network

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The latest academic thinking – From the Journals

Editorial Note

Who has time to scan the journals to find relevant papers, let alone to read all that material? The aim of this section is to do some of the hard work for you.

Specifically, we have identified recent articles in the economics literature, summarised the key messages, and sought to put the paper in the broader context, so that you can decide whether or not to read the paper in more detail yourself.

The focus here is on papers from different areas of economics which may be of relevance to readers of *Network*. This includes regulatory economics, competition economics, digital platforms, law and economics, energy economics, benchmarking, and empirical techniques used in these areas.

Inclusion in this list does not imply endorsement of the conclusions. Where appropriate we will offer our own critique. Readers are encouraged to read the original papers to form their own view.

We have grouped the papers into the following headings so that Network readers can quickly find material that interests them: Energy markets; Telecommunications regulation; Digital platforms; Regulatory policy; and Competition policy.

Energy Markets

It is not every day that issues in the Australian National Electricity Market (NEM) feature in a major energy economics journal, and even less common for the authors to be local academics. Our first paper is important for these reasons alone.

For some time now, policymakers have been concerned about the implications of increasing penetration of large amounts of variable renewable generation (VRG, particularly wind and solar) in the wholesale electricity market. The output of this generation can change rapidly with weather conditions, making balancing supply and demand in the power system tricky. One of the problems is that much conventional thermal generation cannot necessarily just ramp up and down its output in response to the changing output of VRG – instead, the conventional thermal generation often faces limits on how quickly it can ramp up and down, or minimum generation levels below which the unit must switch off. In the presence of minimum generation levels generators must make all-or-nothing decisions when to turn on or turn off, known as 'unit commitment' (UC) decisions.

Also, much conventional thermal generation supplies a service known as 'inertia', which slows down the rate at which the frequency increases or decreases following a shock or disturbance to the power system. As VRG displaces conventional generation the inertia of the power system tends to go down which makes the power system unstable. When the inertia is low AEMO will sometimes require a conventional generator to turn on purely to maintain the inertia in the system.

These unit commitment (UC) and rate-of-change-of-frequency (RoCoF) decisions occur in real-time, in the daily dispatch process and affect the dispatch and prices that determine how generators are compensated. But these decisions are not normally taken into account in planning models which determine the future mix of generation that will be required. As a result, there is a risk that the system planner will predict the need for a different mix of generation – for example, overestimating the amount of VRG and underestimating the volume of conventional generation that is required in real time.

In a paper just published in Energy Economics, **Marshman, Brear and Ring (2022)** find that as long as the penetration of VRG is less than around 40 per cent wind and 20 per cent solar, the omission of these UC and RoCoF constraints in planning models doesn't matter – the pricing signals in the market with a generation fleet as predicted by the planning models are sufficient for generators to earn a normal return.

But, for penetration of VRG above this level, there is a risk that with the generation fleet predicted by the planning models, the generators will not be able to earn a sufficient return. In other words, the generation fleet predicted by the current planning

Contents

models is not economically rational. The solution suggested by Marshman, Brear and Ring (2022) is to include these UC and RoCoF constraints in the planning modelling process. The issue of whether UC or RoCoF constraints should also be included in the daily dispatch process is not discussed in this paper.

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Modelling the effect of storage in a wholesale power system is slightly tricky. At the simplest level, the role of storage is that of *arbitrage* between times of low prices and times of high prices. But what if the price path is uncertain?

In the real world, demand (and therefore the price) for electricity follows a path that is both somewhat predictable (in that it follows a regular daily pattern of peaks and troughs) and partly unpredictable (in that it depends on factors, such as the weather). If we assume perfect foresight, it is straightforward to compute the optimal use of an energy storage device (charging when the wholesale price is the lowest and discharging when the wholesale price is the highest). But the assumption of perfect foresight is unrealistic as it ignores the need to maintain a reserve of storage capacity to protect against the event of even higher prices in the future.

In a recent paper, one of the most famous economists in regulatory policy, **Schmalensee (2022)** assumes that demand follows a deterministic daily cycle (reflecting the so-called 'duck curve') with stochastic variation. He develops rules for the efficient operation of a storage device and assesses whether or not, a storage device, operating under these rules would be able to break even. He concludes:

> "If energy prices are not capped below the value of lost load, [textbook]-style models indicate that revenue from competition in energy markets leads to the economically efficient supply of generation capacity. The results here provide the same sort of support for reliance on the competitive supply of storage, at least in the context of the duck curve problem. These results thus provide support for the preference in the EU and at the federal level in the U.S. for storage to be determined by market competition."

He goes on to observe that in many US and EU electricity markets, the spot prices are capped below reasonable estimates of the value of lost load. As a result, there is a risk of under-investment in generation capacity. This problem is often addressed through the establishment of additional mechanisms for rewarding investment in generation capacity (known as "capacity mechanisms"). He notes that as long as such price caps are maintained "it does seem likely that some analogue to 'capacity mechanisms' may … be necessary to supplement energy arbitrage revenues to increase the supply of storage"

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Another recent paper in the *Energy Journal* is by one of the editors of this newsletter.

In the simple models of power systems, generators are 'dispatched' according to their 'merit order' (that is, from the cheapest to the most expensive, until all demand is served). But with the increasing penetration of variable renewable generation (VRG) in the power system, it is increasingly likely that other, conventional forms of generation will have to ramp up or ramp down rapidly (for example, as the sun goes down). But, as noted above, some conventional generation faces limits on how quickly it can ramp up or down, known as ramp rate constraints.

The presence of ramp rate constraints has an important effect on merit-order dispatch. If a ramp rate constraint is anticipated to be binding in the future, it can affect how generation is dispatched in the present. For example, if a slow-ramping generator is expected to be required to be turned on following an event in the near future, it may be efficient to turn on that generator immediately, even though that generator is out-of-merit order, while backing off a generator that is in the merit order, in order to reduce the cost of adjustment to the new equilibrium when the ramp-rate-constraint event occurs.

But how should such sophisticated dispatch outcomes be incorporated in the spot market dispatch process? The dispatch process in the Australian NEM is one-shot in that it only solves for a single five minutes at a time. Ostensibly, therefore, it will not lead to the efficient dispatch outcome in these cases.

To address this problem many wholesale electricity markets around the world have introduced "multi-interval" dispatch. Under this approach the dispatch process solves for a sequence of intervals at the same time (e.g., 12 consecutive five-minute intervals, for up to an hour ahead). In these markets, only the first of these intervals is used for dispatch purposes, the dispatch and pricing from future intervals are merely advisory.

The previous literature on such multi-interval markets highlighted a potential time-inconsistency problem. In the economic dispatch task it is important for the price paid to each generator to be consistent with the dispatch so that the generator has an incentive to voluntarily comply with the dispatch instructions. It can be shown that, in these multi-interval markets, with perfect foresight of demand, given the sequence of prices predicted at the outset generators would have an incentive to comply with the dispatch

instructions. But several papers have observed that, even under perfect foresight, the prices predicted at the outset would not necessarily materialise as the dispatch process stepped through time. This is potentially a major problem and various papers have suggested possible solutions.

Biggar and Hesamzadeh (2022) show that this time inconsistency problem is an artefact of the common assumption that the bids and offers of generators are 'step functions'. If we assume (as is more common in economics) that the bids and offers of generators are smooth curves rather than step functions (reflecting their demand and supply curves), this problem of time inconsistency is eliminated.

More generally, do we need to implement multi-interval markets to correctly handle ramp rate constraints in the dispatch process? Biggar and Hesamzadeh (2022) show that provided the price forecasts are accurate, the dispatch process itself does not need to be multi-interval. Instead, faced with a set of prices, ramp constrained generators will voluntarily choose to back off or increase their output in response to anticipated ramp rate events in the future. In other words, a single-shot dispatch process suffices. There is value in implementing a multi-interval dispatch if and only if it improves the quality of short-term price forecasts. If the short-term price forecasts are effective, multi-interval markets are not required.

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It is widely recognised that efficient wholesale prices for electricity may vary widely between peak and off-peak times, reflecting different supply and demand conditions in the power system. Electricity market participants who face these prices are therefore exposed to risk and may want to mitigate the risks they face. They usually can do this by trading in financial instruments which are designed for mitigating price risks.

The precise risks faced by market participants will vary from one location on the power system to another, but exactly how those risks will vary depends on how congestion on the transmission network is managed. In markets with 'nodal' pricing (also known as Locational Marginal Pricing), prices vary across different locations, reflecting the short-run marginal cost of producing electricity and delivering it to different locations over the network. But many markets (including the Australian NEM) do not use nodal pricing, instead preferring some form of zonal or regional pricing.

Ambrosius, Egerer, Grimm and van der Weijde (2022) explore how the risks faced by market participants varies between zonal and nodal pricing. In the case of zonal pricing, they assume there is some form of 'redispatch' for managing congestion when it arises. There is currently no such redispatch mechanism in Australia, although something like this is being considered by the AEMC and may be implemented.

These authors find that uncertainty and risk aversion have a fundamentally different effect in markets with zonal pricing as compared to markets with nodal pricing. They find that zonal pricing (which blurs price signals) partially mitigates risk and blunts investment signals. In contrast, under nodal pricing transmission investment has a more significant effect on nodal price differences. They conclude that:

> "transmission planners in a nodal pricing market should be particularly aware of the degree of risk aversion among generation investors to be able to make optimal transmission expansion decisions".

This paper highlights the importance of mechanisms for managing transmission congestion on the risk experienced by participants in energy markets. The authors suggest that their results might explain the relative lack of emphasis on energy-related financial products in wholesale electricity markets with fewer locational price signals.

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Another important recent paper also deals with concerns about risk aversion – but this time in the retail market.

It is widely recognised among energy economists that, if electricity users and consumers were risk neutral, an optimal retail contract would involve pass-through of the time-varying wholesale electricity spot prices (including the costs of network congestion). This is known as "real-time pricing" (RTP). A few retailers in Australia (such as Amber) already offer retail contracts of this form.

In an older seminal paper **Borenstein and Holland (2005)** pointed out: (a) that RTP improves market efficiency (by reducing the extent of market power held by generators); (b) that consumers who switch from a flat retail contract to RTP are better off; and (c) that consumers who remain on the flat-retail contract are also better off (as the average wholesale price declines).

But why then are so few customers on RTP? Around the world the share of customers on RTP is negligible.

This question is explored in an important recent paper by **Boom and Schwenen (2021)**. These authors start by dropping the assumption that consumers are risk neutral. If consumers are risk-averse they may not prefer to switch to RTP.

The authors explore a market in which electricity-generating firms have market power in the wholesale market and consumers are homogenous and risk-

averse. They find that *both* customers on RTP and customers on flat tariffs are better off when customers switch to RTP. A customer that switches to RTP therefore imposes a "positive externality" on both groups. But consumers on flat tariffs are better off than customers on RTP. Consequently, risk-averse consumers do not have incentives to switch to RTP. This gives rise to a public good dilemma: Everyone is better off when some customers switch to RTP but none of the customers individually want to be the one to switch.

The policy conclusions of their paper are summarised by the authors as follows:

> "Our findings confirm that real-time pricing is beneficial but suggest that regulatory effort has to be spent to overcome the public good nature of increasing demand response in power markets. Regulatory policies to push towards RTP always increase social welfare but can only increase total consumer surplus in concentrated power markets, where RTP schemes cushion strategic mark-ups. If power markets are relatively competitive, the benefits of reducing mark-ups are moderate and can then be outweighed by increased risk exposure. In conclusion, our results clearly show that with risk-averse consumers, retail contracts and regulatory mechanisms need to give explicit incentives to consumers for facilitating further market penetration of RTP."

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One of the likely consequences of increased penetration of variable renewable generation (VRG) is increasing variability in wholesale prices. This increasing variability could be mitigated either through increased storage or increased price responsiveness by end-customers (known in the lingo as 'demand response').

A new paper in *Energy Economics*, **Guo and Weeks (2022)** models the response of a representative household to retail prices and uses that information to compute the profit-maximising time-of-use retail contract. Using data from the Irish electricity market, they find that the retailer is better off relative to offering a flat-rate retail contract by about 7 euros per annum. With regulation, some of those gains could be shared with consumers, leaving both the retailer and the household better off. They point out that introducing time-of-use tariffs does not reduce electricity demand overall as the household may increase its consumption in off-peak periods by more than the reduction in demand in peak periods.

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In many countries retail customers are charged for the costs of programs promoting renewable energy. But what is the best way to recover the cost of such programs? Should it be recovered through a fixed charge per unit of consumption, or through a time-varying charge?

Göke and Madlener (2022) explore whether or not the fixed cost of a renewable-energy subsidy should be recovered through a 'tax' or pricing scheme that varies in line with the wholesale price – with a smaller tax when the wholesale price is low and a higher tax when the wholesale price is high. Göke and Madlener (2022) find that this process of 'dynamisation' (as they call it) reduces the costs of integrating VRG by 4%.

On the load side, electric vehicles (EVs) are a major new source of potentially controllable load. **Ma, Yi and Fan (2022)** carry out a survey to identify customer preferences with respect to EV charging. They find that a time-of-use pricing mechanism with a 50% price increase during peak hours and a 50% price reduction during valley hours reduces the total cost of the Beijing-West Inner Mongolia power system by 302.3 million CNY compared to the status quo.

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In simple textbook theory, an effective competitive wholesale electricity market should deliver efficient outcomes, including an efficient amount and mix of generation types (including demand response). In practice, however, various factors (such as price caps, or political sensitivity to high electricity prices) mean that policymakers often express concerns that required generation capacity will be delivered on time or in the right amount. In response, many countries have mechanisms by which governments explicitly procure additional generation capacity, often known as a "capacity market". In Australia we have the Reliability and Emergency Reserve Trader (RERT) mechanism. Various additional mechanisms to ensure "resource adequacy" are currently being evaluated by the Energy Security Board.

In principle, if done effectively, such interventions would not affect wholesale market outcomes. The additional capacity would be called upon only at those times when the existing market would otherwise fail to efficiently balance supply and demand. In practice, this is difficult to achieve. As a consequence, the introduction of a capacity market may depress wholesale market prices and therefore forward prices for electricity. This should show up in changes in the prices for forward contracts.

Roughly speaking we can distinguish two types of forward contracts: "baseload" (which apply at all times) and "peak" (which apply at times when demand/supply conditions are tight and prices are high). In principle, the capacity market could affect both of these prices, but if the capacity market focuses on procuring capacity at times when demand/supply conditions are tight, we might expect

that it would affect peak forward prices more than base forward prices.

In a recent paper **Moraiz and Scott (2022)**, two economists from Ofgem, analyse the impact of the "surprise" announcement of the UK capacity mechanism on forward prices in the UK market. They find that the capacity mechanism reduced the price difference between forward peak and base prices by £0.84/MWh. This suggests that around half of the capacity payments in the first auction of £380 million had the effect of reducing wholesale prices (rather than increasing compensation to generators).

Telecommunications Regulation

A key factor which drives the extent of competition in mobile telecommunications is the cost of achieving sufficient network coverage. In a large, sparsely populated country such as Australia, the cost of achieving nationwide coverage can be substantial, limiting the number of mobile competitors that can survive in equilibrium. One possible solution is to require networks with nationwide coverage to provide access to their networks in remote or rural areas to networks with a smaller geographic scope. This is the known as mobile "roaming". But do governments need to intervene to achieve an efficient level of roaming?

These issues are explored in a paper by **Arve, Foros and Kind (2022)**. They consider a model in which there are three mobile network providers, two with nationwide coverage and one with partial coverage. The network with partial coverage needs to obtain a roaming agreement with one of the other providers to compete effectively. The authors observe that with Cournot competition in the end-user market (and no price regulation) the nationwide firms will compete to *voluntarily* offer access agreements in the roaming market.

A key objective of this paper is to explore the implications of a decision by the Norwegian Competition Authority (NCA) to impose a fine on Telenor (the incumbent mobile operator) for an abuse of a dominant position. Specifically, in regard to the charges for mobile roaming, Telenor had introduced a fee per end-user of the access seeker (a per SIM-card fee) and reduced the rate for renting access to the network.

The NCA intervened to prohibit the fee per end-user and imposed a substantial fine on Telenor. The authors argue that this asymmetric intervention (on Telenor but not on the other nationwide network) had the effect of increasing end-user prices and therefore is detrimental for consumers. They conclude:

> "This is a cautionary tale for competition authorities as well as for sector-specific regulators that both typically impose restrictions on only one of the vertically integrated firms".

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Internet Service Providers (ISPs, like NBN) and content providers (CPs, like Netflix) provide complementary services. Another way of saying this is that ISPs and CPs are in a vertical relationship in a supply chain. A bottleneck ISP is in a strong position to control the performance of competing CPs through the access terms and services it provides.

A recent paper by **Baranes and Vuong (2022)** explore the decision of an ISP regarding the quality of service to offer to two different CPs – a high-quality CP and a low-quality CP. Should the ISP upgrade the service it offers to the high-quality CP, further increasing the degree of differentiation between the CPs? Or should the ISP upgrade the service it offers to the low-quality CP, reducing differentiation and increasing competition between the content providers?

The authors argue that an unregulated ISP has an incentive to increase the service quality to the high-quality CP as this enhances demand for the CP and therefore for internet services. It also softens competition between the CPs. The ISP can extract some of the surplus created through higher charges.

The authors consider the effect of a non-discrimination requirement (that is, a requirement that any quality upgrade must be provided equally to both CPs) and conclude that, although this enhances competition between the CPs, it reduces the incentive of the ISP to invest, in a way that is detrimental to social welfare.

The authors also suggest that, from a social-planner's perspective, it can be socially optimal to give asymmetric quality upgrades. If the two CPs are close substitutes it can be preferable to give the quality upgrade to the low-quality CP. If the two CPs are strongly differentiated, it may be better to give exclusive access to the high-quality CP. The authors conclude:

> "[A] major point of contention in net neutrality regulation by policymakers around the world is the question of how to promote investment in broadband infrastructure and competition in the content market. We suggest that policy-makers, who pursue investment goals, should develop a 'rule of reason' framework to determine if a quality upgrade contract between the ISP and a CP is allowed to proceed. Under this approach, the important inputs are the degrees of substitutability and content differentiation. Furthermore, the impacts of the quality upgrade should be considered from both private and social perspectives. In other words, the contract can be analyzed on a case-by-case basis to identify all

possible types of benefits and harms, including distortion of competition within the content market, prices of services, investment level, and social welfare."

Digital Platforms

The central thesis of **Montero and Finger (2021)** is that the regulation of digital platforms should be thought about using the same conceptual framework that was developed for the analysis of traditional network industries in telecommunications, transport and energy. This framework, the authors claim, yields useful tools for the regulation of these 'new network industries'.

The authors distinguish three types of network effects which give rise to concentration and market power: *Direct network effects* arise when a service is valued more highly by a customer the larger the number of other similar customers on the service (e.g., the number of contacts that are also on Facebook). *Indirect network effects* arise when a service is valued more highly by one side of the platform (e.g., sellers) the larger the number of potential trading partners (e.g., buyers) on the other side of the platform. *Algorithmic network effects* arise when the collection of data leads to improvements in the service, and when the more intensive use of the service leads to greater ability to collect data:

> "Such algorithmic network effects are central in digital markets: with more users, more data is harvested, the more efficient the algorithm becomes, and the better the service gets for users, which in turn will attract more users".

The authors point out that both traditional and new network industries tend to follow a similar development path: At the outset there are often a large number of firms competing in the market. These firms will typically prioritise growth over short-term profit. But, in the presence of network effects, eventually the market will 'tip' in the favour of a very small number of companies. This process may be accompanied by practices such as acquiring rivals, exclusivity clauses that prevent customers dealing with rivals, predatory pricing, and practices that make it harder for customers to switch – all strategies that were present in the early years of the telecommunications industry.

In terms of regulatory policies, the authors draw on their experience with regulation of traditional network industries to suggest a range of policies for digital platforms: In order to reduce barriers to entry, the authors point to action to promote data portability, controls on requirements that limit multi-homing, and the need to promote access to key data (such as Google ranking, query, click and view data). The authors also recommend the development of common standards and interoperability obligations (which might allow, messages to be exchanged across different instant messaging services). Finally, the authors discuss structural remedies, both horizontal (e.g., Facebook and Whatsapp) and vertical (e.g., Amazon and Amazon own brands), and 'data separation' to reduce algorithmic network effects. The authors conclude:

> "The experience of regulating the traditional network industries provides, we think, the best insights for the regulation of digital platforms. The most valuable regulatory instruments are those developed over the last 40 years for introduction of competition in the previously monopolistic industries. In these network industries, different regulatory measures have been adopted across countries and industries so as to make competition compatible with the full exploitation of network effects to the benefit of consumers, innovators and society more generally".

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One of the reasons why the regulation of digital platforms has proven intellectually challenging is that the international consensus of the last few decades (the 'consumer welfare standard') doesn't easily apply to digital platforms. After all, Google and Facebook provide their valuable services to the public for free. How can there be a consumer harm?

The response offered by **Comanor and Baker (2022)** (who previously had senior roles in the FTC and DOJ, respectively) is that consumers care not only about price but also about quality, and that a reduction in competition is likely to lead to a reduction in service quality (e.g., a reduction in privacy or an increase in advertising).

For Comanor and Baker (2022), the potential threat to the quality of services provides a ground for intervention to prohibit exclusionary behaviour by dominant digital platforms (either by imposing contractual restrictions, or by acquiring potential competitors).

This is a useful observation, but does this analysis go far enough? Many of the concerns about the behaviour of digital platforms relates to the treatment of complementors (e.g., app developers in the case of the app stores, or manufacturers in the case of Amazon). Such concerns cannot easily be associated with an effect on quality experienced by consumers. We suspect that the attempt by these authors to resurrect the consumer welfare standard would be viewed by many Neo-Brandeisians as not going far enough.

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In a short opinion piece published by the **OECD, Marsden (2022)** takes aim at those that say that ex

ante regulation of digital platforms is not necessary or that we are moving too quickly.

Professor Marsden calls the claim that we are moving too fast to implement ex ante regulation "preposterous". He asserts that we have waited "far too long" for regulatory reform and that entreaties for more study will only serve to delay action and entrench gatekeeper power.

In response to claims that utility-style regulation has been a nightmare and should not be imported into this sector, Professor Marsden points to the success of regulation in the financial sector. He points out we should be learning what regulations work well rather than dismissing intervention out of hand.

Finally, he observes that there are already a broad set of principles set out in a number of widely-read reports. He notes the need for some changes to the way we think about competition law:

> "[W]e need to take a more dynamic view of markets rather than the price-based snap-shots we are already so good at. We also need to expressly consider the benefits of and harms to innovation from business activity within our remit, and of our decisions themselves."

But changes to competition law alone are unlikely to be sufficient. He also favours targeted regulatory interventions:

> "The most relevant pro-competitive interventions introduce interoperability and data portability in digital markets. Opening platforms up to other innovators, and allowing greater freedom of movement for users themselves, can spur competition and boost innovation. Entry is fostered, competition on the merits has a chance to operate, and consumers and platforms become more engaged with each other".

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In another recent paper **Colaneglo and Bogogno (2022)** (academic legal scholars from Italy) look at regulation of the App Stores. These authors note that app stores have all the key features of multi-sided platforms, act as gatekeepers, and are often vertically integrated:

> "Indeed, they represent the prototype of multi-sided platforms, having all their distinctive features: the presence of significant indirect network effects and economies of scale and scope leading to highly concentrated and not easily contestable markets; the growth in ecosystems providing a variety of products and services which serve as vital gateways for business users to reach potential end customers; the control and intermediation power exerted by gatekeepers, which act as private regulators, determining the terms and conditions under which users can join the network, playing a dual role as both intermediaries and trading operators on the platform".

These authors explore whether competition law enforcement is flexible enough to keep up with the dynamics of app stores, and whether regulatory intervention, on the other hand, may be required. The authors are sanguine about the scope for competition law enforcement but ultimately concede that ex ante regulation may be required for mandating data portability and interoperability. But they remain sceptical whether ex ante regulation can strike the right balance between competition and innovation.

Regulatory Policy

There are not that many academic economists publishing papers on economic regulation, so it is always interesting when a new substantive paper comes out.

Bogetoft and Eskesen (2022) note that the regulatory problem can be viewed as a game between a principal (the regulator) and one or more agents (the regulated firms). In the case where the regulator only uses information about an individual firm when regulating that firm, this game reduces to the usual "principal-agent" problem. But these authors are particularly interested in the question how relative performance information (that is, information about the performance of *other* firms) could help to reduce the information asymmetry, leading to improved regulatory outcomes. This is sometimes referred to as "benchmarking".

The central problem with benchmarking is distinguishing differences in relative performance that are due to factors within the control of each firm, as compared to differences in relative performance that are due to external differences in services provided or costs incurred. Relative performance evaluation is easiest when the regulated firms produce the same services and face the same cost conditions. But this is rarely the case in practice. Different networks typically face quite different cost conditions (e.g., different weather conditions, different terrain, different labour rates, different regulatory obligations) and produce a different mix of services.

This paper focuses on the question of differences in the services to be provided. The idea here is that customers of firm A may prefer a different bundle of services to customers of firm B (e.g., differences in action to address climate change), but allowing such differences makes it more difficult for the regulator to compare the relative performance of the two firms. This leads to a trade-off: The regulator could (a) insist that the two firms produce the same services, thereby enhancing the quality of the performance evaluation and reduce the information rent; or (b) allow the two firms to produce different services, reducing the

quality of the performance evaluation and increasing the information rent. They conclude:

> "We show that in some cases, and despite different preferences, it is optimal to let the two utilities produce the same services since the information rents associated with a diversified service mix outweigh the added value to consumers of a service differentiation. More generally, the second-best service mixes are biased toward each other compared to the first-best mixes."

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According to regulatory theory, increasing the power of the incentive to achieve one objective (such as cost efficiency) may induce the regulated firm to pay less attention to another desirable objective (such as service quality). Where this is the case, high-powered incentives must be applied with care, where they are used at all.

To an extent, this has been confirmed empirically. Several studies have observed that a shift from cost-of-service or rate-of-return regulation to price cap regulation has led to a deterioration in the quality or security of supply. For example, empirical studies for the electricity sector generally find that price cap regulation lowers security of supply.

A recent paper by staff of the Danish Competition Authority, **Bjørner, Hansen, Jakobsen (2021)**, seeks to explore whether or not this effect occurred in the Danish water sector, using a natural experiment.

In 2011, water companies in Denmark above a certain threshold size were switched from cost-of-service regulation (with low-powered incentives for cost efficiency) to so-called "price cap" regulation (with high-powered incentives for cost efficiency). The authors were interested to explore whether this change in financial incentives had any impact on observed water quality.

The measure of drinking water quality used was based on results from a compulsory surveillance drinking water testing program, which investigates the microbiological content of water samples.

The authors compared the change over time in water quality for a treatment group of 113 companies regulated with price caps that have a size close to the threshold size for being regulated, with the change in drinking water quality for a control group of 282 companies that are below but close to the threshold size. They summarise their results as follows:

> "We find that water quality has improved both for companies that shifted from cost-of-service regulation to price caps in 2011 (the treatment group) and for companies that had cost-of-service regulation in the whole period covered by the data (the control group). In addition, the improvement is fairly similar for our treatment and control group. Thus, water quality does not appear to have deteriorated due to the implementation of the price cap regulation. In fact, results from some of the estimated models suggest that price cap regulation has improved water quality."

But why did the shift to higher-powered incentives not lead to lower service quality? Importantly, the authors give, as a reason, the fact that the water supply companies are government owned and not necessarily strictly profit-maximising. In this context, the switch to price cap regulation may have had the effect of reducing the budget of the water supply companies without affecting their service quality.

> "Danish drinking water companies are owned by local governments (municipalities) or by customers and are not allowed to pay out profits to their owners. Thus, in practice the Danish price cap regulation put cost reduction requirements on the Danish drinking water companies, but the price caps do not provide the same high-powered incentive to additional cost reductions as for-profit maximizing companies that are allowed to pay out profits to their owners. In addition, it has been put forward that there is a strong commitment in the Danish drinking water companies to delivering high water quality because the companies are customer owned or owned by local governments. In this case, it might be that the companies regulated with price caps (cost reduction requirements) prioritize reducing unnecessary costs (reducing X-inefficiency) and maintaining water quality, instead of reducing water quality and maintaining X-inefficiency."

This is a valuable contribution to the literature on the differences between regulating state-owned and privately-owned utilities.

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Although not strictly a paper on regulatory cost of capital **Trinks et al (2022)** explore the impact of the carbon emissions on the cost of capital. Interestingly they find that higher carbon-intensive firms have a slightly higher cost of capital. They explain this as due to a systematic effect: "high-emitting assets are significantly more sensitive to economy-wide fluctuations that low-emitting ones".

Competition Policy

Bill Kovacic is a respected thinker and commentator on antitrust policy. He speaks and writes well and has written extensively on questions of the design of antitrust agencies and process. In a new paper **Kovacic and Hyman (2022)** discuss the rapid change in attitudes towards digital platforms, and what lessons would-be digital platform regulators can learn from the past.

One of the reasons why the debate over the regulation of digital platforms has been so unsettling or destabilising for the competition policy community is that it raises still-unresolved questions about the economic foundation of competition law. For the last few decades there has been something of a truce in this war, as it was widely accepted that competition law and policy should seek to promote a concept of "consumer welfare".

But this consensus has come under threat. The authors identify three competing visions for competition law and policy: So-called "expansionists" maintain the longstanding focus on consumer welfare but argue for more aggressive use of existing enforcement tools. In contrast, "neo-Brandeisians" argue for root-and-branch overhaul of competition law thinking, and an abandonment of the consumer welfare framework. Advocates of this approach now occupy senior positions in the US federal government antitrust agencies. Finally, "traditionalists" double down on the efficiency-oriented consumer welfare standard, and reject any move to expand the scope or reach of competition law.

Kovacic and Hyman draw on their experience implementing ex ante regulation on telecommunications companies in the early 2000s (the establishment of a "do-not-call" registry to restrict the activities of telemarketers) to identify a set of lessons for new regulators of Big Tech. Their lessons are straightforward enough on the surface ("Learn from past successes and failures", "Get the right team in place", "Manage expectations", "You're gonna need a bigger boat", "Expect litigation – and adaptive responses", "Hunt in packs") but the lessons are thoughtfully illustrated, drawing on their own knowledge and experience.

Kovacic and Hyman close by highlighting a danger: the current leadership of the FTC and DoJ, having obtained those roles through an attack on the record of the FTC and DoJ in the past, may be disinclined to carefully study and learn lessons from the past. The authors note that a significant body of recent commentary has taken the view that the past history of the FTC and DoJ is an "unmitigated disaster":

> "Prominent contributors to that literature now occupy key positions in entities that will be involved in developing ex ante regulations for Big Tech. Does it seem likely these individuals will be inclined to instruct others to study the past performance of the FTC and the DOJ Antitrust Division when they ascended to prominence by assailing the performance of these same agencies? It does not take an expert in human psychology or an astute student of public administration to recognize such instructions are unlikely to be forthcoming unless those responsible for these disaster narratives are willing to publicly 'walk back' their prior criticisms".

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Steinbaum (2022) takes a judge's dismissal of the FTC complaint against Facebook as the starting point of a broader discussion about market power in competition law and policy.

Steinbaum observes that many US antitrust cases define market power as the ability to charge prices in excess of marginal cost (or average cost) for a period of time, by restricting output. This definition is consistent with a conventional economic welfare framework in which the primary concern is the promotion of economic welfare or surplus.

But Steinbaum critiques this definition as ignoring the case where the price at which the transaction occurs is indeterminate, where the transaction will occur regardless of how the surplus from the transaction is allocated, and where market power is exercised to shift the share of the surplus from the transaction from one party to another:

> "In a bargaining context where the distribution of surplus is indeterminate, one counterparty can exercise, or attempt to exercise, its market power vis-à-vis another to redistribute surplus in its favour … . In that case, the insistence on quantity or output effects as competitive harms, or that the distribution of surplus is irrelevant so long as the transaction takes place, is imposing an inapposite understanding of market power".

Steinbaum points out that, in this bargaining context, an increase in the exercise of market power may not lead to a *reduction* in transactions (as required in the classic definition of market power) but to an increase in transactions. For example, if, say, Amazon cut the price it paid to suppliers that were 'locked-in' to its platform, it may be able to pass on some of that price cut, leading to an increased volume of total sales. But the anticompetitive harm to those suppliers would remain.

Steinbaum also makes the point that when assessing platform competition, it is not sufficient to examine whether or not there are similar platform services available (e.g., other credit cards, other ridesharing services, other app stores), but whether the customers of those platforms are locked in (that is, so dependent on a specific platform that they cannot switch). In this case the relevant market is much smaller than the set of all similar services.

Steinbaum argues that, when looking for evidence of market power, we should look evidence that the "residual supply or demand elasticities are low" – that is, that the platform can change its terms and conditions without losing either upstream complementors or downstream customers. He

argues that the fact that Facebook customers did not switch away even after the Cambridge Analytica scandal is direct evidence of Facebook's market power.

Steinbaum's critique of textbook approaches to market power is on point. But the author does not link his alternative concept of market power to a theory of harm. In fact, he actively seeks to separate these ideas: he recognizes that price discrimination can enhance economic welfare (and therefore presumably should be encouraged) but spends time arguing that price discrimination is an indicator of market power (presumably indicating something bad). Another problem is that the author does not identify when the "bargaining context" he identifies will arise. While there is a need to re-think the classic concept of market power, this paper is not yet the final word on market power.

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As we noted above, a bottleneck firm in a supply chain has enormous power over the relative commercial performance of its downstream buyers through the prices it charges for access to the bottleneck service. For this reason, downstream firms usually insist that they be charged a price for the bottleneck service no worse than the price paid by their downstream rivals. This ensures a "level playing field" for competition downstream. Competition authorities also sometimes intervene to impose such a requirement by prosecuting input price discrimination.

In recent years there has been increasing interest amongst competition authorities in partial- or cross-ownership arrangements between competing firms. A new paper by **Li and Shuai (2022)** observes that:

> "In many industries, horizontally competitive firms are linked by partial ownership arrangements. When making the output or price decisions, a firm that has non-controlling interest in its rivals partially internalize the impact of its decisions on their profits, leading to less intensified competition. This anticompetitive effect of horizontal shareholding has raised considerable antitrust concerns in recent years."

This paper by Li and Shuai (2022) explores the interplay of input price discrimination and horizontal shareholding. Surprisingly, input price discrimination can offset the effects of horizontal shareholding. Specifically, under price discrimination the input supplier charges a lower price to the downstream buyer that holds shares of the rival:

> "This offsets the un-evening of output created by the ownership structure and causes total output to rise compared with uniform pricing. Consumer and social welfare are increased, and total firm profits are also higher, with the input buyer whose shares are horizontally held being the only party that becomes worse off under price discrimination."

The authors summarise the policy implications of their paper as follows:

> "First, although not the focus of the paper, minority stake acquisitions are harmful to welfare. This is true regardless of the pricing regime of the input. Consequently, antitrust agencies should be on the alert … Second, given that horizontal shareholding are prevalent, our analysis indicates that input price discrimination helps mitigate the anticompetitive effect of horizontal shareholding compared with uniform pricing. Therefore, from a welfare perspective, there is another case for allowing input price discrimination."

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Regulatory Decisions in Australia and New Zealand

Australia

Australian Competition and Consumer Commission (ACCC)

ACCC to Monitor Petrol Prices Following Federal Budget

On 29 March 2022 **the ACCC commented on the new Federal Budget announcement of a six-month reduction in fuel excise**, from midnight on 29 March 2022. Under direction from the Federal Government, the ACCC currently monitors fuel prices, costs and profits and reports on these each quarter. The ACCC can compel refiners, importers, terminal operators, wholesalers, and retailers to provide information relating to fuel prices where necessary.

ACCC to Monitor Effect of Qube's Acquisition of Newcastle Agri Terminal

On 18 March 2022 **the ACCC announced its decision not to pursue enforcement action** in relation to Qube's completed acquisition of Newcastle Agri Terminal. The ACCC remains concerned, however, with potential impacts on the supply chain for bulk grain export through the Port of Newcastle, and will continue to monitor developments in the industry.

Improvements in NBN Fixed Wireless Service – Report Published

On 17 March 2022 **the ACCC released its latest Measuring Broadband Australia quarterly report** showing NBN fixed wireless download speeds have improved significantly over the past year.

Petrol Prices At Eight-Year High - Petrol Monitoring Report

On 14 March 2022 **the ACCC released its latest petrol monitoring report**, which outlined the economic impact of Russia's invasion of Ukraine, the OPEC cartel's refusal to boost crude oil production, combined with recovering oil demand as countries relaxed COVID-19 restrictions.

Agencies Form 'Digital Platform Regulators Forum'

On 11 March 2022 the ACCC announced it has joined with the Australian Communications and Media Authority, Office of the Australian Information Commissioner, and Office of the eSafety Commissioner, **to form the Digital Platform Regulators Forum**.

Potential New Rules for Large Digital Platforms – Discussion Paper

On 28 February 2022 **the ACCC released a discussion paper** seeking views on options for legislative reform to address concerns about the dominance of digital platforms. Feedback is required by 1 April 2022.

Gas Prices Increase – Report Issued

On 16 February 2022 **the ACCC issued its latest gas report**, showing that domestic gas contract prices, offered to commercial and industrial users for supply in 2022, have increased.

Mereenie Gas Field Joint Venture to Market Gas – Final Determination

On 27 January 2022 **the ACCC issued a final determination** allowing joint marketing arrangements between the four owners of the Mereenie gas field in the Northern Territory, until February 2027.

Australian Competition Tribunal (ACT)

Collective Bargaining at Port of Newcastle - Determination

On 18 February 2022 the Australian Competition Tribunal denied authorisation for the NSW Minerals Council and ten mining companies to collectively negotiate the terms and conditions, including price, of access to the Port of Newcastle to export coal and other minerals. **The Tribunal's determination sets aside the ACCC's decision from August 2020 which granted authorisation** for collective bargaining at the port.

Australian Energy Market Commission (AEMC)

Extending the Regulatory Frameworks to Hydrogen and Renewable Gases – Review

On 17 March 2022 the AEMC updated on its review of the National Gas Rules and National Energy Retail Rules, to develop initial rules that will extend regulatory frameworks to include low-level hydrogen blends and renewable gases. **The review draft paper will be released on 31 March 2022**.

Australian Energy Market Operator (AEMO)

Institute of Electrical and Electronics Engineers (IEEE) and AEMO Collaboration – Memorandum of Understanding

In March 2022 **the AEMO announced that it had entered into a Memorandum of Understanding with IEEE** in June 2021, to address power system operations challenges driven by an evolving resource mix, ageing infrastructure, weather, emerging technologies, consumer choices and interdependencies between gas and electricity markets.

Australian Energy Regulator (AER)

Reports on High Wholesale Electricity Prices in Queensland, Victoria and South Australia

On 29 March 2022 **the AER published two reports** into energy prices exceeding $5,000 per megawatt hour, in the National Electricity Market on 31 January 2022. On 17 January 2022 **the AER reported** on high wholesale electricity prices in Queensland on 11 November 2021.

AER Innovation in Regulatory Resets

On 21 March 2022, the AER announced that two New South Wales-based network businesses will follow its **new early signal pathway for revenue determinations**, for the 2024–29 regulatory period.

Quarter 4 Wholesale Markets – Report Released

On 23 February 2022 **the AER released its report** on electricity and gas markets, from October to December 2021.

AusNet Services' 2022-27 Transmission Revenue – Final Decision

On 28 January 2022 **the AER announced its final decision** on the revenue Victorian electricity transmission network service provider AusNet Services can recover from its customers in the 2022–27 regulatory period.

Roma to Brisbane Pipeline 2022–27 Access Arrangement Revised Proposal

On 20 January 2022 **the AER published APT Petroleum Pipelines Pty Limited's revised proposal** for its Roma to Brisbane Pipeline in the 2022–27 access arrangement period. Feedback was required by 18 February 2022.

Export Tariff Proposals - Draft Guidelines

On 19 January 2002 **the AER released draft guidelines** for distributors governing two-way export tariff proposals. Feedback is required by 8 March 2022 and final guidelines anticipated in May 2022.

APA's Victorian Transmission System Gas Access Arrangement Proposal 2023–27

On 22 December 2021, the AER announced receipt of **APA's access arrangement proposal** for its Victorian Transmission System for the period from 1 January 2023 to 31 December 2027. Submissions were sought by 18 February 2022.

APA's Victorian Transmission System Gas Access Arrangement Proposal 2023–27

On 22 December 2021, the AER announced receipt of **APA's access arrangement proposal** for its Victorian Transmission System for the period from 1 January 2023 to 31 December 2027. Submissions were sought by 18 February 2022.

Retail Energy Market Performance - Quarter 1 2021–22 Update

On 22 December 2021 **the AER published its Retail Energy Market Performance update data**, covering the period from July to September 2021.

Gas Network Performance – Inaugural Report Published

On 22 December 2021 **the AER published its first annual report** into the performance of its fully regulated gas distribution networks.

Three-year Consumer Vulnerability Strategy – Draft Consultation

On 20 December 2021 **the AER announced its consultation**, aimed to improve outcomes for consumers in a rapidly transforming energy market. Feedback was sought by 28 February 2022, for the AER's Consumer Vulnerability Strategy to be published mid-2022.

Values of Customer Reliability Adjusted for 2021

On 17 December 2021 the AER released the **updated Values of Customer Reliability** for 2021, for customers in the National Electricity Market and Northern Territory.

Standardised SCS Capex Model Released

On 16 December 2021 **the AER published its standardised model** for standard control services capital expenditure, to streamline the distribution determination process.

National Competition Council (NCC)

Application for Certification of the South Australian Rail Access Regime – Draft Recommendation

On 16 December 2021, **the NCC released its Draft Recommendation** on the South Australian Government's application to certify the South Australian Rail Access Regime. Submissions on the Draft Recommendation were required by 24 January 2022.

Independent Competition and Regulatory Commission (ICRC)

Water and Sewerage Services Price Investigation – Release of Issues Paper

On 1 March 2022 **the ICRC released an issues paper** outlining its approach to the 2023-28 water and sewerage services price investigation. Feedback is required by 8 April 2022.

Utilities Commission

2022-2025 Prescribed Port Services Price Determination – Final Determination

On 19 January 2022 **the Utilities Commission published its final price determination** for 2022-2025 for Prescribed Port Services in the Port of Darwin.

Queensland Competition Authority (QCA)

Regulated Retail Electricity Prices for Regional Queensland 2022–23 – Draft Determination

On 25 February 2022 **the QCA released its draft determination** on regulated retail electricity prices for regional Queensland to apply in 2022–23. Feedback is required by 7 April, and the final determination is anticipated by 31 May 2022.

Essential Services Commission of South Australia (ESCOSA)

Off-Grid Energy Networks Regulatory Performance Report 2020-21

On 18 February 2022 **the ESCOSA released a report** outlining the performance of Off-Grid Energy Networks for the period 1 July 2020 to 30 June 2021.

Offshore Electricity Infrastructure Act (Cth) Overview

On 10 February 2022 the ESCOSA announced that on 2 December 2021 **the Commonwealth Government enacted the Offshore Electricity Infrastructure Act (Cth)** (Act). The Act provides a regulatory framework for renewable energy infrastructure in the offshore waters of a State or Territory in Australia.

Review of the South Australian Electricity Licensing Framework

On 14 January 2022 the ESCOSA announced that **the Department for Energy and Mining sought stakeholder feedback** by 18 February 2022 on the South Australian licensing framework that applies to electricity entities.

Call for Submissions to the Ports Pricing and Access Review 2022

On 3 December 2021 **the ESCOSA called for submissions** by 1 February 2022 to its review of the ports access regime and the ports pricing regime.

Off-grid Energy Consumer Protection Framework Review

On 24 November 2021 the ESCOSA announced commencement of its **review of the off-grid energy consumer protection framework**, which applies to around 11,000 customers located in regional and remote areas of South Australia. Feedback was due by 25 March 2022.

Office of the Tasmanian Economic Regulator (OTTER)

Annual Energy Report Published

On 18 March 2022 **the OTTER published its annual performance report**, *Energy in Tasmania 2020-21*.

Water and Sewerage Prices – Draft Report Released

On 28 February 2021 the OTTER announced completion of **a preliminary review of TasWater's proposed prices and service levels for water and sewerage services** for the fourth regulatory period (1 July 2022 to 30 June 2026). Feedback was required by 28 March 2022.

Regulated Electricity Feed-in Tariff Pricing Investigation – Draft Report Published

On 28 January 2022 released its **draft report on the feed-in tariff rate for 2022-23**, that retailers must pay customers for electricity exported to the network. Feedback on the draft report was required by 15

March 2022, and a final decision will be made in May 2022.

2022 Regulated Electricity Pricing

On 18 January 2022 the **OTTER released a Draft Report and Draft Determination** on decisions made in relation to the regulated electricity prices that are to apply from 1 July 2022 on mainland Tasmania. Feedback was required by 25 March 2022.

New Zealand

New Zealand Commerce Commission (NZCC)

NZCC Commences Review of Regulatory Rules for Energy Networks and Airports

On 23 February 2022 **the NZCC announced commencement of a review** of the rules and processes that underpin its regulation of the energy and airport sectors.

International Working Group to Monitor Global Supply Chains

On 18 February 2022 **the NZCC announced it has joined with international counterparts** in a working group focussing on identification of potential cartel conduct in global supply chains.

New Rules for Petrol Stations and Fuel Wholesalers and Distributors

On 11 February 2022 **the NZCC announced new rules** requiring petrol stations to display standard prices of all engine fuels they sell; and that fuel wholesalers and distributors will be required to disclose a range of information to the NZCC.

2022 Gas Default Price-Quality Path

On 10 February 2022 **the NZCC sought feedback on its draft decision** applying to gas distribution and gas transmission businesses. Submissions were due on 10 March 2022 and a new price quality path is due 31 May 2022.

Network **is a quarterly publication of the Australian Competition and Consumer Commission for the Utility Regulators Forum. For editorial enquiries please contact Darryl Biggar (Darryl.Biggar@accc.gov.au) and Yuelan Chen (Yuelan.Chen@accc.gov.au), and for mailing list enquiries please contact Genevieve Pound (Genevieve.Pound@accc.gov.au).**