

**Satellite Spectrum Auctions:**  
*Regulatory Feedback in Transnational Markets*

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# **Satellite Spectrum Auctions:** *Regulatory Feedback in Transnational Markets*

## **Abstract**

The objective of this study is to assess the effect of a U.S. auction on the economic risks of providing satellite services that cross national borders. The differences between satellite communications services and terrestrial communications could induce significant distortions because satellite licensing involves a time-consuming parade of licensing decisions, conflicting cultural norms, and differing technical and economic characteristics of geographically segmented markets. In the proposed “sequential game” framework, governments and potential licensees play against one another to find the best strategy. We assess the costs in terms of the political and regulatory receptiveness of a U.S. company in other countries and correlate the reaction in those countries with the degree of market attractiveness in those countries. We argue that the reaction to foreign (and especially U.S.) companies’ applications for operating licenses will differ across the three country types. The reactions consist of informed fears that U.S. auctions will accomplish the goal of awarding licenses to the “best” and strongest company as well as of fears that auctions are inconsistent with cultural and international norms. We find that the most attractive countries with the largest potential demand are typically those countries that have the most negative reaction to U.S. auctions. The analysis shows that U.S. auction of satellite spectrum is a risky policy establishing a precedent for the sale of satellite spectrum. While there is the prospect of efficient domestic allocation of licenses and the tempting specter of large private sector contributions to reducing the federal budget deficit, there is a large downside risk that foreign reactions will thwart the economic viability of international satellite communications projects. We suggest some policy initiatives that could be taken to ameliorate some of the risks.

## **I. Introduction**

### **A. The Cachet of Auctions**

Auctions have become an attractive means of allocating licenses for radio spectrum in part because of the massive amounts of money that have thus far been raised in the U.S. (estimated at \$9 billion thus far). The efficient resource allocation that derives from awarding licenses to the bidder with the highest and best use for the spectrum is the main attractive policy feature of auctions. The full benefits of efficiency are achieved when several features of markets are present. Ideally, a large number of bidders participate, and financial markets are well-developed to provide capital to bidders, even those who are not large mature firms but who nonetheless have “bankable” investment projects. Regulatory expertise and infrastructure should be substantial enough to make the costs of running the auction low. A sufficiently stable legal and

regulatory regime warrants participation with the knowledge that the rules will not change dramatically and that redress for grievances will be reliable. Equal access to a high level of expertise will ensure there are sufficient “informed” bidders.

Spectrum auctions have been lauded in at least eleven countries around the world, including the U.S., for their efficiency in allocating spectrum for new terrestrial services. Alternative means of allocating licenses for domestic spectrum—lottery, comparative hearing, first-come-first licensed—have not achieved the speed or cost efficiency that auctions in the U.S. have produced. The advantages of auctions are well-discussed in the literature (see McAfee and McMillan [1996], McMillan [1995 and 1994], Kwerel and Williams [1993]) requiring little further elaboration. However, the appropriateness of this means of distributing spectrum for international services still is being debated. Although nearly ideal conditions have developed in the U.S., the conditions are farther from ideal in many other countries. The use of auctions in those countries may not produce an efficient resource allocation. Furthermore, if the objective is to raise money for the government or to subsidize the telecommunications infrastructure, auctions could be sub-optimal if other means of charging for the spectrum license can be employed. (In the U.S., auctions are the only means by which the FCC can raise money in excess of the administrative cost associated with the licensing process.)

Thus in this paper, we focus on the less often discussed problems that can potentially arise with auctions in an interesting context. The benefits of auctions can be substantial but a more in-depth analysis of the potential costs when companies serve markets across country boundaries is needed.

## **B. Problems Induced by Satellite Spectrum Auctions**

The U.S. became the first country to award a satellite communications license/orbital position through an auction mechanism on January 24, 1996 when MCI won a direct broadcast satellite license for \$682 million. This event focused attention in the U.S. on the differences between terrestrial PCS service and satellite service license awards. The differences between international satellite communications services and terrestrial communications stem from the time-consuming parade of licensing decisions, conflicting cultural norms, and differing technical and economic characteristics of geographically segmented markets.

Low earth orbit (LEO) satellite systems and some geostationary (GEO) systems must transmit radio signals across national boundaries because many of the services cannot succeed economically without providing service in multiple countries, i.e., in multiple licensing jurisdictions. This is a significant factor that is not faced by terrestrial domestic providers whose service can be “contained” within national boundaries. The LEO systems face this in an extreme form because they will operate with a “footprint” that is global. We examine the potential stream of events that will flow after a U.S. auction of satellite licenses.<sup>1</sup> In the proposed “sequential game” framework, governments and potential licensees play against one another to find the best strategy.

We assess the economic viability of international satellite services that cross national borders in terms of the political and regulatory receptiveness that a U.S. company could encounter in other countries following a U.S. auction. First we classify countries into one of three telecommunications infrastructure categories and argue that the reaction to foreign (and especially U.S.) companies’ applications for operating licenses will differ across the three country categories. We discuss several root causes for the potential negative reactions in foreign countries.

The reactions of countries may be a moot point if companies would not find the markets in those countries attractive enough to warrant applying for a license. Thus, we also create a model of market attractiveness and identify three classes of attractiveness. We create a matrix of markets by their receptiveness and attractiveness and characterize the size of the markets within each cell of the matrix. We find that the most attractive countries with the largest potential demand are typically those countries that are expected to have the most negative reaction to U.S. auctions.

#### **D. Organization of Paper**

In the next section, the methodology for this study is described with a focus on the classification into telecommunications infrastructure groups and market attractiveness categories. Next a detailed discussion of foreign reactions and how they would vary by country type is

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<sup>1</sup> Although spectrum auctions can be viewed as a tax on new satellite service operators that is not imposed on incumbent competitors whether satellite or terrestrial, we do not explore this motivation for concern about spectrum auctions. Clearly, this is important to satellite operators and influences their decision on whether to enter this business; however, it should not influence the cost of service at the margin unless the provider has a monopoly in its market. Instead of focusing on this obvious issue, we focus on the longer term issues related to reactions in other countries to the U.S. auctions.

provided. In the fourth section, the attractiveness of each country is assessed and the matrix of regulatory receptiveness versus market attractiveness is created. We find that the most unmet demand occurs in countries with attractive market opportunities but with relatively low regulatory receptiveness. The paper then turns to policy implications for the U.S. under these circumstances and provides several recommendations on policies to pursue. The paper ends with a conclusion and summary section.

Our main conclusion is that U.S. auction of international satellite spectrum is a risky policy. While there is the prospect of efficient domestic allocation of licenses and the tempting specter of large private sector contributions to the federal budget deficit, there is a large downside risk that foreign reactions will thwart the economic viability of satellite communications projects. U.S. policy needs to be considered in this light.

## **II. Methodology**

### **A. A Taxonomy**

The success of the PCS auctions in 1994 and 1995 presaged the FCC's decision to auction satellite communications (SATCOM) spectrum licenses for Direct Broadcasting Satellites (DBS) on January 24, 1996. However, differences in regulatory, economic, social, and cultural perspectives, foreign governments may produce some misgivings about auctions. As Levin indicates "the semantics of buying and selling...of orbit spectrum (that go along with auctions) may evoke deep-seated reservations about the legal-political viability of market type mechanisms" (Levin, 62). Therefore, evaluating the implications of foreign reactions to U.S. action is crucial to the FCC's policy decision on mechanisms for SATCOM licensing of additional satellite spectrum.

Figure II. 1 illustrates the framework of U.S. satellite spectrum licensing, foreign reactions to U.S. decisions, business assessments of opportunities, and the feedback to the FCC's policy. The international licensing process is viewed as a series of actions, reactions, and feedbacks. Before undertaking an analysis of foreign reactions to various U.S. actions, this section presents a taxonomy of countries that enables a more meaningful analysis of the licensing game.

We expect systematic differences in countries' reactions to U.S. actions and hypothesize that the status of the existing telecommunication infrastructure explains a major part of the differences. This is because governments' telecommunication regulatory policies tend to protect

their countries' interests, and the needs for protection and regulation vary depending on the maturity of their telecommunication industry. For instance, countries with very developed infrastructure will probably be more concerned with protecting local infrastructure providers from foreign competition than those that do not have much local interest to protect. The opportunity costs of not being the front-runner are high for those latecomers with some developed infrastructure and plan to participate in the future competitive game for good orbital positions.

Could economic development rather than infrastructure better explain some of the cross sectional differences in country reactions? In fact, the association between the degree of economic development and the degree of telecommunication infrastructure development is positive and so strong that 70% of the variation of teledensity (usually measured by the number of phone lines divided by population in hundreds) across countries corresponds to the variation of wealth across countries.<sup>2</sup> It is estimated that an extra \$1000 of GDP per capita is equivalent to an extra 2.24 telephone lines for every 100 inhabitants (World Telecommunication Development Report, 76). However, for the countries with large populations, wealth per capita can be quite misleading. China and India, because of their huge population, have very low per capita income. Yet, in cities such as Beijing and Delhi, the telecommunication infrastructure is moderately developed. Thus, their telecommunication policies are quite different from those of countries with the same economic class but with very little telecommunication infrastructure. Greece, Malta, and South Korea also have more advanced networks than may be expected for their level of economic development because their governments promote telecommunications investments.<sup>3</sup>

Thus, we believe it is useful to categorize the world into three groups according to the amount of existing telecommunication infrastructure: countries with most developed infrastructure (MDI), countries with moderately developed infrastructure (mDI), and countries with least

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<sup>2</sup> According to our sample of 195 countries, the degree of telecommunication infrastructure development accounts for 80% of the variation of teledensity. The 70% figure comes from the World Telecommunication Development Report. They found that the correlation coefficient between telecommunication development (as measured by telephone density) and wealth (as measured by gross domestic product (GDP) is 0.85 (World Telecommunication Development Report, 76). Correlation coefficient ranges from -1 to 1. The absolute value of 1 stands for strong correlation where 0 stands for no correlation. The signs represents the direction of the relationship.

<sup>3</sup> Countries can move from one category to another within a decade. With low interest government bonds and installation charges, the Republic of Korea has moved from a moderately developed infrastructure with a teledensity of 12 to a most developed infrastructure of 36 within the period of 1983-1992 (The World Telecommunication Report, 86).

developed infrastructure (LDI). In practice, information on the costs of telephone usage, the quality of the network, the availability of enhanced services, or the distribution of lines between business and residential users and between urban and rural users for the whole world is difficult to obtain. So we rely on the number of telephone lines per 100 inhabitants as the baseline (this is referred to as phone penetration rate or teledensity).<sup>4</sup> Teledensity is used as the base line because it is the most available and "widely used (as) indicator of telecommunication well-being" (World Telecommunication Development Report, 75).

## **B. Description of MDI, mDI , LDI Classifications**

Countries with a telephone penetration rate above 30<sup>5</sup> in 1992 will be considered countries with most developed telecommunication infrastructure (MDI). They represent about 20% of all countries in the world. Examples of MDI are Taiwan, South Korea, Singapore, Bahamas, Malta, Israel, Martinique, and the OECD<sup>6</sup> member states, including the U.S., but excluding Mexico and Turkey (their penetration rates in 1992 were 7.54 and 16 respectively). These countries are characterized by a high level of economic development with a GDP/capita generally above \$10,000, a highly competitive telecommunication market (98% of the household have phones) with relatively low barriers to entry and high international traffic (around 40 minutes/inhabitant in MDIs, 3-5 minutes in mDIs and 0.5 minutes in LDIs). Public investment in telecommunication in MDI countries is high compared to the mDI and LDI. The average investment per capita for MDI is \$120, for mDI is \$15, and for LDI is \$2. Countries with telecommunication penetration rates below 30 but more than 2, or with more than 1 million telephone subscribers in 1992 are classified as mDI. Examples of mDI are Algeria, Mexico, Indonesia, India, China, Pakistan, Turkey, and Eastern European countries. About 50% of the world belongs to this group. mDI typically have insufficient telecommunication infrastructure to meet demands. The average waiting time for a

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<sup>4</sup> The ITU has worked on designing an index that might better reflect a country's level of telecommunication development. They try to include network coverage, distribution, costs, quality and modernity into their index. "Preliminary results suggest there is not a big variation between rankings based on the TDI (telecommunication and development index) and teledensity" (World Telecommunication Development Report 75).

<sup>5</sup> U.S. had a teledensity of 56.49 in 1992.

<sup>6</sup> Members of Organization for Economic Cooperation and Development (OECD) are Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Japan, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, United Kingdom, and the United States.

phone line is from 2-5 years in mDI compared to 0.1 year in MDIs and 5 years in LDIs. The quality of service is relatively low, and there is constant congestion in telephone traffic. The rate of unsuccessful calls ranges from 30% to 40%. Most of the telephone services are monopolized by the local government telecommunication providers, and there are usually significant barriers to entry for foreign companies.

Even though the overall penetration rate is relatively low in mDI countries, most of the mDI have a much higher penetration rate in the cities. For instance, the three Argentine cities of Buenos Aires, Sante Fe, and Cordoba have 50% of the country's phone lines (Latin America Telecommunications, 5). Cities in India contain only 25% of the country's population, but have 90% of their lines (World Telecommunication Development Report, 75). The need for further development in rural areas is high. The growth in cellular service subscribers is around 80% per year in mDI versus 40% in MDI. The increasing need for business and some residential uses in the cities in addition to the traditional government usage generates significant demand. Satellite services can play an important role in complementing and supplementing the existing services in mDI.<sup>7</sup>

Any country having penetration rates less than 2 per 100 inhabitants and less than 1 million subscribers in 1992 is classified as LDI. Examples of LDI are Congo, Nigeria, Ethiopia, Albania, Vietnam, Nepal, Kenya, Tanzania, Cambodia, Haiti, and Zaire. The main users of telecommunications are the government and the military. With such a low penetration rate, there is much room for improvement. However, these countries tend to have low wealth status, and financial markets are not adequately developed. The GDP/capita is around \$300-600. Most of the population (around 80%) is in the rural areas where telephone services are almost non-existent. The level of competition in these telecommunications markets is low. Most of the services are monopolized by the government-owned PTTs with high entry barriers. Due to political instability, many LDI governments control telecommunications in order to reinforce their authority over and legitimacy among diverse ethnic and social groups. For these countries, the laying of wired

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<sup>7</sup> Hughes HS-333 and 376 satellites have linked more than 1000 islands in Indonesia. INSAT-1B provides national telephone, television and weather reconnaissance services in India at a fraction of the cost of a conventional terrestrial system (\$130 million versus \$1 trillion) (Martinez, 33).

networks in remote areas may be prohibitively expensive, but satellites that are insensitive to distance may provide an inexpensive form of communications for people in these countries.

### **C. Data For Commercial Assessment**

We collect data on a sample of 195 countries for the purpose of assessing market potential. Factors such as population, GDP per capita<sup>8</sup>, geographic area, unmet demand, level of competition, and to a limited extent, political stability are entered in a model with discretionary weights to classify countries into three commercial attractiveness categories.<sup>9</sup> We estimate latent revenue which is defined as the amount of revenue that can be obtained if all of the unmet demand is served by new satellite systems. In our model, unmet demand is estimated as the maximum of the waiting lists and the “naive” lines needed. The latter is calculated as the difference between the teledensity that particular country should have (based on its wealth) and the existing teledensity. We use the Communication Outlook’s statistic that telecommunication revenues are equivalent to 2.27% of the GDP/capita in OECD member states to estimate the dollar revenue from unmet demand.

### **III. Foreign Reactions to the U.S. Action Vary by Country Types**

Foreign negative reactions to further FCC auctions could be the result of a blending of traditional negative sentiments about the U.S. and negative perceptions of the many facets of auctions. Figure III. 1 summarizes, by country type, the possible sources of the fears that contribute to foreign reactions. Some factors identified here may exist with and without auctions but many will be exacerbated by auctions. Some factors may be based on informed analysis as well as on misperceptions but are genuine fears in either case. We outline the sources of the reactions below with a numbering system that corresponds to that in Figure III.1. The two sets of concerns that could drive the behavior of foreign countries are:

1. concerns for the costs borne by late-comers and
2. concerns for the public welfare of their nations.

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<sup>8</sup> The results reported are not affected by adjusting GDP for purchasing power in each country.

<sup>9</sup> The overall results compare favorably with the results from a small survey of professionals in a large U.S. communications company.

Informed regulators and service providers outside the U.S. may fear that auctions will succeed in reaching objectives of efficient allocation of satellite spectrum, thereby quickly creating a front-runner and a strong competitor who could provide transnational service and challenge incumbents in foreign markets. In addition, the U.S. government would reap the premium bids from those companies wanting an early foothold and thus potentially deprive other governments of the additional revenue.

Such fears could also serve as a rallying point to arouse the reservations that some citizens and their representatives already may have about the social and political viability of auctions. These people may be more fearful that a U.S. auction winner could sap their countries' economic potential, establish a monopoly, decrease settlement payments<sup>10</sup> (and thus decrease subsidies for local loop service), and reduce domestic jobs. Whether those fears are realistic assessments by informed players or not, the fears are genuine. Although once the ability of auctions to accommodate various property rights considerations and public welfare issues are well-recognized, opposition to auctions will diminish, in the interim, such fears may arouse deep-seated mistrust of market mechanisms and the U.S.' historical reliance on the market.

The perception that auctions cater to the materialistic world view of U.S. companies who disdain the public's welfare will make the sale of what is viewed as common property seem particularly egregious. The U.S. use of auctions will be viewed in many governments as inconsistent with the accepted international doctrine that space is a common heritage for all humankind and that space is not the property of any one government to sell. Thus, together with the late-comers' costs, there will be several pillars on which opposition to auctions will stand, leading to the call for increased international "cooperation" in satellite spectrum allocations.

In the absence of cooperation, however, countries may retaliate against U.S. companies. Some may retaliate by using non-auction mechanisms which can easily incorporate anti-foreign or anti-American measures, and under certain circumstance, may yield the host countries higher prices for spectrum than auctions.<sup>11</sup> In any case, irrespective of foreign government's decision to auction

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<sup>10</sup> The telephone companies of the originating parties pay the terminating party a fee based on the accounting rates agreed upon by the PTTs. This termination fee is usually lower than the collection fee charged to the consumers by the originating telephone companies.

<sup>11</sup> In countries where conditions for maximum benefits from auctions are not met (such as limited number of bidders, inefficient financial markets), host governments may be able to exercise their power more easily through non-auction mechanisms than auctions.

or not, U.S.' auctioning of satellite spectrum sets the precedent for charging for spectrum—a precedent many governments may gladly accept despite reservations about auctions.

## **A. Perceived Causal Factors for Foreign Reactions**

### **1. Anti-front-runner/Late-Comers' Concerns**

A front-runner is a leading contestant in a rivalry. Any person/company who enters a market after the front-runner has established a position incurs late-comers' costs.<sup>12</sup> Though the apprehension of having a front-runner who could sap their economic potential and decrease settlement payments exists with or without auctions, auctions accentuate the fear and provide the rallying point for alliance with the other concerned parties. We address each of these in more detail below.

#### ***a. The Fear of the Loss of International Competitiveness/Future Economic Growth***

The U.S. competitors' fear is reflected in the European Communities' (EC) complaint regarding space-based personal communications that "the U.S. operating systems will dominate this emerging market — precluding the introduction of non-U.S. systems" (WARC 1992, 119). Competitors believe that the U.S. itself represents a market sufficiently large to sustain a system that provides global services. Any market gained outside the U.S. could be charged for service at marginal costs. This will leave no opportunity for others to develop their systems. Thus, the EC does not want the FCC to license spectrum first to companies that provide worldwide services.

In addition to the potential loss of market share, late comers may have to incur adjustment costs, too. Once the U.S. has established a system, late comers would have to incur higher system coordination and adjustment costs to avoid interference with incumbents. If these costs are borne by late comers, late comers will be in a relatively disadvantaged position. This is especially relevant for the low earth orbit (LEO) systems with many satellites. The potential for coordination costs is high when hundreds to thousands of satellites are proposed by U.S. companies. Therefore, the international community would desire a global agreement on how to allocate orbits and coordinate systems before individual countries license LEO satellite spectrum.

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<sup>12</sup> These costs include opportunity costs of foregone market share, adjustment costs for orbital slots, and coordination costs to avoid interfering with existing systems.

The use of auctions magnifies U.S. competitors' fears because an auction that readily assigns a license to what is assumed to be a wealthy U.S. company could create a strong competitor. Licensees elsewhere, whose licenses may require performing costly social functions, would compete at a disadvantage against the wealthy U.S. winner. Moreover, auctions increase the speed of granting licenses. For instance, the entire licensing process, from the filing to awarding a license, for the broadband PCS auctions took only 83 days for all 99 licenses compared to the average 471 days needed for each authorization for the initial licensing of cellular phone services lotteries and hearings (FCC News Release, June 23, 1995). As a result, the fear of U.S. dominance is intensified when auctions are used in the U.S.

The politicians in LDIs have the same concerns as those in other countries about competitiveness and late-comers' costs, but those are outweighed by the benefits of such a global system. For instance, the benefits and costs of investment in telecommunications and economic growth approached 200:1 for manufacturing industries in Kenya and 85:1 in rural Egypt (Martinez, 35). Thus, investment in telecommunications would enable them to leapfrog stages of economic development.

#### ***b. The Potential Loss of Revenues***

This is the second group of concerns. The concern is most relevant to mDI local phone companies and is of moderate concern in MDI and LDI phone companies.

The loss of revenues comes from two sources: the loss of collection charges due to direct competition and the loss of settlement payments due to lower international rates. Businessmen, travelers, and subsidiaries of major corporations that are the target markets for a global satellite system also provide local phone companies a high volume of profitable international traffic. The incumbents fear the loss of customer base as well as the lowering of prices from increased competition. That fear is based on their apparent belief that demand is inelastic.<sup>13</sup>

For the mDI countries, the lowering of charges due to competition could lower local phone companies' revenues from settlement payments, too. Lower international rates will stimulate new demand for outgoing international calls which would reduce the imbalance of incoming and

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<sup>13</sup> New services may increase the volume of the international traffic and end up raising rather than lowering collection charges. This would depend on the elasticity of demand. If the demand is elastic enough, the lowering of prices as a result of competition would actually increase the total collection charges received rather than lower them.

outgoing calls, effectively lowering the lucrative settlement payments that form a major source of telecommunication income.<sup>14</sup> For instance, in 1992, the U.S. settlement payments to El Salvador<sup>15</sup>, Jamaica, Guyana, and Honduras were approximately 50% of their telecommunication revenues (Jipguep, 5). Auctions in the U.S. will heighten the anti-front-runner sentiment because auctions will become the rallying point for local phone companies to persuade foreign governments to carry out anti-foreign/pro-domestic policies.<sup>16</sup>

In summary, the first two issues—loss of international competitiveness and loss of current income—are concerns held by many regulators and service providers outside the U.S., but the mDI countries are expected to exhibit much stronger negative reactions to a U.S. auction based on these two issues than are MDI countries. MDI countries' concerns are expected to be focused on the loss of competitiveness, and LDI countries are expected to be less concerned given the benefits that they could receive from new technologies introduced by U.S. companies.

## **2. Public Welfare Concerns**

Public welfare concerns — concerns that the benefits of telecommunications to society will not be realized or will be negated by harm done to society—are strongest in mDI and are moderate in MDI and LDI countries. The use of auctions will intensify the foreign concerns for protecting the public from negative aspects of auctions, monopolistic powers of telecommunications providers, and foreign exploitation of natural resources. We describe each of these concerns in detail below.

### ***a. An Anti-Auction Sentiment***

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<sup>14</sup> The telephone companies of the originating parties pay the terminating party a fee based on the accounting rates agreed upon by the PTTs. This termination fee is usually lower than the collection fee charged to the consumers by the originating telephone companies. Within the existing framework, developing nations usually experience more incoming than outgoing calls due to high rates in those developing countries. Telephone companies in those nations usually receive more money from termination fees than they pay out, creating an imbalance of incoming funds.

<sup>15</sup> The \$70.5 million U.S. settlement payments to El Salvador in 1992 constituted 57.8% of their telecommunication revenues while another \$96.3 million constituted 56.8% of Jamaica's telecommunication revenues (Jipguep, 5).

<sup>16</sup> Ownership of local phone companies may affect the receptiveness of U.S. auctions. Governments are supposed to have a broader social objective than phone companies, so they should favor the new systems more than local phone companies.

This sentiment is rooted in misconceptions about auctions, particularly the perception that auctions rely heavily on wealth as a critical factor in obtaining a license and the perception that auctions cede all property rights to the winner. Anti-auction sentiment is strongest in mDI and LDI. Even some MDI governments are afraid of losing control over selection criteria and the future reassignment of spectrum rights. Such concerns also intensify mDI's desire for *a priori* global planning and coordination.

i. *Wealth-orientation:*

Wealth seems to be the only criteria used in a simple form of auctions.<sup>17</sup> The concern about "non-public welfare" based auctions is well summarized by a statement made by Canada's Department of Communications: auctions "eliminate our discretion in the selection process and diminish our capabilities as spectrum managers" (McMillan, 196). This fear of heavy wealth reliance is not unfounded. "The weak capital formation mechanism found in the third world countries" and "the significant constraints on access to international capital markets" will lower the ability of local firms in mDI and LDI to compete with international companies on a monetary basis (Samarajiva and Shield, 233).<sup>18</sup>

ii. *Exclusivity and Property Rights:*

The mDI and LDI are also concerned with the possible loss of reassignment rights that come along with the sale of spectrum. Spectrum managers may fear that they would not be able to reassign the spectrum later to someone who may provide better services or technologies than the initial licensee. This lack of flexibility would be damaging to developing nations trying to catch up with new technologies.

Some believe that spectrum belongs to the people of the world as a common heritage of humankind. The selling of satellite spectrum implies the violation of a long accepted view in the ITU. Even though some economists may argue that auctioning

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<sup>17</sup> In the simple form of auctions, licenses will be granted to the highest bidders. This is the concept of auctions that is understood by the majority of the public and foreign governments. Auctions conducted by the FCC, however, are not this common, simple-form of auctions understood by the public at large. The FCC has hired many economists and auction experts to design auctions that, through modified procedures and formats, accommodate particular social welfare concerns.

<sup>18</sup> With special provisions such as bidding credits or set aside spectrum, the possibility of excluding local firms from winning licenses will be mitigated.

spectrum is actually selling a lease for spectrum, some politicians may be unwilling to let the U.S. be the first to license and receive a premium on property that belongs to the public.

**b. *An Anti-Monopolistic Sentiment***

This anti-monopolistic sentiment is strongest in mDI countries. Auctions are thought to have the effect of reinforcing monopoly and lowering competition after auction. Some regulators who are not aware of the different auction alternatives (such as giving multiple licenses <sup>19</sup>) that can be used to tailor auctions to the needs of the public may fear that these powerful companies will undercut prices and create a monopoly. The potential for monopoly is the lowest in MDI because of the competition from other incumbent means of communication. In the LDI, "it may be necessary to guarantee investor/operators that the PTT (or other provider) will have a monopoly for some fixed period" due to their low income to support the telecommunications demands (The U.S. Telecommunication Services in European markets, 56).

**c. *An Anti-Foreign and Anti-Americanism Sentiment***

There are concerns that local companies are disadvantaged relative to foreign companies and that direct benefits of the economic activities do not flow into the local economies. This anti-foreign/anti-American sentiment is prevalent in MDI and moderately prevalent in mDI. A successful U.S. auction would have the effect of intensifying the fear of foreign dominance in local or international markets. An anti-American sentiment is keen in the EC where the U.S. is their strong competitor.<sup>20</sup> In mDI countries, the desire of the governments to protect local businesses is strongest even though there is a major trend toward attracting foreign investment. In China, the investment climate is improving, but foreign investors are still only allowed to buy non-voting

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<sup>19</sup> Granting multiple licenses to low earth orbit systems may help to increase competition. However, this method of authorizing multiple operators to use a single orbital position may not be appropriate to geostationary orbits unless several competitors already have a slot and the licenses are for operating in the country. To induce competition in the local market, host countries may authorize companies from neighboring countries to operate in their countries if neighboring satellites' footprints would cover the host countries. Neighboring countries can be as close as U.S. and Mexico or as far apart as the African continent and Europe.

<sup>20</sup> The intensity of this sentiment can be illustrated by the following fact. "For the U.S. firms, nearly 85 percent of the potential (European telecommunications and related services market) is closed" to foreign investment (the U.S. Telecommunication Services in European markets, 2). Members of Parliament in France even declared opposition to further deregulation because "it would enable the U.S. operators to penetrate the European markets" (The U.S. Telecommunication Services in European markets, 61).

common stocks in selected companies. In many countries (including U.S.), foreign ownership of a strategic industry or public utility such as telecommunication is a politically sensitive issue.

## **B. Summary**

Overall, U.S. SATCOM auctions will raise significant concerns in foreign countries. Some countries will believe that the U.S. actions are inconsistent with the accepted view that space is a common heritage. Some countries will challenge U.S.' stated willingness to cooperate with international spectrum license norms. While some are concerned with the materialistic nature of auctions and their impacts on the public's welfare, others are wary of the late-comer's handicap. The major concern for MDI governments is the threat of the U.S. to their competitiveness. LDI's sentiment is mainly against auctions because of their basis on wealth of winners and the loss of income from settlement payments, but the benefits of having a better communication system could outweigh the costs.

## **IV. Market Assessment and Regulatory Receptiveness**

### **Outside the U.S.**

Based on these features, we classify countries into three levels of commercial assessment: High, Moderate and Low. Each group is again subdivided by the extent of telecommunication infrastructure as defined in section II. The section below will discuss the distribution of latent revenues among these subdivisions.

### **A. Distribution of Latent Revenues**

We integrate the classification of countries by level of commercial assessment with the extent of telecommunications infrastructure. Instead of counting the number of countries for each combination (e.g., high assessed potential and MDI status), we concentrate on the distribution of latent revenue within the various combinations of country types and levels of market attractiveness. Here, latent revenue is defined as the amount of revenues that could be obtained if all of the unmet

demand were served by new satellite systems.<sup>21</sup> We believe that aggregated latent revenue provides more important information than the number of countries in each category.

Our analysis shows:

- Highly Attractive Markets constitute approximately a quarter of global latent revenue. The majority of the revenue is in mDI.
- Moderately Attractive Markets constitute the majority of the latent revenue and is concentrated in MDI countries.
- Least Attractive Markets constitute a minute portion of the latent revenue, mostly concentrated in mDI countries.

In sum, markets with high attractiveness for satellite communications services are predominantly mDI countries. MDI countries dominate among markets with moderate attractiveness, and LDI run the gamut of attractiveness, but are weak opportunities compared to mDI and MDI countries.

## **B. Integration of Commercial Assessment & Foreign Reactions to U.S. Auction**

To illustrate the extent of the effects of auctions on U.S. companies, the followings summarize the results of section III and IV on auctions, assessments, and U.S. companies' responses:

- Although mDI are the majority of the highly attractive markets, they will be the most costly or most unreceptive in the wake of U.S. auctions. U.S. auctions will have the most detrimental effects on U.S. companies' ability to serve the most attractive opportunities abroad.
- Entrance to the moderately attractive MDI markets is very difficult due either to strong pro-domestic policies or intense competitiveness of the environment. Thus, establishing a joint

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<sup>21</sup> As discussed in Section II B, unmet demand is defined as the maximum of the waiting list and a "naive" estimate of the lines needed, calculated as difference between the model's predicted teledensity and the actual teledensity .

venture with a firm in the target country is crucial. Markets that have low commercial assessment, such as the less attractive part of the LDI, can become more attractive when their neighboring countries are served by U.S. companies. The relatively big footprint of satellites

means the marginal costs of providing service to areas that otherwise would be unserved would be very low when they are within the same footprint as other attractive areas.

In the next section, we will look at the policy implications of the FCC in face of the pressure from U.S. companies, from the Congress, and from the international community.

## **V. Policy Implications**

The FCC will face pressures from U.S. companies as well as the U.S. Congress. To the U.S. Congress, auctions are an efficient way to allocate spectrum. But, more important, auctions would bring billions of dollars to the Treasury lowering budget deficit. We suggest that the FCC urge the U.S. government to work with the ITU on the regulatory and technical aspects of auctions. Subcommittees on setting international licensing principles, standards, particularly auction standards, investigating the possibility of a global license, coordinating international regulatory policy should be formed at the ITU level. Meanwhile, the FCC may need to consider delaying SATCOM international service auctions in the U.S. to strengthen U.S. companies' chances of obtaining elsewhere.

### **A. U.S. Companies' Responses to Negative Foreign Reactions and Their implication on the FCC**

#### **1. Foreign Retaliation Upon U.S. SATCOM Auction**

Despite the trend toward market approaches in telecommunications, many countries outside U.S. do not appear to meet the conditions for which auctions would enhance efficiency. The use of non-auction mechanisms such as negotiations with applicants may give foreign governments more revenues. Realizing this, rational mDI/LDI governments should be less likely to auction spectrum

licenses. Furthermore, countries may prefer to use non-auction mechanisms so that they have more control over the selection criteria. Below, we will highlight the possible retaliatory measures that foreign governments may employ in response to U.S. auctions.<sup>22</sup>

At best, a U.S. auction of satellite licenses could achieve domestic efficiency in allocating a scarce resource (satellite spectrum), generate revenue for the Treasury, and would have a neutral effect on the license opportunities for the U.S. companies outside the U.S. Given the possible negative foreign reactions to U.S. auctions, at worst, foreign governments may retaliate against the U.S. In fact, the downside risks under the worst case scenario can be quite devastating, possibly taking the following forms:

- Unrealistically high prices may be set for license awards to U.S. companies if foreign governments erroneously use the U.S. price as a floor for the value of their licenses. The practice of charging for the use of spectrum will continue no matter whether foreign governments choose to use auctions or non-auction mechanisms, and in some countries the latter licensing methods may yield much higher returns, too.
- Foreign governments may choose to be uncooperative in international negotiations. The U.S.' loss of bargaining chips in ITU negotiations can be detrimental to the success of the U.S. industry as with the case of the little LEOs, who did not get allocations from the ITU at WARC 95. Loss of negotiating power at future ITU meetings and other international conferences may mean high coordination costs for U.S. systems, delays in getting appropriate spectrum, and even loss of proposed spectrum.
- Foreign governments may choose not to grant any licenses or landing rights to majority foreign-owned companies.<sup>23</sup>

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<sup>22</sup> The degree of retaliation depends on the type of businesses. In general, the operator business for private network will be more seriously affected by U.S. auctions than the manufacturing and broadcasting businesses. As an operator, a U.S. company will compete with local incumbents in host countries while as a manufacturer, a U.S. company is transferring technology to the locals. On the other hand, the effect of auctions on broadcasting operators would be small/minimal at the margin. This is especially true for television broadcasting because this business is extremely difficult to enter regardless of whether auctions are held.

<sup>23</sup> For instance, in Indonesia, three major telecommunications firms are controlled through the Bimantara Group by Bambang Trihatmodjo, a son of Indonesian President Suharto (Noam, Komatsuzaki and Conn, 128). In India, there are persistent reports saying that Mahendra Nahata, executive vice chairman of Himachal Futuristic, "has benefited from close ties to Mr. Ram," Indian Communication Minister. His relationship with Mr. Ram may enable him to get out of penalties from insufficient funds to back up Himachal Futuristic Communications' bids (Jordan, *The Wall Street Journal*, October 6, 1995).

- Host countries may limit purchases of U.S. hardware by host country's companies and agencies. Large international, U.S.-based companies that have established relationships throughout the world may have an advantage over smaller companies in entering into these markets. Some companies may by-pass some of these defensive countries if the markets are not attractive enough to bear the costs of entering them.

## **2. U.S. Companies' Responses And Their Implications For The FCC**

U.S. companies must decide whether and how to face the challenge imposed by foreign communities in the event that the FCC proceeds with the auction of satellite spectrum. The misunderstandings associated with auction mechanisms may be lowered and some of the negative reactions to an FCC auction of satellite spectrum may be avoided as foreign countries become increasingly aware of different auction types and their characteristics. On the other hand, auction education may make some countries more aware that auctions may not fit them, and that higher prices can be obtained through non-auction mechanisms. Despite this caveat, U.S. companies and the FCC should actively sponsor conferences and workshops in developing nations to increase their knowledge about auctions and the present wave of regulatory reforms. Since the bulk of the most attractive markets, mDI countries, are most concerned with an auction's ability to incorporate different social welfare objectives, sponsoring teams of auction experts to different parts of the world to help with setup could be a worthwhile long-run investment. Even the ITU has been encouraged to "use its bully pulpit to educate regulators from around the world," (Dykewic, Satellite News, January 29, 6).

### **B. Pressures From the U.S. Congress**

In May, 1993 when the House Energy and Commerce Committee agreed to President Clinton's proposal to raise money to reduce the budget deficit by selling rights to publicly owned airwaves to the highest bidders, the whole concept of free airwaves was changed. Since then, the FCC has been very successful in using auctions for licensing spectrum. Even though the talk of more auctions has drawn the ire of practically all companies interested in obtaining spectrum licenses, the FCC is again considering auctioning other parts of the spectrum such as those for digital audio radio services (DARS). One of the Commissioners once commented that it would be foolish for them not to use auctions. Even if the FCC does not want to auction licenses, the

Congress may order the FCC to use auctions and “the FCC may have no choice in that matter,” (Space Business News, Feb. 21, 1996, 6).

### **C. FCC’s Strategies**

The FCC will balance the cost and benefits of auctions. The FCC should work with the ITU on forming subcommittees on:

- setting basic principles for licensing new technologies,
- setting international licensing and auction standards such as build-out requirements and the form of auctions,
- coordinate auction policy with foreign countries, particularly with those high demand mDI markets and the vocal European countries, and
- evaluate possibilities of holding international auctions for orbital positions (as privately suggested by officials at the ITU).

Collaborating with the mDI may help to lower their concerns as late comers and draw them closer to the U.S.; however, coordination with the vocal European countries on auction policy may not produce fruitful results because their opposition stems from the fear of losing competitiveness to U.S. Even if foreign countries are willing to be bound by the licensing principles, auction standards will not do any good if foreign countries choose non-auction mechanisms.

The idea of having a global licensor to carry out the licensing work is worth investigating. First, it is easier to equip a global licensor, the representative of all nations, with auction expertise and computing resources that are required by a successful auction than to equip individual countries all over the world. Second, handling the procedure under a single umbrella would guarantee standardized auction and other licensing procedures, and this, in turn, would decrease the overall nationalistic influences from individual countries. Third, as a whole, this would mean more allocation efficiency and a significant decrease in attorney fees, administrative fees, and licensing time. Nevertheless, this idea is not without problems. The following are some of the issues that have to be addressed carefully before the implementation of global licensing:

- How should this licensor grant the licenses?
- How will individual countries regulate the licensees’ transmission?
- How will the global licensor incorporate the different needs of individual countries?

- How should the profits from licensing be allocated? Some suggest establishing a telecommunication fund for building infrastructure in developing nations.
- Is there a need for reallocation of existing users? If so, what would be a fair way to allocate orbital slots?

It will take time for the international community to consider alternatives. Meanwhile, the FCC should consider delaying international services SATCOM auctions in the U.S. if there is strong opposition from the international community. If auctions were used by a smaller and economically less threatening nation, foreign countries may better appreciate the positive aspects of auctions. As more and more countries outside the U.S. use auctions for terrestrial licenses, the misconception about auctions should decrease. So, the FCC and U.S. companies should work together to oppose the Congressional pressure to auction spectrum for international satellite communication. Doing so will not only safeguard U.S.' international relationship but also U.S. companies' chances of obtaining licenses elsewhere.

## **VI. Conclusions**

Because satellite communications services and terrestrial communications differ in important ways, auctions of international satellite communications (SATCOM) licenses in the U.S. could significantly distort the communications market. A U.S. auction could retard the global momentum towards using auctions and prove debilitating for U.S. companies desiring to provide global service because foreign countries may react negatively to U.S. auctions. There are several roots for the potential negative reactions:

1. One set of fears is based on the prospect that U.S. auctions will be successful at achieving their proponents' ideals: quickly and efficiently awarding a license to an operator with the highest and best use for the spectrum.
2. Misperceptions about auction processes will spawn additional fears that U.S. companies will not act in the interests of domestic welfare. Auctions are perceived in some cultures as crassly materialistic, sacrificing the public's welfare.
3. The auctioning of spectrum appears to be contrary to the Act of 1934 and to international norms in the ITU that could have important consequences in future WARC meetings when

the U.S. requires the cooperation of other countries to obtain allocations desired by U.S. industry.

This problem is aggravated by the fact that the most attractive economic markets for satellite communications are those that present the highest political and cultural hurdles if auctions are used in the U.S. Those countries may either prohibit or restrict U.S. companies from serving those markets or may realize that by employing non-auction mechanisms they can extract even larger rents from U.S. companies than they could with the use of auctions. This will be especially true for those countries where the underpinnings do not exist for an auction to successfully and efficiently allocate licenses. In addition, countries that allocate licenses following allocations by many other countries will be at a disadvantage with auctioning spectrum. In those cases, non-auction mechanisms may be the best means of selling spectrum.

The FCC is caught in the horns of a dilemma. If the U.S. auctions international spectrum licenses, U.S. companies could face burdens due to the international community's reaction against U.S. insensitivity, U.S. dominance in SATCOM, and lack of U.S. cooperation in the global telecommunications community. At the minimum, other countries could start charging for spectrum following the U.S. precedent. However, the use of non-auction mechanisms in the U.S. does not prevent other countries from using auctions for licensing. On the other side, if the FCC does not auction spectrum, Congress will press for the use of auctions to raise revenue.

Nevertheless, current trends toward the use of market mechanisms as indicated by the increased use of auctions and the privatization movement could reduce the magnitude of the effects outlined above. In fact, the trend is toward increased use of auctions. We expect that foreign countries will more greatly appreciate the value of auctions in the future, thus enabling companies to compete in open markets. Moreover, if major changes occur in the settlement system, the opposition to U.S. companies and an FCC auction could diminish. While the charges are now split 50/50 between the countries involved, other schemes are being considered including an “originator takes all” settlement plan. Such plans are not being favorably received by many smaller countries; however, change is likely given the progress being made on multi-lateral trade negotiations and the desire of providers in “originating” countries to reduce the costs to their customers.

The U.S. government should work with the ITU on setting licensing principles and auction standards regarding SATCOM licensing for new technologies, sponsoring workshops and conferences to educate the international community about auctions and designs that can achieve particular needs, and finding alternatives to the existing licensing procedures. If auctions are the preferred method, then international standards for auction rules and procedures should be supported and established at ITU. However, if auctions are not the preferred means, setting auction standards at the ITU level would be useless. Education on auctions may help to lower the resentment towards U.S. auctions. But, it may also make other nations more aware of the fact that their countries may not have all the required conditions for successful auctions and that non-auction mechanisms may be more appropriate for licensing spectrum. A safer route would be coordinating licensing policy with moderately developed infrastructure countries to lower their late comers’ concerns and bring them closer to the U.S. However, in the long run, promoting a global licensing auction in which auction and licensing rules are clearly laid out and all countries would participate has the most potential benefits.

## **Bibliography**

Dykewicz, Paul, "Special Report: industry & Regulatory Officials Offer ITU Input," *Satellite News*, January 29, 1996, 6.

FCC News Release, "FCC Grants 99 Licenses For Broadband Personal Communications Services In Major Trading Areas," June 23, 1995.

Gruley, Bryan, "Politics & Policy: MCI, with \$450 Million Bid, Outlast TCI in Auction for Satellite License," *The Wall Street Journal*, January 25, 1996.

Jipguep, Jean, "Telecommunications Trade And Economic Development Among Developing Countries," CANTO 10th Annual Conference and Trade Exhibition, June 1994, 4-5.

Jordan, Miriam, "India May Limit Phone-Franchise Awards," *The Wall Street Journal*, October 6, 1995.

Kwerel, Evan and John Williams, "Moving Towards a Market for Spectrum," *CATO Review of Business and Government Regulations*, 1993: 2, 53-62.

*Latin America Telecommunications:: A study of Deregulation and Privatization In Argentina, Chile and Mexico*, 1-11.

Levin, H. J. , "Latecomer Cost Handicap," *Tracing New Orbit*, edited by Demac, Columbia University Press, New York Guilford, 1986, 258-279.

Martinez, Leo, "Use of Outer Space For Power On Earth," *Communication Satellites: Power Politics in Space*, 1985, 29-43.

McAfee, Preston and John McMillan, "Analyzing the Airwaves Auction," *Journal of Economic Perspectives*, Winter 1996, Volume 10(1), 159-75.

McMillan, John, "Selling Spectrum Rights," *Journal of Economic Perspectives*, Volume 8, Number 3, Summer 1994, 145-162.

McMillan, John, "Why Auction the Spectrum?" *Telecommunication Policy*, Volume 19, No. 3, 1995, 191-199.

Noam, Eli, Komatsuzaki, Seisuke, Conn, Douglas A. , *Telecommunications in the Pacific Basin: An Evolutionary Approach*, Oxford University Press, New York, 1994.

Reuter New Media, "FCC Adopts Rules on Foreign Telecom Investment," November 28, 1995.

Robichaux, Mark, "MCI, News Corp. To Form Venture For Satellites," *The Wall Street Journal*, January 26, 1996, B3.

Samarajiva, Rhan and Shields, Peter, "Value Issues in Telecommunications Resource Allocation in the Third World," *Telecommunication Values and the Public Interest*, edited by Lundstedt, S., Ablex Publishing Corp., Norwood, New Jersey, 1990, 227-253.

*Satellite News*, "Special Report: Industry & Regulatory Officials Offer ITU Input," Phillips Business Information Inc., January 29, 1996, 6.

Seitz, Patrick, "European, U.S. Interests To Clash at WRC '95," *Space News*, October 16-22, 1995, 4, 28.

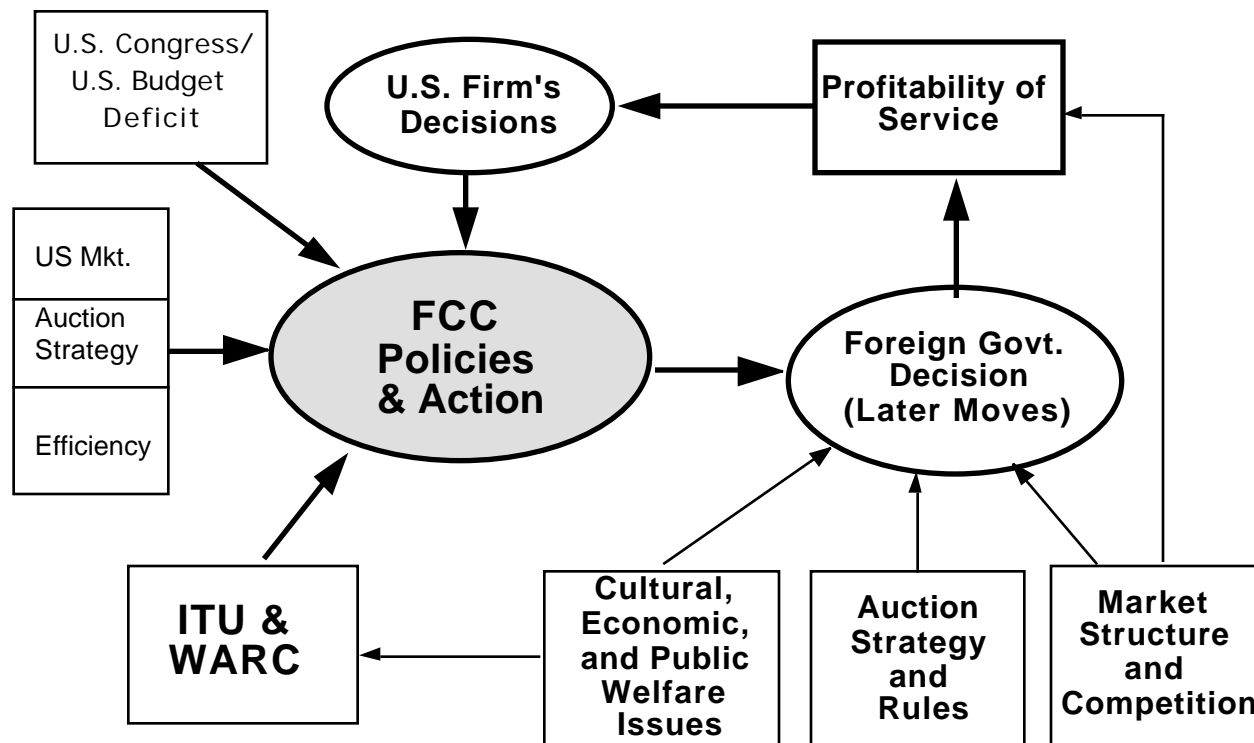
*Space Business News*, "Industry Execs Try to Halt Spread of Auctions to International Market," Phillips Business Information Inc., February 21, 1996, 6.

Space Network List, *Thirty-Fourth Report of the International Telecommunication and the Peaceful Uses of the Outer Space*, ITU publication, #43, 1995.

*The 1992 World Administrative Radio Conference: Technology and Policy Implications*, Congress of the United States, Office of Technology Assessment, 1992.

U.S. Congress, Office of Technology Assessment, *U.S. Telecommunications Services in European Markets*, Washington DC, U.S. Government Printing Office, August, 1993.  
*World Telecommunication Development Report 1994*, International Telecommunication Union, 1994.

**Figure II.1.  
Satellite Communications Licensing Decisions and Feedback**



**Figure III.1. Foreign Reactions to US SATCOM Auction**  
(by Sources of Fear and Country Type)

Reactions to US Auction(2)	Types of Countries		
	Most Developed Infrastructure(1) (MDI)	Moderately Developed Infrastructure (mDI)	Least Developed Infrastructure (LDI)
<b>1. Latecomers' Concerns</b>			
a. Future Growth/Loss of International competitiveness(3)	✓	✓	✓
b. Loss of Current Income from International Calls	✓	✓	✓
<b>2. Public Welfare Concerns</b>			
a. Anti-Auction	✓	✓	✓
i. Wealth-Oriented			
ii. Exclusivity & Property Rights	✓	✓	✓
b. Anti-monopolistic (3)		✓	
c. Anti-Foreign/ Anti-Americanism (3)	✓	✓	

The size of the check-marks indicates the relative significance of the factors.

Notes:

1. Infrastructure is defined as the overall communication capabilities/facilities which include both the wireless and the wired networks. MDI are characterized by high level of capital investment in telecommunications. mDI usually have low level of development in the countryside that houses the majority of the population. Main users of LDI are often the government instead of businesses.
2. Late comers and public welfare concerns are the roots underlying foreign reactions.
  - Late Comers' Concerns: This anti-front-runner sentiment is based on the fear that auctions will succeed in reaching objectives of efficient allocation of satellite spectrum, therefore creating a front-runner in the international arena and a strong competitor providing transnational services.
  - Public Welfare Concerns: To those that have misconceptions about auctions, the use of auctions to allocate licenses would mean the sale of spectrum to the richest, the loss of control over the selection criteria and the reassignment rights. Some local operators and regulators outside the U.S. may fear that the strong transnational competitor created by a U.S. auction would challenge incumbents in foreign markets and establish monopolistic powers in foreign markets.
3. The blank cells do not indicate the non-existence of that particular factor. They do reflect the relative insignificance of that factor as a handicap to US winners. For instance, the loss of settlement payments, the anti-foreign and anti-monopolistic feeling in the LDI have been subjugated by the positive by-products from having better telecommunication infrastructure. Thus, these two factors pose smaller obstacles to U.S. in LDI. Anti-monopolistic feeling is not strong in MDI as there will be a sufficient number of telecommunications companies to warrant a competitive environment.