

Brief Synopsis of the Argument of Dr Bronwyn Howell

- Although arguably there may be justification for PSTN ULL in terms of static efficiencies, there seems to be little in the case of broadband ULL in terms of dynamic efficiencies
- In a supply and demand framework, the supply side is all about technologies, costs and prices which can influence levels of substitution between different types of networks. The demand side is all about applications, productivity and learning, and the growth of broadband will be driven from the demand side.
- The danger of PSTN ULL is that it leads to over-investment in narrowband and therefore substitution against broadband.

Synopsis provided by John Ure, Director of the TRP, who chaired the seminar.





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THE UNCERTAINTIES OF BROADBAND: Implications for Unbundling the Local Loop

Presented at the Centre for Asian Studies,
University of Hong Kong
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COROPRATE MEMBERS

Contact Energy Ltd
Fonterra Co-operative Group Ltd
Meridian Energy Ltd
Natural Gas Corporation
New Zealand Post Ltd
Powerco Ltd
Reserve Bank of New Zealand
Telecom Corporation
of New Zealand Ltd
Transpower New Zealand Ltd
Victoria University of Wellington
Westpac Institutional Bank

CONTEXT

Internet information transfer technologies

broadband = frontier (speed, capacity)

critical importance for productivity growth, increasing welfare

“a significant harbinger and bellwether of future economic prospects” - Haring *et al.* (2002)

Perception

“the current bottleneck to growth in the communications sector, and beyond for areas such as electronic commerce, is the limitations of local access networks” as “there is usually one, or at best two, networks passing most homes and businesses in OECD countries” – OECD (2001)

‘Ideal’ objective/performance measure

high broadband penetration



OECD'S 'IDEAL' ENVIRONMENT

Multiple competing broadband technologies

independently owned

“the countries with alternative infrastructure available to business users are developing broadband access much faster than in those markets where there is only one, or at best two, platforms available to provide broadband access”



THE INTERNATIONAL REALITY

Limited inter-platform competition

Monopoly telecommunications providers

History of telecommunications regulation

limiting the ‘natural monopoly’

The search for a regulatory ‘solution’



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THE 'SOLUTION'

Local Loop Unbundling, compulsory wholesaling

to “open up the networks of players in dominant positions to competitive forces” as a stepping-stone on the path towards full facilities-based competition”



THE NEW 'PROBLEM'

Measuring 'success'

market shares of new entrants?

penetration rates of specific new technologies?

prices to the customer?

percentage of new entrant infrastructure?



THE ISSUES

The state of the market

or

The type of regulatory environment?

Productivity gains from an ‘Information Economy’

or

Satisfying a specific technology diffusion statistic?

Static efficiency on the PSTN

or

Dynamic efficiency of information transfer markets?



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WHAT IS THE MARKET?

Historic focus on the supply side

dominance of voice

the emergence of data

limits to open entry

PSTN dominance

Technological innovation

declining costs

emergence of new technologies

New products and services

or new products and services on old technologies?



MARKETS FOR INFORMATION TRANSFER

Product is information

Voice, data = two forms of information

Information is

created

transferred

processed

consumed

Role of applications, transport

**Markets for supply and demand of applications,
transport**



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FRAMEWORK FOR ANALYSIS

Internet = General Purpose Technology

product = digital information transport

derived demand: end-user applications

dial-up, broadband = two variants for transporting application-determined digital information

substitution between variants governed by user-determined productivity enhancements

businesses => increased profit

residential => increased utility within budget (time, money)

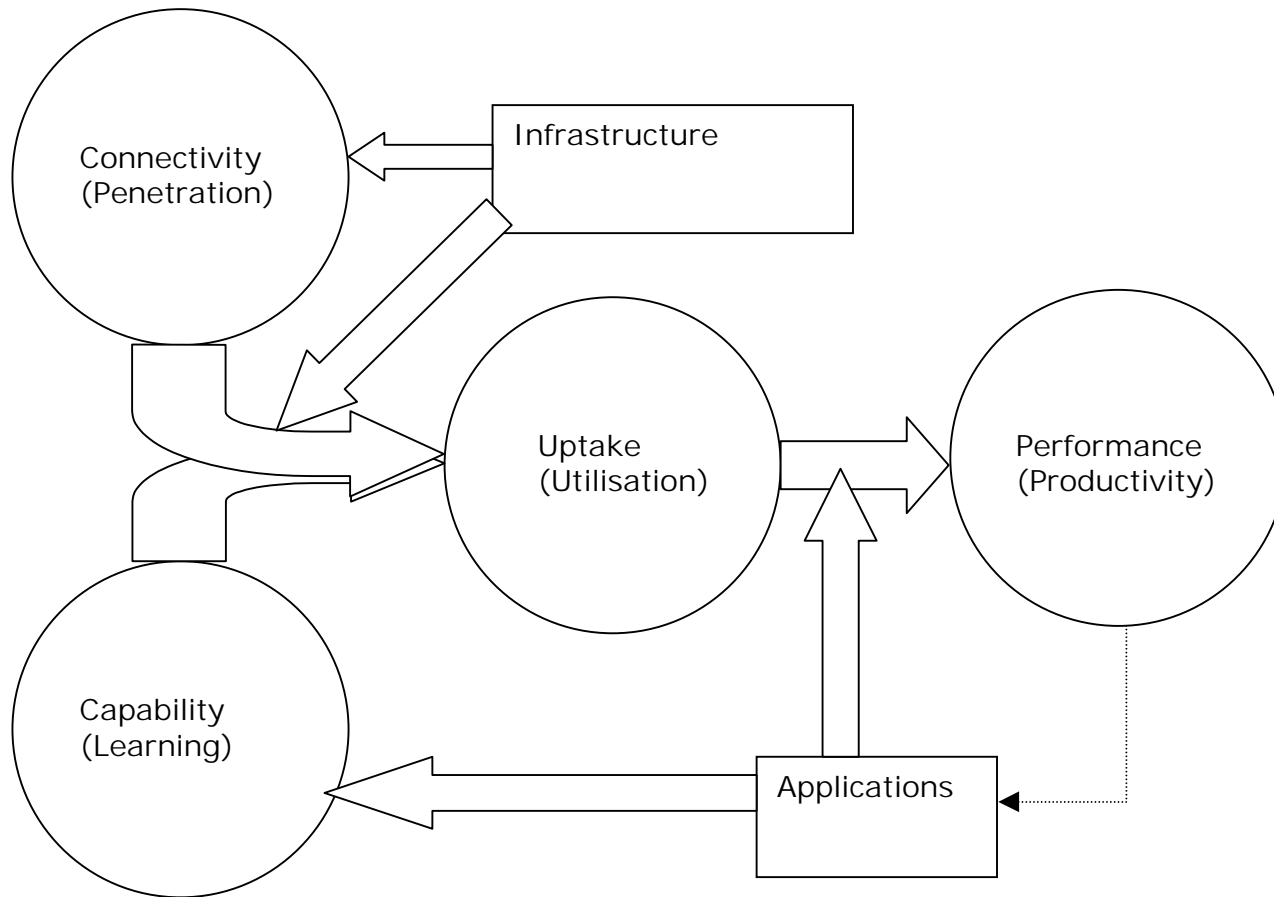
Trucking analogy

trucks, roads, cargoes, production and consumption processes

Markets evolve from intersection of supply and demand

examine demand-side issues





TECHNOLOGY SUBSTITUTION FACTORS

Fixed costs of access

Utilisation costs

time taken for information exchange

user time

costs of information transfer

volumes of information transferred

application portfolio

number of uses of each application

Substitute broadband for dial-up when

Application benefit-broadband costs > Application benefit-dial-up costs

OR

when new application requires broadband capability



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WHAT CAN INFLUENCE TECHNOLOGY SUBSTITUTION?

Relative technology prices

fixed access

variable usage

User valuation of time

User learning

Application portfolio

number of applications

number of times each application used

Supply side can only influence prices

Hence importance of understanding demand side



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LIMITS OF LOCAL LOOP UNBUNDLING

Confined to existing infrastructures

and then only the PSTN

Pricing differentials may induce earlier substitution

Induces increased use of existing applications

may accelerate learning effects

But cannot of itself create new applications

although allows new cargoes to be transported

May entrench existing infrastructures, applications

network effects

increased barriers to new infrastructure entry, applications
development

Long term dynamic welfare loss



THE OECD EVIDENCE

Korea

The United States

Denmark

Iceland

New Zealand



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KOREA

OECD broadband penetration leader without LLU

Government subsidies, infrastructure provision directives

low prices to consumer

Dominance of residential applications

1st in broadband penetration; 26th in Internet hosts/1000; 28th in secure servers/1,000,000 per million; 17th in websites/1000

no significant evidence of content, application creation

Significant role of applications

voice-over-IP, gaming, other entertainment

Absence of copyright enforcement

ultimate reduction in content, application creation



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Internet Metric	New Zealand		Australia		USA		South Korea		UK		France	
	#	Rank	#	Rank	#	Rank	#	Rank	#	Rank	#	Rank
<i>Connectivity Statistics</i>												
ISP Accounts/100	14	9 th	12	10 th	18	5 th	23	1 st =	11	12 th	5	21 st
Household %	48	5 th	47	8 th	50	3 rd	-	-	38	10 th	12	23 rd
School Availability	22	4 th	17	5 th	27	2 nd	5	19 th	16	9 th	6	18 th
Internet Hosts/1000	10 5	8 th	95	10 th	272	1 st	14	26 th	63	13 th	31	19 th
Web Sites/1000	11	12 th	9	13 th	47	1 st	6	17 th	25	4 th	4	20 th
Domain Names/1000	22	11 th	19	16 th	38	5 th	21	14 th	51	1 st	9	20 th
Secure Servers/million	20 2	3 rd	19 0	5 th	301	2 nd	11	28 th	141	8 th	38	21 st
<i>Broadband Statistics</i>												
BB Subscr/1000 ⁷⁸	7	19 th	9	17 th	47	4 th	173	1 st	6	20 th	11	15 th
DSL Subscr/1000 ⁷⁹	14	15 th	8	20 th	15	14 th	130	1 st	7	21 st	12	17 th
DSL Coverage %	85		85			65		90		66		91
<i>Uptake Statistics</i>												
Hours/month/ISP account	21	2 nd	18	4 th	26	1 st	-	-	10	7 th =	10	7 th =
		(Xtra)		(Telstra)		(AOL)				(All ISPs)		(All ISPs)

Source: Howell (2003) *Building Best Practice Broadband in New Zealand*



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UNITED STATES

LLU leader (1996 Telecommunications Act)

Yet cable has market dominance (Hausman, Sidak and Singer, 2002)

market share cable:DSL 2:1

cost advantage to suppliers

advantage derived from price bundling or content bundling?

Evidence of decline in entrant investment

Econometric (Aron and Bernstein, 2003)

Proportion of unbundled lines

2000 - 17%; 2002 - 7%; 2003 - 5% (OfTel 2002, 2003; reporting FCC)

'Hit and run' usage

incumbent bears disproportionate risk of new investment,
exposed to erroneous market projections



DENMARK

EU unbundling leader (1998)

Justification: competition in the local loop

pre-dates availability of DSL

Objective: “best and cheapest ... several pipes to the home” (Andersen, 2003)

Fast growth of DSL penetration – EU leader

Rapid growth in entrant market share

40% in DSL market

Unbundled loop performance:

100% exchanges available; 1% of lines unbundled (Melody, 2002)



DENMARK (cont.)

Prices, penetration build on wholesaling

Accusations of predatory pricing by TDC

And TDC owns the cable infrastructure as well

Application and usage evidence:

higher broadband penetration, but residential skew (fewer Internet hosts, secure servers than NZ, Iceland)

Average hours per Internet user approx 10 per month
(compared to United States 26; New Zealand 24; Germany 10; Sweden 8 Howell and Obren, 2003; Nielsen//NetRatings July 2003)

Productivity implications?



ICELAND

Early adopter

History of infrastructure competition

High Internet penetration, utilisation

Pre DSL (1999) 2nd in Internet accounts/100, 3rd in hours per ISP account per month

Broadband penetration 2003 7th in OECD; 67% of Denmark

Unbundling implemented after DSL available

Outcome?

June 2000 – June 2002 ISP accounts/100 grew 200%; Internet users per 10,000 grew 2%

pricing arbitrage to access the Internet – role of foreign data charges



NEW ZEALAND

Very early market deregulation

begun 1987; SOE 1989; full privatisation 1991

‘light-handed’ regulation – no barriers to entry

Amongst OECD leaders in connectivity, utilisation

investment levels (#1 in OECD in ICT investment as % of GDP)

early adoption (Internet 1989; 100% digitalisation 1995)

broadband 1996; cable 1999)

infrastructure competition (limited local loop 1992; LAN 1996;

wider local loop 1998, cable 1999)

internationally low dial-up prices - role of Kiwi Share/TSO

very high dial-up usage



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NZ'S BROADBAND MARKET

Early adoption (1996)

Multiple competing platforms (6)

Ethernet LAN, Satellite, DSL, Cable, Wireless, Mobile

Wide geographic coverage

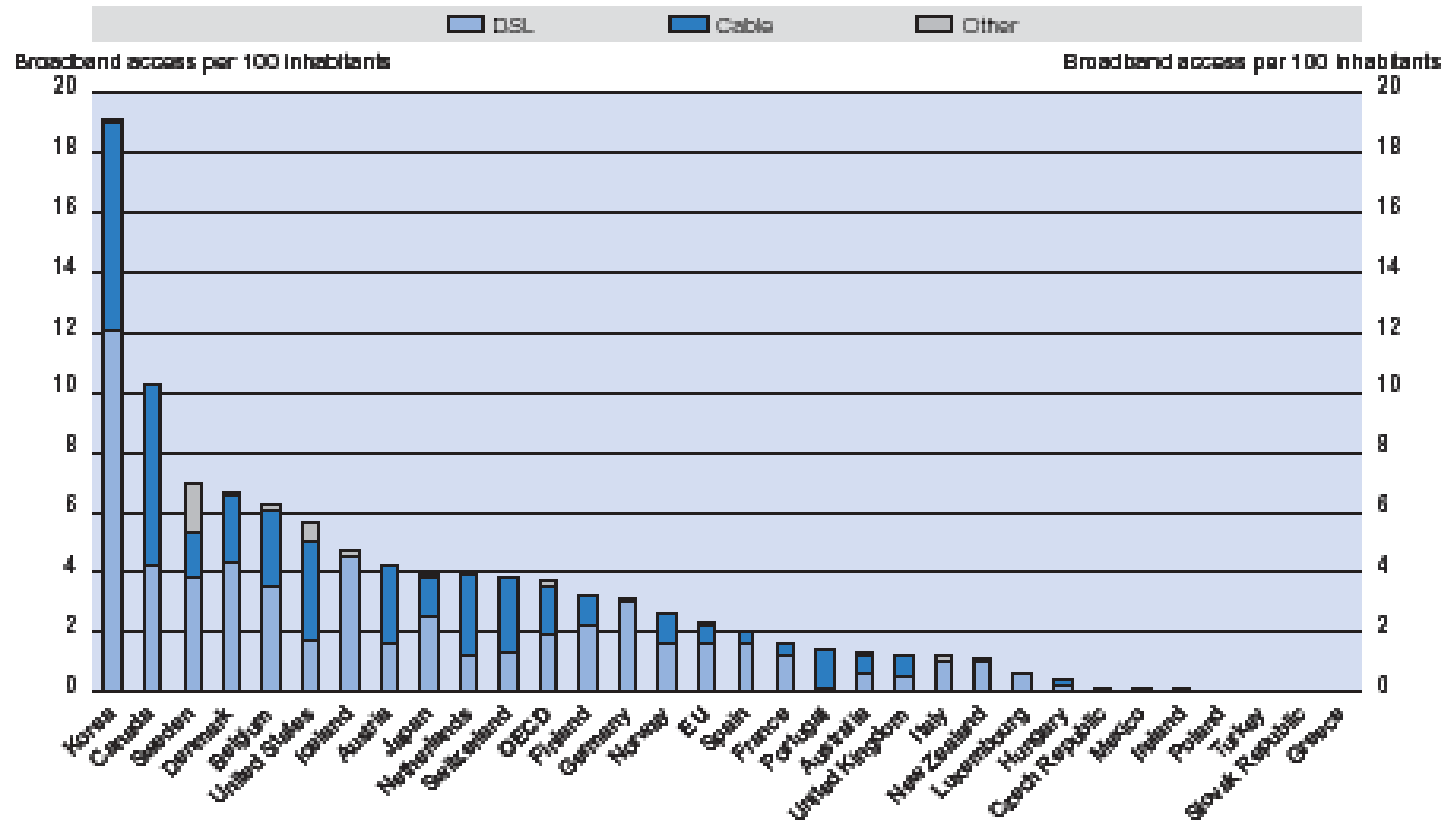
Satellite 100%, mobile 95%; DSL 85% of Telco customers;
wireless 10 CBDs, 9 planned

Internationally comparable prices

allowing for speed and levels of observed usage
metered pricing positive for low users



YET DISMAL BROADBAND PENETRATION



THE DILEMMA

No evidence of a supply-side market failure

So why is an experienced, high Internet-using population with all these advantages just not buying broadband Internet access?

And does it really matter?



RELATIVE PRICES

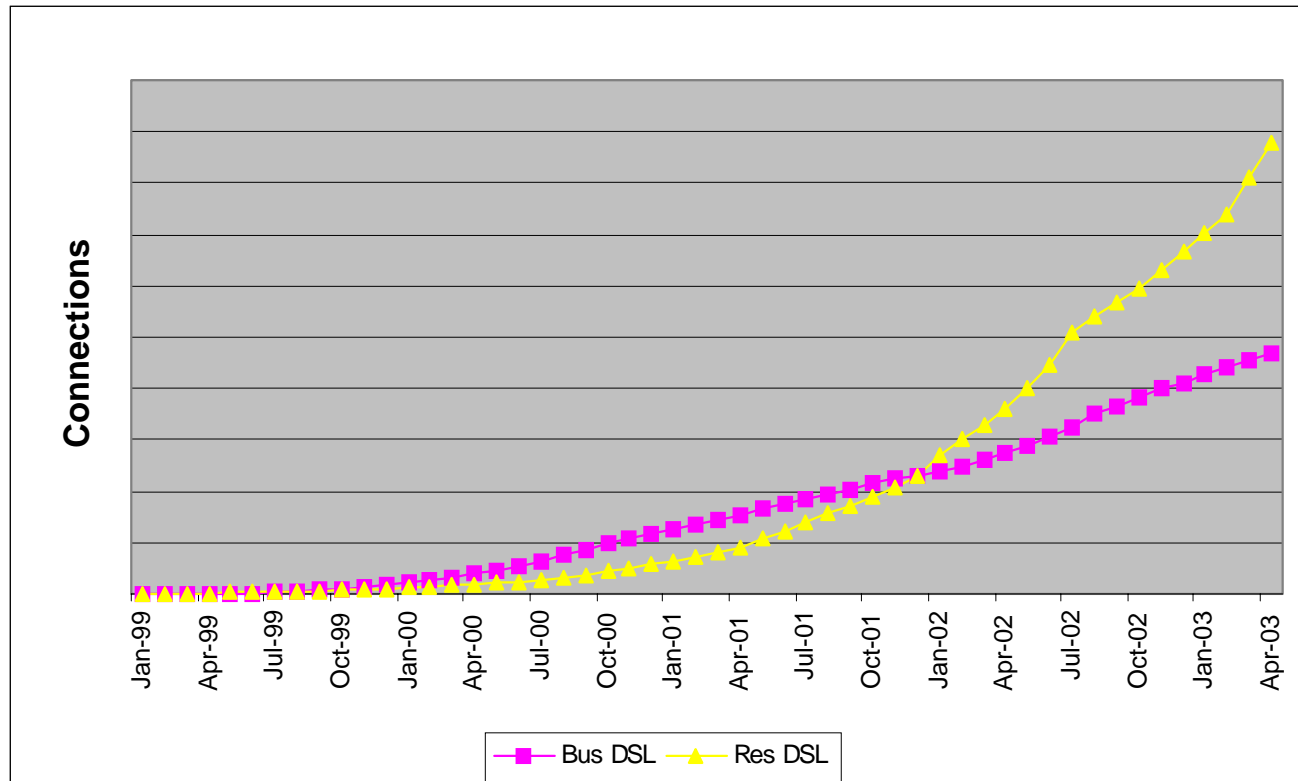
	Residential			Business		
	Broadband	Dial-Up (150 hours)	Ratio	Broadband	Dial-Up (150 hours)	Ratio
France	367	793	0.46	850	1460	0.58
Germany	305	537	0.57	510	1110	0.46
Sweden	250	805	0.31	430	1281	0.34
UK	317	224	1.42	370	332	1.12
US	317	247	1.28	442	328	1.35
NZ (1)⁸⁵	348	134	2.59	420	353	1.19
NZ (2)⁸⁶	348	230	1.51	213	263	0.81

Prices in UK£, PPP at August 2002



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BUSINESS & RESIDENTIAL MARKETS



STATISTICS

**Diffusion per significant business unit is 10 times
diffusion per inhabitant**

**Residential consumption per account exceeds
business consumption per account**

daytime usage incentives to residential customers

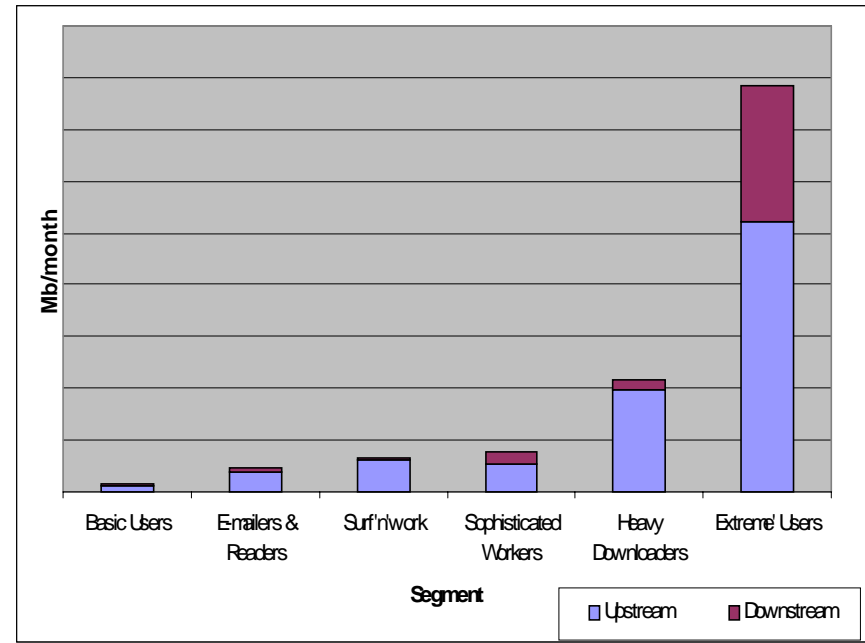
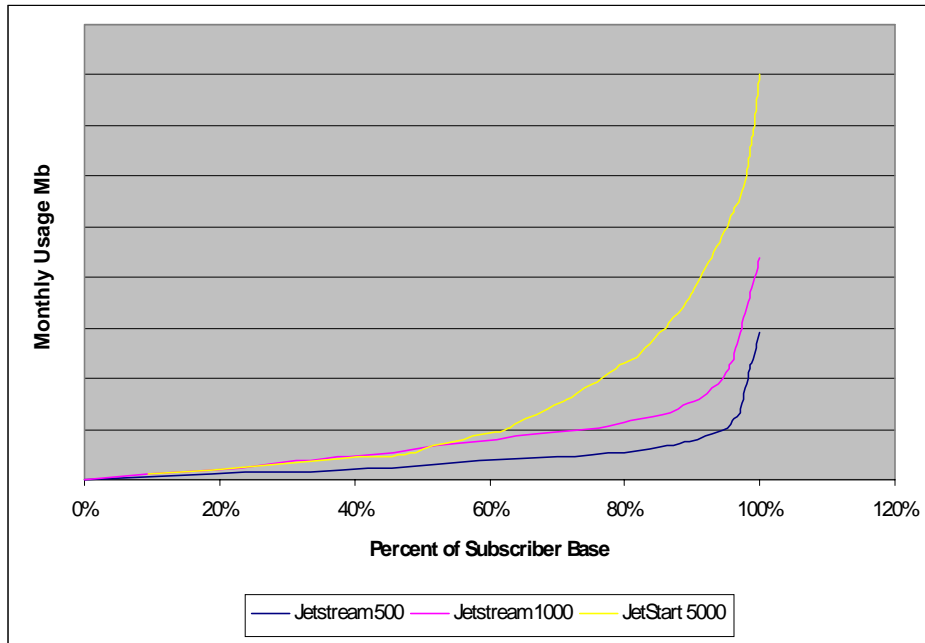
Significant 'skew' to residential consumption

median residential consumption only half the average
consumption

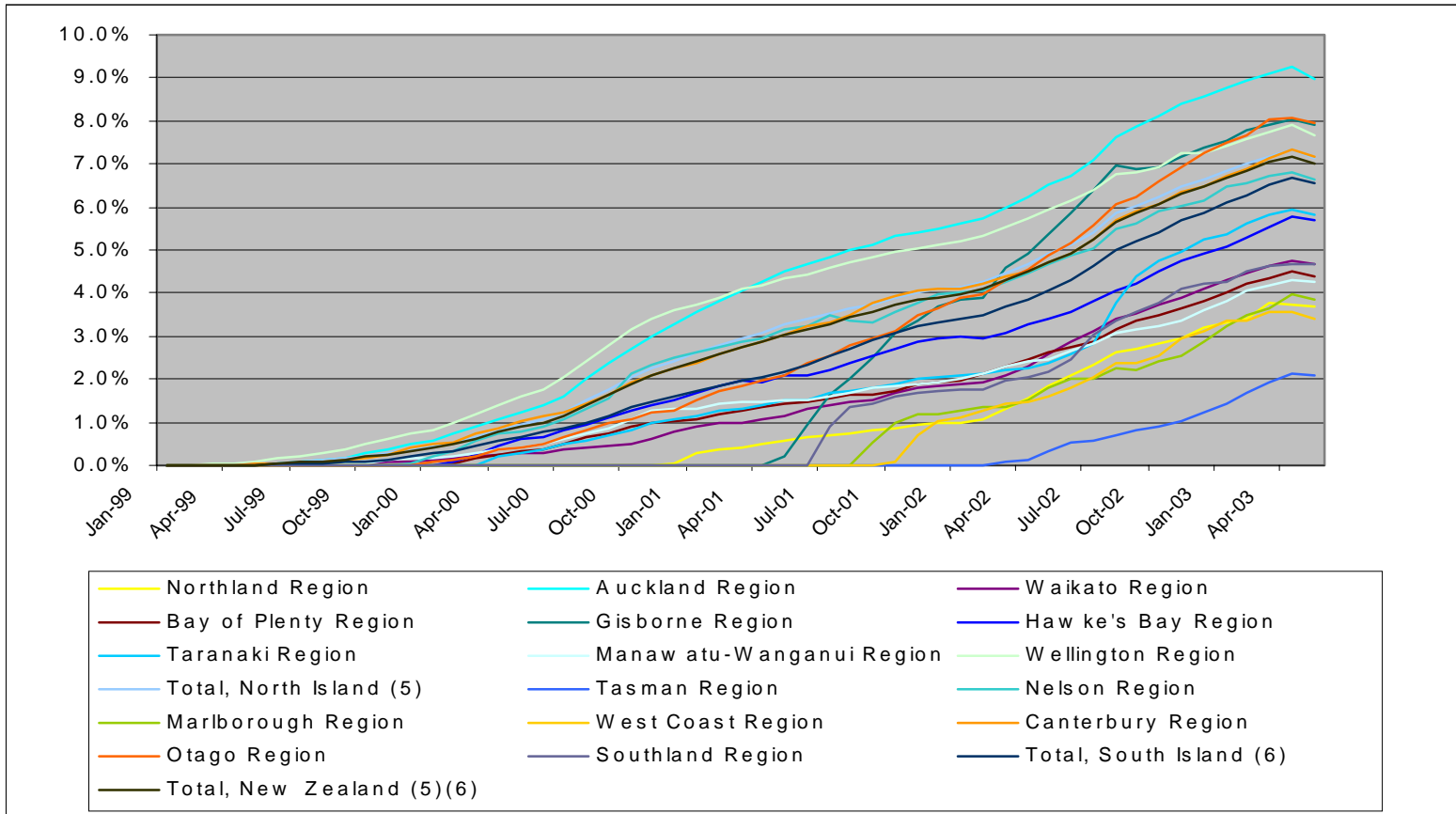
Flat-rate versus capped pricing



USAGE LEVELS –RESIDENTIAL



NO EVIDENCE OF 'DIGITAL DIVIDE'



PRICING ARBITRAGE

THE MOST SIGNIFICANT DETERMINANT OF BROADBAND PURCHASE IN NEW ZEALAND IS PRICING ARBITRAGE

**Internet users are merely purchasing the most
cost-effective way of accessing the Internet**

Price differential bigger for businesses

**=> Would expect to see proportionately more
business purchase**



APPLICATIONS

Pricing arbitrage brings forward substitution

Ongoing productivity benefits require

more usage of existing applications

new productivity-enhancing applications

**Shortage of productivity-enhancing applications
delaying substitution**

business sector – email, web browsing

residential sector – email, web browsing

New Zealand findings especially relevant

no cable TV bundling to distort

variety of leisure alternatives



POSITIVE IMPLICATIONS

**NZ has ‘solved’ the SME broadband uptake
incentive problem**

usage-based pricing

**NZ market environment has ‘exposed’ worldwide
broadband penetration reliance upon pricing
arbitrage and a limited number of residential
entertainment applications**

**Focus now on demand-side application
development**



IMPLICATIONS

Supply-side regulatory intervention impotent to ‘fix’ the applications problem

New Zealand doesn't appear to have a supply-side problem anyway

LLU-induced ‘price wars’ may reduce competition to one platform

Focus must be on productivity-enhancing applications

not necessarily just an Internet issue

can we be sure that future new applications will require the types of information transfer that current policies encourage



RISKS OF LLU

Over-investment in idle infrastructure

Infrastructure development too far in advance of application development?

Raising entry barriers for new technology platforms

entrenching existing infrastructures, applications
delaying implementation of the 'next wave'

Political economy of the telecommunications industry

Risks from having no LLU policy

no evidence of delayed deployment of new platforms if application need justifies it

case of mobile telephony

new infrastructure entry is the best competition



CONCLUSION

NZ regulatory environment *IS* different

but this hasn't necessarily disadvantaged NZ
learning may enhance other regulatory environments

Focus on productivity outcomes

productivity improvements not necessarily proportional to
bandwidth consumption

Application development the key to increased productivity

Information use underpins productivity

requires learning more about how we use information
it's the 'Information' economy, not the 'Technology' economy.



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