

Net Neutrality, Double Marginalization, and Natural Monopoly in Internet Service

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Abstract

This paper explores two effects of net neutrality that might be expected to hurt consumers. First, it disallows contracts with transfer fees that could prevent double marginalization caused by the successive monopolies of content and service provision. Second, it reduces the profits of service providers, which results in small markets being entirely unserved because the price to consumers is insufficient to reach zero profits and in larger markets being served by only one service provider because entry of a second provider would reduce profits below zero.

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THE MEANING OF NET NEUTRALITY

There are two regulatory prohibitions commonly called “net neutrality”.

The first bans internet service providers from providing faster service for some kind of content than others. A service provider could not, for example, prioritize long-distance surgery signals over the same number of packets of You-Tube video. The provider could charge more only for generally faster service, to be sure, but could not discriminate based on the type of content.

The second prohibition is against service providers providing faster service to individual content providers based on discriminatory pricing.

MARKET POWER

The only situation worth analyzing is where both the content company and the service provider have market power.

Since content companies have differentiated products, service provider natural monopolies are actually successive monopolies.

Google picks a content price and Comcast picks a service price that the consumer pays.

If we allow the two companies to charge prices to each other, we create a bargaining game between the two, a game which might end up with Google paying Comcast for access to the consumer or Comcast paying Google for access to the content.

Industry belief seems to be that it would end up with Google paying Comcast.

WHO GETS THE PROFITS?

It seems to be a question of who should get more profits, and for economists that is the heart of the debate.

If we deregulate, Comcast charges Google a fee, Comcast is richer, and service provision expands to new regions.

If we require net neutrality, Comcast can't charge Google and Comcast is poorer, but Google is richer and will innovate further in content.

The question is which marginal elasticity of supply of innovation is greater, in markets or in content.

Robin Lee and Tim Wu make the argument for net neutrality that content providers need incentivizing in their 2009 *Journal of Economic Perspectives* article, but only verbally (though carefully and at length). Greenstein, Peitz & Valletti (2016) have simple models illustrating the tradeoffs.

TWO SIMPLE POINTS

First: under net neutrality the successive content and service monopolies create double marginalization, but the transfer payments allowed by deregulation can allow the two monopolies to reduce the total price, to the benefit of consumers and themselves.

Second: since payments by the content provider to the service providers increases service profits, it both allows entry into markets otherwise unserved because they are too small (the deregulation advantage in the basic tradeoff just described), but also allows two service providers to fit profitably into a market where only one could otherwise survive.

As a result, deregulation could reduce prices in already-served markets as well as cause new markets to be served.

2. THE MODEL

There is a continuum of consumers of size m who buy internet service and internet content separately. The quantity of internet service demanded in the market is the weakly concave function $m \cdot Q(p_s + \sum_i^n p_{ci})$, where p_s is the price of service and p_{ci} is the price of content i for $i = 1, \dots, n$.

There are two potential service providers. Each provider has a fixed cost K_s and a constant marginal cost c_s .

There are n content companies. Each has a fixed cost K_c and a constant marginal cost c_c . A content company pays lump sum amount T to a service company to carry its product, where T might be negative.

POLICIES

Two government policies might be used: net neutrality, or deregulation. Under net neutrality, $T = 0$, and the prices p_c and p_s cannot depend explicitly on each other or on a consumer's purchase decision of any kind. Under deregulation, prices can take any value, and it will turn out that T may be positive.

Question: Does net neutrality rule out contracts agreeing on prices between content company and service providers? Does deregulation allow it? I will assume the answer to both is Yes.

A service provider's payoff is

$$\pi_s = m \cdot Q(p_s + \sum_i^n p_{ci})(p_s - c_s) - K_s + nT \quad (1)$$

A content company's payoff is

$$\pi_c = m \cdot Q(p_s + \sum_i^n p_{ci})(p_c - c_c) - K_c - T \quad (2)$$

PRICE SETTING

We must model price setting in oligopoly for the service providers, whose product is undifferentiated. We will use a general setting. Denote the monopoly service price as $p_s^*(p_{c1}, \dots, p_{cn})$, and let the duopoly price be $p_s^d(p_{c1}, \dots, p_{cn})$, and assume that the duopoly service price is lower than the monopoly price given identical content prices

Assume that service prices are also decreasing in expected values of p_{ci} but do not depend on T .

Third, we implicitly assume that service prices do not depend on T or m by not including them in the price functions.

We will assume that content companies choose their prices after the service providers choose theirs.

The service providers will make simultaneous take-it-or-leave-it offers to the content companies.

MODEL 1: THERE IS ONE CONTENT COMPANY.

Under net neutrality, we get double marginalization if there is room for just one service provider. If there is room for two, the content company gets more of the rents but not all of them, and there is still double marginalization.

Under deregulation, we do NOT get double marginalization, either with 1 or 2 service providers. With 1 service provider, the content company pays the service provider, who charges

With two service providers, the service providers will pay the content company.

The values of m_1 and m_2 differ depending on the regime. m_1 will be smaller under deregulation. m_2 will be bigger.

MODEL 2. THERE ARE 1,000 CONTENT COMPANIES, ALL VALUED EQUALLY BY CONSUMERS.

Under net neutrality, we get double marginalization with either 1 or 2 service providers.

Under deregulation, we do NOT get double marginalization. m_1 will be smaller. m_2 will be smaller.

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