

## Chapter 6

# Welfare Implications of Deviation from Network Neutrality: A Price Discrimination Application

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### ABSTRACT

*This paper investigates how incentives of network operators to deviate from neutrality may create social costs or benefits in different market structures. The deviation from network neutrality is a general form of discrimination based on charging different prices for non-affiliated content and application providers. In this paper, deviation from network neutrality is formulated as a form of vertical foreclosure. While constructing the model two-sided nature of the internet service, the providing market is considered. The author found that, although monopoly network operators have no incentive to deviate from neutrality, the duopoly network operators have this incentive. Welfare analysis suggests destructive results for almost all participants, hence the total surplus in both market structures. In addition, the analysis for the degree of integration between the network operators and their affiliated content and application providers, suggest some policy proposals to discourage their degree of integration.*

### INTRODUCTION

Through the Internet with broadband, users can benefit different applications such as streaming media, on-line games, video phones, etc. along with traditional internet services such as mail ser-

vices, information supplying web sites. Bandwidth need for the mentioned applications, and growing user demand on such content and applications provoke network operators (NOs) to invest more on their networks. On the other hand, it has been largely argued that increasing marginal value of bandwidth for the Internet services incites NOs, or integrated internet service providers (ISPs)

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to discriminate against content and application providers (CAPs). This situation refers to deviation from network neutrality, which has been considered as a primary rule of the Internet that ensures open and equal access for any CAP. Until recently, NOs of the Internet remain neutral for CAPs. However, since 2005 incidents in US have arisen that claimed to be threatening the “neutral architecture” of the Internet. Thus, network neutrality has become a heated debate throughout growing importance of the broadband internet.

The debate indicates some current and also some future issues. For instance, while advocates of neutrality regulation claim that network neutrality ensures the end-users’ (EU) access freedom and gives incentives to CAPs for innovation at the edge, opponents argue that mandated network neutrality discourages NOs’ incentives to invest on. Hence, the resolution of this debate may greatly influence the variety of CAPs available for EUs, business models for service providers, and modes of development of social communication (Peha, Lehr, & Wilkie, 2007). On the other hand, the debate is highly technical, and requires more research to reach reliable conclusions.

This paper is designed to make a contribution to the debate through an economic model which consists of two different market structures related with the number of NOs. Particularly, we investigate how private incentives of NOs to deviate from neutrality may create social costs or benefits in different market structures. We have made our analysis through a static model, and we have not elaborated the dynamic effects on incentives for investment and innovations.

The deviation from network neutrality that we have deal during the paper is a general form of discrimination based on charging different prices for certain CAPs. Although we have employed the model created by Economides and Tag (2007) for the neutrality cases, our specification for the deviation from neutrality is quite different than the mentioned model.<sup>1</sup> We have formulated the deviation as a form of vertical foreclosure. And,

while constructing the model two-sided nature of the internet service providing market is considered.

During the model we have examined incentives of deviation of NOs. We have found that while the monopoly NO has not any incentive to deviate from neutrality, the duopoly NOs have. Our welfare analysis suggests destructive results almost for all of the participants, hence the total surplus in both market structures. In addition, our analysis for the degree of integration between the NOs and their affiliated CAPs, suggest some policy proposals to discourage their degree of integration.

The rest of the paper is organized as follows: the second section approaches the debate with an aim to provide a framework for the model. The third section introduces the model with monopoly NO, in order to analyze the welfare implications of the deviation from neutrality. The fourth section follows the third with an additional NO, in a market with duopoly NOs. While the fifth section offers an extended analysis for the degree of integration between NO(s) and CAPs, the sixth section concludes with some policy proposals.

## **NETWORK NEUTRALITY, PRICE DISCRIMINATION, AND TWO SIDEDNESS OF THE MARKET**

### **Deviation from Neutrality through Price Discrimination**

Considering network neutrality as a non-discriminatory behavior, any deviation from it should be considered as a discriminatory action. And, discrimination against any party in economics can be classified as discrimination based on charging different price (price discrimination), and discrimination independent from pricing issues (non-price discrimination). In this paper we will deal with the former type of discrimination rather than the latter.

Although the above mentioned general classification of discrimination may be very useful

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