Electricity Policy Research Group

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An economic analysis of the ownership unbundling of electricity distribution in New Zealand

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Background

- Ownership unbundling of electricity distribution from retail an issue in the Netherlands.
- Dutch studies suggest that effects ambiguous at best.
- Three examples exist:
  - UK voluntary ownership unbundling
  - Netherlands forced unbundling proposed
  - New Zealand 1998 unbundling enacted
- This paper motivated by Dutch case.

Disclaimer: This does not represent the views of PwC and does not constitute policy advice by PwC. The views expressed are the personal views of the authors.

Literature on New Zealand Electricity Reform

- Kaldermis (2000) – Government ignored advice against unbundling and generally viewed as not a success.
- Brunekreeft (2003) – Light-handed regulation of networks did not work and was not in interest of owners.
- Bertram and Twaddle (2005) – Light-handed regulation cost consumers $200m NZD p.a. in higher network charges.
- Bertram (2006) – Self-governance in distribution and generation failed.

Theory relevant to Ownership Unbundling

- Social cost benefit analysis framework (Jones et al., 1990)

- Transaction costs of unbundling
  - These can be direct or contract renegotiation costs
- Dynamic efficiency effect on costs and quality
  - Loss of vertical economies vs gain in focus
- Effect on degree of concentration in competitive segments
  - Reduction in no. of competitors vs breaking of incumbency

Background to New Zealand Electricity Reform

- Reliant on ‘threat of regulation’
- Market liberalised in 1993
- Network activities ring-fenced and subject to disclosure in 1994
- Electricity Reform Act (1998) required ownership separation of distribution from generation and retail by 1 Jan 2004
- Achieved by April 1999
- Government inquiry into sector in 2000
- Further amendments to unbundling possible in 2006
- Unique opportunity to evaluate ownership unbundling

Results of initial reforms following 1992 not satisfactory

- *Competition*: Switching rates were low and price levels did not decrease following liberalisation. In fact they increased for residential consumers.
- *Generation*: There was a lack of competition in the generation market. There were only two players in the market: ECNZ and Contact Energy.
- *Technical*: There was no system to reconcile the distribution of electricity and no standard profiles to estimate the load share of individual customers.
- *Distribution price inflation*: There were concerns that network operators were able to extract additional profits by re-valuing their network assets and justifying price increases of electricity distribution (see Bertram & Twaddle 2005).
- *Economies of scale*: It was felt that economies of scale were to be gained if network operators merged and consolidated their activities.
- *Cross-subsidies*: There was concern that integrated companies could subsidise retail activities or inefficient generation schemes with profits from the monopoly networks.
- *Access*: The Government was concerned that integrated companies could restrict access to the networks.

Unbundling the regional electricity companies and the outcome

The Electricity Industry Reform Act 1998: unbundling

- Corporate separation of lines and energy businesses was to be achieved by 1 April 1999 and full ownership separation no later than 31 December 2003;
- ECNZ (state-owned generator) was split into three competing state-owned generators (Genesis Power, Meridian Energy, and Mighty River Power); and
- The Electricity (Information Disclosure) Regulations 1999 came into force, replacing the 1994 version.

There was an incentive to split early in that cross holdings could be held up to a limit if split achieved before July 1999.

Results of unbundling for the industry:

- All the companies, except Top Energy, chose for the early separation option.
- The large generators and the larger regional energy companies saw an opportunity to expand their business and pursued the acquisition of smaller retailers.
- Between July 1998 and April 1999 nearly all retail operations were sold. Generators expanded into retailing, new companies appeared on the scene.
- By September 1999 there were ten retailers in total holding over 97 percent of the market.
- 6 major generation/retail combinations accounted for approximately 50 percent of the market.

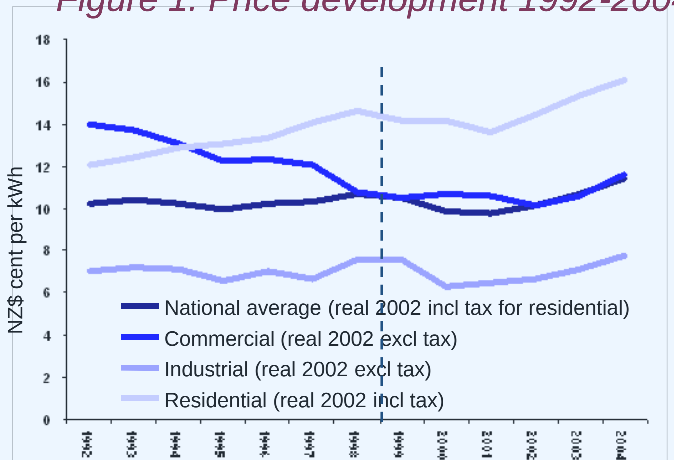
Unbundling did not have desired effects

Prices have only temporarily decreased following ownership separation, and are currently above the pre-unbundling level

Results of unbundling for consumers

- Following the forced ownership split and the split of ECNZ, average prices showed only a marginal decrease, recently they have increased again. Figure 1 shows the price development from 1992 to 2004.

Figure 1: Price development 1992-2004



Source: MED, Energy Data File July 2005

- In the period 1998 to 2004 real national average prices (2002 prices) increased by 1.1 percent p.a..
  - Household prices increased by 1.6 percent p.a.;
  - Commercial prices increased by 1.2 percent p.a.; and
  - Industrial prices increased by 0.5 percent p.a.
- As the system is largely hydro-based, we assume that prices are stable, except in extreme dry periods (see figure20) .

The Government reacts

- In February 2000, the Government announced a Ministerial Inquiry to examine New Zealand's electricity industry.
- The Minister states the following: "*It is unfortunate that the Government is forced to this effort and expense to address a problem created by the previous administration. The instability and uncertainty created by National's [previous Government] hasty and ill-conceived changes were both predictable and predicted. We must, however, deal with the electricity sector we have inherited, rather than the one we would like. Some of the recent changes are now irreversible, but changes are possible in many other areas to ensure good outcomes for consumers.*"
- The main recommendations in the Inquiry for distribution were:
  - The Commerce Commission should be responsible for the content and enforcement of the information disclosure regulations and analysis of line company performance;
  - The Commerce Commission should be given responsibility for developing criteria and thresholds upon which price control should be imposed;
  - The Commerce Commission should be empowered to impose price control (CPI-X) on individual distribution companies (and Transpower) for a maximum of five years; and
  - Distribution companies that are majority owned by trusts should be subject to the Local Government Official Information Act, the Public Finance Act and the Ombudsman Act.

Subsequent reforms

- 2001 Electricity Act updated flags Electricity Commission
- 2004 Electricity legislation updated again!
- 2006 Possible amendments to E Act on separation
- Current concerns of government to do with adequate investment and competition in generation.

Timeline of relevant reforms

Mid-80's

Generation and transmission were responsibility of Ministry of Energy Electricity while distribution and supply were the responsibility of electricity supply autorities (ESA's).

1987

ECNZ was set up to own and operate generation and transmission assets.

1988

Transpower was set up as a subsidiary of ECNZ to run the tranmission network.

1992

- Energy Companies Act 1992: corporatisation of ESA's.
- Electricity Act 1992: further liberalisation.

1994

- Electricity (Information Disclosure) Regulations 1994
- Transpower becomes a stand alone State-Owned-Enterprise (SOE).

1996

ECNZ split into two competing SOE's: ECNZ and Contact Energy.

1998

Electricity Industry Reform Act 1998: corporate separation of lines and supply businesses and ownership separation.

1999

- ECNZ split into three competing state-owned generators.
- Separation of ownership of line and supply businesses.
- Electricity (Information Disclosure) Regulations 1999

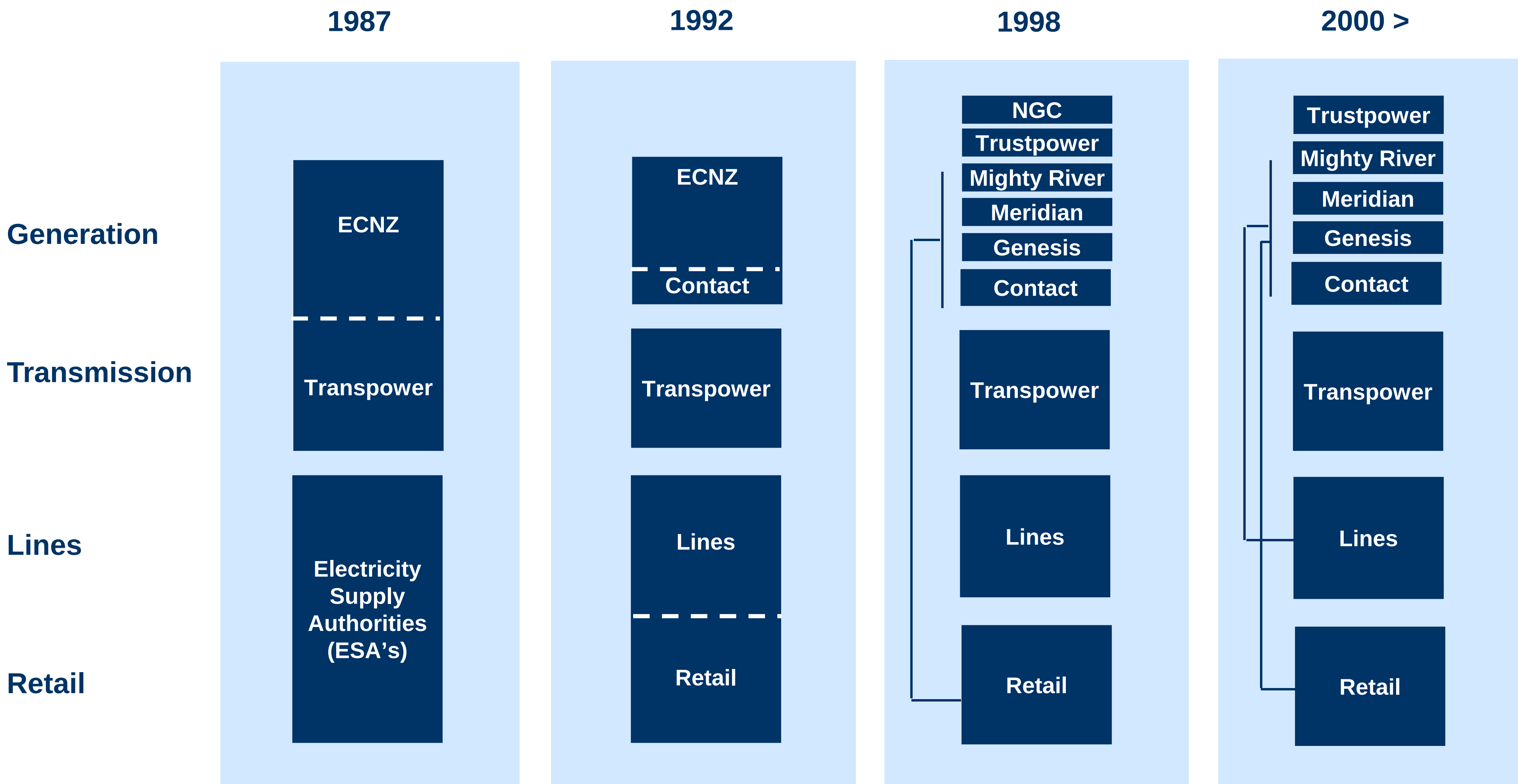
2001

- Electricity crisis.
- Electricity Industry Reform Amendment Act 2001: rules of ownership of generation and lines companies are relaxed.

2004

Electricity and Gas Industries Bill passed: less restrictions on lines companies owning electricity generation.

Electricity industry structure



Approach to quantitative analysis

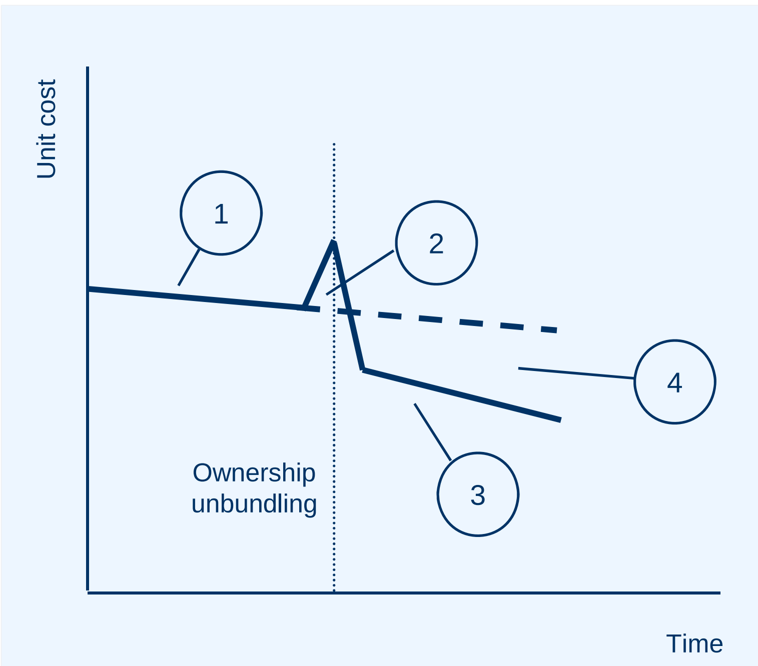
As a result of ownership unbundling, one would expect…

A	**…one-off transaction costs to occur as integrated companies are split into two. However, as a result of more focus following unbundling we would subsequently expect structurally lower unit costs.**
B	**…more retail competition (higher switching rates) and lower prices, as potential cross-subsidies to retail activities are removed.**
C	**…security of supply in generation not to be affected, and security of supply in networks to increase (outages and line losses).**

A

Assessing the impact of ownership unbundling on distribution operating costs

As a result of ownership unbundling, one would expect……one-off transaction costs in distributions operating costs, but as a result of more focus, structurally lower costs following unbundling



1. Prior to ownership unbundling distribution operating costs follow a trend path. In this picture distribution operating costs decrease with percentage X
2. At the moment of ownership unbundling transaction costs are incurred to separate the businesses. This causes a one-off cost increase to occur
3. Following the structural separation, we expect to see the overall cost level to decrease and for the cost reduction trend to be stronger than prior to unbundling
4. The discounted net difference between (2) and (3) provides an estimate of the net costs or benefits resulting from the unbundling

A

One-off transaction costs and operating costs

One-off costs

Figure 2: One-off restructuring costs for distribution (cust numbers in brackets)

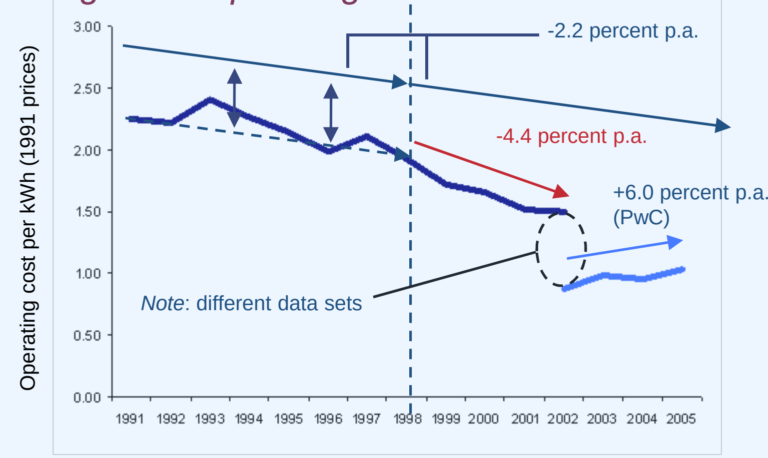
Company	One-off transaction costs 1999 ('000)
Vector (251,155)	
Loss on sale of retail assets	50,798
Restructuring costs	5,688
United Networks (463,014)	
Loss on sale of energy contracts	35,000
Restructuring costs	6,681
Powerco (194,859)	
Loss on sale of generation assets	10,026
Orion (156,878)	
Restructuring costs	3,984
Hawkes Bay/Unison (56,000)	
Restructuring costs	2,612
Total restructuring costs	18,965
Total contracting costs	95,824
Total one-off transaction costs	114,789
Total one-off transaction costs per customer (1999 NZD)	102.32

Source: Annual reports Vector, UnitedNetworks, Powerco, Orion and Hawkes Bay/Unison (1999)

- The one-off costs for five major distribution companies amounted to approximately NZ$115mln. Based on the total number of connections and the costs per customer, the aggregate restructuring costs for the entire distribution lies around NZ$170 million. This is equivalent to 20 percent of annual distribution revenues (1998).
- Due to a lack of data we cannot estimate the one-off costs for retail. However, we expect that one-off set-up costs were incurred at the time of unbundling (e.g. IT systems).

Operating costs

Figure 3: Operating costs for distribution companies



Source: Bertram & Twaddle (2005) and PwC analysis

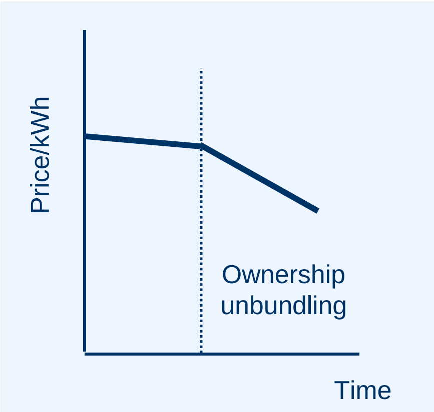
- Based on data from Bertram & Twaddle (2005) we find that unit distribution operating costs decreased by 2.2 percent p.a. *pre* unbundling and 4.4 percent p.a. *post* unbundling until 2002.
- After 2002, we find that unit distribution costs have increased by 6 percent p.a.

B

Impact of ownership unbundling on competition

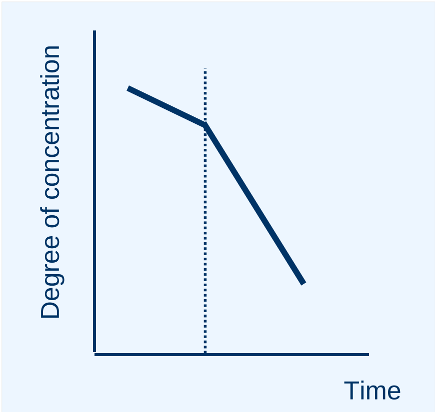
As a result of ownership unbundling, one would expect……more retail competition will occur and result in lower prices, as potential cross-subsidies to retail activities are removed

Prices to decrease



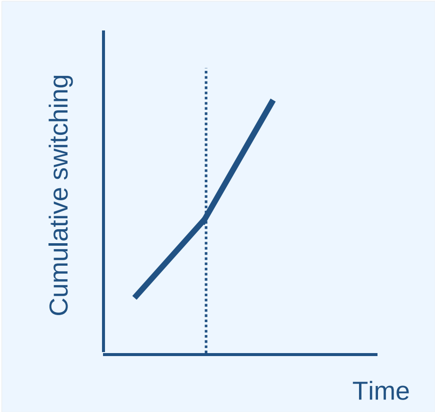
Unbundling leads to more competition, and therefore *ceteris paribus*, lower prices

Concentration to decrease



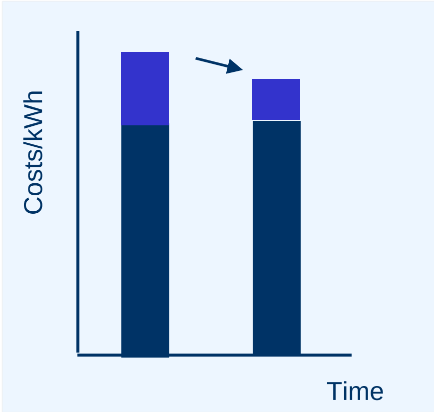
Unbundling leads to more entry into the retail market, thereby decreasing the degree of concentration

Switching to increase



Given active competition, we expect to see an increase in cumulative switching between retailers

Margins to decrease



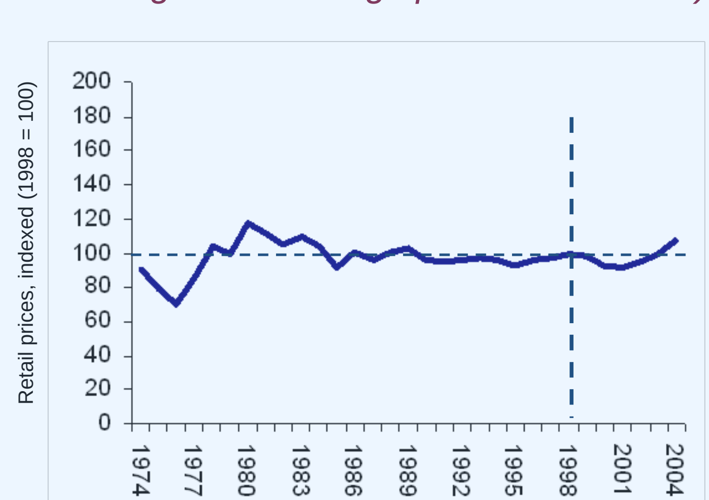
As competition increases, the pressure on margins will increase and will fall

B

Retail prices and market concentration

Average prices

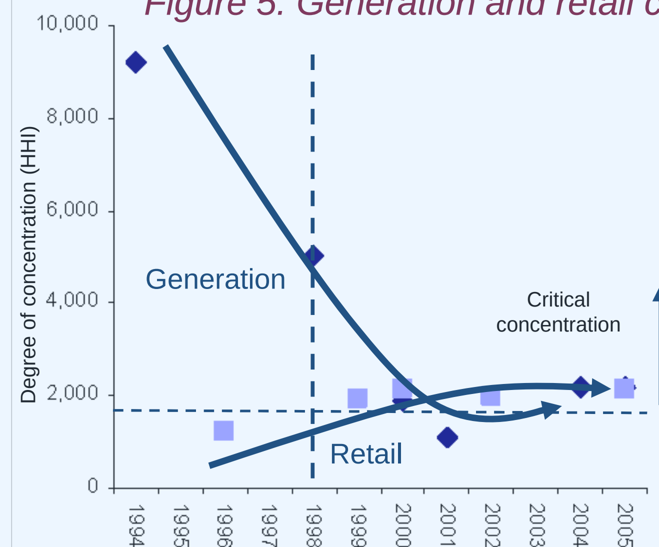
Figure 4: Average prices 1974-2004)



Source: MED, Energy Data File July 2005

Market concentration

Figure 5: Generation and retail concentration



Sources: see appendix figure 16

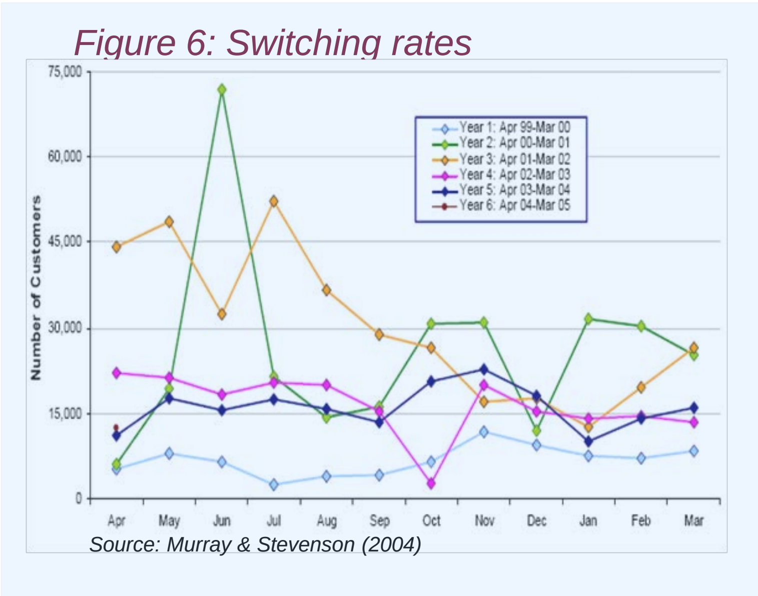
- After the ownership unbundling in 1998 there is a small dip in average prices. However, recent prices are above the level pre-unbundling.
- Wholesale electricity prices make-up 40 percent of the total electricity price. We have not corrected for changes in the underlying wholesale price. As the system is largely hydro-based, we assume that prices are stable, except in extreme dry periods (see figure20) .

- Market concentration in generation decreased substantially until 2001, but has increased again.
- Market concentration has been increasing for the retail sector.
- The main players active in the generation market are also active in the retail market, and are thus in addition, vertically-integrated.

B

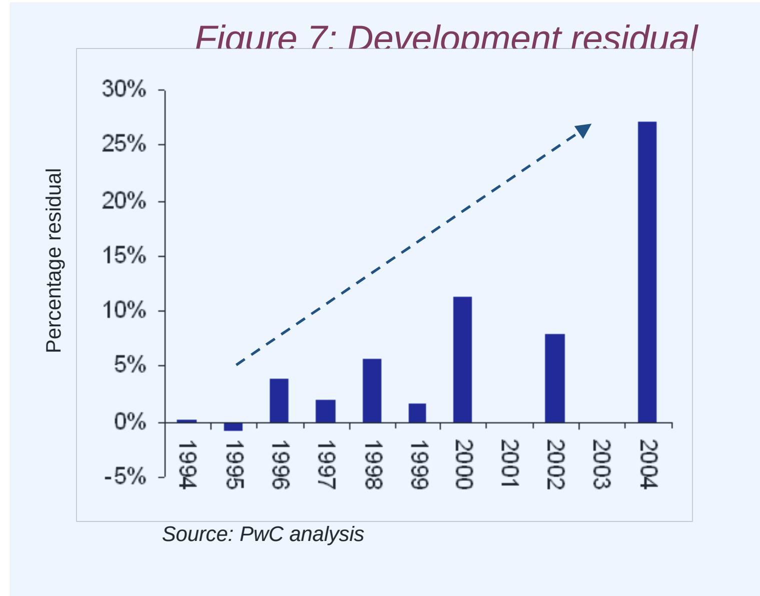
Switching rates and residual margins

Switching rates



- The retail market saw only moderate switching in 1999, followed by considerable customer switching in 2000.
- The extent of switching has stagnated in the years following 2000.

Residual margins



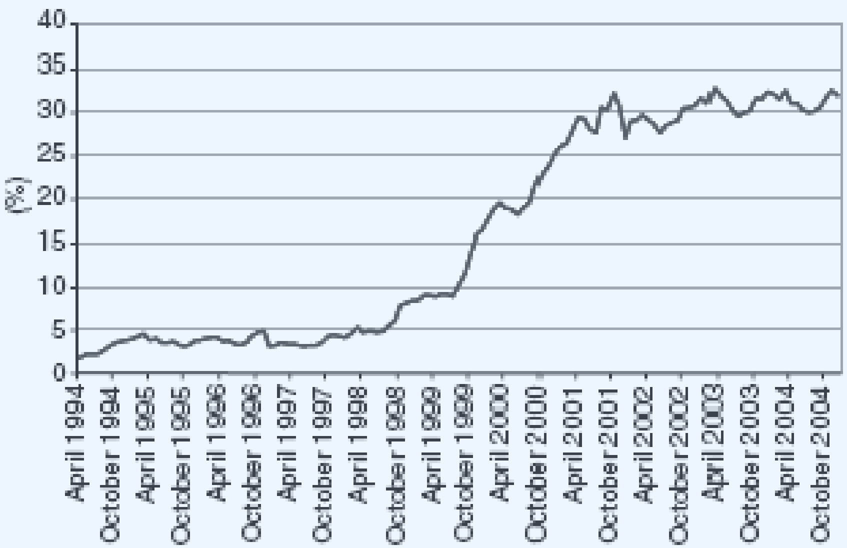
- Residual margins available in the sector have increased between 1994-2004.

  As the New Zealand system is predominantly hydro-based, we assume stabile wholesale prices, except in dry periods. 2001 and 2003 were excluded from our analysis as these qualify as outliers. 2001 and 2003 saw electricity crises as a result of hydro shortages (see figure 20).

Switching: market shares of non-incumbent players in former franchise areas

Market shares of non-incumbent retailers increased post unbundling, but has frozen at around 30 percent

Figure 18 Share of non-incumbent retailers in former franchise territories



Source: Bertram (2006) based on Stratagen

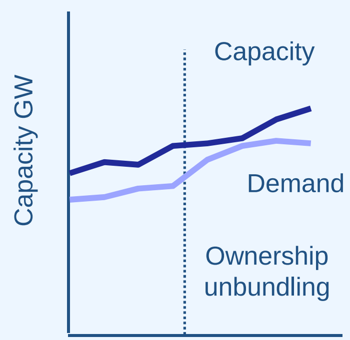
- Figure 18 shows the new entrant market share of retail sales in former franchise areas.
- Although the market was fully liberalised since 1993/4, it is only after ownership unbundling that the market share of non-incumbents increases substantially.
- In 1999 "profiles" were introduced – facilitating this switching. This occurs between 1999 and 2000. The penetration rate freezes at 30 percent from mid-2001.

As the retail market has consolidated, the share of non-incumbent retailers has remained constant

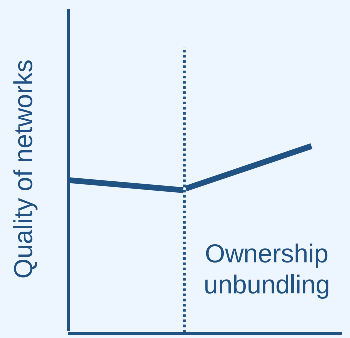
C

Impact of unbundling on security of supply

As a result of ownership unbundling, one would expect……security of supply and investments in generation not to be affected, but network quality to increase



- We expect that the ownership unbundling of retail and network activities will have no impact on the level of investments in generation capacity.
- We therefore expect the reserve margin (difference between installed capacity and peak demand) not to change as a result of unbundling.



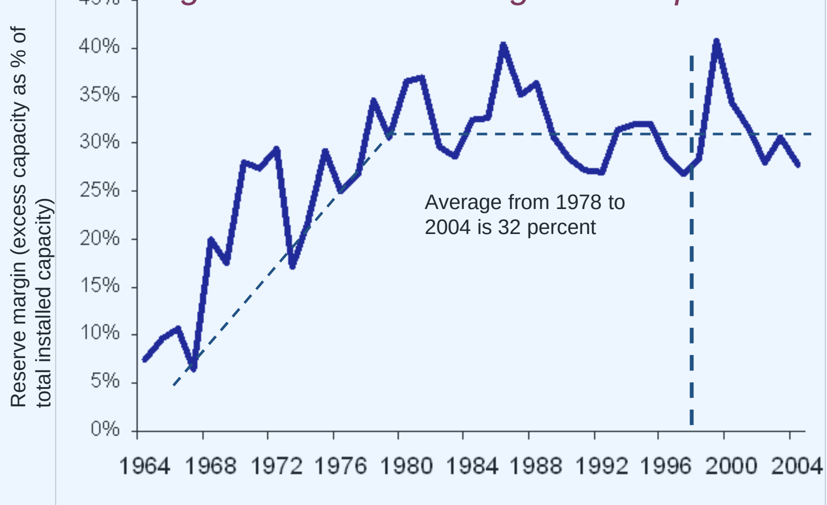
- As a result of ownership unbundling we expect that there will be more focus in the network operators, thus increasing the security of supply.
- If unbundling removes potential cross-subsidies to the retail company, it is expected that more funds will be available for investment, therefore increasing security of supply.
- However, the long-term nature of such trends means that structural breaks in the data cannot *a priori* be expected.

C

Generation reserve and network quality

Reserve margin

Figure 8: Reserve margin development

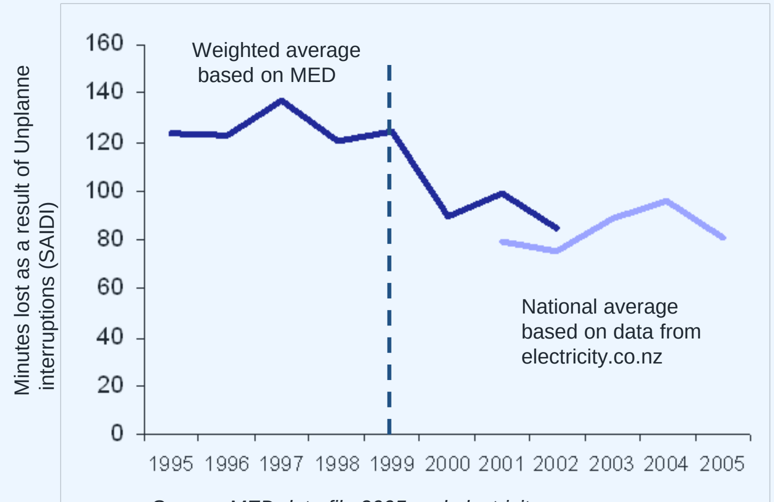


Source: MED, Energy Data File July 2004.

- The reserve margin has not increased since ownership unbundling.
- According to the Ministry of Economic Development there has been very little investment in generation by lines companies since 2004.

Network quality

Figure 9: Minutes lost due to unplanned outages



Source: MED data file 2005 and electricity.co.nz

- There is a decrease in the number of outages *pre* and *post* unbundling. Recent data shows an increase in number of outages.
- No conclusions can be drawn over the impact of unbundling

Summary and conclusions of quantitative analysis

A	Impact on distribution operational costs	Evidence of substantial one-off transaction costs following ownership split. Unit distribution costs decrease following unbundling, but increase from 2002 onwards. Financial benefits do not outweigh financial costs of unbundling.
B	Price development over time	Prices have only temporarily decreased following ownership separation, and are currently above the pre-unbundling level
	Degree of concentration	Market concentration has increased since unbundling. No “pure” retailer left in market.
	Degree of switching	Peak in switching in 2000 but has stagnated since.
	Margin development over time	Residual margins have increased over time.
C	Generation reserve	The reserve margin has not increased since ownership unbundling.
	Quality of networks	No conclusive evidence that quality has structurally improved.

Conclusions and Lessons

- Unbundling does have unintended consequences.
- The quantitative effects of NZ unbundling not positive.
- NZ government unhappy with reform consequences.

- However further study is justified:

- Active distribution networks
- UK evidence on switching and prices may be different