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OF COMPETITION AND REGULATION INC.**

New Zealand's Electricity Lines Companies: an ownership analysis

June 2012

Talosaga Talosaga and Bronwyn Howell

New Zealand Institute for the Study of Competition and Regulation Inc.
Victoria University of Wellington
Email: talosaga.talosaga@vuw.ac.nz

The authors acknowledge Dave Heatley's contribution to the ISCR Ownership project, and his helpful comments, along with those of Toby Darglish, on this paper. The views in this paper solely reflect those of the authors, and do not necessarily represent those of the institutions with which they are affiliated or their constituent members. Any errors or omissions remain the responsibility of the authors.

Abstract

New Zealand's 30 Electricity Lines Businesses (ELBs) combined hold assets with an estimated value of over \$8.8 billion (Commerce Commission, 2012). The vast majority of analysis of the New Zealand electricity sector has focused on generation, retailing and transmission activities. Very little formal analysis of ELBs has been undertaken. This paper aims to redress this imbalance. We trace the history and catalogue the ownership structures of ELBs. Using Hansmann's (1996) theory of enterprise ownership we analyse the economic factors underpinning the evolution of the ownership forms of New Zealand's ELBs since reforms in the 1990s, with particular emphasis on its ability to explain ownership differences observed between ELBs serving urban and rural constituencies. We find that despite the reforms' bias towards private ownership, co-operative and trust structures predominate in rural New Zealand. However, privately-owned ELBs are much more likely to be serving urban communities. We suggest that this is likely a consequence of the smaller size of and greater homogeneity of interests amongst the communities served by rural ELBs.

Introduction

New Zealand's 30 Electricity Lines Businesses (ELBs) combined hold assets with an estimated value of over \$8.8 billion (Commerce Commission, 2012). Along with Transpower, the ELBs comprise some of the last-remaining true 'natural monopolies' in the New Zealand economy. The ELBs' market power derives from the fact that their high fixed costs make it extremely unlikely that they will face competition in their business of distributing electricity to retail consumers. Consequently, under part 4 of the Commerce Act 1986, with the exception of the twelve firms meeting the 'consumer-owned' criteria set out in s 54D¹, they are subject to price-quality regulation by the Commerce Commission². The qualifying 'consumer-owned' firms are subject only to disclosure obligations.

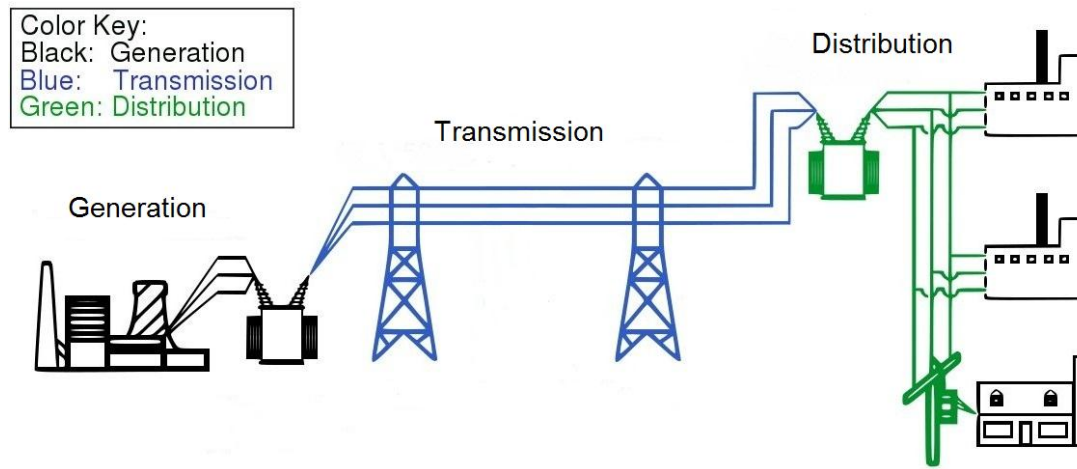
Although a considerable amount of research effort has been exerted on the New Zealand electricity sector, the focus has been on generation, retailing and transmission activities, with much of it concentrated upon the implications arising from ongoing government ownership of the transmission grid and a large proportion of the country's generating capacity. By contrast, very little formal analysis of ELBs has been undertaken. This paper aims to redress this imbalance by examining the ownership structures of ELBs, taking account of both their historic origins and the political and economic forces that have shaped them in recent years.

We first give a background of the New Zealand electricity network today and a short history of ELBs including the reforms that lead to their creation. Next we outline Henry Hansmann's theory of enterprise ownership, and use this theory to analyse the relevant factors affecting the ownership structures of ELBs. We use this framework to survey of the ownership structures of the 30 ELBs currently operating in New Zealand, with particular emphasis on its ability to explain ownership differences currently observed between urban and rural ELBs. We contend that despite the bias towards private ownership introduced in the 1990s reforms, there are plausible economic reasons underpinning the persistence of consumer control of small and rural ELBs.

¹ <http://www.comcom.govt.nz/treatment-of-consumer-owned-electricity-distribution-businesses/>

² <http://www.comcom.govt.nz/2010-2015-default-price-quality-path/>

1. The Network Today



The physical electricity network in New Zealand is made up of three components: generation, transmission and distribution. Generation is the production of electricity from sources such as hydroelectric dams, thermal plants and wind turbines. This electricity is then transmitted to 172 power substations across the country through the high-capacity national grid transmission network. The national grid is owned and operated by Transpower, which is constituted as a State-Owned Enterprise. From each substation, electricity is then distributed to individual consumer households and businesses through a network of lower-capacity power lines. ELBs are the companies that own and operate the distribution network - the part of the electricity network between the substation and the end customer.

The most important economic characteristic of electricity distribution is that each ELB enjoys a local geographic ‘natural’ monopoly. Most of the costs of operating an ELB are fixed, meaning that the lowest average cost per connection is achieved by having a single firm serving all consumers in a given geographic location.

For the physical electricity network to become operationalised as a commercial entity a fourth component – retail – is required (Evans & Meade, 2005). Retailers bill individual consumers for the electricity they consume. Retailers purchase the electricity from generators (via long-term contracts, wholesale markets and their associated complex reconciliation processes), albeit that some retailers also engage in generation activity (‘gentailers’). In New Zealand, retailers typically compensate the transmission and distribution firms for the costs incurred in delivering the electricity they sell across the network (although a minority of ELBs bill end consumers directly). The ELB charge is a combination of a fixed monthly fee and a usage charge based on the quantity of electricity consumed. Retailers recover the costs

of transmission and distribution from end consumers by bundling these charges in with the bills for electricity consumption.

2. A History of Reform

New Zealand's ELBs emerged in their current form from a series of electricity market reforms in the 1980s and 1990s.

Prior to 1993, electricity distribution was controlled by a mix of some 60 Electricity Supply Authorities (ESAs) comprised of local government-controlled Municipal Electricity Departments (MEDs) and local Electric Power Boards (EPBs), each established under their own legislation and governed by members elected by the community they served (McKinlay, 1999)³. The EPBs and MEDs also managed the retailing of electricity, which was purchased (principally) from initially the New Zealand Electricity Department (NZED) and subsequently (from 1987) the Electricity Corporation of New Zealand (ECNZ), the State-Owned Enterprise created as the first phase of corporatizing and deregulating the New Zealand electricity industry (it is noted that some EPBs did also undertake limited generation activities at facilities within their local distribution area). The NZED and ECNZ also managed the transmission function of the New Zealand industry over this period.

In September 1989, the Labour Government commissioned the Electricity Task Force to "report on the industry structure, form of ownership and regulatory environment for electricity generation, transmission and distribution"⁴. The Task Force recommended restructuring the ESAs into a corporate form (to allow comparability with other businesses and to separate commercial and non-commercial activities) and privatising the ensuing entities via the creation of direct transferable shares allocated to direct owners (that is, not local bodies or co-operative ownership). This ownership form was seen to offer better incentives for cost-minimisation, managerial performance and productive efficiency. McKinlay (1999:1) observes that for the government, corporatisation was the overriding objective. The matter of ownership of the ensuing corporate entities was strictly a secondary consideration⁵.

However, the proposed option proved controversial. A Crown Law Office opinion asserted that EPBs had no owners, but that MEDs were owned by their local authority, leading local bodies to argue that any restructuring would constitute a forcible deprivation of

³ McKinlay (1999: 73) identifies these as "thirty-eight electric power boards, 21 municipal electricity departments and Southland Electricity Supply, a former power board which had been taken over by government in the late 1930s, when it became insolvent".

⁴ Electricity Industry Task Force (1989), cited in McKinlay (1999) p, 43.

⁵ "for the Government, the important question appeared to be not so much the exact form of future ownership as simply the need to choose owners so that the process of corporatisation could get underway".

their property rights in existing facilities. However, it was argued by other interests that local body ownership risked the diversion of assets and the revenues they generated to other local body service provision, such as roading, water and waste-water, to the detriment of the interests of electricity consumers. The Labour government eventually negotiated a compromise, announced in mid 1990, that corporatised the ESAs, but with a bias towards a trust ownership model. All MEDs and EPBs would be formed into companies, with shares in the new firms being vested in newly formed trusts established for the benefit of the community. Directors of the newly formed companies would be appointed by the Government, albeit from nominations by existing EPBs and local government. Existing EPB members could become directors of the new firms, or trustees of the new trusts, but not both. Furthermore, at least 90% of the dividends paid by the companies would be returned to customers by way of rebates overseen by the trustees under a standard trust deed.

Before the process of corporatisation could be completed, the Labour government lost the 1990 general election. The incoming National government supported corporatisation, but was less enamoured of the trust ownership form. The government came under pressure from former power board members to adopt trust ownership, based upon the logic that under these arrangements, local communities would maintain effective control of their ELB (and importantly, their substantial asset base). It was argued that as the EPB assets had been accumulated under the aegis of a locally-elected trust from proceeds of trade between the trust as a local geographic monopoly and local consumers and the wider local community were certainly their beneficial, if not legal, owners. The concept of consumer beneficial ownership was reinforced by the historic pattern of (in most cases) EPB surpluses being distributed annually to customers in proportion to their electricity consumption, in the manner normally associated with co-operative ownership. On the other hand, some of those appointed as directors of the not-yet-established ESAs urged the government to fully privatise the companies, believing this would ensure the companies would be run most efficiently.

Ultimately, the National government reached a compromise enacted with the passage of the Energy Companies Act 1992⁶. The act left the decision of ownership form to the future directors of the ESAs (the ‘establishing authorities’), but required them to gain the agreement of the former power board members acting as interim trustees (McKinlay, 1999)⁷. The ESAs

⁶ McKinlay (1999: 49) describes this as “an extraordinary compromise that is really without parallel anywhere in the world as the preferred means of selecting the future ownership of significant public assets”.

⁷ McKinlay (1999: 50-51) notes that this need for agreement was designed to act as a real discipline on the process. If agreement on future ownership could not be reached, a default provision would be triggered vesting the shares in territorial local authorities. In practice, “virtually all of the interim trustees turned out to detest the idea of local authority ownership even more strongly than

would create an establishment plan, which would determine the ownership structure of the ELB, and submit this plan to the Minister of Energy for approval.

Despite the government's stated preference for firms with defined owners and tradable equity, the majority of establishment plans submitted had all or part of the shares held by trusts⁸. To tilt the playing field in favour of privatisation, the government required all trusts that resulted from the reform to undergo an ownership review at least once every five years. Bolstered by the belief that individual community members would prefer privatisation and the lump sum payments it would bring over continued trust ownership, government officials expected the ownership reviews to result in substantial privatisation after the first tranche of ownership reviews was conducted.

In practice, however, the government officials appear to have been somewhat overoptimistic in their assessment of the preference of consumers to keep ownership of ELBs in community hands. Despite the additional challenge of reforms in the latter half of the 1990s, when the ESAs were required to separate their retail and lines businesses, creating the ELBs in their current form, and though the number of ELBs has fallen due to mergers and takeovers (Evans & Meade, 2005), even after nearly two decades two thirds of ELBs remain partially or fully owned by consumer-controlled trusts (Table 1).

It begs the question, therefore of why, despite strong incentives being applied to encourage the evolution of ELBs towards private ownership, trustee ownership has proved so resilient. Whilst McKinlay (1999) has argued that the trust model has rendered ELB trustees only very weakly accountable to their beneficial owners in regard to the stewardship of the assets concerned, this does not appear to explain why, at each of the five-yearly mandatory ownership reviews, the majority of individual consumers in the trust-controlled ELBs appear to have opted to persist with the status quo. As the EPBs were originally constituted as trusts (albeit with strong similarities to co-operative models) and these structures have persisted in some areas at the same time as other areas have pursued the alternative of fully

the establishing authorities themselves" (p 50), due to a concern that the assets would be diverted away from the electricity sector to other things such as water, waste-water and roading.

⁸ McKinlay (1999: 51): "What almost amounted to the revulsion that many interim trustees felt at the idea of local authority ownership meant that they had a very weak negotiating position if they happened to disagree with the proposals of their establishing authority". "In a number of cases, there was a broad measure of agreement. Approximately 20 electric power boards adopted share allocation plans providing for a community trust. ... Where the establishing authorities preferred an element of privatisation, there was much less agreement. The establishment plans of a number of individual power boards were the subject of quite bitter battles. ... with one exception, this resulted in the adoption of compromise arrangements, in order to avoid the alternative of local authority ownership".

private ownership, it cannot be discounted that, for some ELBs, there may be some legitimate economic and social reasons why the trust model has persisted.

3. A theory of enterprise ownership

In order to explore the nature of ownership of the ELBs, we utilise a Price Theory (Coase, 1937; Stigler, 1968; Williamson, 1975) view as a starting point for our analysis. Under this view, a firm's ownership and control arrangements can be explained by the incentives faced by the firm and its patrons. If one party can make itself better off by changing ownership or control arrangements, we would expect the firm and its patrons to interact so that ownership and control move closer to that outcome. However, if the benefits are small, or the costs of acting are large, then there will be no net benefit in deviating from the current arrangements, and the status quo will prevail.

Hansmann's (1996) theory of enterprise ownership is an extension of this view, and we use it as a framework for understanding the ownership structure of ELBs. Hansmann observes that the vast majority of enterprises are owned by a class of the firm's stakeholders. Importantly, he distinguishes the stakeholders by the nature of the interactions they have with the firm. Stakeholders can be classified into the firm's consumers (that is, its downstream 'customers') and its ('upstream') suppliers – who can be further subdivided into suppliers of production inputs (such as labour and materials) and capital (such as lenders and shareholders, who, in the classic shareholder-owned firm, supply equity as a commodity that is used in the firm's productive activities).

Hansmann hypothesises that, without outside forces, ownership and control of the firm will be vested in that group of stakeholders whose exercise of those tasks leads to the lowest combined cost of market contracting and cost of ownership. Market contracting describes the stakeholders' engagements with the firm that are mediated by contractual interaction. In the absence of an ownership stake, the stakeholder can only influence the firm's actions through enforcement of her contract with the firm, or by threatening to stop contracting with the firm altogether. Costs from market contracting can include transaction costs, costs of market power, asymmetric information and contractual incompleteness (Williamson, 1985). When the costs of market contracting are sufficiently large for a particular stakeholder group, it is more efficient for that group to bid to buy the firm from its current owners (or set up their own firm in competition to it) in order to avoid the higher costs that will arise from persisting with arms-length contractual interaction.

When a group of stakeholders own a firm they have the ability to use their ownership rights to directly control the firm's behaviour, in addition to the options available to a non-owner patron, which mitigate the cost of market contracting. Ownership costs include the cost of motivating management, such as agency costs, and the cost of collective decision making. Decision making costs in general depend on the degree to which owners have similar interests

(Buchanan & Tullock, 1962). If owners have homogenous interests, it is easy for them to come to an agreement, whereas a heterogeneous group of owners will find it hard to reach a decision all parties can agree on (Hart & Moore, 1990).

Hence, the decision for any given stakeholding group to become owners requires the trading-off of these two sets of costs. Whilst owning the firm may decrease some of the costs arising from market contracting (e.g. exploitation by a party with market power), it may also invoke additional costs associated with ownership (e.g. the costs of co-ordinating a large number of owners to make decisions about how the firm will be managed). Only if the change in ownership leads to a net reduction on the joint costs of ownership and market contracting will it be beneficial for a different stakeholder group to bid for control.

Hansmann uses this reasoning to explain why, for example, consumer purchasing co-operatives might form in rural areas to militate against the potential exploitation of a supplier with market power, and supplier co-operatives (such as observed in the dairy industry or in employee-owned firms) can counter the power of a single powerful purchaser. He also demonstrates the rationale for consumer ownership of early insurance firms due to the high costs of acquiring information and constraining managerial excesses when regulatory oversight was less well-developed. Importantly, his model can be used to explain why, when changes occur in the external environment affecting the costs of ownership and/or market contracting, ownership of the firm may shift from one stakeholding group (e.g. consumers) to another (e.g. investors). For example, he suggests that improved regulation reducing the risk to consumer-owners facilitated the demutualisation of insurance firms in the 1980s.

Hansmann's theory can also plausibly explain the circumstances in which it might be most efficient to structure a firm so that it has no owners – that is, as a classic 'nonprofit' firm. Such firms would arise when the most efficient ownership group faces very large costs of ownership if the ownership interests are clearly defined and allocated. This might occur, for example, when a very large number of consumers seek to own the firm in order to circumvent the market power of a single provider of an essential good, but the costs of co-ordinating decisionmaking amongst this group were very large. In these circumstances, it might be more efficient for each consumer exerting a diffuse control interest (which is costly to administer and subject to free-riding and other problems) to forgo this interest and instead vest control of the firm in a group of fiduciaries managing the firm 'in trust' for them. This arrangement will be more efficient if the increased costs of forgoing a direct ownership interest are less than the costs saved from having to co-ordinate the decisionmaking associated with ownership.

Nonprofit firms are characterised by a 'nondistribution constraint' preventing the distribution of residual profits to those who exercise control over the firm (e.g. the

management and board). Instead, proceeds must be allocated according to the criteria articulated in the firm's constitution. The fiduciaries appointed to govern the firm are bound by a set of fiduciary duties to act in the interests of the beneficiaries when controlling the assets, and there are generally constraints placed on how the assets can be managed (e.g. preventing their sale without an explicit mandate being sought from the beneficiaries). Whilst the absence of defined owners opens up some opportunities for exploitation, when considered in the context of the costs of both ownership and market contracting, there may be some advantages. For example, where there are no owners to receive the proceeds, a firm that might otherwise face no competition and charge monopoly prices, but which must pay the proceeds back to customers in proportion to their custom finds few incentives to charge high prices in the first place. Whilst such a firm may be less operationally efficient than one with defined owners, the costs of regulating such a firm will be very much less than one with defined ownership. Trading off these costs means that overall, non-ownership may be the least-cost option in amongst some customer groups.

4. Cost of contracting and cost of ownership for ELBs

We now apply these theories to the ownership of ELBs in New Zealand.

4.1 Cost of Market Contracting

Because of electricity distribution's high fixed cost of building and maintaining network infrastructure and the low marginal cost of adding an additional electricity consumer to that network, electricity distribution is a natural monopoly and is supplied at lowest cost by a single provider. Without intervention this would increase the costs of market contracting as the firm would set prices to maximise profits at the monopoly price. For this reason, ELBs in New Zealand that are not defined as consumer-owned are subject to price-quantity regulation by the Commerce Commission.

However, regulation comes with its own costs, both in terms of the transaction costs of operating a regulatory authority (a cost of ownership, discussed subsequently) and the incentives created by setting regulated prices – which are considerations in examining the costs of market contracting for ELBs and their customers. Regulators face an information disadvantage when setting regulated prices, as they do not know the exact costs of provision for each firm, and the firm managers have few incentives to honestly disclose the relevant information. If regulated prices are set too low, the monopoly will earn a rate of return below the market rate, and there will be underinvestment. If prices are set too high, consumers will once again face excessively high prices and there will be overinvestment. So long as the

fiduciaries controlling the firm can exert the appropriate of controls on the excesses of management (as is arguably the case, regardless of whether the board is appointed by consumer-owners or investor-owners), then consumer ownership of ELBs offers one solution to the problem of incentivising a firm with market power to set retail prices that both stimulate appropriate levels of investment and minimise the risk of consumers facing inefficiently high prices.

These characteristics tend to suggest that the historic arrangements, whereby in the absence of explicit sector regulation the precursors of the modern ELBs were established as either consumer trusts or as local body entities reflecting the pre-eminence of consumer interests in their control, were underpinned by some plausible economic rationale. Whilst explicit and improved quality of regulation might eliminate some of the risks faced by consumers, the residual costs and risks remaining would still tend towards some form of consumer ownership of ELBs offering the lowest costs of market contracting, as it avoids the cost of regulation and eliminates the incentive to set monopoly prices.

4.2 Costs of Ownership

Whilst consumer ownership of ELBs will mitigate the costs of market contracting, for it to be a more efficient ownership structure overall, these benefits must outweigh the cost of ownership. A number of costs of ownership militate against this.

First, customer ownership is inseparably tied to being an electricity customer. The ownership stake in the ELB cannot be easily separated from the consumer and sold. This limits its transferability and hence the desirability of a defined ownership stake. Whilst the non-tradeability can to some extent be mitigated by the ownership stake being embodied as membership of a co-operative or as the beneficiary of a trust, such an arrangement leads to the ‘locking up’ of a large amount of the consumers’ wealth in the firm beyond the access of the intended beneficial owner. Without a defined tradable right, the only way for the beneficial owner to extract the capital value is to trade the asset to which the ownership stake is allied in a bundle that reflects the value of both assets (for example, the house to which the lines are connected). However, not all customers are the owners of the properties to which the lines are connected, rendering such ownership stakes of little material value. These limitations in part underpinned the arguments of those reformers favouring full privatisation of the old EPBs by way of a share allocation to all existing customers in the 1980s and 1990s reforms (McKinlay, 1999).

Second, costs of ownership will depend on the heterogeneity of the firm’s owners’ interests. The more similar are the customers the more likely it is that they will share similar objectives for their ‘ownership stake’ in the business. Greater accord means (usually) less

contentious decision-making, and in the case of a non-profit, lower likelihood of beneficiary dissatisfaction with decisions made by the fiduciaries about how the company will be operated. The costs of ownership are therefore lower than in the case where heterogeneous customers may have very different objectives regarding their stake in the ELB.

In the case of consumer ownership, there are likely significant differences in interests between different customer types such as home owners, renters and industrial customers. Homeowners are likely to be living in their current home for a long period of time, so are likely to be more supportive of long-term infrastructure investment and proper infrastructure maintenance, rather than short-term decreases in electricity prices. Furthermore as the value of these investments will be built in to the value of their houses, they have strong incentives to support an ELB strategy favouring long term high quality investment, even if it means paying slightly higher prices in the short term. By contrast, as renters are less likely to live in their current home for long periods of time and receive no capital gains from infrastructure investment, this predisposes them to prefer ELB strategies with lower prices and less infrastructure investment. Industrial consumers share many of the investment incentives of property owners, as the value of their business will be aligned with the quality of the infrastructure serving it. However, they may disagree with residential consumers about pricing policies. If lines charges are calibrated to the amount of electricity consumers, there will also be tensions over pricing policies between low-consuming and high-consuming customers. Low electricity consuming residential customers will prefer variable pricing based on the quantity of electricity consumed, whereas high consuming industrial customers will prefer a fixed per-customer charge.

Thus, the more heterogeneous is the customer mix of an ELB, the greater will be the costs of consumer ‘ownership’, regardless of whether it is effected via shares or by some fiduciary arrangement, and the greater the benefits arising from reduced costs of ownership and ultimately costs of distribution services if the diffuse stakes are concentrated into a more tightly-held firm. Once again, these costs were part of the advantages presaged by the privatisation element of the 1980s and 1990s reforms. If tradable shares were offered to individual consumers, then single firms would be prepared to pay individual consumers a premium reflected in the benefits available from consolidating the ownership interests.

Investor ownership will thus lead to lower costs of ownership. Investors are primarily interested in maximising the firm’s value, and otherwise have no preference over pricing policy and the level of investment, making investor interests fairly homogeneous. Investors will be better able than a disparate group of individual consumers to hedge the risk from owning an ELB, or may be using their investment in the ELB to hedge other risk they hold. Investors can easily sell off their shares in liquid stock markets. Moreover, the ELB will be

able to raise capital more easily from the share market than from customer owners. Therefore, we would expect investor ownership to lead to the lowest cost of ownership, though the size of this difference will depend on the heterogeneity of an ELB's customers.

An interesting question arises in respect of ELBs owned by local municipalities. Relative to consumer trusts and co-operatives, they face fewer problems in raising capital as a consequence of their powers to levy ratepayers and stand as guarantors to loans. Indeed, using Hansmann's reasoning, if municipal ownership is adopted principally in order to finance the ELB, then it is more properly viewed as an investor-owned firm – with ratepayers (who need not be customers) as the suppliers of capital – rather than a firm owned by the consumers of electricity provided over the lines. However, as municipalities serve a broad constituency of interests other than just electricity lines business activities, they likely face higher costs of decision-making than investor-owned firms, as ELB interests are diluted amongst other concerns. Yet they may also have lower decision-making costs relative to consumer-owned firms where the ownership interests are heterogeneous, as legal powers of coercion can be used to facilitate the execution of plans that may be contentious. Trading off these costs, it may well be that municipal ownership offers a less costly alternative to consumer ownership in the presence of consumer heterogeneity, albeit that it moves the balance of governing interests away from consumers towards investors. It stands therefore as a 'half way house' between consumer ownership and private investor ownership.

3.3 Are all ELBs Equal?

The costs of ownership and market contracting associated with ELBs appear to pull in opposite directions. Whilst the costs of ownership are generally lower for investor-owned firms, this must be put in the context of the market power held by the firms and the strong market contracting costs that bias towards consumer ownership. To fully assess the costs of the option of investor ownership, it is necessary to also take account of the additional costs of a regulatory regime to control the tendencies of an investor-owned firm to charge inefficiently high prices.

It may well be that when all of these costs are taken into account, there may be some ELBs where the consumer base is sufficiently small and homogeneous that the costs of ownership are not large enough to justify a move away from the consumer trust-oriented ownership forms that emerged from the reforms of the 1980s and 1990s. If this was the case, then we might expect to see, some twenty years on, a mix of ownership forms emerging in the context of the New Zealand electricity lines businesses. We would expect to see those where the consumer base was large and diverse to be more likely to have migrated to investor ownership. However, we cannot discount the possibility that some small and homogeneous

ELBs will have continued in trust or other consumer-governed ownership forms, even through a number of ownership reviews, because there is not a clear case to be made for the long-term benefits exceeding the costs. This is especially likely to have been the case since the introduction of the less rigorous regulatory provisions for consumer-controlled firms, as for small firms, the additional burden of adherence to a more rigorous regulatory regime might have a significant effect upon the costs, and hence prices of service delivery. Municipal ownership might also be observed, with it being more likely in areas where there is a large, heterogeneous customer base than in areas than a smaller, homogeneous one.

5. The Ownership Structure of ELBs

We now proceed to examine the ownership of the ELBs in New Zealand.

In 2012, the majority of (corporatized) ELBs are fully or partly owned by trusts. These trusts hold shares in their respective ELBs on behalf of their beneficiaries, which in most cases are the ELB's electricity consumers. Though being the beneficiary of an ELB trust is legally different from being the owner of an ELB, we found that beneficiaries in general hold the right to control and the right to residual profits, and thus in economic terms can be considered the owners of ELBs. These arrangements appear to be little changed from those enacted in the 1990s reforms

Across all ELBs, including those not owned by trusts, we found a mixture of consumer, investor and municipal ownership, as well as one ELB structured partly as a nonprofit. Table 1 gives a list of all New Zealand's ELBs and their ownership structure. Table 2 shows the number of ELBs with each ownership structure and the percentage of electricity customers⁹ distributed by each type of ELB. We can think of this as the market share of each type of ownership structure. By the number of ELBs, the consumer ownership structure is by far the most common. However, consumer owned ELBs tend to have fewer consumers on average than the other types of ELBs. By number of electricity consumers, the most common ownership structure (supplying just under a third of electricity consumers) is a mixture of investor and consumer ownership. Fully consumer owned and fully investor owned ELBs supply around a quarter of total customers each (as compared with 65% and 13% by the number of firms). Municipally owned ELBs supply around a sixth of customers, with a negligible number being supplied by consumer/municipally owned and nonprofit/investor owned ELBs.

This appears to confirm our preliminary hypothesis that we would find a mix of ownership forms, with larger firms being more likely than smaller ones to have moved to an investor-controlled (or at least partially investor-controlled) structure.

⁹ As measured by the number of Installation Control Points (ICPs) serviced by an ELB.

Table 1.

<i>Electricity Lines Business</i>	<i>Ownership type</i>					
	<i>Municipal</i>	<i>Consumer/ Municipal</i>	<i>Consumer</i>	<i>Investor/ Consumer</i>	<i>Investor</i>	<i>Non-profit/ Investor</i>
<i>Top Energy</i>			Y			
<i>North Power</i>			Y			
<i>Vector</i>				Y		
<i>Counties Power</i>			Y			
<i>WEL Networks</i>			Y			
<i>Waipa Networks</i>			Y			
<i>The Lines Company</i>			Y			
<i>Powerco</i>					Y	
<i>Horizon Energy</i>						Y
<i>Eastland Network</i>	Y					
<i>Unison Network</i>				Y		
<i>Centralines</i>			Y			
<i>ScanPower</i>			Y			
<i>Electra</i>			Y			
<i>Wellington Electricity Lines</i>					Y	
<i>Nelson Electricity</i>					Y	
<i>Malborough Lines</i>			Y			
<i>Network Tasman</i>			Y			
<i>Buller Electricity</i>			Y			
<i>Westpower</i>			Y			
<i>Mainpower</i>			Y			
<i>Orion Group</i>	Y					
<i>Electricity Ashburton</i>		Y				
<i>Alpine Energy</i>		Y				
<i>Aurora Energy</i>	Y					
<i>The Power Company</i>			Y			
<i>OtagoNet Joint Venture</i>					Y	
<i>Electricity Invercargill</i>	Y					
<i>Network Waitaki</i>			Y			
<i>Stewart I. Electrical Supply Authority</i>	Y					

Table 2.

<i>Ownership Structure</i>	<i>Number of ELBs</i>	<i>Number of ICPs</i>	<i>Percent of total customers</i>
<i>Investor</i>	<i>4</i>	<i>505,323</i>	<i>25.30%</i>
<i>Investor/Consumer</i>	<i>2</i>	<i>635,308</i>	<i>31.81%</i>
<i>Consumer</i>	<i>16</i>	<i>467,433</i>	<i>23.40%</i>
<i>Consumer/Municipal</i>	<i>2</i>	<i>48,067</i>	<i>2.41%</i>
<i>Municipal</i>	<i>5</i>	<i>316,802</i>	<i>15.86%</i>
<i>Nonprofit/Investor</i>	<i>1</i>	<i>24,504</i>	<i>1.23%</i>

4.1 Rural versus Urban

To further examine the effects of consumer heterogeneity on the ownership structure of ELBs, we examined the ownership form of ELBs serving predominantly urban and predominantly rural communities. In general, we would expect that customer heterogeneity is lower in rural areas as there is a higher proportion of individuals who own their own homes, and a much greater likelihood that individuals have lived, or intend to continue living, in the same community for an extended period. Furthermore, the interests of residential rural consumers are closely tied to those of rural industry, namely agriculture. A pricing policy that benefits large agricultural customers will flow through to higher wages and better employment prospects for rural residential consumers. By contrast, renters and shorter-term residents are much more likely in urban areas, leading to greater heterogeneity, and industrial customers are not the singular economic engine in urban areas, leading to greater likelihood of disagreement over pricing policy between industrial and residential customers.

Statistics New Zealand (2010) defines a “main urban area” as an area with population 30,000 or more. There are 16 such areas across the country. We define an urban ELB as one that contains a main urban area within its distribution network. Rural ELBs are the remaining ELBs with no main urban areas within their boundaries. Table 3 shows the percentage of rural and urban electricity consumers distributed electricity from each type of ELB.

Table 3.

<i>Ownership Structure</i>	<i>Rural</i>	<i>Urban</i>
<i>Investor</i>	3.94%	30.24%
<i>Investor/Consumer</i>	0.00%	39.16%
<i>Consumer</i>	76.60%	11.11%
<i>Consumer/Municipal</i>	12.82%	0.00%
<i>Municipal</i>	0.11%	19.50%
<i>Nonprofit/Investor</i>	6.53%	0.00%

As predicted by our analysis, consumer ownership dominates rural electricity distribution, supplying over three quarters of rural electricity consumers. By contrast, consumer owned ELBs only supply a little over ten percent of urban electricity customers. Investor owned ELBs and mixed consumer and investor owned ELBs dominate the urban market and together supply nearly seventy percent of the urban electricity consumers. Furthermore there are few full and no partial investor owned ELBs supplying electricity in rural areas.

Municipally owned ELBs have a very interesting distribution over urban and rural areas. Full municipally owned ELBs predominantly supply electricity in urban areas, whereas only mixed consumer municipal owned ELBs supply electricity in rural areas. One possible explanation for this pattern is each municipality's access to capital. Urban municipalities have large tax bases from which to draw funds, and because of their higher population densities, the cost in per capita terms of investment and maintenance is smaller. Thus urban municipalities are better able to undertake this investment alone. Rural municipalities by contrast have smaller rate bases and larger per capita investments to undertake, so are more likely invest when in partnership with another organisation.

6. Conclusion

Our analysis confirms that a mix of ownership forms for New Zealand's electricity lines businesses has emerged from the reforms of the 1980s and 1990s. Whilst the reformers structured the firms initially as trusts, but with a set of conditions strongly biasing the firms towards fully private ownership, this outcome has failed to eventuate. Whilst fully and partly investor-owned firms supply nearly 60% of New Zealand electricity consumers, the consumer trust form prevails in more than half the ELBs.

Whilst this result may be surprising to those who predicted the rapid dominance of the investor-owned form, when analysed through the lens of Hansmann's theories of the ownership of enterprise, the result may be less controversial. When trading off the costs of market contracting and the costs of ownership of ELBs, the case for investor ownership is not necessarily clear-cut. Countervailing the market power of ELBs offers a strong rationale for consumer-owned firms as an alternative to costly explicit regulation of investor-owned monopolies, and the benefits of private ownership may not be as great for firms where there are lower costs of consumer ownership due to high levels of consumer homogeneity. Correspondingly, we find that consumer ownership is far more likely to have persisted in smaller ELBs serving rural constituencies, where consumer homogeneity is high and the corresponding costs of ownership are likely smaller. By contrast, investor ownership dominates in larger and urban ELBs, likely as a consequence of the higher costs of ownership associated with both higher customer numbers and greater heterogeneity of the customer base.

We contend therefore that these findings are not inconsistent with the evolution of ownership forms in response to the changing costs of ownership and market contracting in Hansmann's model. The plurality of models observed would appear to broadly reflect the different sets of incentives facing consumers in different ELB constituencies, and the different costs and options for regulating ELBs in the New Zealand context. As long as consumers have the option as beneficial owners to revisit the ownership form of trust-controlled ELBs, then it would appear feasible for the ownership form of all ELBs in New Zealand to continue to change in response to changes in the economic environment in which the ELB operates.

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