

Ownership Unbundling of Electricity Distribution Networks

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In the past three decades, electricity markets around the world have been radically transformed. Power utilities have dramatically diverged from their origins as integrated monopoly utilities. Many of the changes have been initiated by significant institutional reforms, such as horizontal and vertical unbundling of integrated utilities, the introduction of independent regulators and incentive-based regulatory frameworks, and the privatisation of publicly-owned energy assets. At the same time, the way power is produced, managed, and consumed is changing, with increasing amounts of decentralised and distributed intermittent renewable sources. Network operators are transforming into network data platforms, increasingly leveraging data collected from the grid for e.g. predictive maintenance and customer services.

Separating electricity distribution and transmission networks from generation, trading, and supply, has been a key component of the reforms over the past decades. The most common form of separation in OECD countries has been to create legally separate entities that own and operate the networks, with an external and independent regulator. The more extreme form of separation is to require ownership unbundling and to prohibit the networks to be (majority) owned by players with competitive power market activities. Although there are several examples of voluntary ownership separation of the Distribution System Operator (DSO), there have only been two countries to have forced this in their markets: New Zealand (1998) and the Netherlands (2009). In both cases the aim was to improve competition, increase network quality, and reduce costs by increasing efficiency.

The discussion over the advantages and disadvantages of mandated ownership separation of DSOs is topical given the changes to the role of distribution networks in the energy transition. Whereas the role of networks was clear at the start of deregulation, the challenges posed by the energy transition and the opportunities offered by digitisation, provides additional arguments to examine the value of ownership unbundling, relative to legal unbundling with additional policy measures, at the DSO level in more detail.

From a policymaking perspective the question is whether the benefits of DSO ownership unbundling outweigh the costs, both in the short term and in the long term, relative to a situation with legal unbundling and additional policy measures. This requires understanding the current market structure and dynamics, and importantly, forming a view of how the energy system will develop given the energy transition and further digitalisation.

According to proponents, distribution ownership unbundling leads to (i) increased retail competition, (ii) improved quality of networks and security of supply, (iii) increased market transparency, and (iv) improved efficiency and lower costs. According to opponents, ownership unbundling leads to (i) consolidation among incumbents, (ii) reduced coordination between networks and generation/ supply, (iii) less investment in generation and networks, and (iii) high one-off transaction costs and structural costs.

The optimal scale and scope of a firm is highly firm-specific, both the type of industry and history are significant in determining optimal scale and scope at any given time. The wide range of scales and scopes observed in firms demonstrates this. Forcing simultaneous ownership unbundling of different activities can subsequently result in horizontal consolidation of separated activities, raising the possibility of increased concentration and reduced competition in the long run. There is very little evidence for the stability of forced separations and that they lead to a reduction of long-run prices, in the presence of such horizontal mergers. It is also not clear if ownership unbundling addresses the possible need to better align managerial incentives across the different activities. The latter is particularly relevant in mar-

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kets with significant customer autonomy and high customer switching rates, high distributed renewable penetration, and advanced digitised network operators.

We reviewed 60 papers relevant to ownership unbundling of electricity transmission and distribution over the period 1990 to today, of which 23 discuss the effects of (ownership) separation of distribution networks. We have developed a framework for assessing the degree of consensus on forced distribution ownership unbundling, looking at their overall ownership unbundling assessment and with respect to their assessment of the effect of unbundling on competition, quality, and costs. The majority of papers – both theoretical and empirical – are either *not in favour* or *inconclusive* on the benefits of distribution network ownership unbundling. Along the competition and quality dimensions, the papers are relatively equally spread between *in favour*, *inconclusive*, and *not in favour*. However, with respect to costs, there are a significant number of papers *not in favour*.

To examine the impact of ownership separation we collected data from New Zealand and the Netherlands to test whether competition and quality improved, and whether costs fell. To examine the effects on retail competition we collected data on: (i) Retail market concentration (HHI index), (ii) Concentration ratio of the top 3 retail players (CR3), (iii) Retail margins, and (iv) Switching rates between retailers. To examine the effects on network quality we collected data on: (i) Outage duration (SAIDI), and (ii) Outage frequency (SAIFI). To examine the effects on costs we collected data on (i) One-off costs, and (ii) structural costs/ efficiency.

The empirical evidence for New Zealand demonstrates that the benefits do not appear to outweigh the costs by a wide enough margin to justify interfering in the ownership structure of companies. On the positive side, ownership unbundling in New Zealand led to substantial cost reductions and increases in quality of service. On the negative side overall competition was reduced, tariffs rose as cost reductions were not passed on the end-users, and there were substantial one-off transactions costs involved. In recent years, the rules on ownership unbundling have been relaxed to allow distribution companies to own and operate generation and be active in retail – under certain conditions.

The data for the Netherlands do not show a significant impact of ownership unbundling on quality or competition. There is no difference *pre-* and *post-*unbundling. However, there were clear one-off and structural costs involved with unbundling. Thus on balance, the expected benefits have largely not materialised, whereas the costs of unbundling, have materialised and are significant. Additionally, as the Netherlands implemented this form of unbundling unilaterally, many foreign players – with network assets – are active in retail and other commercial activities (approximately 60 percent of retail customers are served by a company that owns networks outside the Netherlands). Thus, creating an un-level playing field nationally as well as on a European level, rather than levelling the playing field. If network companies could have been sold, they too may well have passed into the foreign ownership of bundled international companies.

With the emergence of distribution network platforms, data hubs, and increasingly active DSOs, enforcing an organisational form, even disregarding the negative theoretical and empirical evidence, seems outdated. From a policy perspective, it is thus advisable to consider other policy measures to improve competition in retail, improve the quality of the network and drive down monopoly network costs. Measures that could be considered, in addition to current legal unbundling, are (i) strengthening the regulatory framework and the regulator, (ii) decreasing or removing barriers to entry for retail activities, (iii) further ring-fencing of distribution activities, and (iv) improving transparency for end-users. The latter is one of the key focus areas for the European Commission and leading regulators, such as the UK's, Ofgem.