

# THE ECONOMICS OF FREQUENCY TRADING

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Bad Honnef, February 2003



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## Extended abstract

Radio frequencies are an essential and scarce input for electronic communications services. National regulatory frameworks, in particular, should ensure that frequencies are allocated to their most efficient uses and that spectrum allocation fosters competition. Traditionally the focus of spectrum management is on the primary allocation of frequencies (using beauty contests and/or auctions). So far, national regulatory frameworks in the European Union do not provide for spectrum trading, and secondary markets for rights of use spectrum do not exist. The resulting problem with the traditional approach clearly is its lack of flexibility in reallocating spectrum. Technologies and markets change and the primary allocation of spectrum may become largely inefficient. The difficulty in reallocating rights to use spectrum may also prevent market expansion or new entry of competitors and thereby lesson competition.

According to a recent FCC Report, three technological trends are of major importance: (i) The development of spread spectrum technology has increased the demand for contiguous broadband spectrum allocation. (ii) Technology is making increased use of higher frequencies, e.g., of bands above 50 GHz that previously were considered to have limited utility. (iii) The development of frequency-agile technology creates a potential for services and uses that are not tied to specific frequency bands.

These technological developments increase the scope for efficiency improvements through flexible re-allocation of rights to use spectrum. With spectrum trading, rights to use spectrum could move more easily from low-value uses to high-value uses and scarcity of spectrum for specific applications would be alleviated. The full potential of spectrum trading, however, would only become apparent if at the same time frequency user plans were rendered more flexible.

The new EU regulatory framework for the electronic communications sector has acknowledged the current lack of flexibility in spectrum (re)allocation and explicitly provides for the possibility of spectrum trading. The Framework Directive explicitly allows Member States to make provisions for undertakings to transfer rights to use frequencies to other undertakings. A number of Member States such as Germany France, Spain and the UK are currently debating the introduction of spectrum trading or have already drafted new legislation that that provides for spectrum trading.

This paper distinguishes spectrum trading from administrative spectrum reallocation by two characteristics: (i) It is the current holder of a right to use spectrum that initiates its transfer to another firm. And (ii) the price achieved for the transfer is (at least partially) retained by the original holder of the right. The paper highlights the case for introducing spectrum trading in the EU and, more specifically, discusses institutional arrangements for spectrum trading that meet the goals of moving spectrum rights to the most efficient users, foster competition on end-user markets for electronic communication services, and is transparent, objective and non-discriminatory.

In more detail the paper deals with the following issues: First, we briefly sketch the new EU regulatory framework for spectrum trading. In the following section, we examine the guiding principles for frequency management (e.g. to promote an efficient usage of spectrum, create incentives to invest and innovate, to ensure competition, to be non-discriminatory, objective and transparent, practicability of the system, be in line with international obligations, set aside spectrum for public safety and defence, to pursue government public policy goals such as cultural diversity). In the subsequent section, we provide an economic analysis of major issues related to frequency trading such as efficiency of spectrum use, internalisation of external effects, how to pursue public policy goals, frequency trading providing an incentive to give up hoarding, measures to ensure the intensity of competition, how to deal with windfall profits, big-bang auctions as a proactive approach to introduce frequency trading and retrospective introduction of spectrum trading. Afterwards, we discuss various aspects of institutional arrangements that may govern spectrum trading under the new EU regulatory framework. Alternatives include (i) an arrangement, where trading is governed by individual transactions between undertakings only subject to general regulatory principles, (ii) an arrangement, where trading is performed under the close supervision of, and on the basis of a trading platform run by, the National Regulatory Authority (NRA), and (iii) other alternatives between these polar cases. The scope of frequency trading is addressed in what follows. We analyse the incentive to trade depending on the initial assignment procedure (e.g. beauty contest, auctions, first-come first-served, lotteries) as well as the frequency fee (e.g. fees which cover administrative cost, economic incentive pricing as the guiding principle for the calculation of the fees). In the subsequent section we focus on the most relevant aspects of an institutional arrangement, on the question of a step-by-step versus simultaneous introduction, and a discussion of additional elements. Finally, we end up with a conclusion.

### **Keywords**

Telecommunications, regulatory policy, frequency management, market mechanisms

### **JEL Classification code**

D4, D61, H2, K2, L51, L96