



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

THE ROLE OF PRICE STRUCTURE IN TELECOMMUNICATIONS TECHNOLOGY DIFFUSION

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TECHNOLOGY DIFFUSION

Current relevance

- internet and broadband connectivity

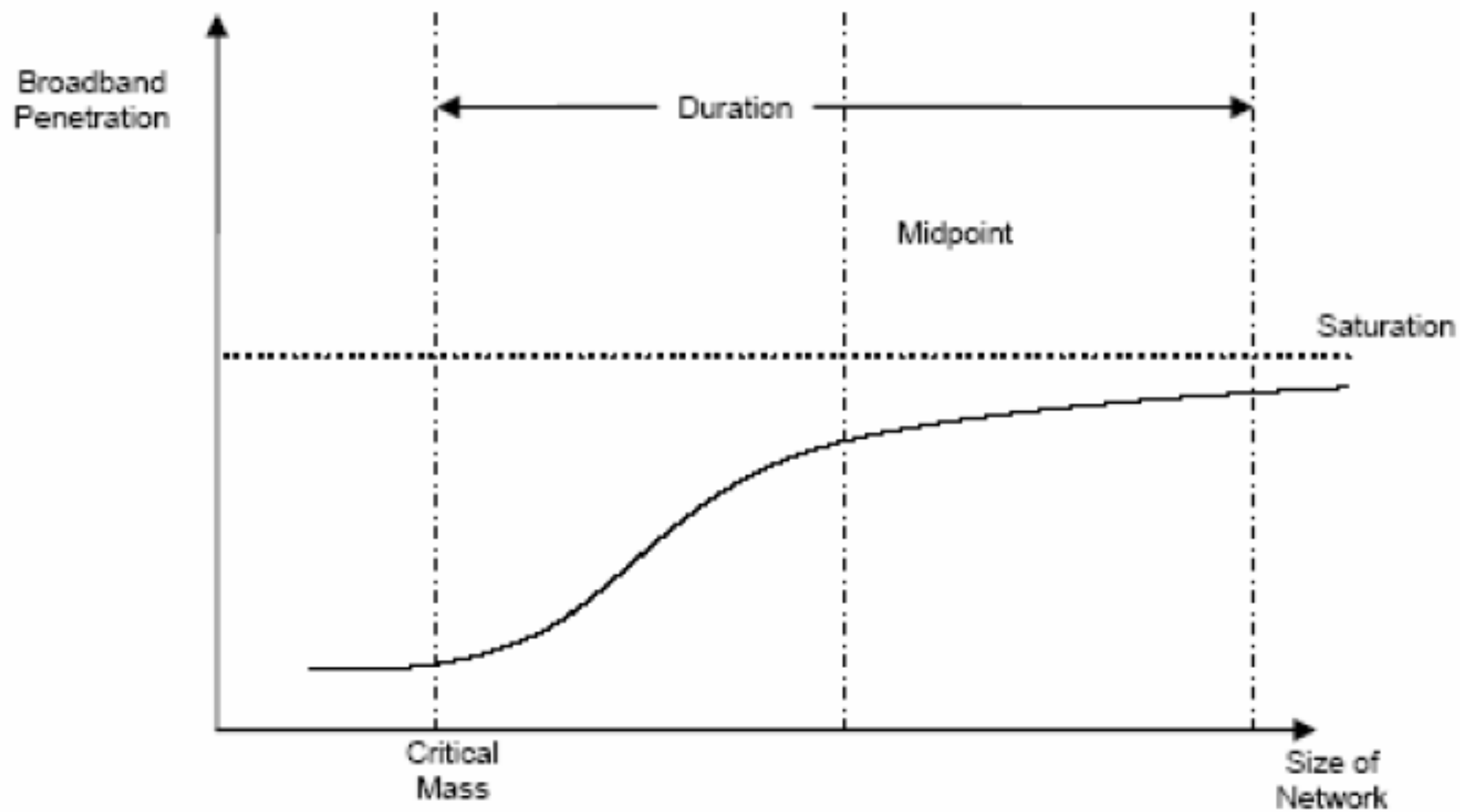
Interaction of supply and demand side factors

- supply-side
 - price, availability, product variety
 - ease of entry => quantity increases, price falls, diffusion increases
- demand-side
 - willingness to pay (consumer valuations)
 - as price falls, consumers with increasingly lower willingness to pay will purchase => diffusion increases

Time-based (dynamic process)



Figure 1: Technology Diffusion Curve



TARIFF STRUCTURE AND TELECOMMUNICATIONS DIFFUSION

Social implications

- increased welfare from higher connection numbers
- higher diffusion levels ‘better’ than lower

Voice telephony

- two-part tariffs (connection and usage)
- ‘tied’ pricing – consumer purchase determined by joint valuation of connection and usage
 - connection essential to garner any benefit from calling

Connection diffusion rate accelerated if

- discount connection price below cost
- increase usage charge above cost
- e.g. prepay mobile phone connections at the extreme



IMPLICATIONS OF TWO-PART TARIFFS

The more call minutes consumed, the lower the average cost per call minute faced by consumers

Compared to neutral, cost-based two-part tariffs

If usage subsidises connection

- more connections are sold; fewer call minutes are sold
- average cost per call minute faced by marginal consumer is higher => favours those valuing connection lowly

If connection subsidises usage

- fewer connections are sold; more call minutes are sold
- average cost per call minute faced by marginal consumer is lower => favours those valuing calling highly



FLAT-RATE TARIFFS

Special case of two-part tariff

- usage charge is zero

Connection priced above cost to subsidise zero-priced calling

- confers social benefits on those valuing calling highly (at the expense of connection diffusion and associated network effects)
- those valuing connection lowly will not purchase
- those valuing calling lowly will purchase only if they value connection highly enough to pay the higher cost
- all those purchasing a connection will consume calling to the point where the marginal benefit of calling is zero (not to the point where it equals the marginal cost of calling)



BUT BROADBAND IS SOLD MOSTLY BY FLAT-RATE TARIFFS

Diffusion rates would be higher if flat-rate tariffs were banned and usage subsidised connection

Yet policy advocacy (supposedly) supporting increased broadband diffusion urges the use of flat-rate tariffs

An enigma!

What does this tell us about consumer valuations of connection to and usage of broadband networks?



INSIGHTS FROM TWO-SIDED MARKETS

Based upon user valuations of each of connection and usage

On the 'Money' side:

- users valuing connection very highly (i.e. inelastic demand) and low usage volumes

On the 'Subsidy' side

- users with more elastic demand - i.e. will not buy if the price changes only a little

Flat-rate tariffs 'tax' those with the highest connection valuations in order to subsidise those with high usage volumes (and low average value per unit of that usage)



IN THE DIFFUSION CYCLE

‘Early adopters’ valuing connection highly will buy first, even though their usage levels are low

Flat-rate tariffs reduce uncertainty for these users as they learn their usage volumes and values

- enabling more knowledgeable users with lower connection and usage values (‘bandwidth gluttons’) to exploit the asymmetry
- e.g. NZ plan with 10Gb/month cap – average monthly usage 1500 Mb; median monthly usage 700Mb



THE STRATEGIC PROBLEM

Once all high-valuing and highly-knowledgeable early adopters have purchased at the flat rate, how can the market grow/diffusion increase without cannibalising existing profits/margins?

Cannot lower the flat-rate tariff

- ‘elastic’ demanders will shift to new tariff, consume even more units of usage and generate even higher costs/lower profits as they pay a lower fixed fee

But can introduce a two-part tariff

- elastic users will not substitute (as they do not value their high volume usage highly enough to pay a positive price for it)
- high connection-valuers may substitute (but they can be locked in to the flat-rate plan with minimum term contracts)



CAN ALSO BUNDLE/TIE WITH OTHER PRODUCTS

With another product with inversely correlated consumer valuations

- e.g. dial-up telephony (e.g. Skype as substitute)
- e.g. broadcast television (internet use as a substitute leisure activity; or tie copyright pay-per-use content to bb purchase)

Consumers valuing the bundled product highly but broadband connection & usage below the flat-rate price but above the bundle price will now buy the bundle => broadband diffusion increases

Existing margins in broadband market preserved

- only problem if existing consumers of both products (i.e. high valuers of both) buy the bundle



POTENTIALLY EXPLAINS ANOTHER ENIGMA

Inter-platform competition (e.g. cable, ADSL) appears to be more strongly correlated with higher broadband diffusion than intra-platform competition (access regulation, local loop unbundling)

Application bundling across technologies enables more individuals with lower valuations of broadband to purchase a connection than if only one set of technology-specific applications is available for bundling



A FURTHER PROBLEM CREATED

When legacy technologies (e.g. dial-up internet access) are sold at flat-rate tariffs, the rate of substitution to frontier technologies (e.g. broadband) is retarded

Flat-rate tariffs confer a 'usage gift' to low connection valuers

- higher benefits from usage on the frontier are required to justify substituting
- i.e. all else equal, the marginal substituter from a flat-rate legacy tariffed technology to the frontier will have a higher valuation of usage (higher usage volume) than the marginal substituter from an optimal two-part tariff



CONCLUSION

Tariff structures are at least as important in telecommunications technology diffusion as tariff levels and access regulation

Demand-side factors – user valuations of each of the components of connection and usage – matter greatly

These issues have not to date been considered as part of the array of policy tools available to accelerate broadband uptake

- but offer powerful explanations for many enigmatic observations in current diffusion patterns

Empirical work is to follow

