many liberalised electricity sectors around the world have become organised. Natural monopoly activities like high-voltage long-distance transmission, and lower-voltage shorter-distance distribution, have been separated from competitive activities like generation, and retailing.

Some generators and retailers are vertically integrated – i.e. commonly owned and controlled – "gentailers". Each gentailer competes with other gentailers, and also with stand-alone (separated) generators or retailers.

The pros and cons of vertical integration between generation and retailing – "gentailing" – is often the subject of scrutiny. It is currently receiving scrutiny in New Zealand with lower-than-normal hydro lake levels and disruptions in the availability of gas-based generation having led to sustained increases in wholesale prices. This has placed strain on separated retailers and large consumers purchasing electricity at those prices. A natural question is whether vertical integration is exacerbating this situation, and whether separating gentailers might improve it?

This study surveys scholarly economics literatures on the pros and cons of vertical integration between generation and retailing – relative to their vertical separation – in electricity and comparable sectors. It focuses on the pros and cons of vertical integration relative to vertical separation – between generation and retailing – from the perspective of electricity consumers.

In the main, distinctive features of electricity systems serve to reinforce the overall conclusions of studies of vertical integration and vertical separation from a wide range of sectors including electricity sectors. Specifically, that vertical integration – where it naturally arises – is superior to vertical separation in managing wholesale price risks, supporting investment, reducing incentives for the exercise of market power, and providing better outcomes for consumers.

The main sources of these benefits are through integration offering much more effective protection against wholesale price risks, which means consumers can be insulated from wholesale price volatility, and gentailers are better able to finance investments. However, another key benefit is that vertical integration avoids inefficiencies in pricing along the vertical supply chain – i.e. it achieves the so-called "elimination of double marginalisation" – which results in lower retail prices than would arise under separation.

Importantly, these benefits of integration often coexist with practices by integrated firms that appear to be anticompetitive. These include foreclosure (refusing to supply rivals), and raising rivals' costs (by purchasing on wholesale markets to raise wholesale prices, and hence the input costs of separated downstream rivals). However, integration is not always associated with such

activities, especially in electricity systems which have design and regulatory features which reduce foreclosure risk. And even when foreclosure incentives exist, the benefits of integration are sufficient to result in net consumer benefits. In any case, separated firms can also engage in anticompetitive activities – but without the countervailing benefits of integration. They can also engage in countervailing strategies, such as integrating themselves, or using contracting to offset or neutralise integrated firms' strategies.

These conclusions do not imply that "one size fits all" – not all firms find it beneficial to be vertically integrated. Indeed, many studies show that firms would often prefer not to be vertically integrated, as they could make higher profits by remaining separated. However, integrating can still be their best strategy if they can't stop their rivals from integrating. This means many firms find integration to be their "least worst" alternative – they do it even though it reduces their profits, because not doing so when their rivals do means they could suffer even worse profits. Importantly, when firms find it beneficial to integrate, this also tends to benefit consumers.

However, depending on the existing level of integration and their own circumstances, some firms may still find it preferable to separate, or to remain separated. Integrated firms might also find it preferable to separate if circumstances change to make alternatives to integration more viable solutions to the challenges that cause firms to integrate in the first place.

Where naturally-occurring vertically integrated firms are forcibly separated, there is solid evidence from a variety of sectors around the world that this harms consumers. There is also evidence that it can harm separated retailers, and the large customers that purchase electricity directly on wholesale markets.

Ironically, where vertical separation of integrated firms is mandated, this forces those firms to use contracting to a greater degree to try to replicate the outcomes of vertical integration. This undermines separation, and imposes costs on firms and consumers alike where contracting is only an imperfect substitute for integration. Where neither approach is feasible – i.e. where separation is mandated, and contracting is not permitted – there is clear evidence that this can lead to system-wide collapse (e.g. as occurred in California in 2000-2001).

A balanced assessment of the pros and cons of either approach, and an acknowledgement that policymakers do not face a simple choice between complete integration and complete separation, is therefore critical for identifying the source of any perceived problems in already-integrated electricity sectors. It is important for distinguishing the impacts of vertical integration or separation from other relevant considerations, such as fuel supply volatility, or (as in California) ill-considered or poorly implemented reforms. It is also critical for ensuring that any policy prescriptions meet their stated aim, and avoid causing greater problems.

1. Introduction

1.1 Context

1. New Zealand's electricity sector is organised in a way that is very similar to how many liberalised electricity sectors around the world have become organised. Natural monopoly activities like high-voltage long-distance transmission, and lower-voltage shorter-distance distribution, have been separated from competitive activities like generation, and retailing.

2. Some generators and retailers are vertically integrated – i.e. commonly owned and controlled – "gentailers". Each gentailer competes with other gentailers, and also with stand-alone (separated) generators or retailers. They do so by buying and selling contracts in wholesale markets for either forward (i.e. future) supply, or for real-time (spot) supply. They also do so by entering into supply contracts with retail customers, commonly at fixed retail prices.

3. Figure 1.1 provides a stylised depiction of the types of arrangements in place for generation and retailing in electricity sectors like New Zealand's:

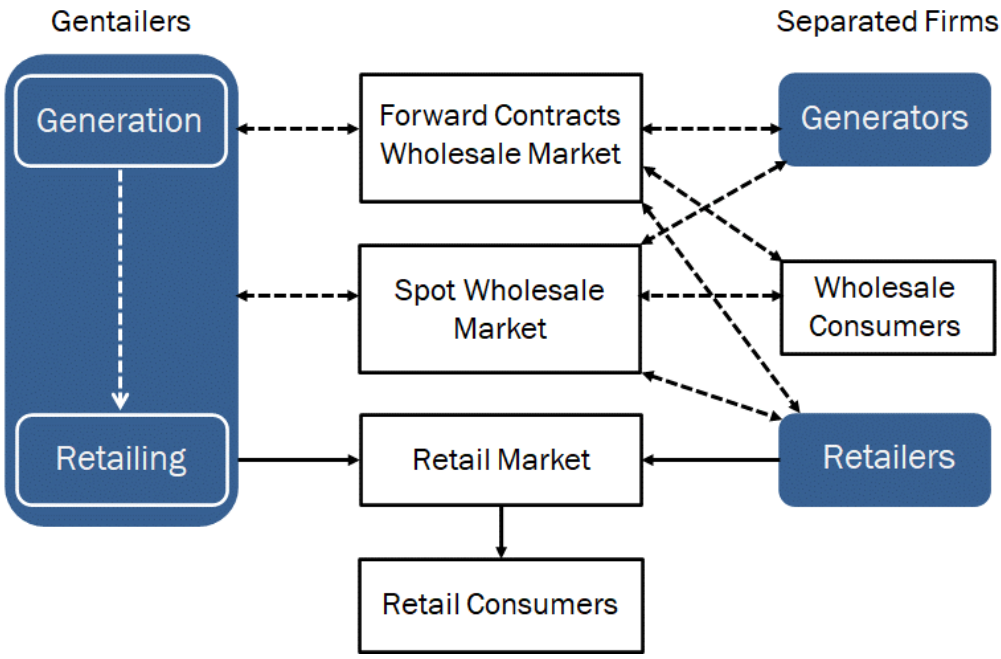
    3.1. Generation is sometimes called an "upstream" activity, while retailing is a "downstream" activity (which relies on the upstream production of generators);

    3.2. Natural monopoly activities like transmission and distribution are treated as being "behind the scenes".

4. The pros and cons of vertical integration between generation and retailing – "gentailing" – is often the subject of scrutiny. It is currently receiving scrutiny in New Zealand with lower-than-normal hydro lake levels and disruptions in the availability of gas-based generation having led to sustained increases in wholesale prices:

    4.1. These high prices have placed pressure on separated retailers that buy electricity at high spot wholesale prices, or who need to replace existing forward contracts and face much higher prices to do so. Their input costs have increased, but they face obstacles in raising their retail prices when other retailers (especially gentailers) have maintained their retail prices, which insulates their retail customers from high wholesale prices;

Figure 1.1 – Stylised Representation of Vertical Integration and Vertical Separation in Electricity Sectors like New Zealand's



4.2. Likewise, large industrial customers who purchase electricity directly on wholesale markets also face increased input costs. They too face constraints on their ability to pass on those increased costs when they sell their products on competitive markets.

5. A natural question is whether vertical integration is exacerbating this situation, and whether separating gentailers might improve it? For policymakers, an important consideration would be whether electricity consumers' interests might be better served – in the long-term and not just the short-term – by vertically separating gentailers.

1.2 Electricity Reforms and the Origins of Gentailing

6. Vertical integration – or common ownership and operation – of different elements of electricity systems (generation, transmission, distribution and retailing) was the dominant form of organisation in many countries before liberalisations began in the 1980s.[1] With the emergence of viable smaller-scale generation technologies, and better communications

[1] New Zealand started its reform process with generation and transmission bundled in a state-owned monopoly, while distribution and retailing were bundled in a number of locally-owned organisations. For histories, see, Martin (1988), Rennie (1989), Evans and Meade (2005).

and market design technologies allowing decentralised system control and pricing, many jurisdictions began to liberalise their electricity systems.

7. Reformers intended to ring-fence natural monopoly activities like transmission and distribution, while introducing competition into contestable parts of the sector, namely generation and retailing.[2] Competition was expected to benefit consumers through improved prices, and more timely and appropriate investment.

8. In most liberalising jurisdictions reforms involved vertically separating competitive activities from natural monopoly activities. It also involved horizontally separating monopoly generation, or generation by very few firms, into a larger number of competing firms.[3] However, due to ongoing economies of scale and scope in generation, and the importance of maintaining portfolios of generation that balanced the characteristics and uncertainties of different fuel sources (hydro, gas, coal, wind, etc), even competing generators typically remained large:

    8.1. Atomistic competition has not been, and still is not, a viable approach to organising generation.[4]

9. In addition to these types of vertical and horizontal separation, some liberalising jurisdictions limited the ability of generators to vertically integrate with retailing – i.e. they maintained vertical separation between those activities. This was often with a desire to encourage entry by competing retailers, especially when generation remained highly concentrated in one or only few firms:

    9.1. In those jurisdictions it was anticipated that effective contracts markets would evolve, offering separated retailers and generators an effective means by which to manage volatility in the wholesale prices at which they traded, and also to provide the security of revenues generators needed to support their long-term generation investments.

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[2] For a history of the origins and early decades of contemporary electricity sector liberalisation around the world, see for example Evans and Meade (2005), Meade (2005), Joskow (2006), Chao et al. (2008), Meyer (2012a), Simshauser (2021).

[3] Vertical integration or separation refer to how activities across different levels of the sector are organised. Conversely, horizontal integration or separation refer to how activities at the same level of the sector are organised.

[4] This will change to some degree with the improving economics of distributed generation technologies like rooftop solar.

10. Electricity sectors have certain key features that distinguish them from others. These include the need to maintain real-time balance between supply and demand to maintain system stability (given the lack of economic, large-scale storage), sometimes highly uncertain fuel supplies (e.g. where generation relies on nature to provide fuel), and demand that is often highly unresponsive to price changes:

    10.1. These factors combine to mean that wholesale electricity prices can be very volatile, and sometimes need to rise significantly to maintain real-time balance. They can also be vulnerable to manipulation by generators with market power;

    10.2. Effective forward contract markets offered the potential to address both concerns, by enabling firms to lock in prices on their wholesale supplies, while limiting the incentive for generators to exercise their market power in spot (real-time) wholesale markets.

11. It quickly emerged, however, that effective contracts markets did not emerge, and that this reflected fundamental mismatches between the contracting preferences of generators and retailers, in part precisely because of competition in retail markets:

    11.1. Episodes of failing separated generators and retailers led to a rapid realignment of electricity sectors where vertical integration was permitted, resulting in the rapid formation of integrated "gentailers" – generators combined with retailers;

    11.2. New Zealand is far from being alone as a country whose liberalised electricity system took this course.[5]

12. It would be a mistake, however, to see vertical integration as a complete substitute for effective contracting (or vice versa). Even in electricity systems dominated by the gentailer model, it is commonplace for there to be trade in contracts on both forward and spot (real-time) wholesale markets. Moreover, some of the benefits of vertical integration (e.g. management of wholesale price risks) are achievable through contracting, and separated generators and retailers commonly rely on contracting to provide some of those benefits:

    12.1. This means that if gentailers were to be vertically separated, they should be expected to use contracting to a much greater degree to manage their pricing risks,

[5] For example, see Kühn and Machado (2004), Evans and Meade (2005), Grubb and Newbery (2018), Simshauser (2021).

and to support investments, which to some degree will simply replicate what they already achieve through integration, albeit at greater cost.

1.3 Scope of this Study

13. This study surveys scholarly economics literatures on the pros and cons of vertical integration between generation and retailing – relative to their vertical separation – in electricity and comparable sectors. Both theoretical and empirical studies are reviewed, with the literatures in relation to electricity sectors being particularly deep given the importance of the topic (and the sectors), and the decades of experience that can be drawn on to inform the analysis.

14. The study focuses squarely on the pros and cons of vertical integration relative to vertical separation – between generation and retailing – from the perspective of electricity consumers. While retail electricity consumers are the study's primary focus, impacts on wholesale electricity consumers (e.g. large industrial consumers) are also considered.

1.4 Main Findings in Brief

15. In the main, the distinctives of electricity systems serve to reinforce the overall conclusions of studies of vertical integration and vertical separation from a wide range of sectors including electricity sectors:

    15.1. Specifically, that vertical integration – where it naturally arises – is superior to vertical separation in managing wholesale price risks, supporting investment, reducing incentives for the exercise of market power, and providing better outcomes for consumers.

16. The main sources of these benefits are through integration offering much more effective protection against wholesale price risks, which means consumers can be insulated from wholesale price volatility, and gentailers are better able to finance investments:

    16.1. However, another key benefit is that vertical integration avoids inefficiencies in pricing along the vertical supply chain – i.e. it achieves the so-called "elimination of double marginalisation" – which results in lower retail prices than would arise under separation.

17. Importantly, these benefits of integration often coexist with practices by integrated firms that appear to be anticompetitive – including foreclosure (refusing to supply rivals), and

raising rivals' costs (by purchasing on wholesale markets to raise wholesale prices, and hence the input costs of separated downstream rivals):

17.1. While integration is often – though not always – associated with such activities, the benefits of integration are sufficient to result in net consumer benefits;

17.2. In any case, separated firms can also engage in anticompetitive activities – but without the countervailing benefits of integration – or in countervailing strategies (such as integrating themselves, or using contracting to offset or neutralise integrated firms' strategies).

18. These conclusions do not imply that "one size fits all" – not all firms find it beneficial to be vertically integrated. Indeed, many studies show that firms would often prefer not to be vertically integrated, as they could make higher profits by remaining separated. However, integrating can still be their best strategy if they can't stop their rivals from integrating:

18.1. This often leads to many firms finding integration to be their "least worst" alternative – they do it even though it reduces their profits, because not doing so, when their rivals do, means that they could suffer even worse profits;[6]

18.2. However, depending on the existing level of integration and their own circumstances, some firms may still find it preferable to separate, or to remain separated.[7]

19. Furthermore, where naturally-occurring vertically integrated firms are forcibly separated, there is solid evidence from a variety of sectors around the world that this harms consumers. There is also evidence that it can harm separated retailers, and the large customers that purchase electricity directly on wholesale markets:

19.1. Ironically, where vertical separation of integrated firms is mandated, this forces those firms to rely on contracting to a greater degree to try to replicate the

[6] As Simshauser (2021) observes, vertical integration is an organisational form of last resort.

[7] For example, one of New Zealand's gentailers, Trustpower, recently announced intentions to sell its retailing business to another gentailer, Mercury. It intends to do so with a tapering long-term contract with Mercury that secures the price it receives for generation, and by relying on the forward contracts market being deep enough to provide an ongoing supply of such contracts at acceptable prices. See Trustpower (2021) for details. While this strategy might prove best for Trustpower, it might not be viable if one or more of the other gentailers attempted to follow suit.

outcomes of integration. This undermines separation, and imposes costs on firms and consumers alike where contracting is only an imperfect substitute for integration;

19.2. Where neither approach is feasible – i.e. where separation is mandated, and contracting is not permitted – there is clear evidence that this can lead to system-wide collapse (e.g. as occurred in California in 2000-2001, discussed further in Section 4.3).

20. A balanced assessment of the pros and cons of either approach, and an acknowledgement that policymakers do not face a simple choice between complete integration and complete separation, is therefore critical for identifying the source of any perceived problems in already-integrated electricity sectors:

20.1. This is important for distinguishing the impacts of vertical integration or separation from other relevant considerations, such as fuel supply volatility, or (as in California) ill-considered or poorly implemented reforms;

20.2. It is also critical for ensuring that any policy prescriptions meet their stated aim, and avoid causing far greater problems.

1.5 Structure of this Study

21. The balance of this study is structured as follows:

21.1. Section 2 surveys the pros of vertical integration, relative to vertical separation, from the perspective of consumers;

21.2. Section 3 then surveys the cons of vertical integration, focusing especially on the apparent anticompetitive harms that can arise in integrated sectors;

21.3. Section 4 considers the net benefits of vertical integration, taking into account both the benefits and harms of integration. It also considers evidence on the consumer impacts of policies mandating the separation of vertically integrated industries, and discusses how the benefits of vertical integration might be achieved through other means; and

21.4. Section 5 summarises and concludes.

2. Benefits of Vertical Integration

2.1 Overview

22. This section and the next respectively survey studies on the pros and cons of vertical integration in electricity and other relevant sectors. These pros and cons are each sometimes obvious, but at other times more subtle. A balanced view of vertical integration requires consideration of both subtle and obvious considerations:

    22.1. Assessments of the pros and cons of integration have become increasingly important with a number of high-profile vertical mergers occurring across the world, especially in the technology sector, and a number of recent studies have reinvigorated this area of inquiry.[8]

23. The survey starts with the key pros of integration, followed by the key cons. Evidence on the net consumer impacts of vertical integration is then surveyed in Section 4, as is evidence on the consumer impacts when vertically integrated sectors are separated.

24. In this section, the following benefits of vertical integration are considered:

    24.1. Supply-side efficiencies;

    24.2. Risk management;

    24.3. Elimination of double marginalisation;

    24.4. Improved investment; and

    24.5. Reduced incentives to exploit wholesale market power.

25. Each is discussed in turn.

2.2 Supply-Side Efficiencies

Electricity Sectors Feature Particular Coordination Challenges affecting Supply-Side Efficiency

26. Supplying electricity poses particular supply-side challenges. Electricity is not economically storable at scale. Furthermore, physical laws dictate how electricity flows around

[8] For example, see Salop (2018), Baker et al. (2019), Kwoka and Slade (2020), Slade (2021). Owen (2011) provides an earlier survey of the relevant issues.

transmission and distribution networks, with issues in one part of the network having ripple effects in other parts of the network. Each of these means electricity systems require highly coordinated operation to ensure that demand and supply are kept in balance in real-time.[9]

27. This is made more complicated by uncertainties in both supply and demand. Much electricity supply relies on renewable fuel supplies (especially hydro, wind, solar), which can be highly volatile. Furthermore, even non-renewable fuel supplies can be subject to disruption (e.g. when issues arise in gas supplies). Demand too can be highly uncertain, for example varying in response to sudden weather changes. With many retail customers on fixed-price retail supply contracts, retail demand is also largely insulated from spikes in wholesale electricity prices, and can otherwise be unresponsive to short-term price changes.

28. These factors mean that sudden changes in supply, or in the demand of large electricity consumers exposed to wholesale prices, can be required to maintain real-time balance. Large movements in spot wholesale prices are often required to achieve this, meaning wholesale prices can be highly volatile, and subject to large increases. Generators or retailers exposed to such volatile prices can therefore face significant risks.[10]

Supply-Side Coordination Benefits of Integration have Often Been Overlooked

29. The economic literature on vertical integration is vast,[11] but pays relatively little attention to the most obvious types of efficiencies that vertical integration might offer, focusing instead on strategic and other considerations.[12] In particular, vertical integration can result in supply-side efficiencies, such as better coordinating the operation of and investments in vertical supply chains, minimising duplication of facilities, improved information sharing, exploiting complementarities between upstream and downstream activities, and achieving economies of scope.

30. In liberalised electricity systems, real-time coordination of supply and demand is commonly achieved by a centralised system operator, seeking least-cost dispatch of generation to supply expected demand, while also ensuring that physical transmission grid constraints are satisfied. This substitutes for vertical integration in relation to certain real-time

[9] For example, see Kwoka (2002), Evans and Meade (2005), Gugler et al. (2017) for further discussion.

[10] For example, see Boroumand and Zachmann (2012), Boroumand and Goute (2017).

[11] For summaries, see Lafontaine and Slade (2007), Joskow (2010), Slade (2021).

[12] Kwoka and Slade (2020).

operations. However, it does not coordinate generation and transmission investments (which can be highly complementary), or other types of supply-side coordination, which is naturally achieved through integration of those activities.

Loss of Supply-Side Coordination in Liberalised Electricity Sectors Has Spurred a Re-Evaluation of its Significance

31. When electricity sectors were first liberalised, the potential gains from introducing competition were prioritised over the likely efficiency costs of reduced supply-side coordination. Those competitive gains are very real, following often monopolistic generators being transformed into multiple, competing firms. However, the costs of lost supply-side efficiencies has now also become much more appreciated, with a range of studies exploring the extent of these lost efficiencies. This has reignited debate about the pros and cons of different types of vertical separation in electricity systems.[13]

32. Separating generation and transmission from retailing and distribution has been found to increase supply costs by 8-10% in U.S. electric utilities.[14] However, even larger cost increases are found to have arisen from generation being separated from other activities,[15] with cost increases being as high as 19-26%. Conversely, separating transmission from other activities is associated with smaller cost increases (4% in the U.S., and 14-21% in European utilities).[16] One U.S. study even suggests that the loss of such supply-side efficiencies has been so great that consumers have not enjoyed sufficient competition benefits to offset the efficiency losses caused by vertical separation.[17]

33. These studies do not specifically explore the cost increases associated with separating generation from retailing (with transmission and distribution having already been separated), but are indicative of the possible levels of cost increases that might result. However, simulations of vertically integrated and vertically separated pairs of generators and retailers using data from Australia's National Electricity Market (NEM) indicated that integrated firms enjoyed costs that were 17% lower (and profits 34% higher) than those of separated firms:[18]

[13] For example, see Kwoka (2002), Michaels (2006), Chao et al. (2008), Boroumand and Zachmann (2012), Meyer (2012a, b), Su (2015), Gugler et al. (2017), Simshauser (2021).

[14] Meyer (2012b). See also Kwoka (2002), and the survey in Michaels (2006).

[15] Meyer (2012a, b).

[16] Meyer (2012b), and Gugler et al. (2017), respectively.

[17] Su (2015).

[18] Simshauser (2021).

33.1. As for evidence from the U.S.,[19] a significant share of these cost savings derives from integrated firms being able to generate electricity at a cost that is less than what they would pay to acquire electricity at wholesale prices, even though they incur higher capital and operating costs to run their own generation plant.

34. Furthermore, centralised dispatch provides important real-time supply-side coordination in decentralised electricity systems. However, evidence using early U.S. data suggested that this coordination was not sufficient to fully compensate for lost efficiencies arising from vertical separation.[20]

Conclusion on Supply-Side Efficiencies

35. The above evidence on supply-side efficiencies from integration in electricity sectors complements that from surveys of evidence on vertical integration across a range of industries, finding that integrated firms tend to be more efficient.[21]

36. Taken together, these findings suggest that vertically integrated gentailers may be better-placed than vertically separated ones to achieve supply-side efficiencies:

36.1. If upstream generation activities were separated from downstream retailing, other means of achieving supply-side efficiencies would be required to ensure consumers remained well-served, all other things being equal.

2.3 Risk Management

Risk Management and Supply Security are Important Rationales for Vertical Integration

37. Vertical integration can reduce risk for upstream firms by providing them with more certain downstream demand, and for downstream firms by providing them with more certain supply, both of which can result in lower costs.[22] More generally, security of supply considerations have been identified as a motivation for vertical integration:

> "[T]here is abundant support in the business history literature for [the] theory that supply security considerations provide a motivation for vertical integration."[23]

[19] Koka (2002).

[20] Kwoka (2002).

[21] For example, see Lafontaine and Slade (2007), Slade (2021).

[22] Salop (2018).

[23] Joskow (2010, p. 581).

Fundamental Mismatches between Contracting Preferences of Generators and Retailers favour Vertical Integration for Risk Management in Electricity Sectors

38. For the reasons outlined above, managing uncertainties in both demand and supply is a key challenge in electricity systems. In particular, separated retailers serving customers with sticky retail prices while exposed to very volatile input supply costs (wholesale prices) are exposed to severe price and quantity risks. This is exacerbated by those risks being highly correlated in electricity markets (i.e. prices tend to be high when demand is high):[24]

    38.1. While entering into long-term supply contracts for electricity at a fixed price would help separated retailers to manage such risks, it would also induce new risks. In particular, if they lock in wholesale prices which prove to be excessive when market circumstances change, they face the risk of having their customers flee to, or be poached by, rival retailers who secure supply at lower prevailing wholesale prices.[25]

39. For generators, opposing considerations prevail. In particular, separated generators needing to raise capital at low cost to finance long-term investments have a preference for long-term supply contracts that lock in a price for their output, improving revenue security and lowering their financing costs.[26] Generators also prefer to contract on fixed quantities matching their generation capacity, whereas retailers prefer quantity flexibility to enable better tailoring of supply with their varying demand:[27]

    39.1. This means separated generators and retailers face fundamental asymmetries in their preferences over contract features when trading in wholesale markets, providing them with incentives to vertically integrate so as to better manage wholesale price risks and to support investment;[28]

    39.2. Furthermore, generators entering into long-term supply contracts with separated retailers rationally anticipate that those retailers might renege on their contractual

[24] Boroumand and Zachmann (2012), Boroumand and Goute (2017).

[25] Finon (2008), Howell et al. (2010), Meade and O'Connor (2011), Boroumand and Zachmann (2012), Simshauser (2021).

[26] For example, see Chao et al. (2008). Simshauser (2021) explains that Australian retailers, once separated from distribution activities and their associated strong balance sheets, were incentivised to integrate with generation in order to regain access to strong balance sheets in order to improve their access to capital.

[27] Boroumand and Zachmann (2012).

[28] Newbery (2002), Aïd et al. 2010, Boroumand and Zachmann (2012).

commitments if wholesale prices fall, which exposes those retailers to being predated by other retailers. This induces generators to incorporate a risk premium in their contracts (which makes them even less affordable to retailers),[29] or to limit their investments.[30]

40. However, separated firms relying on contracting rather than vertical integration face other fundamental shortcomings of contacting. Substantial evidence exists showing that contracting is unable to replicate the risk management benefits of vertical integration in electricity systems, thus favouring integration as a risk management tool:[31]

    40.1. Simulations of the electricity spot price risk management properties of vertical integration and portfolios of contracts demonstrate that separated retailers cannot replicate the risk-management benefits of physical hedging through vertical integration by portfolios of contracts alone;[32]

    40.2. Similar simulations of vertical integration and vertical separation (and hence contracting) using data from Australia's NEM found that integration was associated with an 83% reduction in earnings volatility, a 26% increase in credit quality, and 34% higher profits.[33]

Inadequacy of Relying on Contracting for Risk Management by Separated Retailers

41. These considerations are more than theoretical. Problems experienced by a large (mostly) separated retailer in New Zealand when contract markets proved inadequate to hedge their wholesale price risks in a time of system stress is at least partly responsible for the evolution of New Zealand's gentailer model:[34]

    41.1. Natural Gas Corporation (NGC) had only recently acquired a large retail electricity customer base when the 2001 winter power crisis emerged and wholesale prices surged;

[29] Boroumand and Zachmann (2012).

[30] Howell and Meade (2010), Meade and O'Connor (2011).

[31] Howell et al. (2010), Aïd et al. (2011), Meade and O'Connor (2011), Boroumand and Zachmann (2012), Meyer (2012a), Boroumand and Goute (2017).

[32] Boroumand and Zachmann (2012).

[33] Simshauser (2021).

[34] See Evans and Meade (2005), pp 173-175.

41.2. With little generation of its own, and having opted not to renew its forward contracts ahead of winter, NGC was unable to raise retail prices to pass on increased wholesale costs to consumers, and was forced to sell its retail customers to firms that had significant generation capacity, and were thus able to supply those customers without buying supply at high wholesale prices.

42. This experience echoes that of many other electricity sectors where reliance on contracting has proved inadequate to support separated retailing:

> "[A]sset light retail entry has never eventuated as expected. Asset-light retailers bankrupted, left the market, were taken over, or evolved towards an upstream integration in all the retail markets opened to competition (UK, New Zealand, Australia, France, etc.). Even in the UK, presented as a benchmark for electricity deregulation … [by 2012] twenty new entrants left the retail market since 2000 … At their climax between 1999 and 2001, the total market shares of the new entrants into retail was less than 2% in the UK …".[35]

Conclusions on Vertical Integration and Risk Management

43. In principle, contracting should be able to offer at least some of the benefits of vertical integration in terms of managing the significant price risks faced by separated retailers. However, contracts markets have not evolved as many expected, in part due to fundamental asymmetries in contracting preferences between generators and retailers. Moreover, significant research establishes that portfolios of contracts are simply unable to replicate the physical hedge offered by vertical integration against price risks:

43.1. These considerations strongly favour vertical integration over vertical separation in electricity systems;

43.2. In Section 4.3, the calamitous experience of the Californian electricity system in 2000-2001 is further discussed, since it illustrates how an absence of both integration and contracting – i.e. a lack of effective vertical coordination arrangements – leaves firms so exposed to wholesale price risks that system-wide collapse can result.

[35] Boroumand and Zachmann (2012, p. 465). At time of writing, surging wholesale gas and electricity prices in the UK have resulted in the failure of nine small energy suppliers in the space of just one month. See "Enstroga, Igloo Energy and Symbio Energy go bust as UK crisis deepens", *The Independent*, 30 September 2021.

2.4 Elimination of Double Marginalisation

Vertical Integration Avoids Retail Prices Incorporating Cascading Profit Margins

44. The above supply-side and risk management considerations are likely to be fairly obvious examples of efficiencies that can be achieved by vertical integration. A far more subtle but critical efficiency commonly associated with vertical integration is the elimination of so-called "double marginalisation".[36] While the efficiencies discussed above relate to physical supply, the elimination of double marginalisation relates to pricing.

45. In particular, when upstream and downstream firms in an industry each enjoy market power to some degree, they have an ability to add a markup – i.e. a "margin" – to their input costs when setting the prices they charge their customers. When those firms are vertically separated, the upstream firm adds a margin to its production or supply cost when setting its wholesale price, which is the purchase price of its downstream customer. The downstream firm then adds its own margin to the wholesale price when setting the price it charges its own customers. This means the price ultimately paid by consumers involves a margin being charged on top of a margin.

46. Such double marginalisation means that the ultimate retail price is higher – and retail volumes lower as a consequence – than if only one margin was added. The upstream firm does not fully account for the impact of this on the downstream firm when setting its upstream price. If, instead, the upstream and downstream firms were jointly owned and coordinating their pricing decisions, the integrated firm would add just one margin – to its supply cost – and enjoy higher profits as a consequence. Retail consumers would benefit by facing a lower price and higher supply, meaning that both the integrated firm and consumers ultimately benefit through such improved pricing coordination.[37]

47. While the elimination of double marginalisation is more subtle than observable supply-side efficiencies, its benefits are nonetheless well-established.[38] This has been so much so, in fact, that competition authorities for decades have considered vertical mergers to be relatively benign (as opposed to horizontal mergers between firms operating at the same

[36] For example, see Lafontaine and Slade (2007), Kwoka and Slade (2020), Slade (2021).

[37] The pricing coordination referred to here is along the vertical supply chain, not horizontally among competitors at the same level of the sector. As such, it does not give rise to the same antitrust concerns as price fixing by competitors.

[38] For example, see Salinger (1988), Gaudet and Van Long (1996), Lafontaine and Slade (2007).

industry level). While recent vertical merger waves involving technology giants has given rise to calls for fresh scrutiny of possible harms from vertical mergers, the benefits that vertical mergers can create in terms of improved pricing coordination remain well-accepted.[39]

Eliminating Double Marginalisation in Electricity Sectors

48. The elimination of double marginalisation is an important source of efficiencies in vertically integrated electricity systems. As discussed in Section 2.2, research on the U.S. electricity sector and Australian NEM found significant supply-side efficiencies in integrated firms, with the cost savings of self-supply rather than purchasing electricity at wholesale prices a key driver of efficiencies:[40]

    48.1. An integrated firm's cost base is its cost of self-supply, which is the cost to which its profit margin is added when setting its retail prices. Separated retailers, by contrast, add a retail profit margin to wholesale prices, which already reflect the generation profit margin added by generators, and thus add compounding margins.

49. These conclusions are supported by theoretical analysis of electricity system behaviour when some firms are integrated but others separated, and when wholesale trading is possible through both forward and spot markets:[41]

    49.1. Consistent with the elimination of double marginalisation, this analysis predicts that retail prices decrease as the extent of vertical integration rises, for a given number of generators and retailers;[42]

[39] For example, see Salop (2018), Baker et al. (2019), Kwoka and Slade (2020), Slade (2021).

[40] Kwoka (2002), Simshauser (2021).

[41] Meade (2012). As discussed in Gugler et al. (2013), the elimination of double marginalisation is less a consideration when firms adopt non-linear pricing, such as when they charge both fixed and variable tariffs (two-part tariffs, of 2PTs). However, while such pricing is common in the transmission and distribution parts of electricity sectors, linear pricing remains common in wholesale and retail markets. Kühn and Machado (2004) provide evidence from the Spanish electricity system that integrated firms jointly maximise generation and retail profits in practice, as is assumed in Meade (2012), and even do so despite being legally separated.

[42] Brown and Sappington (2021) likewise predict that vertical integration in electricity sectors leads to lower retail prices.

49.2. Furthermore, if all firms are integrated, this produces the same retail pricing benefits as if there was another upstream generator in the sector (i.e. full integration can be thought of as a form of synthetic additional generation).

Conclusions on Vertical Integration and Double Marginalisation

50. The above discussion points to the elimination of double marginalisation as being an important source of efficiencies of vertical integration, including in electricity systems. This means that separating gentailers – unless efficient alternatives for achieving vertical coordination are available (see Section 4.4) – can re-introduce double marginalisation, to the detriment of consumers:

50.1. Furthermore, such vertical separation could result in the additional loss of supply-side and risk management efficiencies as summarised above;

50.2. For separation to benefit consumers, there would need to be significant countervailing benefits to compensate for the loss of such efficiencies.

2.5 Improved Investment

Channels via which Vertical Integration can affect Investment

51. Vertical integration can result in increased investment levels via multiple channels. One obvious channel is through reducing risk and increasing credit scores, as mentioned above. This makes investment more viable, and improves access to finance.

52. Another key channel is by resolving possible "hold-up" risks, where either of the upstream or downstream firms makes investments that have value tied to their relationship with the other firm. After such specific investments are made, the investing party faces the risk that its counterparty reneges on providing the returns they promised and which made the investment viable. The investing party reduces or withholds its investment if it anticipates such hold-up risk, resulting in both parties suffering inferior outcomes:[43]

52.1. An example of such hold-up in electricity systems was offered in Section 2.3 – separated retailers entering into long-term supply contracts that generators rely on to finance long-term generation investments face an incentive to renege on those

[43] For example, see Joskow (2010).

contracts if wholesale prices fall and their contract prices turn out to be uncompetitive;

52.2. This is because they face the threat of competing retailers that can purchase their electricity at lower supply prices stealing their customers by being able to offer lower retail prices.

53. This risk is resolved if the two firms are jointly owned – i.e. vertically integrated – and more efficient investment levels can be realised:[44]

53.1. Similarly, vertical integration better supports investments involving spillover effects from one firm to the other, since the integrated firm enjoys all those spillover benefits;

53.2. Conversely, separated firms would likely underinvest in such cases, since they take into account only the investment benefits they enjoy themselves.

Impacts of Vertical Integration on Investment in Electricity Systems

54. Looking more specifically at the possible impacts of vertical integration on investment in electricity sectors:

54.1. Simulations using data from Australia's NEM found that integration was associated with an 83% reduction in earnings volatility, a 26% increase in credit quality, and a 34% increase in profits – with separated firms unable to sustain investment grade metrics, while integrated firms did so in all years simulated. These results point to integrated firms being better able to finance investments;[45]

54.2. Likewise, integrated electric utilities in the U.S. are less risky than firms relying on long-term contracts, with potential benefits in terms of reduced cost of capital (i.e. better ability to finance investments);[46]

54.3. The lack of reliable long-term contracts in electricity markets raises investment risks to generators, encouraging integration to improve access to finance;[47]

[44] Salop (2018).

[45] Simshauser et al. (2015), Simshauser (2021).

[46] Michaels (2006).

[47] Newbery (2002).

54.4. Incompleteness in contracts markets has been implicated as contributing to the financial failure of many separated generation investors;[48] and

54.5. Theoretical studies of investment in electricity systems predict that integration is associated with both greater upstream (i.e. generation capacity) investment than vertical separation, and improved consumer outcomes.[49]

Conclusions regarding Vertical Integration and Investment in Electricity Systems

55. The superiority of vertical integration (supported by contracting) for risk management in electricity systems – relative to contracting alone – points to vertical integration offering advantages over separation in terms of supporting investments, especially in generation:

55.1. These advantages stem from both the better risk-management that integration provides over reliance on contracting, but also from strategic considerations.[50]

56. Together with the conclusions from earlier sections, this means that vertical integration in electricity systems is associated with better supply-side coordination, risk management, resolution of vertical pricing inefficiencies (elimination of double marginalisation), and improved incentives and capacity for investment.

2.6 Reduced Incentives to Exploit Wholesale Market Power

57. Last, but not least, vertical integration is commonly associated with reduced incentives for firms to exercise pre-existing market power, especially on wholesale markets. This is in addition to integrated firms resolving double marginalisation and optimally choosing to set lower retail prices than would prevail under vertical separation.

58. Because integrated firms effectively pre-commit a share of their output to supply their own retail customers, this reduces the output capacity they have to trade on wholesale

[48] Meade (2005), Joskow (2006), Meade and O'Connor (2011), Simshauser (2021).

[49] Meade (2011), Brown and Sappington (2021). Boom and Buehler (2020) predict that integrated firms over-invest in capacity so as to avoid having to make costly purchases on wholesale markets to meet retail supply commitments. They find that separation is preferred as a consequence, though speculate that this might not hold with more than two upstream firms (as is common in most liberalised systems). Brown and Sappington point to these predictions also resting on an assumption that brownouts are required to ensure supply-demand balance, which is typically not the case in practice.

[50] Unlike Brown and Sappington (2021), Meade (2011) does not allow for uncertainty in firms' investment decisions, thus isolating strategic incentives for integrated and separated firms to invest.

markets. Moreover, their net capacity for wholesale trading could in fact be negative – i.e. they are net buyers on wholesale markets, not net sellers.

59. Multiple studies show that it is this *net* wholesale positions of integrated firms that affects their incentives to exercise market power on wholesale markets. If this net position is positive – i.e. they are net sellers – then integrated firms face incentives to increase wholesale prices:

    59.1. But this incentive is less than that they would face if their entire output needed to be sold on wholesale markets;

    59.2. Conversely, if an integrated firm's net position is negative, they are net buyers, and if anything would seek to use their market power to reduce wholesale prices.

60. More specifically:

    60.1. Multiple empirical studies from U.S. electricity systems and the Spanish electricity sector demonstrate that integration is associated with less exercise of market power than separation, and wholesale prices that are closer to competitive levels.[51]

    60.2. Wholesale prices can be higher or lower than competitive levels under integration. This is because integrated firms can exercise their market power as both buyers and sellers on the wholesale market[52] – firms exercising market power on only one side of the market would cause prices to deviate from competitive levels in one direction only;

    60.3. Theoretical modelling predicts that vertical separation is worse for total welfare in electricity systems even when integration is associated with raising rivals' costs. Conversely, integration is predicted to substitute for extra competition (i.e. is procompetitive);[53] and

    60.4. Other theoretical work predicts that wholesale prices can be lower under integration,[54] and can achieve competitive levels if firms are integrated and neither

[51] Bushnell and Saravia (2002), Kühn and Machado (2004), Mansur (2007), Bushnell et al. (2008).

[52] Kühn and Machado (2004).

[53] Meade (2011), measuring welfare as total surplus – i.e. consumer surplus plus industry profits.

[54] Bushnell et al. (2014).

net buyers nor net sellers (i.e. have balanced positions between generation and retailing) on spot wholesale markets.[55]

61. This latter theoretical work further predicts that separated generators always have an incentive to exercise market power and over-report their wholesale prices:

    61.1. Integrated generators only have an incentive to do so if they are net sellers, such as might arise with the entry of non-integrated retailers (i.e. non-integrated retail entry could lead to *increased* wholesale prices); and

    61.2. Integrated firms that are net buyers (e.g. due to the presence of separated generators) face an incentive to *under*-report their wholesale prices, which serves to reduce wholesale prices.

62. In conclusion, vertical integration not only results in improved retail pricing for consumers. It also reduces incentives for firms to exercise market power on wholesale markets, thus resulting in lower wholesale prices than under vertical separation:

    62.1. The implications of this for large electricity consumers who purchase electricity on wholesale markets are discussed further in Section 3.3.

[55] Hogan and Meade (2007).

3. Anticompetitive Effects of Vertical Integration

3.1 Overview

63. Vertical integration can lead to both competitive benefits as well as competitive harms.[56] Having discussed the benefits of vertical integration in the previous section, the focus in this section is on possible anticompetitive harms.

64. The following possible anticompetitive effects of vertical integration are considered:

    64.1. Foreclosure and entry barriers;

    64.2. Raising rivals' costs; and

    64.3. Incentives to coordinate with rivals.

65. Each is discussed in turn.

3.2 Foreclosure and Entry Barriers

What is Meant by Foreclosure?

66. A vertically integrated firm can naturally choose to only trade with its own affiliate. This is particularly the case where it makes specific investments that enhance the value of being vertically integrated.

67. When integrated firms choose not to supply non-affiliated rivals, this leads to two types of refusal to supply, or "foreclosure":[57]

    67.1. Input foreclosure – where an integrated firm refuses to supply an input to a downstream rival; or

    67.2. Customer foreclosure – where an integrated firm refuses to purchase an input from an upstream rival.

68. Foreclosure is often highly visible, and it means that it can be difficult for vertically separated firms to compete with the integrated firm:

[56] Salop (2018).

[57] Lafontaine and Slade (2007), Salop (2018).

68.1. Where the separated firm is a potential entrant, foreclosure therefore also represents a form of entry barrier.[58]

69. Because of its visibility and apparent competitive harms, foreclosure by integrated firms often attracts attention from policymakers and regulators, including calls by affected separated firms for integrated firms to be vertically separated so as to encourage greater competition:

69.1. Such calls are further encouraged by evidence that foreclosure can arise in practice.[59]

Reasons Why Foreclosure by Vertically Integrated Firms Need Not Raise Competition Concerns

70. However, despite this apparently damning evidence of anticompetitive conduct by vertically integrated firms:

70.1. There is a significant body of evidence demonstrating that the benefits of vertical integration (as discussed in Section 2) typically outweigh the harms arising from foreclosure;

70.2. Vertical separation offers no guarantee that foreclosure will not occur, and in electricity markets centralised dispatch determines which buyers are supplied by which sellers – and generators can be required by regulation to sell a certain amount of their output via forward contracts – making it harder for integrated firms to foreclose separated retailers in those markets in any case;[60] and

70.3. A natural solution for separated firms facing foreclosure is for them to vertically integrate themselves.

Vertical Integration Can be Beneficial Even when Foreclosure Arises

71. As to the former, prominent reviews of the literature on vertical integration feature conclusions such as:

[58] Salop (2018).

[59] For example, see the empirical studies summarised in Table 15 of Lafontaine and Slade (2007).

[60] Mansur (2007). With effect from February 2020, New Zealand's Electricity Industry Participation Code has provided for mandatory market making in forward contracts.

> "Much of the empirical evidence with respect to foreclosure … [finds] evidence that it exists. However, in spite of this fact, efficiencies often dominate so that the net effect of a vertical merger [i.e. allowing vertical integration] is positive."[61]
>
> "[E]xistence of foreclosure is, by itself, insufficient to conclude that vertical integration is pernicious. Indeed, … there are two countervailing factors associated with vertical mergers: an increase in foreclosure … and a lessening of double marginalization. … [studies that attempt to assess this trade-off] conclude that efficiency gains outweigh foreclosure costs."[62]

72. Indeed, vertical integration is even predicted to be more procompetitive under full foreclosure if the industry is otherwise more concentrated,[63] and the forcible foreclosure of integrated firms from the spot wholesale market (requiring them to trade in forward markets only) can result in increased consumer welfare:[64]

    72.1. In any case, the conditions in which vertical integration is predicted to be firms' preferred strategy in electricity sectors are the same conditions in which integration is predicted to lead to lower retail prices, higher capacity investments, and improved consumer surplus;[65] and

    72.2. Vertical separation is predicted to be worse for total welfare in electricity systems even when integration is associated with foreclosure, whereas integration is predicted to substitute for extra competition (i.e. is procompetitive).[66]

73. This implies that if vertical integration raises competition concerns – and the discussion in Section 2.6 indicates there is reason to expect it shouldn't – those concerns should be greater if the integrated firm already has many separated rivals (i.e. faces more intense retail market competition):

    73.1. In such circumstances, theoretical studies indicate that vertical integration is less likely to be firms' preferred strategy in any case.[67]

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[61] Slade (2021, pp 498-499).

[62] Lafontaine and Slade (2007, p. 673).

[63] Loertscher and Reisinger (2014).

[64] Meade (2014).

[65] Brown and Sappington (2021).

[66] Meade (2011), measuring welfare as total surplus – i.e. consumer surplus plus industry profits.

[67] Gaudet and Van Long (1996) and Meade (2012) predict that vertical integration in industries with only two upstream firms is those firms' preferred strategy provided they face only a small number of separated

Vertical Separation Can Lead to Similar or Worse Harms

74. These conclusions are only reinforced by considering the consumer impacts of policies forcing vertical separation of integrated firms – so-called "divorcement" or "unbundling":

    74.1. A prominent survey of divorcement studies indicates that consumers either faced higher prices and lower service levels, or at best enjoyed no difference in outcomes.[68]

75. Regarding the possibility of foreclosure arising under vertical separation:

    75.1. This has been demonstrated theoretically in cases where foreclosure occurs over time;[69] and

    75.2. Separated firms can have incentives to foreclose separated rivals if they replicate the vertical coordination benefits of vertical integration through other means (see Section 4.4 for further details of how they might do so).

76. More particularly, multiple empirical studies from U.S. electricity systems and the Spanish electricity sector demonstrate that:

    76.1. Vertical separation is associated with increased exercise of market power on wholesale markets;[70] and

    76.2. Conversely, integration is associated with less exercise of market power than separation, and wholesale prices that are closer to competitive levels.[71]

Thin Forward Contract Markets Can Reflect Retail Competition rather than Foreclosure

77. In any case, if forward contracts markets in electricity systems are not deep, this is not necessarily an indication of foreclosure. It can instead be a reflection of the fundamental

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downstream rivals. Once the number of downstream firms becomes sufficiently large, only some firms choose to integrate, and eventually all firms prefer to be separated when downstream competition is sufficiently intense. Meade (2018) hypothesises that integrated firms might choose to separate if retailing came to be dominated by a strong, disruptive entrant (such as a "Big Tech" firm).

[68] Lafontaine and Slade (2007).

[69] Fumagalli and Motta (2020).

[70] Joskow and Kahn (2002), Mansur (2007), Bushnell et al. (2008).

[71] Bushnell and Saravia (2002), Kühn and Machado (2004), Mansur (2007), Bushnell et al. (2008).

misalignment of contract preferences of separated generators and retailers, as discussed in Section 2.3:

77.1. This means that highly competitive retailing – rather than foreclosure due to vertical integration – can be a reason for forward contract markets being thin.

Integration by Separated Firms Can Mitigate Foreclosure Concerns

78. Finally, foreclosure becomes less of a concern if the separated firms themselves vertically integrate, since they no longer rely on input supply or customer demand from their integrated rival:[72]

78.1. Indeed, integration might give rise to foreclosure while overcoming foreclosure by integrated rivals that existed pre-integration.[73]

79. Theoretical studies predict that vertical integration in industries with only two upstream firms is those firms' preferred strategy, provided they face only a small number of separated downstream rivals:[74]

79.1. More particularly, when there are an equal number of upstream and downstream firms, integration is firms' preferred strategy provided there are not many upstream-downstream pairs of firms to integrate.[75]

80. These incentives to integrate arise despite the fact that integration has the consequence of producing *lower* total industry profits – i.e. the integrating firms would enjoy higher profits by remaining separated:

80.1. However, firms in vertical industries can face a prisoner's dilemma that induces them each to integrate – this is because their profits would be lower still if they failed to integrate when their rivals do.[76]

Conclusions regarding Vertical Integration and Foreclosure

81. In conclusion, this literature demonstrates that foreclosure by vertically integrated firms can be a genuine consequence of integration. However, this is less of an issue in electricity

[72] Joskow (2010), Salop (2018).

[73] Slade (2021).

[74] Gaudet and Van Long (1996), Meade (2012).

[75] Gaudet and Van Long (1996).

[76] Gaudet and Van Long (1996), Meade (2012).

markets where centralised dispatch determines which firms supply which customers, side-stepping the issue of foreclosure in those particular markets:

81.1. In any case, foreclosure can also arise under separation, and thin forward contract markets can reflect retail-level competition rather than apparently anticompetitive strategies by integrated firms.

82. More fundamentally, even when integration is associated with foreclosure, vertical separation is associated with worse consumer outcomes, because integration results in significant countervailing benefits:

82.1. Since those benefits – notably, but not exclusively, the elimination of double marginalisation – are generally significant but relatively difficult to observe and measure, this calls for considerable care when considering the merits of mandating vertical separation in sectors that are already vertically integrated.

3.3 Raising Rivals' Costs – Including Wholesale Price and Large Consumer Impacts

83. Instead of foreclosing its rival, a vertically integrated firm may have an incentive to increase the wholesale supply price it offers to non-integrated downstream rivals. Since that wholesale price is the non-integrated rival's input cost, by raising the wholesale price the integrated firm can raise its rival's costs:

83.1. Such a "raising rivals' cost" strategy makes the separated downstream firm a weaker competitor to the integrated firm's downstream affiliate (which enjoys a lower supply cost, being the price at which its upstream affiliate can procure or manufacture the relevant good).

84. In this scenario the integrated firm finds it more profitable to supply its separated downstream rival at a high wholesale price than it does to completely refuse to supply (i.e. foreclose) that rival. This can even involve the integrated firm going so far as to be a net *buyer* on upstream markets, rather than a net seller.[77]

85. If a vertically separated industry has already been able to eliminate double marginalisation through means other than vertical integration (see Section 4.4 for possible approaches), then allowing vertical integration can lead to increased retail prices, hurting consumers:[78]

[77] Gaudet and Van Long (1996), Meade (2012, 2014).

[78] Lafontaine and Slade (2007).

85.1. Conversely, if vertical integration is required to eliminate double marginalisation, then the ultimate effect of the raising rivals' cost strategy on consumers is ambiguous – it depends on whether the gains to consumers from the integrated firm eliminating double marginalisation outweigh the cost to consumers of the separated downstream firm having to pay a higher input price.

86. While there are studies demonstrating that integrated firms can indeed engage in raising rivals' costs, they are confined to detecting impacts on upstream wholesale prices, and do not assess whether retail level prices leave consumers worse or better off as a consequence of vertical integration:[79]

86.1. Of greater relevance, theoretical studies which also consider the consumer welfare impacts of vertical integration in the presence of raising rivals' costs find that integration can still be welfare maximising.[80]

87. Indeed, with sufficient access to forward contracts, separated retailers can effectively neutralise and even profit from integrated firms' strategy of raising rivals' costs. They can do so by strategically buying more forward supply than they need for their retail supply, and selling their surplus energy on the spot wholesale market, effectively profiting from the higher spot wholesale prices caused by raising rivals' costs:[81]

87.1. In this case, integrated firms engaging in raising rivals' costs do so for *defensive* reasons – their profits are lower if they fail to do so, given the competition they face from separated retailers being able to be net sellers on the spot wholesale market;

87.2. In situations where raising rivals' costs arises, this countervailing retailer strategy can result in consumer gains – specifically, when there are sufficiently many upstream firms with a sufficiently high level of integration, or when there are sufficiently few downstream firms (another example of how *less* intense retail competition can have benefits for consumers, subject to how the rest of the sector is configured);

[79] For example, Hastings and Gilbert (2005), Normann (2011).

[80] For example, Meade (2012, 2014).

[81] Meade (2012, 2014).

87.3. However, consumers gain even more if the integrated firm is *forcibly foreclosed* from the spot wholesale market – e.g. via regulation – since that eliminates both strategies.[82]

88. As discussed in Sections 2.6 and 3.2, multiple empirical studies from U.S. electricity systems and the Spanish electricity sector demonstrate or predict that:

88.1. Vertical separation is associated with increased exercise of market power on wholesale markets;[83] and

88.2. Integration is associated with less exercise of market power than separation, and wholesale prices that are closer to competitive levels.[84]

89. In summary, empirical and theoretical studies for electricity sectors point to vertical separation being associated with higher wholesale prices than would arise under vertical integration:

89.1. This is despite integrated firms facing incentives, in some cases at least, to foreclose their rivals, or raise their rivals' costs.

Impacts of Vertical Integration on Wholesale Electricity Consumers and Total Welfare

90. The literature surveyed above indicates that raising rivals' costs can indeed be associated with vertical integration. However, where it does arise, it is not necessarily anticompetitive in effect, and wholesale electricity prices in particular can be lower than under separation.

91. Moreover, as per the foreclosure discussion, vertical separation can be associated with worse harms. Importantly, this is not only the case from the perspective of retail consumers, it also applies to wholesale customers – e.g. large industrial consumers who purchase directly from the wholesale markets (forward or spot).

[82] Meade (2014). Conversely, limiting the ability of separated retailers to strategically overbuy on forward wholesale markets can hurt consumers. This is because it stops separated retailers from forward buying when consumer welfare would be higher if they bought even more forward than they privately wish to (Powell (1993), Meade (2012, 2014)).

[83] Joskow and Kahn (2002), Mansur (2007), Bushnell et al. (2008).

[84] Bushnell and Saravia (2002), Kühn and Machado (2004), Mansur (2007), Bushnell et al. (2008).

92. The author is not aware of specific studies gauging the impacts on direct wholesale consumers of vertical integration and vertical separation. Doing so from a total welfare perspective would require an assessment of whether increased electricity sector profits (such as might arise if higher wholesale prices arise), and associated electricity retail customer welfare, are higher or lower than the impact of higher wholesale prices on the profits and retail customer welfare of the affected large electricity consumers:

    92.1. This means *higher* wholesale electricity prices may or may not be harmful from a *total* welfare perspective.

93. Conversely, if vertical integration is associated with *lower* wholesale electricity prices as the discussion above indicates it will be, then this is more likely to be unambiguously associated with higher total welfare:

    93.1. This is because both retail and wholesale electricity consumers, and the retail customers of large electricity consumers, would benefit from such lower prices.[85]

94. There have been a number of studies estimating whether excess profits are being enjoyed by power companies selling into New Zealand's wholesale electricity markets, concluding that significant excess profits have been made.[86] However, these studies compare the profits being enjoyed by *imperfectly* competitive firms, necessarily operating in industries exhibiting significant scale economies, with those that would be generated in a *perfectly* competitive industry:

    94.1. Since perfect competition would not enable power companies to recover their large fixed costs, this counterfactual is notional rather than realistic.

95. Of greater relevance for this study, these studies of the New Zealand wholesale electricity market do not examine whether vertical integration produces higher or lower wholesale profits and prices than vertical separation:

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[85] The only reason why this might not be the case is if vertical integration in electricity systems results in a fall in electricity firm profits that is sufficient to outweigh the gains to electricity consumers and the customers of large electricity consumers. As mentioned in Section 3.2, there are conditions under which electricity firms might find it preferable to integrate even though this reduces their profits, namely when failing to do so reduces their profits even more if their rivals integrate.

[86] For example, Wolak (2009), Poletti (2021). The Wolak study has received considerable analysis, including a criticism that it overstates integrated firms' incentives to exercise market power on the wholesale market (Hogan and Jackson (2012)).

95.1. As such, they shed no light on whether large electricity consumers benefit from, or are harmed by, vertical integration in the New Zealand electricity sector;

95.2. Moreover, since these studies do not consider retail market outcomes, they also shed no light on whether vertical integration is better or worse than separation for retail electricity consumers.

96. Hence, the most that can be said based on existing research about the impacts of vertical integration on large wholesale electricity consumers is that despite the incentive for integrated firms to engage in a raising rivals' costs strategy on wholesale markets, this is more likely to be associated with *lower* higher wholesale prices than under vertical separation.

97. Indeed, U.S. evidence is consistence with this, suggesting that if retail electricity prices are inflexible, separation is associated with both higher wholesale prices and lower retailer profits:

97.1. This is because separated generators exercise greater market power than integrated firms, increasing wholesale prices and enjoying greater profits at the expense of separated retailers,[87] and of large electricity consumers too;

97.2. As noted above, however, this does not mean that total welfare is necessarily lower as a consequence, though integration – through lowering wholesale prices relative to separation – should be expected to increase the welfare of both large and retail electricity consumers, as well as the welfare of the consumers of products produced by large electricity consumers.

3.4 Incentives to Coordinate with Rivals

98. The foreclosure and raising rivals' costs strategies discussed above are examples of *unilateral* anticompetitive conduct that individual integrated firms might engage in. The vertical integration literature also points to the possibility that vertical mergers (i.e. the formation of integrated firms) make it more likely that firms operating in the upstream part of a sector might cooperate/coordinate or collude to increase firms' profits:[88]

[87] Mansur (2007).
[88] For example, see Nocke and White (2007, 2010), Normann (2009), Nishiwaki (2016), Salop (2018).

98.1. Section 3.3 referred to studies of excess profitability in New Zealand's wholesale electricity markets – those studies refer to *unilateral* anticompetitive conduct, and as noted in that section, they do not address the impact of vertical integration on excess profitability, which is the focus of relevance to this study.

99. An incentive for integrated firms to collude can arise because a vertical merger gives rise to two offsetting effects. On the one hand, it means there are fewer non-integrated downstream firms available for a collusive upstream firm to sell to if it decided to cease acting collusively:

99.1. This serves to make collusion at the upstream level more sustainable, since it reduces the returns to a firm that abandons collusion;

99.2. On the other hand, an integrated firm remains more profitable than a separated upstream firm if it abandons collusion and the remaining collusive firms try to punish it by acting more competitively. This serves to make upstream collusion less sustainable, since it reduces the penalty faced by a firm that ceases colluding.

100. Under fairly general conditions, theoretical studies show that the former effect dominates for the first pair of integrating firms. This means that the first vertical merger in an industry facilitates collusion:

100.1. However, the impact of multiple vertical mergers occurring in an industry has ambiguous effects on collusion incentives;[89] and

100.2. If the upstream and downstream firms are of different sizes, integration with a larger downstream firm facilitates collusion more than integration with a smaller downstream firm does.[90]

101. That said, it has long been recognised that vertically s*eparated* firms can have incentives not shared with integrated firms to engage in anticompetitive behaviours. For example, separated upstream firms can strategically delegate pricing decisions to independent downstream firms that have market power:

101.1. Since one downstream firm setting higher prices can induce another downstream firm to follow suit (prices are often described as being strategic complements), this

[89] Nocke and White (2007), Normann (2009).

[90] Nocke and White (2010).

results in higher retail prices than under vertical integration;[91] Separated upstream firms can even have incentives to collude when they compensate downstream firms for collusion.[92]

102. Hence, while vertical integration can have important benefits that protect against certain kinds of unilateral anticompetitive conduct, it can also give rise to cooperative/coordinated or collusive conduct with the potential to harm consumers. However, vertical separation can also give rise to such conduct:

    102.1. The best available evidence on anticompetitive conduct in New Zealand's wholesale electricity markets is for unilateral conduct, not coordinated conduct;[93]

    102.2. As noted above, that evidence sheds no light on whether vertical integration increases or reduces the incidence of such conduct.

3.5 Conclusions on Anticompetitive Effects of Vertical Integration

103. The literature surveyed above highlights that vertical integration can be associated with certain, apparently anticompetitive strategies, such as unilateral foreclosure or raising rivals' costs, and coordinated conduct. In electricity sectors this is potentially less the case, for foreclosure at least, in markets in which centralised dispatch determines which producers supply which consumers.

104. Despite this, however, integration is not associated with higher wholesale prices than separation. Both evidence and theory – including specifically for electricity sectors – points to integration being associated with lower wholesale prices, and otherwise being pro-competitive:

    104.1. This benefits not just retail electricity consumers, but also large wholesale consumers;

    104.2. Conversely, vertical separation is predicted – and found – to be associated with worse retail and wholesale outcomes. This includes for separated retailers – the very companies that might be expected to benefit from separation.

[91] Lafontaine and Slade (2007).

[92] Gu et al. (2019).

[93] Wolak (2009), Poletti (2021).

105. To conclude, according to a prominent survey of possible anticompetitive effects of vertical integration:[94]

> "Most studies find evidence that vertical restraints/vertical integration are procompetitive … This efficiency often is plausibly attributable to the elimination of double-markups or other cost savings … Instances where vertical controls were unambiguously anticompetitive are difficult to find. … Empirical analyses of vertical integration and control have failed to find compelling evidence that these practices have harmed competition, and numerous studies find otherwise. … virtually no studies can claim to have identified instances where vertical practices were likely to have harmed competition."

[94] Cooper et al. (2005, p. 658).

4. Net Consumer Impacts of Vertical Integration, and Vertical Separation

4.1 Overview

106. The preceding two sections respectively discuss the benefits and possible harms of vertical integration from the perspective of consumers. Vertical integration is commonly associated with a range of potentially anticompetitive effects. However, it is also associated with certain significant – if sometimes less obvious – benefits.

107. This section builds on the conclusions of the previous two by considering studies on the net consumer impacts of vertical integration, taking into account both its benefits and harms.

108. It then discusses evidence on the consumer impacts of policies mandating vertical separation. Finally, it discusses how the benefits of vertical integration might be achievable through other means, such as through the use of sophisticated contracting approaches.

4.2 Net Consumer Impacts of Vertical Integration

Net Consumer Benefits of Vertical Integration in General

109. Summarising the preceding two sections:

    109.1. Vertical integration gives rise to benefits including improvements in supply-side coordination, risk management and investment, as well as the elimination of double marginalisation, and reduced incentives to exercise wholesale market power;

    109.2. On the other hand, it can give rise to apparently anticompetitive harms like foreclosure, raising rivals' costs, and increased incentives to collude, although theory and evidence for electricity sectors suggests this is not reflected in worsened wholesale market outcomes (relative to vertical separation).

110. On balance, the consumer benefits of vertical integration – where it naturally arises – are often predicted or found to be sufficient to outweigh its costs. Indeed, prominent reviews of vertical integration studies include conclusions such as:

> "We are … somewhat surprised at what the weight of the evidence is telling us. It says that, under most circumstances, profit maximizing vertical-integration decisions are efficient, not just from the firms' but also from the consumers' points of view. Although there are isolated studies that contradict this claim, the vast majority support it. Moreover, even in industries that are highly concentrated so that horizontal considerations assume substantial importance, the net effect of vertical integration appears to be positive in many instances. We therefore conclude that, faced with a vertical arrangement, the burden of evidence should be placed on competition authorities to demonstrate that that arrangement is harmful before the practice is attacked. Furthermore, we have found clear evidence that restrictions on vertical integration that are imposed, often by local authorities, on owners of retail networks are usually detrimental to consumers. Given the weight of the evidence, it behooves government agencies to reconsider the validity of such restrictions."[95] [emphasis added]

> "There is a large body of work that evaluates the effects of vertical integration. … That work tends to show that vertical integration is efficient."[96]

> "[T]here is little empirical support for the antitrust law's traditional suspicion of and hostility toward vertical integration and related nonstandard vertical contractual arrangements except under extreme conditions where firms controlling bottleneck monopoly facilities have the incentive and ability to exercise an anticompetitive foreclosure strategy."[97] [emphasis added]

111. More particularly, there is a dearth of studies demonstrating consumer harm from vertical integration. On the contrary, where consumer impacts of vertical integration are evaluated, they commonly find statistically significant consumer benefits,[98] or in the rare studies identifying consumer harms, they are statistically insignificant.[99]

112. Notably, these findings that vertical integration is typically beneficial to consumers arises despite other trade-offs associated with integration. In particular, trading through markets is typically associated with higher market trading and coordination costs than is managing activity within integrated firms, but it is also associated with stronger performance

[95] Lafontaine and Slade (2007, p. 680).

[96] Slade (2021, p. 495).

[97] Joskow (2010, p. 586). Bottleneck monopoly facilities include transmission grids, and distribution networks, which are not the focus of this study.

[98] For example, see Crawford et al. (2018), or the studies surveyed in Table 16 of Lafontaine and Slade (2007).

[99] For example, see Luco and Marshall (2020), noting that this study relates to a multiproduct industry, not a homogeneous good industry like electricity sectors.

incentives. Conversely, organising activity within integrated firms economises on market trading and coordination costs, but often involves weaker performance incentives:[100]

112.1. The conclusions set out above point to vertical integration being typically net beneficial to consumers even when these additional incentive costs associated with vertical integration are taken into account.

Net Consumer Benefits of Vertical Integration in Electricity Systems

113. The strong conclusions stated above relate to a wide range of sectors, not electricity sectors specifically. They are echoed, however, in multiple theoretical studies on the impact of vertical integration in electricity sectors.[101] For example:

113.1. Retail electricity prices are predicted to be lower under vertical integration than vertical separation;[102]

113.2. Retail electricity consumers are predicted to be strictly better off as the level of vertical integration rises, given the number of upstream and downstream firms;[103]

113.3. Retail electricity consumers benefit from having more upstream firms, with full integration being equivalent in consumer welfare terms to having an extra upstream generator;[104] and

113.4. Retail prices are higher under separation than either full integration (i.e. each retailer responsible for supplying its own load) without a wholesale market, or integration with perfectly balanced wholesale and retail market shares.[105]

114. As stated in Section 3, the strong conclusion from both empirical and theoretical studies of electricity sectors is that vertical integration is associated with better wholesale market outcomes than vertical separation:

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[100] For discussions of these trade-offs, see the overview in Joskow (2010), or a more detailed treatment in Holmstrom and Tirole (1991).

[101] For extensive evidence on the impact of separating generation and/or retailing from other parts of the sector, see Kwoka (2002), Michaels (2006), Meyer (2012a, b), Gugler et al. (2017).

[102] Meade (2012), Bushnell et al. (2014), Brown and Sappington (2021).

[103] Meade (2012).

[104] Meade (2012), and see also Meade (2011) for similar predictions.

[105] Hogan and Meade (2007).

114.1. This lends further weight to a presumption that vertical integration in electricity sectors will be beneficial to consumers too, certainly absent clear evidence that vertical separation is superior.

4.3 Consumer Impacts of Vertically Integrated Firms being Vertically Separated

Consumer Harms from Policies Intended to Benefit Consumers

115. The first of the three quotes given in Section 4.2 above refers to evidence on the consumer harms of restrictions being imposed on vertical integration. So-called "divorcement" (i.e. vertical separation, or vertical unbundling) policies have been implemented or contemplated across a range of sectors in various jurisdictions, requiring already integrated firms to divest either their upstream or downstream activities.

116. The impacts of such policies include:

116.1. The forced separation of petrol retailing from upstream activities has been found in a number of studies to result in *higher* retail petrol prices;[106]

116.2. *Increased* beer prices resulted with brewing separated from retailing;[107] and

116.3. Retail customers have not enjoyed improved prices in U.S. states where integrated utilities were separated in order to facilitate greater retail competition through the entry of separated retailers.[108]

117. Relatedly:

117.1. Simulations of restrictions on vertical integration (or long-term contracting with similar effects) in three U.S. electricity systems indicate marked *reductions* in welfare, due to significantly increased production costs;[109]

117.2. Reducing vertical integration in electricity systems is predicted to lower both investment and consumer welfare, and increase retail prices;[110] and

[106] Borenstein and Bushnell (2005), Lafontaine and Slade (2007), Eckert (2013), Noel (2016).

[107] Slade (1998).

[108] Su (2105).

[109] Bushnell et al. (2008).

[110] Meade, (2011, 2012).

117.3. As surveyed in Section 2.2, separating generation from retailing is associated with significant losses in vertical efficiencies, raising system-wide costs.

118. Given this evidence and these predictions on divorcement and other vertical separation policies, it is perhaps unsurprising that those policies have either not delivered their anticipated consumer benefits, or backfired and resulted in consumer harms:

118.1. While they have often been motivated by a desire to increase downstream competition by reducing foreclosure incentives, they have come at the cost of vertical integration benefits, such as by reintroducing double marginalisation, sacrificing supply-side coordination benefits, or distorting incentives for innovation and investment.

Salutary Experience of What Can Go Wrong in Electricity Systems Lacking Effective Vertical Coordination – The Californian Crisis of 2000/2001

119. Starting in June 2000, wholesale electricity prices in California climbed to unprecedented levels.[111] This reflected increased demand following a hotter-than-usual summer, reduced hydro reserves after a dryer-than-normal year, and steeply rising gas prices (affecting the cost of gas-based generation). The exercise of market power by generators was also implicated:

119.1. Soaring wholesale prices increased the supply costs of utilities that were obliged to serve retail customers at much lower regulated retail prices, causing them to incur substantial financial losses (amounting to millions of dollars each day), and leading to one of the state's three utilities filing for bankruptcy; and

119.2. The state government responded by purchasing electricity at inflated prices under 20 year supply contracts, burdening electricity consumers with high supply costs.

120. The impacts of soaring wholesale prices and low regulated retail prices were worsened by the vertical coordination arrangements – or lack of such arrangements – that had arisen as a consequence of California's electricity market restructuring:[112]

[111] For summary accounts and analyses, see Borenstein (2002), Joskow and Kahn (2002), Bushnell (2004), Evans and Meade (2005), Bushnell et al. (2008), Chao et al. (2008).

[112] Borenstein (2002), Bushnell (2004), Bushnell et al. (2008). Bushnell (2004) highlighted regulations mandating that utilities trade through spot markets, that any long-term contracts entered into by utilities

120.1. Partial vertical separation of the formerly fully-integrated power utilities was introduced as part of restructuring; and

120.2. The partially separated utilities and separated firms were deterred from entering into long-term contracts to manage the resulting exposure to wholesale price risks.

121. California's restructuring crisis – due to a lack of both vertical integration and access to adequate contracting to manage wholesale price risks – illustrates the perils that can arise in liberalised electricity systems without effective vertical arrangements:

121.1. If vertical integration is to be unwound through mandated vertical separation, it may also be necessary to also preclude alternative vertical coordination mechanisms like contracting if the aim is to frustrate outcomes associated with vertical integration;

121.2. In that case, however, it is necessary to fully consider whether precluding vertical coordination in general will be beneficial or harmful to consumers, with the Californian experience a sobering illustration of what could go wrong.

122. This is well put into perspective by the following quote:[113]

> "The argument for vertical integration [of all activities] in the electricity industry and also the argument for restructuring based on unbundling of its products and organizations in favor of market mechanisms [i.e. full vertical separation complemented by contracting] are both deficient. The notion that all is needed is unbundling of the electricity supply chain and establishment of efficient short-term trading institutions, while long-term contracting and markets for financial risk management instruments will emerge spontaneously, was naïve. In retrospect, cost-of-service regulation and vertical integration of generation and retail service continues to be a powerful means of risk diversification. The extremes of vertical integration [of all electricity system activities] and liberalized markets [i.e. full vertical separation supported by contracting] are inferior to a balanced mixture of the two approaches [i.e. to some degree of vertical integration complemented by contracting]." [emphasis added]

Conclusions on Vertical Separation in Electricity Systems

123. The literature surveyed above clearly points to:

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might be struck down if they subsequently failed prudential reviews, and that the risk of long-term contracts being struck down would be borne by utilities' shareholders.

[113] Chao et al. (2008, p. 63).

123.1. Vertical integration being a key ingredient of electricity industry organisation; and

123.2. Electricity consumers facing costs and risks if already-integrated generator-retailers are required to vertically separate, whether or not those firms are deterred from entering into contracting arrangements to manage the consequential wholesale price risks (given those contracts are at best imperfect substitutes for integration, as discussed in Section 2.3).

4.4 Achieving Vertical Coordination by Other Means

Forward Contracting to Replicate Some of the Risk Management and Pro-Competitive Effects of Integration

124. The discussions in Sections 2.3 and 4.3 point to forward contracting being an imperfect substitute for vertical integration in managing the severe price risks that arise in wholesale electricity markets. There are other senses, however, in which forward contracting can replicate at least some of the benefits of integration.

125. In particular, there is a well-established literature showing that forward contracting tends to be procompetitive, replicating the benefit of integration in reducing incentives for firms to exercise market power in spot wholesale markets (as discussed in Section 2.6):[114]

125.1. By committing themselves to a certain level of production through forward contracts, firms have less incentive to try to raise prices on later (e.g. spot) markets; and

125.2. Competing firms will tend to do so, even though this reduces their profits. This is because they face an even worse fall in profits if their rivals gain a first-mover advantage by contracting forward when they don't, leaving a firm that fails to contract forward a weaker competitor in later trade.

[114] Meade (2012) provides a review. The first contribution in this literature is Allaz and Vila (1993). An early example of one of the rare exceptions to this result is Mahenc and Salanié (2004), though the results in Kreps and Scheinkman (1983) suggest that Mahenc and Salanié's assumed mode of competition is unlikely to be relevant where firms' capacity investments are important, as in electricity sectors. Likewise, Willems et al. (2009) find empirical support from electricity markets for the mode of competition assumed in Allaz and Vila, and predicted by Kreps and Scheinkman.

126. This finding has also been reproduced for electricity markets,[115] with a general consensus emerging that forward contracting reduces the exercise of market power by electricity generators:[116]

    126.1. This points to how contracting can reproduce some of the pro-competitive benefits of vertical integration in electricity systems (even if it is less effective at reproducing its risk management benefits).

127. However, other studies point to situations in which forward contracting can in some cases be anticompetitive in electricity systems (e.g. depending on how contracts are allocated):

    127.1. This is due to peculiarities of electricity systems, such as capacity constraints in generation coupled with uncertain demand, or electricity firms of different sizes having differing abilities to influence prices;[117] and

    127.2. It means that forward contracting, at least with simple contracts of the sort commonly used in electricity markets (i.e. contracts for differences, or CFDs), need not always replicate the pro-competitive benefits of vertical integration in electricity systems.

More Sophisticated Contracting Required to Better Replicate the Benefits of Integration

128. Forward contracting is more likely to replicate the vertical coordination benefits of vertical integration if more sophisticated types of contracting are used. For example, instead of CFDs, contracts might involve both fixed and variable price components (so-called two-part tariffs, or 2PTs):[118]

    128.1. Like vertical integration, such sophisticated contracting is predicted to be superior to forward contracts in reducing double marginalisation and increasing supply chain efficiency in electricity systems;[119]

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[115] For example, Green (1999), Wolak (2000), Bushnell et al. (2008), Chao et al. (2008), Joskow (2008).

[116] For example, Joskow (2008).

[117] For example, Murphy and Smeers (2010), de Frutos and Fabra (2012).

[118] Other alternatives include contract clauses designed to induce separated downstream firms to price or supply at levels more closely resembling what would be achieved with vertical integration – such as through specifying maximum retail prices (retail price maintenance), or minimum sales quantities (quantity forcing).

[119] Oliveira et al. (2013).

128.2. However, while forward contracting can be beneficial in industries with either full separation or only some upstream-downstream pairs of firms integrated, it can be relatively less important if all such pairs are integrated.[120]

129. In theory at least, this discussion suggests that contractual arrangements might be implemented to replicate some or all of the benefits of vertical integration, at least in some circumstances, albeit only partially for electricity systems:[121]

129.1. Since difficulties in specifying contracts is often proposed as a key rationale for vertical integration,[122] contracting cannot in general be relied upon in all relevant circumstances to efficiently substitute for vertical integration as a solution to vertical coordination issues.

Is Vertical Integration Beneficial if Contracting can Replicate its Benefits?

130. However, supposing that vertical coordination benefits can be achieved through contracting and without vertical integration, it is relevant to ask whether vertical integration is necessary to achieve those benefits:

130.1. The fact that vertical integration is often adopted by firms instead of using contractual approaches indicates that, for firms at least, vertical integration is to be preferred in certain circumstances – the discussion in Section 2.3 points to deficiencies in contracting for risk management purposes being one such rationale.

131. This does not imply that consumers necessarily benefit just because firms might find vertical integration to be more efficient than contracting in at least some circumstances:

131.1. However, the fact that mandated vertical separations have resulted in net consumer harms (see Section 4.3) suggests that the incentives of firms and consumers are aligned in this regard, at least in those sectors where mandated separation has occurred; and

[120] Meade (2011).

[121] For example, see Lafontaine and Slade (2007), Joskow (2010), Owen (2011), Rey (2012), Salop (2018), Kwoka and Slade (2020), Haucap et al. (2020).

[122] For example, see Joskow (2010) or Owen (2011) for summaries of rationales for vertical integration.

131.2. The discussion in Section 3.2 indicates that the conditions in which firms find it preferable to vertically integrate are also those in which consumers benefit from vertical integration.[123]

132. As such, it is reasonable to presume that where vertical integration is observed, the firms involved find it more efficient than using contracting to resolve vertical coordination issues:

132.1. This does not preclude consumers benefitting from more refined vertical arrangements being implemented, but it does caution against upsetting existing vertical integration unless consumers can clearly be expected to benefit from any alternative arrangements.

Might Contracting Emerge to Frustrate any Attempts to Impose Vertical Separation?

133. If existing vertical integration is to be upset – e.g. through mandating vertical separation – then the efficacy of doing so might be undermined if contracting arrangements emerge to replicate at least some of the benefits of vertical integration. This is especially since those arrangements are likely to be less efficient than integration, given firms have already opted for integration over contracting:[124]

> "[I]n many cases theory suggests that firms with market power are able to obtain the same results with various forms of vertical restraints [i.e. sophisticated contracting] rather than integration. … [I]t is important to recognize that public policy aimed only at preventing vertical mergers [i.e. increased vertical integration] would prove ineffective as it would simply lead firms towards those alternative mechanisms."[125]

Conclusions on Achieving Vertical Coordination Benefits by Other Means

134. In conclusion, contracting might be used to replicate some of the benefits of vertical integration. However, in electricity systems especially, there are reasons to expect contracting to be an inadequate substitute for vertical integration.

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[123] For example, Brown and Sappington (2021).

[124] The presumed efficiency of existing institutional arrangements like vertical integration over alternatives like contracting flows from the application of the "remediableness criterion" discussed in Williamson (2000). This criterion forms the basis of the "three-limb test" applied in the study by Cognitus et al. (2017) for MBIE on the reasonableness of New Zealand fuel prices.

[125] Lafontaine and Slade (2007, p. 667).

135. Separating already integrated firms would likely create strong demand for contracting alternatives to replicate at least some of the benefits formerly achieved by integration (especially in relation to managing wholesale price risks):

    135.1. This means that at least some of the intent of separation would be frustrated through a compensatory increase in contracting, and that separation would introduce additional inefficiencies (since contracting is a less efficient alternative to integration); and

    135.2. Conversely, if integration and contracting are simultaneously deterred (e.g. by mandating separation, and prohibiting compensatory contracting), this could give rise to catastrophic failure risks of the sorts that materialised in California in 2000-2001 (as discussed in Section 4.3).

5. Summary and Conclusions

Vertical Integration in Electricity Sectors Offers Similar Benefits to Integration in Other Sectors

136. The literatures surveyed in this study on the impacts of vertical integration and vertical separation in electricity sectors echo the findings of vertical integration studies for other sectors. Specifically:

    136.1. Where vertical integration naturally arises, it resolves vertical coordination problems (e.g. in relation to production, risk-management, pricing, investment, etc) that alternatives like vertical separation – supported by greater levels of contracting – can only do so less effectively or efficiently;

    136.2. Despite a number of apparently anti-competitive practices that can arise under vertical integration, such as foreclosure or raising rivals' costs, vertical integration is more pro-competitive than vertical separation;

    136.3. Relatedly, even if these apparently anti-competitive practices associated with vertical integration carry costs, integration is associated with a range of compelling efficiencies that ultimately benefit consumers;

    136.4. If already-integrated firms are separated, then they either replicate some or all of the associated benefits of integration through less efficient alternatives (i.e. contracting), or fail to replicate those benefits and risk failure – in either case, both consumers and separated retailers are at risk of inferior outcomes than those achieved through integration.

Electricity Sectors Have Features Suggesting that Vertical Integration is Even More Beneficial than in Other Sectors

137. Some of the benefits of integration in electricity sectors are more pronounced than in other sectors. This is due to particular features of electricity systems that:

    137.1. Increase wholesale pricing risks faced by separated firms, and the opportunities for firms with market power to profit by exploiting that power; and

    137.2. Make it harder to use contracting to resolve market power, price risk and investment issues.

138. This means that if integration can be predicted to most effectively resolve issues in other sectors, then it can be predicted to be even more useful for resolving such issues in electricity sectors. Having said this, this is not to imply that vertical integration is best for all firms in electricity or other sectors:

    138.1. Studies have been highlighted that discuss circumstances under which integration is either the preferred strategy for all firms in an industry, only some, or none at all.

Vertical Integration in Electricity Sectors Might Become Less Dominant if Key Reasons for Integration Change

139. In particular, vertical integration might be predicted to become a less dominant form of organisation in electricity sectors if, for example:

    139.1. Generation investment costs fall to become more commensurate with retail entry costs, in which case the contracting preferences of retailers and generators might better align, making contracting a more effective and efficient alternative to integration for managing wholesale price risks and investment risks;

    139.2. Retail customer bases were less contestable (i.e. more sticky, such as through the use of franchise areas),[126] which would also serve to better align the contracting preferences of generators and retailers;

    139.3. Greater demand-side responsiveness could be introduced into retail electricity markets, making a greater share of demand more price-responsive, and reducing the movement in wholesale prices otherwise required to maintain real-time balance;

    139.4. Large-scale electricity storage became economically viable, likewise dampening movements in wholesale prices; or

    139.5. Electricity retailing became dominated by large firms offering such compelling consumer offerings that existing integrated firms or separated retailers were unable to compete at the retail level.[127]

[126] As proposed by Newbery (2002), Finon (2008). This clearly works in the opposite direction to popular policy measures such as those aimed at reducing customer switching costs.

[127] Such as through disruptive entry by "Big Tech" firms who can bundle electricity supply with other value-added services, as discussed in Meade (2018).

140. Hence, while vertical integration remains the dominant form of organisation in many liberalised electricity systems, this is not to suggest that this is uniformly the case, or that it will remain so indefinitely.

Test for Mandating Vertical Separation if Electricity Sectors are already Integrated

141. However, since vertical integration is currently the dominant form in many electricity sectors, this means that vertical separation should only be mandated if:

    141.1. It represents a feasible superior alternative; and

    141.2. Implementing that feasible superior alternative is expected to generate net gains (to the relevant stakeholders – notably consumers).

142. The literatures surveyed in this study shed light on the costs and benefits of vertical integration, and on the costs and benefits of mandating vertical separation, from the perspective of electricity consumers:

    142.1. Separation would involve the sacrifice of the benefits of integration, but avoid the costs of integration;

    142.2. It would also involve the benefits of alternative means of achieving vertical coordination, but also the costs of establishing those alternative means.

143. Mandating separation would therefore only be justified if the net benefits of achieving separation outweigh the current net benefits of integration.

* * *

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