Rethinking the Regulation for Wholesale FTTH Services

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Key Words: Broadband, Inter-platform Competition, Margin Squeeze, Unbundling, Vertical Integration
1. Broadband market and regulation

With the diffusion of the broadband Internet, the discussions on regulation in many countries are shifting from POTS (Plain Old Telephone Service) to the broadband Internet services. As conventional wisdom tells, the existence of market failure warrants regulation. The introduction of competition into telecommunications industry itself did not eliminate market failure, as incumbent carriers have continued to keep de facto monopoly in local telecommunications market. New entrants started their business from long-distance services. The incumbent carriers vertically integrate both local and long-distance telecommunications services, i.e., they offer wholesale products to new entrants and also retail products in competition with new entrants. There exists potential for them to leverage their dominant power in wholesale market into retail market.

The abuse of dominant position includes refusal to supply, excessive price, quality degradation and margin squeeze\(^1\). Regulators introduced interconnection rules to prevent the abuse. In the case of POTS, the regulation is rather simple, as physical, service and content layers are closely associated and physical layer is offered only as metallic subscriber cables. The competition is characterised by intra-platform competition.

The Internet, especially the broadband Internet has cut off the links between the layers, and physical, service and content layers have become separated. The Internet services are offered on various platforms such as traditional metallic subscriber cables, cable network, FTTH, mobile network and wireless LAN and other wireless networks. The competition has changed from intra-platform to inter-platform. This is expected to change the pattern of market failure and to remove market failure in the long run.

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\(^1\) Cave (2004) p.30

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*Figure 1 Broadband Penetration (2004)*

However, the degree of the development of the broadband Internet differs from country to country (Figure 1, 2) and the platforms on which it is offered are different. Cable modem services are more used than DSL services and FTTH services are at its early stage in the U.S.A. In some of EU countries, DSL services dominate the broadband market. As will be analysed in next section, considerable users are using FTTH services and there are significant competitors to incumbents both in wholesale broadband access market and retail market in Japan. The regulation of POTS is common among developed countries. Regulators introduced interconnection obligation and wholesale charge control. But the regulation of wholesale broadband Internet access market should take into accounts the phases and aspects of competition. In countries where DSL dominates the broadband Internet market and facilities based competition in metallic subscriber lines has not materialised, the regulation that copied that for POTS might be justified. In countries where inter-platform competition has progressed, the simple application of the regulation for POTS will distort competition. As fixed investment in new network is very large and sunk, it is necessary for the carriers to recover the costs including the specific risks associated. Otherwise, the investment incentives both by incumbent carriers and new entrants will be retarded.

In some countries regulations to impose unbundling and/or to prevent margin squeeze abuse have been introduced. However, the imposition of margin squeeze abuse regulation on top of unbundling obligation will make the outcome worse. In Japan, service providers and new facilities based providers have been engaged in a price war to build a customer base in emerging market. Incumbent carriers are compelled to reduce their retail prices to catch up the competition. They are required to set wholesale charges below retail prices to avoid the allegation of margin squeeze. As competitive retail prices are very low, wholesale charges are believed to be considerably below cost. Thus they are losing
incentives to invest in FTTH facilities other than urban areas. This will increase the risk of further widening of digital divide between urban and rural areas.

To explore above discussion, I will analyse the Japanese wholesale FTTH market and argue that margin squeeze regulation should be repealed.

2. The broadband market in Japan
2.1 Deployment of broadband Internet

The diffusion of broadband Internet services in Japan lagged considerably behind such countries as Korea and Benelux and Scandinavian countries at the beginning of 2000. The broadband Internet services at the early stage were offered mostly thorough DSL except in Benelux countries, Denmark and the U.S.A. where cable penetration is very high. As DSL is offered through the high frequency range of the existing metallic subscriber lines (local loop), it is relatively easier to expand the services compared to FTTH (Fibre To The Home) services that require the investment in new infrastructure. However, it is necessary to impose line-sharing and/or unbundling obligation on incumbent carriers to promote competitive deployment of services as long as metallic subscriber lines are actually monopolised by the incumbents.

One of the reasons for the slow development of broadband in Japan was the absence of the line-sharing obligation. The interconnection rule introduced in 1997 did not stipulate line-sharing. When new competitive carriers wanted to start DSL services on the basis of line-sharing and co-location through the end of 1990s, NTT that was keen on the expansion of FTTH services resisted the request for line-sharing and co-location. Many disputes between new carriers and NTT were reported. The disputes were finally settled through the intervention of the MIC (Ministry of Internal Affairs and Communications) and the FTC (Fair Trade Commission) in 2000\[2\].

NTT local companies \[3\] started to offer line-sharing and co-location by the end of 2000 and the charges for line-sharing and co-locations were set at a considerably low level. Softbank Corp. (the holding company of Yahoo Japan) entered the market with extremely low price setting and aggressive marketing. The broadband market in Japan started to grow since the end of 2000 (Figure 3). The MIC reported that number of broadband users reached more than 19.5 million (41.5 % of households) at the end of March 2005\[4\]. Although DSL dominates the market with 13.7 million users, the recent growth of FTTH has been remarkable and its users reached 2.8 million. If we take the first quarter of 2005, the net increase in FTTH users exceeded that of DSL users for the first time. About 13.1 % of broadband users are now on FTTH.

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\[2\] Refer to Fuke (2003) for the details.
\[3\] NTT was reorganised in 1999 as a holding company of two local companies (NTT-East and NTT-West), one long-distance company (NTT Communications), one mobile company (NTTDoCoMo) and one data processing company (NTT Data).
According to the reports of ITU, broadband services in Japan are the cheapest and the fastest in the world (Figure 2)\[5\]. Softbank BB offers DSL as fast as 50M/bps for monthly charge inclusive of ISP charge of ¥4,008 (US$37.54). Its shared type FTTH service\[6\] inclusive of TV broadcasting over FTTH is ¥6,890 (US$64.53) for individual houses and ¥3,990 (US$37.37) for flats. Other providers are offering services at prices that are not much different from Softbank BB.

### 2.2 Contributing factors behind the rapid growth

The Growth of DSL begun after NTT started to offer line-sharing and co-location in 2000 after the intervention of the MIC and the FTC. The charges for line-sharing are set at a very low level. The charges are determined by the rate of return method based on historical cost of the facilities that are used only for DSL, i.e. the maintenance cost of DSL specific facilities and the cost of MDF. As the rate base is very small and the average earning rate of Japanese industry and the interest rate are very low reflecting deflationary Japanese economy, the rate of return is nominal. Thus the charges started at ¥410 (US$4.03) are now reduced to mere ¥120 (US$1.12). The charges for co-location are also very low. The charge for the use of NTT local companies’ buildings was ¥37,948 (US$355.38) per m² per year. DSL service providers are able to locate their DSLAM (Digital Subscriber Line Access Multiplexer) and other facilities in NTT local companies’ central offices at a nominal cost without investing in buildings that are very costly in big cities. Softbank BB took advantage of these low charges and entered the market with aggressive pricing and marketing. Its share at the end of August 2004 was 34.7% compared to the total share of NTT local companies’ 37.2%. Thus the share of incumbent carriers in Japan is extremely low compared to other developed countries.

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\[5\] ITU(2004)

\[6\] Refer to Figure 5 and 6 in the next section.
The case of FTTH is rather different from DSL. As stated in section 2.1, NTT group has been promoting FTTH services as its key business strategy\(^7\). Electric power companies are also promoting FTTH services to diversify their business into telecommunications\(^8\). They set retail price of FTTH services very low to compete with DSL and other FTTH service providers. NTT also set retail price of FTTH services very low to compete with electric power companies.

While retail FTTH services are not regulated, the MIC has regulated wholesale FTTH access services of NTT local companies as Category 1 designated facilities\(^9\), which means that NTT local companies are put an obligation to offer wholesale FTTH access services to their competitors in retail market at regulated charges. On the other hand, the MIC imposed no regulation on the wholesale and retail services of electric power companies and they have no obligation to offer wholesale FTTH access services to their competitors. Softbank BB, KDDI and other service suppliers entered retail FTTH market by leasing fibres from NTT local companies. The rational for this kind of asymmetric regulation will be questioned in the next section.

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\(^{7}\) NTT (2004)

\(^{8}\) There are 8 incumbent electric power companies that enjoyed monopoly status in each of their business areas. Following the liberalisation of telecommunications industry, the Japanese government started to introduce competition in electric power industry from big business market. They started telecommunications businesses just after the liberalisation of telecommunications industry based on their extended optical fibre network originally installed for the operation of electric power business.

\(^{9}\) When the MIC enforced new interconnection rules in 1997, it regulated intra-prefecture telecommunications facilities of NTT local companies as Category 1 designated facilities. The regulation includes the obligation to offer unbundled network elements with approved charges. Although it was not publicly specified, Category 1 designated facilities are regulated as essential facilities.
NTT local companies offer three types of FTTH services in retail market, i.e. Basic, Hyper Family and Mansion Types and they offer wholesale services that are equivalent to these. In the case of Basic Type, a user enjoys an exclusive use of a fibre core (Figure 4). Several users share a fibre core through a splitter installed on a nearby pole in the case of Hyper Family Type. Mansion Type also offers shared FTTH access service to flats through an assembly ONU (Optical Network Unit) installed in the premise of a flat. Depending on the availability of internal wiring, each flat is connected to the ONU through LAN, or metallic cables (VDSL). If no space is available for an assembly ONU, each flat is connected to an ONU installed on a pole through wireless transmission. These services are offered on the basis of best effort and the maximum transmission speed is 100Mb/s.
The charge for wholesale Basic Type access approved by the MIC in 2001 was ¥5,074 ($47.52) per core per month. NTT local companies set retail prices of FTTH services considerably low to compete with DSL service providers and other FTTH service providers including electric power companies that offer facilities based services. The cheapest retail FTTH price inclusive of ISP service of electric power companies is ¥4,761 ($47.52) per month. NTT local companies set retail price inclusive of ISP service at ¥6,850 ($64.15) in the case of Hyper Family Type (shared use) and ¥11,980 ($112.19) for Basic Type. As shown in Figure 7, NTT local companies reduced the prices of retail FTTH services following the price reduction of electric power companies that are also competing with Softbank BB whose price for shared use is as low as ¥3,990 ($37.37). As the MIC has been imposing a kind of margin squeeze regulation that specifies that wholesale charges should be set below retail prices, NTT local companies are obliged to set wholesale charges very low to be competitive in retail market. I doubt that NTT local companies over-estimated the future demand for FTTH access services to set the wholesale charges very low to comply with margin squeeze regulation[10].

3. Problems behind rapid growth

3.1 Introduction of competition and access regulation

When competition was introduced in telecommunications industry, one of the most important challenges regulators faced was access regulation. Telecommunications tariff was heavily regulated and characterised by an internal cross-subsidy structure to ensure universal service before the introduction of competition. Typically, local rate for consumers was set below cost and the deficit was covered by revenue from long-distance services and business oriented services whose rates were considerably above cost. This structure and economies of density induced new entrants into long-distance market and business market in big cities and local telephone network has continued to be monopolised by the incumbent carriers.

It was natural for new entrants to ask for the access to the incumbent carriers’ local telecommunications network that cannot be easily replicated by them. However, incumbent carriers had the potential to engage in anti-competitive behaviours such as refusal to supply, excessive pricing and quality degradation as they have vertically integrated into both wholesale and retail markets. They offered wholesale products (access to local telephone network) to new entrants and also the same retail products (long-distance services) to consumers that are offered by the new entrants. Thus access regulation was introduced to control incumbent carriers’ market power in wholesale market. The regulation included the obligation to offer access services at regulated charges.

This regulation was complimented by margin squeeze regulation that has been applied to vertically integrated firms in other industries. If I follow the terminology in other industries, as incumbent carriers are acting in both upstream market (access services to competitors) and downstream market (telecommunications services to end users), it is not

[10] They have been demanding the repeal the rule as they have been losing money because of the rule.
sufficient to regulate only wholesale charges. If they set retail prices lower than wholesale charges or at levels that are not sufficient to cover retail cost, their competitors cannot get enough revenue to compensate their activities and would be effectively squeezed out of the market.

In some countries, margin squeeze abuse is handled primarily under competition rules. In others sector specific rules were introduced. In U.K., for example, OFTEL introduced a provision in BT’s licence conditions to prohibit margin squeeze. ‘[I]t [was] required by condition 71 of its licence to provide the Director General with a Price Change Notice (PCN or cost stack). Where the result of the proposed change [was] that the General Price will be less than the aggregate cost attributable to the provision of that service BT must [have sent] the PCN to the Director General and obtain the Director General’s written consent to the proposed change[11].’ This condition was introduced ‘to address the concern that BT would have the potential to engage in price squeezing because of its vertical integration and its strength in a number of markets[12].’

Section 88 of the Communications Act 2003 that was introduced to comply with the EU’s new regulatory framework justifies the imposition of network pricing conditions if ‘there is a relevant risk of adverse affects arising from price distortion if the dominant provider might----(b) so impose a price squeeze as to have adverse consequences for end-users of public electronic communications services.’ However, it is important to note that it pays attention to the balance between the fair competition and the investment incentive. Section 88 of the Act states that ‘OFCOM must take account of the extent of the investment in the matters to which the condition relates of the person to whom it is to apply.’

In the case of EU, the word margin squeeze first appeared in the Telecommunications Access Notice[13]. A clause was also included in Access Directive[14] of the new regulatory framework. Article 13 of the Directive states that ‘[a] national regulatory authority may, in accordance with the provisions of Article 8, impose obligations relating to cost recovery and price controls, including obligations for cost orientation of prices and obligations concerning cost accounting systems, for the provision of specific types of interconnection and/or access, in situations where a market analysis indicates that a lack of effective competition means that the operator concerned might sustain prices at an excessively high level, or apply a price squeeze, to the detriment of end-users. National regulatory authorities shall take into account the investment made by the operator and allow him a reasonable rate of return on adequate capital employed, taking into account the risks involved.’ Here, margin squeeze is explicitly prohibited but the balance between fair condition and investment incentive is also mentioned.

In the U. S.A, the FCC declined to impose ‘imputation rule’ that would ‘require that the sum of prices charged for a basket of unbundled network elements not exceed the retail

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[12] Ibid. Para. 6.27
price for a service offered using the same basket of element\textsuperscript{15} on the ground that ‘[a]doption of an imputation rule could force states to engage in a major rate rebalancing effort at this time\textsuperscript{16}’. Although, allegations of margin squeeze may not be denied\textsuperscript{17}, the low charges for unbundled network elements based on TERLIC make it almost impossible for incumbent carriers to engage in margin squeeze.

In the case of Japan, the MIC imposed implicit margin squeeze rules on NTT local companies. Its administrative guidance issued in 1999 asked NTT local companies to verify that the relationship between retail prices and wholesale charges of Category 1 designated facilities would not be anti-competitive. There is no mention was made to investment incentive in this guidance. In 2001 the MIC further asked them to report and to publish the data to verify the relationship would not be anti-competitive. They have published the retail revenue and wholesale revenue for specified services and the difference between them. Although mere fact that retail revenue exceeds wholesale revenue does not necessarily mean that margin squeeze abuse exists\textsuperscript{18}, this guidance is to be interpreted as the imposition of margin squeeze regulation.

3.2 Broadband services and access regulation
One of the challenges presented to the regulator behind a rapid growth of the broadband Internet and FTTH services in Japan is the suitability of the application of the access regulation designed for POTS (Plain Old Telephone Service) to newly emerging broadband services. It was justifed to regulate wholesale access to local telephone network, as inter-platform competition did not exist and incumbent carriers enjoyed de facto monopoly through the facilities they built at time of monopoly era. However, broadband Internet market is different from POTS market. Regulators should not just copy the regulation of POTS for broadband Internet. It is necessary to design new regulation for wholesale broadband access.

In the case of the U.S.A., where penetration rate of cable TV is very high, fixed line services such as DSL and FTTH are facing a considerable competitive pressure from cable modem services. The FCC reviewed the unbundling regulation in 2003. Line-sharing obligation was abolished and wholesale optical fibre access was un-regulated\textsuperscript{19}.

Many of the member states of the European Union have concluded or been conducting market analysis following the rules stipulated in the new regulatory framework. Although wholesale broadband access is included in the services to be analysed, and wholesale DSL services are regulated, no country has introduced regulation on wholesale FTTH access\textsuperscript{20}.

\textsuperscript{15} FCC (1996) Para. 839
\textsuperscript{16} Ibid Para. 848
\textsuperscript{17} Crandall (2005) p.121
\textsuperscript{18} As for the discussions on price margin between wholesale and retail, see Cave (2004) pp.38-41.
\textsuperscript{19} FCC (2003)
\textsuperscript{20} This is the reflection of the situation that significant FTTH market is non-existent.
The MIC imposed on NTT local companies a kind of imputation test rule to avoid margin squeeze since the establishment of interconnection rules in 1997. It has applied the rule to wholesale DSL services when line-sharing obligation was introduced in 2000. Furthermore, it simply copied the regulation to wholesale FTTH services. NTT local companies set the unregulated retail prices of FTTH services considerably low to be competitive with other retail providers, and the wholesale charges must be lower than retail prices. The wholesale charges are regulated by rate of return method based on the demand estimation for 7 years. They are obliged to overestimate the demand for wholesale FTTH access to comply with margin squeeze regulation. NTT local companies have been complaining that they are losing money in wholesale market and other FTTH providers are free riding on their risk taking decision to invest in FTTH facilities.

The regulation on DSL might have been justified at the time of the introduction of the service. The reasoning is that the penetration of cable TV is very low in Japan, DSL was regarded as the only reasonable mean to access the broadband Internet and that DSL services rely on NTT local companies’ metallic subscriber lines. The line-sharing obligation at very low charges surely contributed to the rapid growth of broadband market in Japan. However, FTTH services appeared in the market when DSL service started to grow and other broadband services like cable modem and wireless LAN service existed. Further, other facilities-based competitors including electric power companies are offering FTTH services. Both intra-platform and inter-platform competition exist in the case of FTTH. It is hard to justify regulating NTT local companies’ wholesale FTTH services as Category 1 designated facilities (essential facilities) and imposing margin squeeze regulation.

In the case of unregulated retail services, it is up to NTT local companies’ business decision to set the charges very low to be competitive and to penetrate into the newly developing market. If NTT local companies are obliged to set wholesale charges below cost because of the margin squeeze regulation that have been applied to traditional telecommunications services, it is necessary to reconsider the application of the rule. The challenge that the regulator is facing is to doubt the appropriateness of the application of the margin squeeze regulation to newly emerging and competitive market. Next section will explore this discussion by surveying the past studies on margin squeeze.

4. Wholesale FTTH services and margin squeeze

4.1 Wholesale broadband access and margin squeeze
The broadband Internet market in EU countries is still at an early stage except for Benelux and Scandinavian countries. FTTH access is deployed only in limited areas and DSL access still dominates the market. For example, BT published in April 2004 that its wholesale broadband access services has reached 5 million. However, the speed of the broadband services offered by BT is 1 and 2 Mb/s and charged based on the data

\[ \text{See Fuke (2003) for the details.} \]
\[ \text{BT(2005)} \]
downloaded\textsuperscript{[23]}. Compared to the flat rate services of 50M/s available in Japan, I am hesitant to say that these are broadband services. As DSL is offered on existing metallic subscriber lines of incumbent carriers, it is rational to find that incumbent carriers keep significant market power in this market and ex post regulation is imposed.

Incumbent carriers, generally, are vertically integrated in upstream market, i.e. subscriber lines market and downstream market, i.e. retail DSL services. It is necessary to prevent incumbent carriers from impeding fair competition in downstream market by abusing market power in upstream market. Possible remedies are classified into structural separation and conduct regulation. If economy of scope exists between upstream and downstream markets, structural separation is likely to be against consumers’ interest, and EU countries have not adopted structural separation\textsuperscript{[24]}. Here, my discussion will be focused on conduct regulation.

Main conduct regulation in wholesale DSL access market is related to the access to incumbent carriers’ essential facilities and their charges. Access to essential facilities includes line-sharing of subscriber lines and co-location in the incumbent carriers’ building and the use of poles and ducts and leaves no considerable discussions.

As for the charges for the access to essential facilities, there is a trade-off between the promotion of service-based competition and the investment incentives. One of the main problems with the charging is discussed as margin squeeze. When an undertaking holding significant market power in wholesale market is also doing business in retail market, the difference between wholesale price and retail price is discussed as price or margin squeeze\textsuperscript{[25]}. Joskow defines a price squeeze as the case where “the monopoly input supplier charges a price to its downstream competitors that is so high that they cannot profitably sell the downstream product in competition with the integrated firm”\textsuperscript{[26]}. If the margin between wholesale price and retail price is too small, competitors doing business in downstream market by buying wholesale product and services from a vertically integrated firm cannot make profit and are squeezed out of the market. This may be a result of either high wholesale price or retail price or both high wholesale price and low retail price of vertically integrated firms.

Margin squeeze in itself does not necessarily constitute an abuse of market power. Geradin & O’donoghue lists six conditions for margin squeeze abuse\textsuperscript{[27]}.

\textsuperscript{[23]} As of April 2005, BT is offering 1Mb/s and 2Mb/s services. (http://www.bt.com/broadband/bb_info.jsp?BV_SessionID=@@@0800498802.1115638804@@@&BV_EngineID=cccgaddeigdfcflgeefkdfnnfni.0&obsNoSee=Y&vStore=1128&obsPage=/index.jsp&obsType=LINK&obsOID=99101)

\textsuperscript{[24]} Although Ofcom had investigated the possibility of the structural separation of BT, it accepted the BT’s proposal to set up a Access Service Division and to observe severe conduct regulation.(Ofcom(2005a, 2005b))

\textsuperscript{[25]} One of the official documents refers to margin squeeze (EU (1998) Para. 117-118) and Recital 20 and article 20 refers to interconnection regulation to prevent margin squeeze. EU made several decisions on margin squeeze in broadband market (e.g. EU (2003)). In member states, similar cases were discussed (e.g. Oftel(2003))

\textsuperscript{[26]} Joskow (1985) p.185

\textsuperscript{[27]} Geradin & O’Donoghue (2004) pp.5-7
1. [A] margin squeeze only arises in situations of vertically integration that is where a firm dominant on a market for an upstream input supplies that input to rivals operating on a downstream market where the dominant firm is also active.
2. [T]he input it supplies to rivals must in some sense be “essential” for competition on the downstream market.
3. [T]he input supplied by the dominant firm constitute a relatively high, fixed portion of the downstream costs.
4. What legal test should be applied to determine whether the dominant firm’s upstream price, downstream price, or the combinations of both prices, causes the activities of a downstream rival to be uneconomic?
5. [I]t needs to be assessed whether there is a justification or explanation for the dominant company’s downstream losses other than an exclusionary intent or object.
6. [I]t would need to be considered whether the dominant firm’s conduct has had, or is likely to have, a material impact on competition.

As these conditions well summarise the practical applications of margin squeeze regulation, I will apply these to wholesale FTTH access market in Japan and evaluate the appropriateness of the imposition of margin squeeze regulation.

4.2 Japanese wholesale FTTH access market.

First of all, it should be necessary to define market as the existence of dominance depends on market definition. The narrower the market is defined, the higher the probability to find dominance. There is some doubt whether wholesale FTTH access market is to be defined as a single market. We can argue that we should define broadband access market as a single market that is composed of various access technologies such as DSL, cable modems, wireless LAN and FTTH. The MIC imposed unbundling obligation of FTTH on NTT local companies without having completed a detailed market study. The market study of the MIC published in 2004 (MIC (2004)) defined the market for wholesale FTTH access as a single market. Here, I will extend discussions by tentatively accepting this analysis. If dominance is not found in a narrowly defined market, no dominant undertaking will be found in a broadly defined market.

Firstly, there is no question regarding vertical integration. As stated in section 2, NTT local companies offer wholesale FTTH access services to their competitors in retail FTTH access market where they are also active. The market share in retail market is as shown in Table 1. NTT local companies’ share is 59.73% at the end of September 2004. Based on this data I estimate their wholesale market share is 77.09% (Table 2)[28]. Judging only from these figures NTT local companies are together dominant at least in wholesale market.

[28] I assumed that electric power companies and USEN are offering services based on their facilities and others are by leasing dark fibre from NTT local companies.
Table 1 FTTH Market Share (Retail)

<table>
<thead>
<tr>
<th></th>
<th>Sep-03</th>
<th></th>
<th>Sep-04</th>
<th></th>
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<tbody>
<tr>
<td>NTT-E</td>
<td>28.52</td>
<td>%</td>
<td>NTT-E</td>
<td>31.07</td>
</tr>
<tr>
<td>NTT-W</td>
<td>28.41</td>
<td></td>
<td>NTT-W</td>
<td>28.66</td>
</tr>
<tr>
<td>Power</td>
<td>12.01</td>
<td></td>
<td>Power</td>
<td>13.42</td>
</tr>
<tr>
<td>USEN</td>
<td>11.20</td>
<td></td>
<td>USEN</td>
<td>9.49</td>
</tr>
<tr>
<td>Others</td>
<td>18.82</td>
<td></td>
<td>Others</td>
<td>17.35</td>
</tr>
</tbody>
</table>

Source: MIC

Table 2 FTTH Market Share (Wholesale)

<table>
<thead>
<tr>
<th></th>
<th>Sep-03</th>
<th></th>
<th>Sep-04</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>NTT-E, W</td>
<td>75.75</td>
<td>%</td>
<td>NTT-E, W</td>
<td>77.09</td>
</tr>
<tr>
<td>Power</td>
<td>12.01</td>
<td></td>
<td>Power</td>
<td>12.01</td>
</tr>
<tr>
<td>USEN</td>
<td>11.20</td>
<td></td>
<td>USEN</td>
<td>11.20</td>
</tr>
</tbody>
</table>

Source: The author’s rough estimation based on MIC data

Secondly, we need to evaluate the essentiality of NTT local companies wholesale FTTH access services to their competitors in retail market. It is not desirable to judge essentiality only by wholesale market share. What is peculiar to Japanese wholesale FTTH access market is the availability of fibres offered by electric power companies. As shown in Figure 7, they installed as many fibres as NTT local companies. Undertakings doing business in retail markets have a choice between NTT local companies and electric power companies for wholesale products.
Present situation where they rely on NTT local companies’ dark fibre is a result of regulation. The MIC imposed only on NTT local companies the obligation to offer dark fibres by regulated charges. We can judge that although competitors in retail market have a reasonable chance of buying alternative inputs from electric power companies, they are buying inputs from NTT local companies because it is just economically rational for them. Thus I reach a conclusion that NTT local companies’ dark fibres are not essential to their competitors in retail market.

Table 3 Ratio of Dark Fibre Cost

<table>
<thead>
<tr>
<th>Hyper Family Type</th>
<th>Mansion Type</th>
<th>Basic Type</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>P km1</td>
<td>P km2</td>
</tr>
<tr>
<td>a. Retail Price ($)</td>
<td>7,080</td>
<td>3,600</td>
</tr>
<tr>
<td>b. Dark Fibre Cost ($)</td>
<td>1,891</td>
<td>649</td>
</tr>
<tr>
<td>c. Ratio (a/b) (%)</td>
<td>26.7</td>
<td>18.0</td>
</tr>
</tbody>
</table>

Source: Author’s estimation based on NTT-east’s data
Having said that NTT local companies’ dark fibres are not essential to their competitors in retail market, we can conclude that it is not reasonable to apply margin squeeze regulation in this case. I would rather examine other conditions to further rectify my conclusion. The third condition to be examined is the weight of the cost of input bought by competitors in their retail cost. As the information on retail cost of FTTH service providers is not available, I examined the retail cost of NTT local companies.

The ratio shown in Table 3 is my estimation of cost based on NTT-East’s data. Retail price normally includes profit. However, NTT local companies claim that they are losing money in both wholesale and retail markets, which means that the cost of retail FTTH access service is well over their retail prices. Therefore, the ratios shown in Table 3 overestimate the ratios of dark fibre cost. Thus we can conclude that the weight of the cost of dark fibre in the cost of retail FTTH access services is considerably low. Therefore, the third condition is not fulfilled in the case of Japanese FTTH access market.

The fifth condition relates to NTT local companies justification for the losses. Judging from the changes in retail price shown in Figure 8, it is clear that they have been following the price decrease of their competitors. Tepco (Tokyo Electric Power Company), the largest electric power company in Japan has led the price war in retail FTTH access market together with Softbank BB. It reduced the prices of retail FTTH services frequently since 2002 and NTT local companies followed the reduction. It might be reasonable to conclude that their price decrease is not to exclude their competitors from the market, but to catch up with the price reduction of their competitors.

From the evaluation of the fifth condition, the answer to the last condition is more than evident. Their action is not suppressing the competition in the market but revitalising the competition.

The evaluation of each conditions listed by Geradin & O’donoghe tells that it is not reasonable to apply margin squeeze regulation to wholesale FTTH services of NTT local companies.
companies. Here, I found the risk of simply applying the rules of the POTS era to the broadband Internet services.

5. Conclusions
In the face of the actual development of inter-platform competition in Japanese broadband Internet access market, it is not appropriate to apply the regulation designed to promote intra-platform competition of POTS. I think it undesirable to designate metallic subscriber lines for DSL and FTTH as essential facilities\(^{[29]}\). Intra-platform competition has been developing between DSL, cable modems, FTTH and various wireless technologies.

Even if I admit the discussion that intra-platform competition has not so fully developed as to warrant the abolishment of the line-sharing and unbundling obligation of metallic subscriber lines, the unbundling obligation of FTTH is not justified. The reason is that electric power companies are investing and marketing aggressively in FTTH access services\(^{[30]}\).

Further, based on the actual market share of NTT local companies in wholesale FTTH access services that might be understood as the result of asymmetric regulation between NTT local companies and electric power companies, one might justify the regulation. Even in that case, the regulation to prohibit margin squeeze abuse is not justified as analysed in the last section.

The discussion on the regulations of wholesale broadband Internet access services have been mainly based on emerging market theory up-to now. My discussion in this paper is rather based on the actual development of the broadband Internet market in Japan. Not the abstract theory but the actual market development demonstrates it inappropriate to apply the regulation in POTS era to wholesale FTTH access services.


\(^{[30]}\) The suspected cross subsidy from de facto monopolistic electric power operation to competitive FTTH services is not much discussed in Japan differently from the U.S.A. where the FCC raised some concern (FCC (2004))
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    20 November 2003

**Remarks**

This paper is based on the research at Centre for Management Under Regulation, Warwick Business School, University of Warwick, U.K. I should like to take this opportunity to thank Dr. Martin Cave who kindly arranged the place for research and Kansai University that sponsored the research.