



**NEW ZEALAND INSTITUTE FOR THE STUDY
OF COMPETITION AND REGULATION INC.**

REGULATED RETAIL TARIFF STRUCTURES, DIAL-UP SUBSTITUTION AND BROADBAND DIFFUSION:

Learning from New Zealand's Experience

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OVERVIEW

Broadband uptake

The NZ enigma

Substitution vs new demand

Role of price structure

Application

Implications



BROADBAND UPTAKE DRIVERS

Dependent Variable:

- broadband connections per capita

Possible independent variables:

- demand-side
 - price, income (individual and country), education, addressable market size, weather, length of time the technology is available, presence of substitutes & complements, teledensity
- supply side
 - price, population density, urbanisation, government policy, competition (intra- and inter-platform)



THE NEW ZEALAND ENIGMA

Apparent absence of constraints

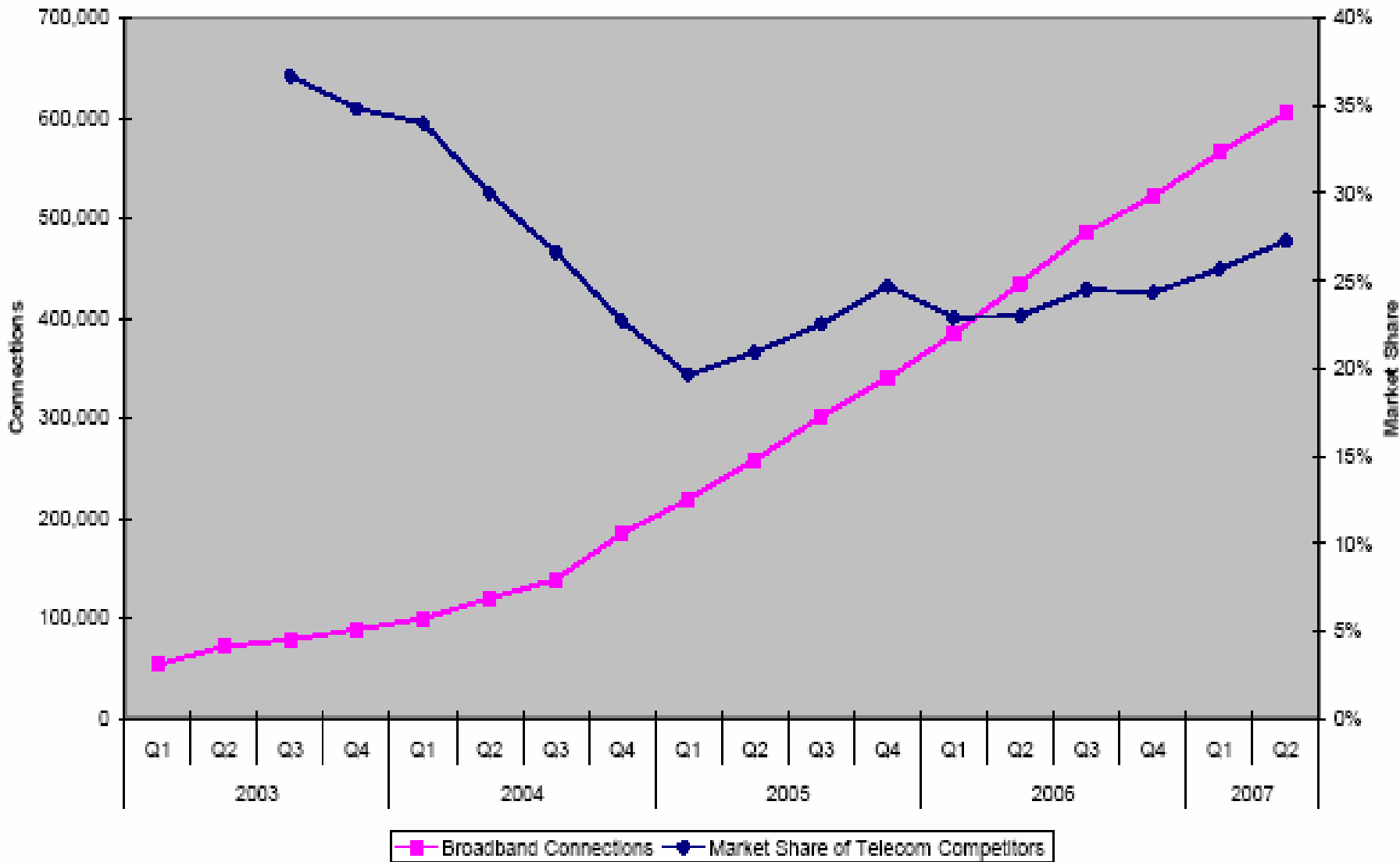
- supply-side
 - early implementation (3rd in OECD for ADSL), low prices (lowest quartile of OECD per mbps – 2nd-lowest in 2000), high speed services (2Mbps base offering), wide availability (85% of lines by 2003)
- demand-side
 - early and avid adopters of telecommunications technologies
 - large internet-using population (#1 in 2006 – ITU), high number of hours online

Regulatory & competitive environment

- highly concentrated; but active fringe competition (5 technologies)
- bitstream LLU introduced 2004, full LLU 2006 but prices still very low – concentration ***increased*** after bitstream access mandated



New Zealand ADSL Market 2003-2007



LOW BROADBAND UPTAKE MAY NOT BE A 'PROBLEM' AT ALL

Low GDP per capita

- 22nd in OECD (2007)

Internationally low population density, urbanisation,
teledensity levels

But inconsistent with evidence of extremely high dial-up
internet connection and usage levels



A SUBSTITUTION PROBLEM

Internet is a General Purpose Technology

Dial-up = legacy

Broadband = frontier

Issue is substitution from legacy to frontier

Why is NZ's substitution (uptake) so low?

Does explanation lie in the market for the legacy technology?



SIMPLE SUBSTITUTION MODEL

Demand-side problem

- when will user substitute?

Derived demand for user i

- benefits $\sum_{j=1}^n \beta_{ij}$ accrued from use of applications j requiring ν_j megabytes of bandwidth and T_{Bj} minutes of time at fixed price F_B variable price V_B using broadband and T_{Dj} minutes of time at fixed cost F_D variable cost V_D using dial-up; user value of time γ_i per minute

User substitutes when

$$(F_D - F_B) + \gamma_i \sum_{j=1}^n (T_{Dj} - T_{Bj}) + \sum_{j=1}^n (V_D T_{Dj} - V_B \nu_j) > 0$$



SUBSTITUTION MORE LIKELY

If fixed costs for dial-up are high relative to the fixed costs of broadband

Value of user time is high (and/or broadband substantially faster than dial-up)

Volume of information transfers is high

Less likely if

- per megabyte charge large relative to per-minute charge
- value of user time is low
- relative speed difference is small



NZ-SPECIFIC CIRCUMSTANCES

Base connection speed high

Broadband sold using multiple two-part tariffs

Dial-up sold using flat-rate tariffs

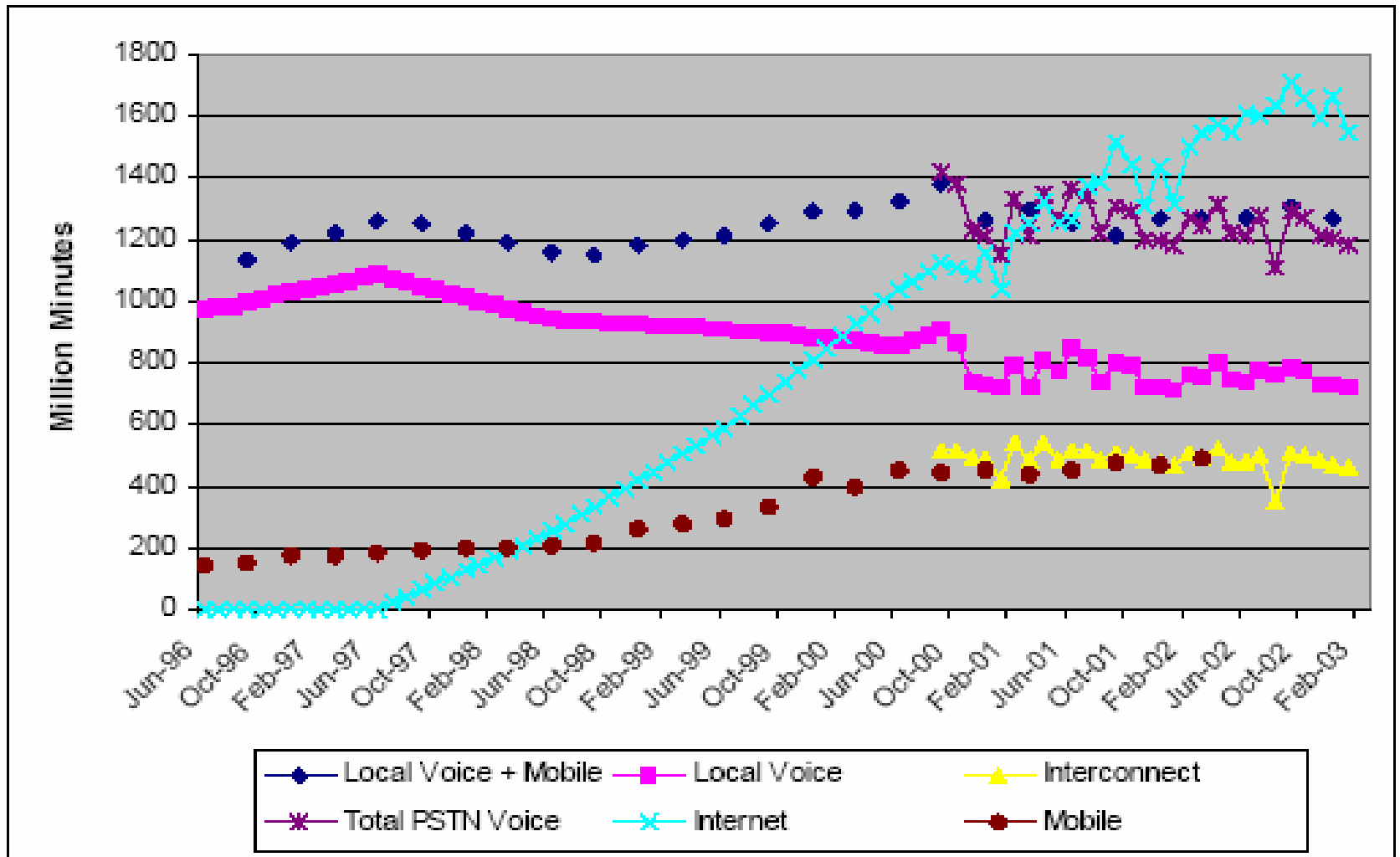
- tariff regulation imposed by contract on the incumbent since 1990 via the 'Kiwi Share; agreement

Per megabyte charge is very large relative to per-minute charge (zero)

Legacy technology tariff structure regulation is affecting rate of substitution to frontier technology



NZ TELEPHONE TRAFFIC 1996-2003



TWO-SIDED MARKET VIEW

‘Money’ side (inelastic)

- high connection values
- low usage volumes

‘Subsidy’ side (elastic)

- high usage volumes
- but must be low value usage



TARIFF STRUCTURE & TECHNOLOGY DIFFUSION

Two-part tariff

- connection and utilisation tied
 - differences in user willingness to pay for each product in bundle crucial to purchase decision
- when connection priced below cost (subsidised from usage) connection diffusion rate is accelerated
 - as usage increases => higher average cost of usage
 - highest-volume users are highest-valuing consumers

Flat-rate tariff

- special case of two-part tariff
- utilisation price is zero – connection subsidises usage
- fewer connections sold, but usage is higher (marginal consumer values usage at zero, not marginal cost)
- usage volume increases => lower average cost of usage
- highest-volume users have lowest average usage valuation



THE SUBSTITUTION DECISION

Two distinct effects: connection & usage

Dial-up internet (legacy):

‘Connection Gift’

- internet connection ‘gifted’ with extant voice connection
- the higher the dial-up connection tariff, the higher the value of the ‘connection gift’ (flat-rate tariffs => highest connection price)

‘Usage Gift’

- flat-rate tariff => higher usage volumes
- but lower average consumer value of usage



USER VALUATIONS & TWO-PART TARIFFS

Connection gift

- valuation of connection for the marginal substituter is higher the higher the value of the connection gift

Usage gift

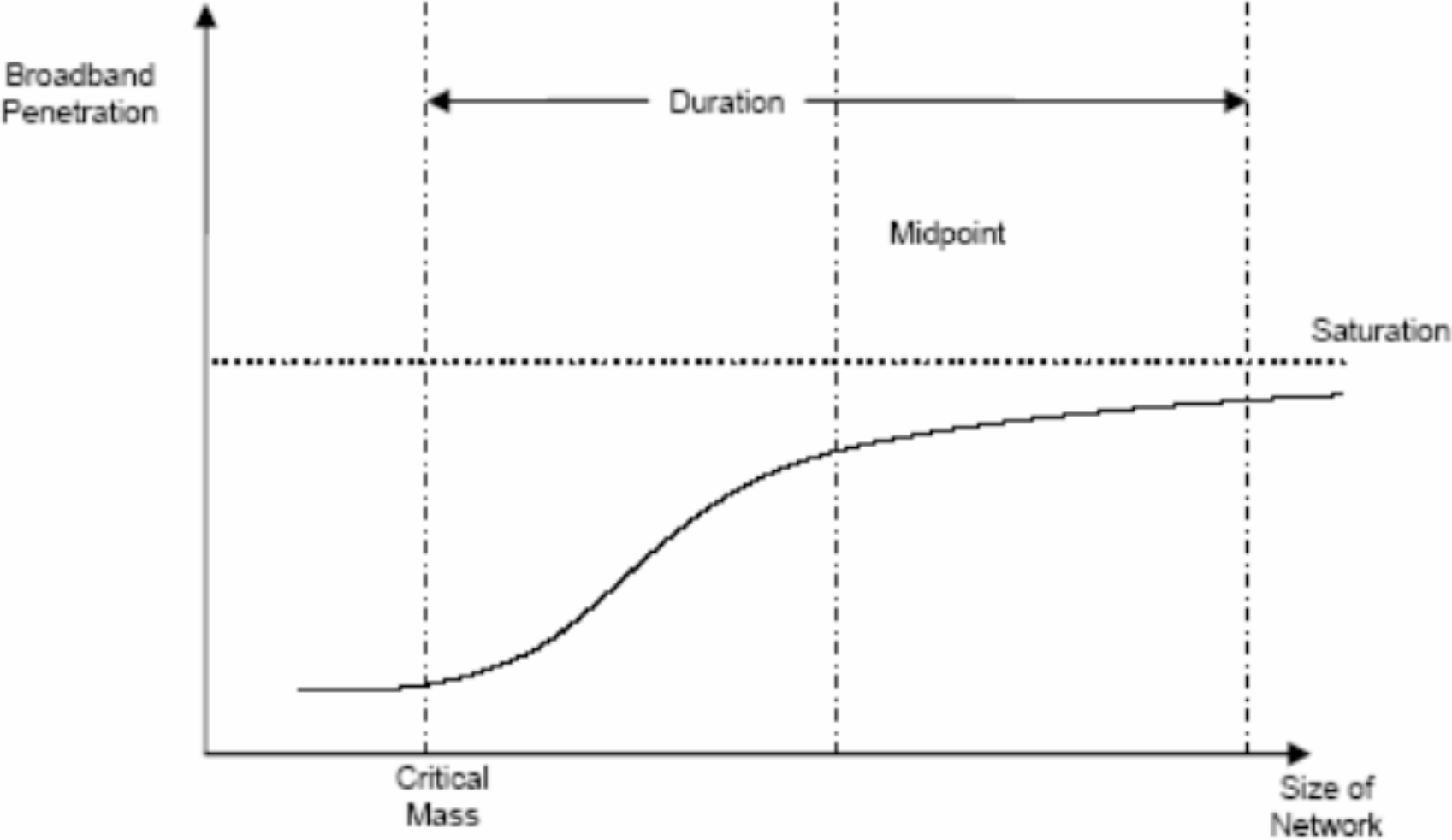
- valuation of usage for the marginal substituter is higher the higher the value of the usage gift

Relative to cost-based connection, usage prices

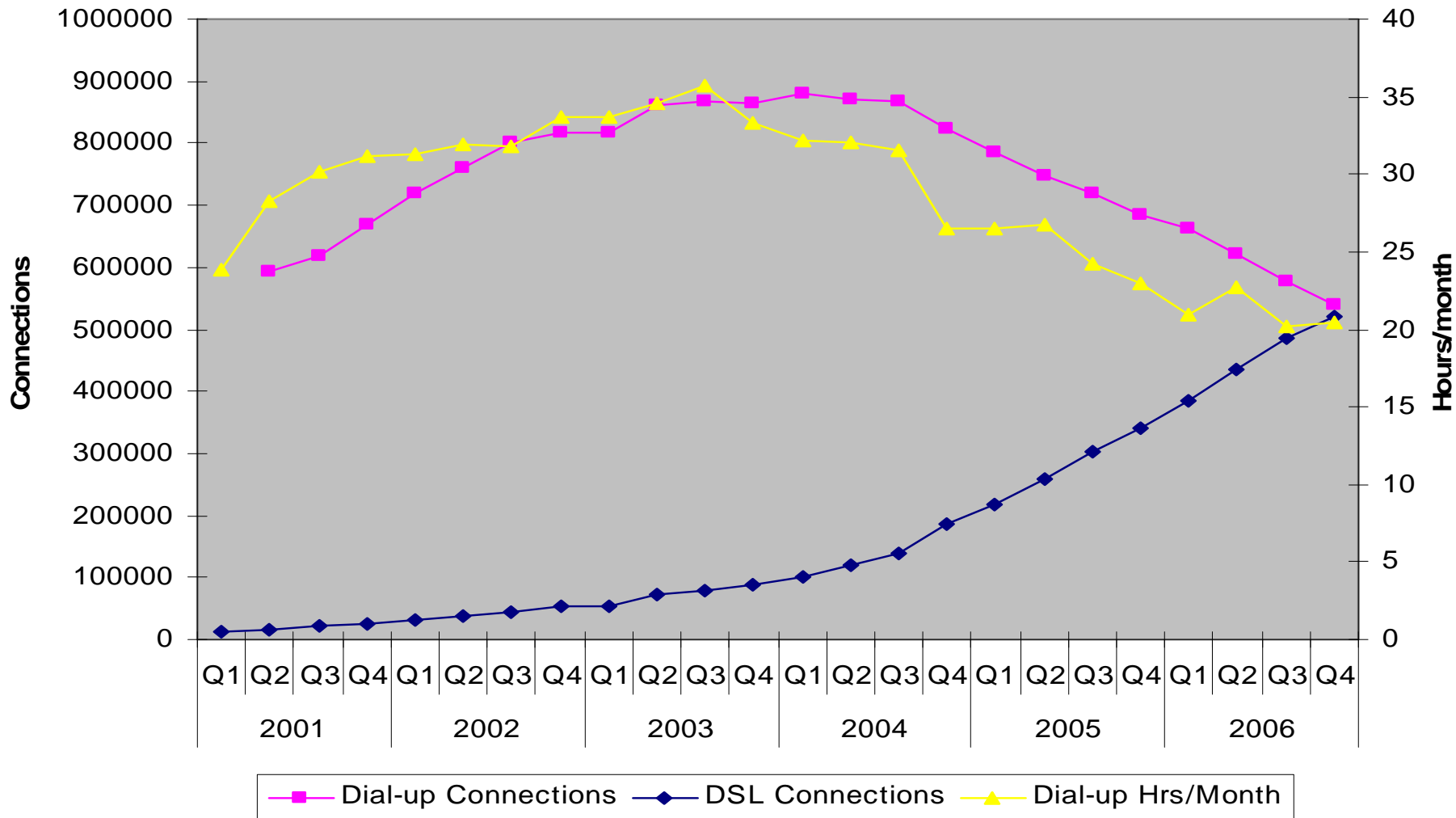
- flat-rate dial-up tariffs maximise both gifts, so substitution will occur at higher valuations of both (i.e. delayed substitution from ‘double disadvantage’)
- two-part tariffs with discounted connection prices and higher usage prices results in substitution at lower values of both (i.e. earlier substitution)



TECHNOLOGY DIFFUSION CURVE



NZ Internet Market 2000-2006



SUBSTITUTION TO FRONTIER DRIVEN PRIMARILY BY LOW-VALUE USAGE

High connection-valuers substitute early; usage not necessarily high for these users

- in 2003, average usage 1500 Mb/month, median 700Mb/month for highest-cap (10Gb/month) residential ADSL plan

High volume users with low average usage valuation will not substitute until combined value of connection and usage exceeds sum of fixed and variable components of broadband charge

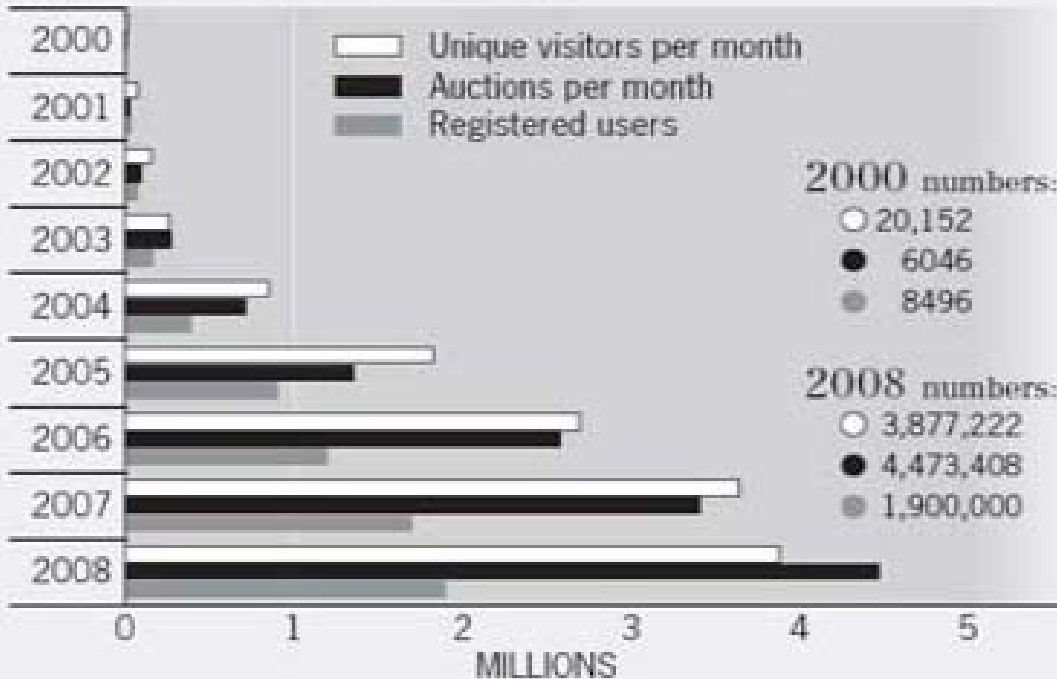
- two-part broadband tariffs will induce earlier substitution by high connection valuers (but exclude lower-valuing consumers)
- flat-rate bb tariffs more attractive to high volume/low average valuation users (subsidy from high connection valuers)



HIGH-VALUED USAGE-GENERATING APPLICATIONS MAKE THE DIFFERENCE

► KEVIN THE KIWI TURNS NINE

The growth of the Trade Me community.



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IMPLICATIONS

Flat-rate tariffs for the legacy technology delay diffusion to the frontier

New applications accessible only on the frontier are required to induce the majority of users to substitute

- if valued applications are accessible on the legacy, then extant ‘connection’ and ‘usage’ gifts from tying and flat-rate tariffs must be overcome to induce substitution

Fibre to the home, 3G mobile

- demand-side (application valuation) factors may be more important than supply-side factors in inducing substitution
- regulated tariff structures must take account of differences in consumer valuations of connection and usage components e.g. handset bundling in Finland

