Telecommunications Policy 36 (2012) 127–139

Contents lists available at SciVerse ScienceDirect

Telecommunications Policy

URL: www.elsevier.com/locate/telpol

Royalties vs. upfront lump-sum fees in data communication environments

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ARTICLE INFO

Available online 10 December 2011

Keywords:
Spectrum
Auction
Royalty
Lump-sum fee
Economies of scope

ABSTRACT

Mobile communications markets worldwide, today, are saturated, the number of mobile network operators (MNOs) in market is declining, mobile revenues are stagnant or falling, MNOs are becoming wireless Internet service providers, and economies of scope are strengthening. This paper challenges existing dominant views on spectrum assignment and license fee payments, estimates spectrum fees that MNOs would have paid under royalties and then compares them with upfront lump-sum fees actually paid by 3G licensees. This paper further proposes that governments need to consider assigning additional spectrum to incumbents as needs arise without using auctions and adopting royalties as a way of collecting spectrum fees should they collect them.

1. Introduction

As more people adopt smart devices such as smart phones, tablet PCs, and laptops, they use more and more bandwidth-intensive services such as video streaming, cloud computing, and online games, eventually resulting in a rapid increase in data traffic over wireless networks. Currently, smart phones and tablet PCs are driving this rapid increase in data traffic over wireless networks.

Smart phones are more like computers used for checking emails, watching video clips, and listening to music, than phones for voice communications. Therefore, the growth of data traffic over wireless networks parallels that of smart phone users. As shown in Fig. 1, the number of smart phone users has been increasing at rapid rates in OECD countries.[1] To mention a few examples, smart phone users in the UK have increased from 4.6 million at the end of 2007 to 12.8 million at the end of June 2010 (Ofcom, 2010, p. 298), the ratio of smart phone users among cellphone subscribers in the US has increased from 16% to 42% between October 2006 and the end of 2009 (FCC, 2010b, p. 4), and in Korea, the number of smart phone users has already increased more than ten times from about 0.8 million in December 2009 to 10 million in March 2011, and is expected to reach 20 million by the end of 2011 (KCC, 2010).[2]

Another factor of the rapid growth in mobile data traffic is rapidly growing use of mobile video services such as YouTube and CNN news. As shown in Fig. 2, according to Cisco (as cited in OECD, 2010, p. 15), mobile video traffic is expected to grow exponentially; the traffic share of mobile video in total mobile data traffic, which was 39.5% in 2009, is forecasted to increase to 51.4% by 2014.[3]

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[1] Fig. 1 is photocopied from OECD (2010, p. 14).

[2] KCC stands for Korea Communications Commission. At the end of 2011, the ratio of smart phone users among cellphone subscribers in Korea is expected to grow to 35.7%.

[3] Fig. 2, where TB stands for terabytes, is photocopied from OECD (2010, p. 15).

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doi:10.1016/j.telpol.2011.11.017

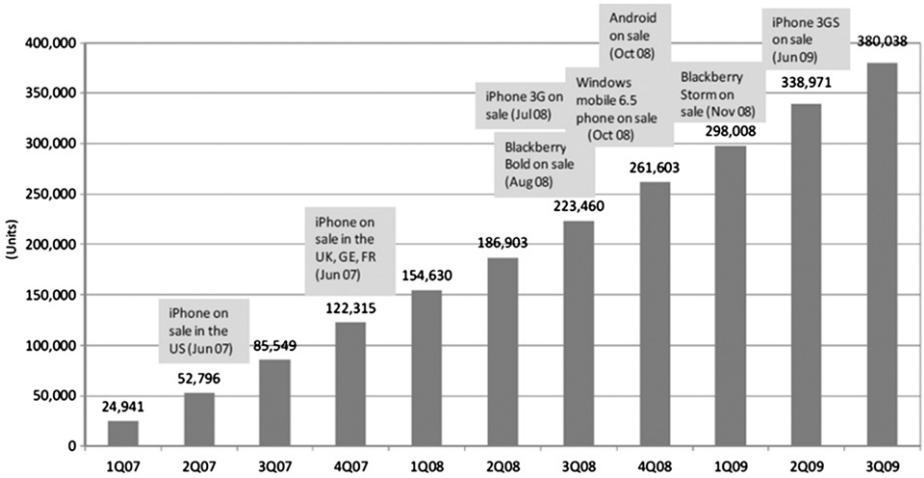

Fig. 1. Worldwide smart phone sales (in thousands of units).

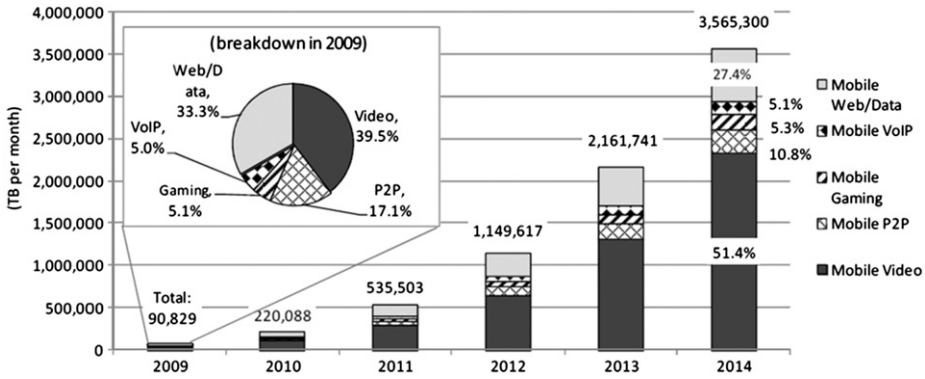

Fig. 2. Mobile data traffic trends.

As a result of increasing smart phone users and heavy use of streaming services, data traffic over wireless networks is skyrocketing in advanced countries. According to the FCC (2010b), world mobile data traffic is expected to grow, on average, to more than 35 times its 2009 levels by 2014. The mobile data traffic of AT&T has grown 5000% over past 3 years (FCC, 2010b). In Korea, the mobile data traffic of three mobile network operators (MNOs) have increased 100–300% since smart phones were introduced in the latter part of 2009. In the UK, mobile data traffic grew 240% between 2008 and 2009 (Ofcom, 2010, p. 283).

In response to this rapid increase in data traffic, governments worldwide have put a policy emphasis on providing more spectrum and encouraging MNOs' investment in faster networks (DCMS & DBIS, 2009; EC, 2010; FCC, 2010a). The FCC (2010a) in the *National Broadband Plan* announced that it would provide 300 MHz bandwidths for wireless broadband by 2015 and additional 200 MHz bandwidths by 2020 and asked the Congress to grant the FCC power to use incentive auctions, which allow incumbent licensees of spectrum bands to obtain a portion of auction proceeds. The UK (DCMS & DBIS, 2009; Ofcom, 2011b) also announced that it would auction the 800 MHz and 2.6 GHz bands for mobile communications services and proposed a policy that would allow the trading of spectrum bands currently being used for 2G and 3G mobile communications services. In addition, the UK (DCMS & DBIS, 2009, p. 15) proposed in the Digital Britain Final Report that it would "make the existing operators' 3G licences indefinite rather than term licences…in order to provide certainty for investment…," which means that spectrum license holders would end up acquiring full property rights over their spectrum. Basically, the ways of coping with increasing data traffic in the US and the UK are to auction additional spectrum, share auction proceeds with spectrum licensees in order to induce licensees to put up their unused spectrum for sale, and allow spectrum trading among MNOs. While the US and the UK were making spectrum assignment process more market friendly, Korea assigned additional spectrum to existing MNOs, 20 MHz each, through a traditional comparative hearing process in 2010 in order to allow them to better manage increasing data traffic over 3G networks.

Exploding data traffic and other factors discussed in the next section pose a few fundamental questions associated with spectrum assignment and license fee payments. For example, spectrum auctions are effective when competition in the market is feasible and the market is growing because new entrants can easily find room for competition. However, as explored in the next section, the wireless communications industry worldwide is becoming increasingly more concentrated and saturated. The objectives of this paper are to present a different view of spectrum assignment and license fee payments, to evaluate whether