

# **The Impact of Non-neutral Federal Regulatory Policy on Competition**

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## **Abstract**

We present a duopoly competition model that analyzes the simultaneous incorporation of two US federal regulatory programs to illustrate how the interaction of these programs affects competition. Specifically, we use the example of the telecommunications industry's Universal Service Fund (USF) and its interaction with the carrier of last resort policy. Our model shows that the simultaneous implementation of the USF policy that grants subsidies to incumbent telecommunications providers serving in high-cost areas, and the carrier of last resort policy that mandates incumbents to provide service in under-served geographic areas, deters competitive entry and thereby runs counter to the objectives for which the policies were intended. This model provides a foundation into how federally administered programs that are designed to be competitively neutral interact to create unintended consequences.

**JEL classification: L52, L96, O11**

## 1. Introduction

In many countries federally administered programs are used to ensure citizens have basic access to food, housing, education, unemployment insurance, emergency services, and communications. In the US, the federal Universal Service Fund (USF) was created in 1984, and expanded in 1996, to ensure that all persons have affordable access to basic telephone services. While the USF is composed of four programs, the largest program within the fund is the high-cost support program.<sup>1</sup> The high-cost support program offers subsidies to telecommunications providers serving in areas deemed too costly for such providers to operate profitably. The program was designed to compensate providers for serving consumers who might otherwise be left without basic telecommunications services due to their geographic location.

In addition to the USF high-cost support program, the US telecommunications industry employs a carrier of last resort policy. The carrier of last resort policy requires designated incumbent telecommunications providers<sup>2</sup> to provide telecommunications access to all households within an un-served community who request such access.<sup>3</sup> Therefore, the policy is designed to work in accordance with goals of the USF to ensure all households have affordable access to telecommunications services.

This paper employs a theoretical model to examine the simultaneous implementation of the two programs. We begin with a model of duopoly competition given the parameters of the

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<sup>1</sup> USF programs also include low-income support programs (known as Lifeline and Linkup), which offer discounts to low-income households to help such households establish and maintain basic telecommunications services, a rural healthcare program that offers reduced rates to rural health care providers for telecommunications and Internet services, and support for schools and libraries to establish and maintain Internet access.

<sup>2</sup> The term incumbent refers to the carrier that prior to the Telecommunications Act of 1996 provided local telephone service in an area. An entrant is a carrier that was not operating prior to the Act that provides some or all of the local telephone service in an area.

<sup>3</sup> In this paper, the term household may refer to one or multiple telecommunications consumers. We use this term as telecommunications policies are primarily concerned with ensuring all persons living within a household have access to telecommunications services.

existence of the high-cost fund and the carrier of last resort policy. The model illustrates that when paired, the programs have deleterious effects on telecommunications competition. We show that despite regulatory efforts to implement a competitively neutral policy, the high-cost support program interacts with the carrier of last resort policy to distort competition. As a result, we find less competitive environments than would exist in the absence of these programs. Our results are consistent with research that finds empirical evidence of a negative impact on competitive entry based on net contributions to the USF high-cost fund.

The paper proceeds as follows. Section 2 provides background information on the USF and the carrier of last resort policy. Section 3 presents our theoretical model of the interacting federal regulatory policies. Section 4 provides suggested solutions to the dilemma, and Section 5 concludes.

## **2. High-cost Support and Carrier of Last Resort**

The Universal Service Fund, and in particular high-cost support, plays a leading role in influencing competition in the telecommunications industry. Under this federally administered program, all telecommunications providers must contribute a fixed percentage (currently 10.5%) of their revenues to the fund, of which a large portion is then distributed to qualifying telecommunications providers operating in areas where the cost of providing telecommunications service exceeds 135% of the national average. In such subsidy structures, deficits and surpluses naturally form, where some providers contribute more to the fund than they receive from it and vice versa. On an aggregate level, net contributions vary significantly among counties and among states. This prompts the question as to whether such differences can be detrimental in attracting competitive entry, particularly into low-cost areas subject to higher net contributions.

At the state level, net contributions to the high-cost fund vary greatly; in 2006, net contributions ranged from \$340 million (California being the highest net contributor) to -\$239 million (Mississippi being the highest net recipient).

With passage of the Telecommunications Act of 1996, all providers of both local and long-distance services (according to Section 254 (d) and (e) of the Act) were required to contribute a fixed percentage of their revenues to the USF and all providers were allowed to qualify to receive USF support. By treating incumbents and entrants the same in terms of contributions, the high-cost fund was designed to be neutral; i.e., it should not distort competition. Still, the fund was designed so that while incumbents automatically qualify for high-cost support, an entrant must first be designated as a *competitive eligible telecommunications carrier* by its state public utility commission before qualifying for high-cost support. This difference proves to be critical in the resulting discrepancy in competitive entry among states.

The carrier of last resort obligation also was an integral part of the Telecommunications Act of 1996. Section 214(e)(3) of the Act states that the Federal Communications Commission (FCC) or a state commission can (and should) determine which telecommunications provider is best able to provide service to an un-served community. Any carrier ordered to provide service for that area is then designated as an eligible telecommunications carrier for that community and subsequently receives high-cost support for providing service there. While this policy is in accordance with the foundation of universal service, it is important to recognize that if an area must be assigned to a provider (rather than the provider willingly entering such an area in which it would face no competition), that area must not be commercially viable for a private telecommunications provider, even with high-cost support.

There is a great deal of research addressing both the USF and the carrier of last resort policy. Much of the literature concentrating on high-cost support and the USF in general has been critical of the program's overall costs relative to its benefits. For example, Mueller (1993) and Jamison (2002) questioned the necessity of high-cost support given that most US households already had wireline service prior to the introduction of high-cost subsidies. Barros and Seabra (1999) and Hazlett (2006) argued that the marginal increase in wireline coverage that resulted from the program did not justify the size and costs of the program, while Garbacz and Thompson (2002, 2003) showed that the relative cost of wireline service had decreased in proportion to household income while demand for telecommunications services became more price inelastic. More recently, Hazlett (2006) noted that wireless and Internet-based substitutes have reached over 95% of households, and have contributed to a decline in wireline subscription where only 89% of households with wireline access actually subscribe to wireline service. Such studies suggest that the primary justification for high-cost support (to ensure affordable telecommunications services for the entire population) is questionable.

In addition to these studies, Rosston and Wimmer (2000) argued that reducing high-cost support would have no significant effect on universal service, while higher taxes needed to fund the program create costly distortions. Ellig and Perraut (2007) argued that USF funds collected based on revenues create more distortions than if they were based on the number of lines. Another study by Cremer et al. (2001) showed that unbalanced rate structures whereby retail prices do not reflect their costs create a potentially harmful redistribution of welfare from one segment of the population to another. They argued that high-cost support is inefficient when the incumbent is not the most efficient operator. In this case, efficient competitors in effect support a less efficient incumbent. Finally, in related empirical studies, Ryan (2003) showed that high-cost

support causes excess operating costs and adversely affects technology choices, while Hauge et al. (2008) found that the USF adversely affects competition within net recipient states.

With respect to carrier of last resort policies, Weisman (1994) argued that such policies are self-fulfilling: by imposing carrier of last resort obligations on incumbents, entrants are less likely to provide capacity beyond expected use, which increases the likelihood that such obligations will become necessary. He argued that carrier of last resort policies can lead to cream-skimming by entrants in areas they would not normally serve in the absence of such policies. Harris and Kraft (1997) argued that the carrier of last resort policy is among many which are no longer useful, and which may unnecessarily impose competitive restraints on incumbent operators. Other papers addressing the carrier of last resort policy have focused on the manner in which a provider is designated to be the carrier of last resort for a particular area. For example, Kelly and Steinberg (2000) and Sorana (1998) considered the use of auctions to determine which providers are capable of serving high-cost and rural areas most efficiently. These studies assume the policy to be valid and concentrate on its implementation.

In this paper, we analyze the effects on competition of simultaneous implementation of the high-cost support program and the carrier of last resort policy. This is an important issue for policymakers for at least three reasons. First, it is worth noting that it is important to consider the ramifications of public programs given the existence of complementary programs. In other words, while a program may be expected to be highly effective in meeting its particular objective(s), such expectations may be in error if all tangentially related programs are not included in the analysis of the new program. Second, it is important to consider more generally whether net contributions to the high-cost fund (in light of the carrier of last resort policy) are

deleterious to competition.<sup>4</sup> Finally, it is important for policymakers considering expanding high-cost support to include broadband to understand all aspects of such expansion, especially given that competition has proven central to broadband development.<sup>5</sup>

### 3. Theoretical Model and Propositions

Consider a homogenous good duopoly competition model in which telecommunications providers simultaneously and independently choose whether to operate in a particular geographic area. Suppose an area can be classified as one of two types, a low-cost area (L) or a high-cost area (H). There are two potential providers, an incumbent (I) and an entrant (E). Providers are assumed to have equivalent operating costs within an area so that  $C_I^k = C_E^k$ ,  $k \in \{L, H\}$ . Then  $C_i^k = [F + c_i q_i^k]$  where  $c_i q_i^k \geq 0$  is provider  $i$ 's marginal cost of serving  $q_i^k$  customers for all  $k \in \{L, H\}$  and all  $i \in \{I, E\}$ .  $F$  is the fixed cost of operating in an area.<sup>6</sup> Providers compete for customers through price only. The total number of potential customers providers compete for in each area  $k$  is given by  $n^k = (q_i^k + q_j^k)$ ,  $k \in \{L, H\}$ . All potential customers enroll with one (and only one) provider, and choose the low-price provider.

First we consider the carrier of last resort policy. Convention dictates that we assume the incumbent (rather than an entrant) to be the carrier of last resort in any previously un-served area. Assume the incumbent has both high-cost and low-cost areas within a specific study area, where a study area is defined as a geographic area the incumbent must serve that may

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<sup>4</sup> One issue emanating from some state governments is that the volume of net contributions to the high-cost fund varies across states, causing telecommunications providers (and ultimately its customers) of net-contributing states to subsidize providers and customers of other states.

<sup>5</sup> For example, Aron and Burnstein (2003) and Gruber and Denni (2005) found that competition between telecommunications companies and cable television companies is the most effective catalyst for increased broadband penetration.

<sup>6</sup> In this paper, we assume fixed costs to be the same for incumbents and entrants. In practice, fixed costs for incumbents may be lower than for entrants if certain facilities were already in place prior to competition. If we instead assume incumbents have lower fixed costs our results do not change; however, because this assumption does not apply in all instances, we do not include it in the model.

incorporate multiple high and/or low cost areas.<sup>7</sup> A low-cost area is generally urban with high customer density and/or relatively easy terrain in which to locate telephone lines. A high-cost area is generally rural and sparsely populated, and/or has more challenging terrain. Recall that the incumbent, having carrier of last resort responsibilities, must serve any customer within its study area who requests service. Next we consider the USF. We incorporate the USF into the model by imposing a fee against all telecommunications providers and allowing the incumbent to obtain high-cost support for its service in high-cost areas.

Let  $P_i^k$  represent the average per customer retail price charged by provider  $i$  in area  $k$ , for all  $i \in \{I, E\}$  and all  $k \in \{L, H\}$ . Because the standard manner in which incumbents set pricing across areas served is by rate averaging, let  $P_i^A$  represent the provider's average per customer retail price (reflecting the average cost of providing service across the study area) for all  $i \in \{I, E\}$ .<sup>8</sup> Since  $c_i q_i^L < c_i q_i^H$  for all  $i \in \{I, E\}$ ,  $P_E^L \leq P_I^A$  based on the overall size of the high and low cost markets, i.e., based on  $q^L$  and  $q^H$ . Because  $q^L$  and  $q^H$  can vary by study area, let  $P^A \equiv P^{L(1+\gamma)}$ , where  $\gamma \in \{0, 1\}$  increases in  $q^H$ . This means the average price increases as firms serve more high-cost customers relative to low-cost customers. The relationship between  $P^A$  and  $P^L$ , however, is non-linear since such price increases also reflect changes in cost as market size changes. This leads to our first proposition.

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<sup>7</sup> A study area is defined by the FCC as a geographic area (within one state) that was traditionally served by an incumbent. Incumbents that operate in more than one state will have a distinct study area for each state in which they operate. In some cases an incumbent may have more than one study area in a state. Study areas cannot overlap.

<sup>8</sup> Rate averaging is a sufficient condition for our model, but it is not a necessary condition. The necessary condition is that the regulator establishes price limits in such a way that the incumbent must use revenues from the low-cost area to cover costs in the high-cost area.

**Proposition 1.** *Given carrier of last resort obligations, the incumbent sets prices using rate averaging and serves only the high-cost area; inefficient entry whereby the entrant serves the entire market in the low-cost area results.*

Proposition 1 implies that the carrier of last resort policy inhibits the incumbent’s ability to compete in the low-cost area since the incumbent must provide telecommunications services at equal rates across high and low-cost areas.<sup>9</sup> Because  $P_I^A > P_E^L$  for any positive  $q^H$ , the incumbent will never gain any consumers in the low-cost area; rather, the entrant will serve all consumers in the low-cost area.<sup>10</sup> Similarly, because  $P_I^A < P_E^H$  for any positive  $q^L$ , the entrant cannot earn profit operating solely in the high-cost area in competition with the incumbent. Finally, we consider incentives for the incumbent and the entrant to operate in both high-cost and low-cost areas. Our analysis is clarified by the normal form game illustrated in Figure 1.

Given COLR		Entrant		
		Low-Cost Area	Both Areas	High-Cost Area
Incumbent	Both Areas	$(P^A q^H, P^L q^L)$	$(\frac{1}{2}P^A(q^L+q^H), \frac{1}{2}P^A(q^L+q^H))$	$(P^A(q^L+q^H), 0)$
	High-Cost Area	$(P^A q^H, P^L q^L)$	$(\frac{1}{2}P^A q^H, \frac{1}{2}P^A q^H + P^A q^L)$	$(P^A q^H, 0)$

Figure 1

Recall that serving only low-cost areas is not permitted for the incumbent given carrier of last resort obligations. Additionally, serving only high-cost areas is the least profitable choice for the entrant. For the incumbent, serving both areas weakly dominates serving only high-cost

<sup>9</sup> Because  $P_I^A > P_E^L$ , the incumbent will never gain any consumers in the low-cost area and therefore incumbent profit in the low-cost area will be zero.

<sup>10</sup> By extension, we might assume the model would allow for additional entrants, making the low-cost area a competitive environment; however, this assumption does not affect our current analysis.

areas.<sup>11</sup> For the entrant then, since it will not serve only the high-cost area, we must consider whether serving low-cost areas only is more profitable than serving both high and low-cost areas, i.e., we must solve the following inequality:

$$P^L q^L < 1/2 P^A (q^L + q^H). \quad (1)$$

Substituting  $P^{L(1+\gamma)}$  into (1), we can state that the entrant will choose to serve only the low-cost area versus both areas when:

$$P^L q^L - 1/2 P^{L(1+\gamma)} (q^H + q^L) > 0. \quad (2)$$

Since  $P^A$  is the lowest price at which the incumbent provider (the carrier of last resort) can operate profitably, (2) can be simplified to:

$$P^L - 1/2 P^{L(1+\gamma)} > 0. \quad (3)$$

There exists a threshold level of  $\gamma$ , let's call it  $\bar{\gamma}$ , such that the entrant would be indifferent between the two strategies; i.e., for  $\gamma = \bar{\gamma}$ , the profit from serving the low-cost area only is equal to the profit from serving both areas. We can then characterize  $\bar{\gamma}$ , a parameter reflecting the minimum size that the high-cost area must be in order for that area to be profitable for the entrant to serve. Solving for  $\bar{\gamma}$ , we find that  $\bar{\gamma} \approx 0.695/\ln(p^L)$ , which means  $\bar{\gamma}$  decreases in a logarithmic manner as  $P^L$  increases. In other words, as the threshold level decreases, the entrant finds it increasingly profitable to serve both areas. We assert then, that there is a range within which the entrant will serve both areas, and that range is bounded by a relatively small  $\bar{\gamma}$  (i.e., a high-cost area with many consumers), which means that a high-cost area must be large

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<sup>11</sup> Specifically, the incumbent's profit from either strategy (serving both areas or serving only the high-cost area) is the same if the entrant only serves the low-cost area, while the incumbent achieves higher profit from serving both areas when the entrant serves both areas. Note that the incumbent also earns higher profits serving both areas if the entrant serves the high-cost area only, but such strategy is dominated and should never be chosen by the entrant.

enough to justify the costs of entering the high-cost market. Empirical evidence suggests, however, that  $\bar{\gamma}$  is not small.<sup>12</sup> Therefore, we can conclude that in most markets,  $\gamma < \bar{\gamma}$ , meaning that most high-cost areas do not have enough customers to make it profitable for an entrant to serve. As a result, entrants choose to serve only the low-cost area and serve all consumers there.

Summarizing the results presented in Figure 1, the incumbent chooses to serve both areas while the entrant chooses to serve the low-cost area. Because the entrant's choice of serving the low-cost area makes the low-cost area unprofitable for the incumbent, the incumbent serves no consumers there and in practice serves only the high-cost area. This result supports Proposition 1.

Now consider the effect of a high-cost subsidy system that is funded by a fee assessed against all telecommunications providers (incumbents and entrants) based on a percentage of each firm's revenue (i.e., the current USF high-cost fund).<sup>13</sup> Let  $\alpha$  represent the percent of revenue each provider must contribute to the high-cost fund, where  $1 > \alpha > 0$ . Providers, in order to pay the fee and cover their costs, must set the average per customer retail price at  $P_i^A / (1 - \alpha)$  for all  $i \in \{I, E\}$ .

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<sup>12</sup> Statistics obtained from FCC statistical reports (<http://www.fcc.gov>) indicate the overall percentage of areas designated as high-cost areas to be generally constant, though support payments per loop have increased each year. Yet, as of 2006 entrants still constitute less than 17 percent of the high-cost market.

<sup>13</sup> Per the current USF arrangement, contributions are collected from all telecommunications carriers providing interstate service based on a fixed percentage of their total end-user long-distance revenues (currently 10.5%). There is a universal service exception for *de minimis* (non-common carrier) telecommunications carriers whose estimated contributions would be less than \$10,000. All carriers that provide service in rural or urban high-cost areas receive support. This includes entrants that are designated as a competitive eligible telecommunications carrier. A rural area is primarily defined as a study area in which less than 15 percent of access lines are in cities of more than 50,000 (<http://www.fcc.gov>). High-cost areas are defined with respect to the five components of high-cost services, and are based on costs greater than 115% of the national average cost per line (\$25.60 in 2006). For defined high-cost areas, the carrier receives \$0.65 in subsidies for each \$1 of loop costs between 115 and 150 percent of the national average loop cost, and \$0.75 in subsidies for each \$1 of loop costs above 150 percent of the national average.

By operating in the high-cost area (which the incumbent is required to do by the carrier of last resort policy), the incumbent automatically qualifies for support for its service within the high-cost subset of the study area it serves. Qualifying entrants also are entitled to such funds for their service though in practice, very few actually qualified to receive high-cost support when the policies were initiated. Let  $\hat{S} > 0$  where  $\hat{S}$  ensures profit  $\pi_I^H \geq 0$  represent the subsidy provided to the incumbent serving the high-cost area. Proposition 2 now can be stated.

**Proposition 2.** *Given carrier of last resort obligations and the USF, the incumbent will serve the entire market in the high-cost area and may compete in the low-cost area. The entrant will compete in the low-cost area only.*

The entrant cannot compete in the high-cost area without the subsidy. In the low-cost area,  $\hat{S}$  such that  $\pi_I^H \geq 0$  provides the possibility that some amount  $\delta = (\hat{S} - \varepsilon)$  can be used to offset the cost of serving the low-cost area such that  $P_I^A - \delta / (1 - \alpha) = P_E^L / (1 - \alpha)$ . Such cross-subsidization allows the incumbent to compete in the low-cost area making the area less profitable for the entrant and potential entrants. In sum, with both policies in force, the incumbent can compete in the low-cost area whereas it is unable to do so without the USF; serving both areas now strictly dominates serving only the high-cost area. Additionally, the entrant now competes for half of the consumers in the low-cost area rather than serving the entire low-cost area. Having both policies in force is clearly an improvement in competitive ability for the incumbent, yet it puts the entrant at a disadvantage relative to its status prior to the imposition of the USF.

Given COLR & USF		Entrant		
		Low-Cost Area	Both Areas	High-Cost Area
Incumbent	Both Areas	$(\frac{1}{2}P^A q^L + P^A q^H, \frac{1}{2}P^L q^L)$	$(\frac{1}{2}P^A q^L + P^A q^H, \frac{1}{2}P^L q^L)$	$(P^A q^L + \frac{1}{2}P^A q^H, 0)$
	High-Cost Area	$(P^A q^H, P^L q^L)$	$(P^A q^H, P^L q^L)$	$(P^A q^H, 0)$

Figure 2

Note that if the incumbent were not required to provide service in the high-cost area, it would be possible to determine through revealed preferences (or more practically through auctions) the appropriate level of subsidy that would allow the incumbent to remain competitive within the entire study area it serves. However as the policies exist now, the carrier of last resort policy distorts the information that might otherwise be gained, and results in study areas that are net recipients of high-cost funds having less competition in both the high-cost and low-cost areas of the study area.

In sum, the coexistence of the USF and carrier of last resort policies creates incentives that distort the competitive market in telecommunications. Further, policymakers in certain states are increasingly concerned with the large amounts of required contributions to the USF relative to the USF support received within the state. Table I shows the overall net contributions to the high-cost fund and average net contributions per local loop (essentially a telephone line) ranked across the 50 US states and the District of Columbia for the year 2006. Based on aggregate and per loop measures, variations in net contributions are significant among states (with even further variations within states), suggesting that the potential impact of USF policies on competition may be substantial.

[Table 1 here]

#### 4. Suggested Solutions

We return to the literature focusing on auctions and their implementation in carrier of last resort designations. If a provider was not required to serve in a high-cost area but chose to do so, we would know that the high-cost subsidy  $\hat{S} > 0$  was sufficient to provide positive expected profit (and possibly higher profit than necessary). As the policies currently exist, carrier of last resort obligations determined by state public utility commissions and the FCC serve to distort information that might be gained if incumbents and entrants were enticed to enter the market freely. Auctioning the right to serve an area is one possible way of gaining knowledge about the proper level of  $\hat{S}$ . While rents would accrue to the provider serving the area due to the information asymmetry inherent in the problem, a properly designed auction would serve to limit those rents, to convey information about specific provider's costs, and to gain information regarding the overall profitability of an area.

Alternatively, we consider amending the carrier of last resort policy rather than the manner in which it is implemented. Currently, the carrier of last resort policy applies to wireline providers only. As technology develops and substitutes to wireline telecommunications become increasingly available, the favorability of eliminating the policy in its entirety grows. By eliminating the requirement to provide landline telecommunications services, providers may choose to develop cost-effective ways of providing service in new areas, and un-served markets might migrate towards newer technologies such as wireless and broadband services.

While we are of the opinion that the USF is largely unnecessary in the US due to evidence that over 95% of residents have access to alternative forms of telecommunications services including wireless and broadband (Hazlett 2006), we also agree with Harris and Kraft (1997) that it may be difficult to eliminate the policy as new technologies become increasingly

demanded and the USF expanded to meet those demands. In fact, in a recent recommendation by the FCC Federal-State Joint Board on Universal Service, it was proposed that the high-cost fund of the USF be separated into three distinct funds to support providers of wireline, wireless, and broadband services in underserved areas (Federal-State Joint Board on Universal Service 2007). Therefore, we suggest that changes to current USF policy be more closely tied to incentive regulation in which auctions and market value are sought in an effort to increase overall efficiency.

## **5. Conclusion**

This paper examines the impact of two federal regulatory policies, the high-cost support program of the USF and the carrier of last resort policy, on the entry decisions of non-incumbent firms in the telecommunications industry. Essentially, the high-cost support program acts as a subsidy to incumbents to offset the costs incurred from its obligation as a carrier of last resort, which requires incumbents to serve all customers in their study areas regardless of cost.

Our analysis led to two propositions that suggest that when both the USF and the carrier of last resort policies are in force, entrant participation should be lower in competitive low-cost areas due to incumbent incentives to maintain market share. Without the USF, the market in low-cost areas is more supportive of competitive entry. These findings suggest that competition is influenced by net contributions to the USF high-cost fund in two ways: 1) entrants are negatively affected by their contributions paid to the high-cost fund given that they qualify for the subsidy less frequently than do incumbents, and 2) incumbents in states with more high-cost areas have greater incentive to create barriers in both high-cost and low-cost areas.

While additional research into how provider-specific strategies influence the competitive market would be useful to capture the full extent of the entry decision, this paper provides a

foundation into how federally administered programs that are designed to be competitively neutral interact to create unintended consequences. We show that in the telecommunications industry the USF high-cost fund and the carrier of last resort policy provide an example of policies that when implemented independently may be effective, however when imposed simultaneously appear to generate provider and state-level incentives that hinder competition. Such outcomes may occur in other industries in which complementary policies interact to create unintended consequences.

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**Table 1.** Rank of Net Contributions into the High-cost Universal Service Fund, By State in 2006

Aggregate Net Contributions			Average Net Contributions Per Loop		
Rank	State	Net	Rank	State	Net/Loop
1	California	\$339,727	1	Rhode Island	\$30.88
2	Florida	\$205,029	2	Connecticut	\$30.27
3	New York	\$203,530	3	Delaware	\$29.11
4	New Jersey	\$149,836	4	New Jersey	\$26.87
5	Pennsylvania	\$105,863	5	Massachusetts	\$26.25
6	Illinois	\$100,185	6	Dist. Columbia	\$26.00
7	Ohio	\$99,026	7	Maryland	\$25.38
8	Massachusetts	\$92,637	8	Florida	\$20.76
9	Maryland	\$88,406	9	New York	\$19.89
10	Connecticut	\$60,486	10	New Hampshire	\$19.18
11	Michigan	\$59,031	11	Ohio	\$16.82
12	North Carolina	\$41,147	12	California	\$16.48
13	Texas	\$41,017	13	Pennsylvania	\$15.05
14	Virginia	\$38,618	14	Illinois	\$14.43
15	Tennessee	\$27,795	15	Michigan	\$11.56
16	Georgia	\$25,058	16	North Carolina	\$9.43
17	Dist. Columbia	\$19,939	17	Virginia	\$9.42
18	Delaware	\$15,450	18	Tennessee	\$9.30
19	New Hampshire	\$13,800	19	Nevada	\$7.05
20	Indiana	\$13,519	20	Utah	\$6.37
21	Rhode Island	\$13,312	21	Georgia	\$5.67
22	Nevada	\$8,808	22	Indiana	\$4.07
23	Utah	\$6,515	23	Texas	\$3.75
24	Arizona	-\$5,180	24	Colorado	-\$2.09
25	Colorado	-\$5,181	25	Arizona	-\$2.14
26	Missouri	-\$7,435	26	Missouri	-\$2.41
27	Washington	-\$15,655	27	Washington	-\$4.80
28	Maine	-\$17,784	28	South Carolina	-\$10.90
29	Vermont	-\$20,205	29	Oregon	-\$12.27
30	South Carolina	-\$22,608	30	Minnesota	-\$21.28
31	Oregon	-\$22,771	31	Wisconsin	-\$22.57
32	Hawaii	-\$23,756	32	Maine	-\$23.17
33	Idaho	-\$31,516	33	Alabama	-\$24.82
34	New Mexico	-\$38,225	34	Kentucky	-\$24.94
35	West Virginia	-\$44,139	35	Louisiana	-\$34.58
36	Kentucky	-\$47,491	36	Hawaii	-\$37.55
37	Wyoming	-\$48,417	37	New Mexico	-\$42.05
38	Alabama	-\$54,516	38	Idaho	-\$45.37
39	Minnesota	-\$54,600	39	Iowa	-\$46.20
40	Nebraska	-\$58,925	40	West Virginia	-\$46.30
41	Montana	-\$63,851	41	Oklahoma	-\$48.01
42	Wisconsin	-\$64,945	42	Vermont	-\$50.82
43	Iowa	-\$67,836	43	Arkansas	-\$72.64
44	Louisiana	-\$69,257	44	Nebraska	-\$77.07
45	North Dakota	-\$71,820	45	Kansas	-\$120.04
46	Oklahoma	-\$78,509	46	Montana	-\$132.79
47	South Dakota	-\$79,322	47	Wyoming	-\$177.07
48	Arkansas	-\$95,391	48	Mississippi	-\$191.39
49	Alaska	-\$140,166	49	North Dakota	-\$215.89
50	Kansas	-\$154,207	50	South Dakota	-\$237.65
51	Mississippi	-\$239,378	51	Alaska	-\$360.32

Note: Monetary figures represent thousands of US Dollars