



80 South Jefferson Road  
Whippany, NJ 07981

Richard A. Askoff

Executive Director –  
Regulatory

(973) 884-8350  
[raskoff@neca.org](mailto:raskoff@neca.org)

January 19, 2012

Marlene H. Dortch  
Secretary  
Federal Communications Commission  
445 12<sup>th</sup> Street, S.W.  
Washington, D.C. 20554

Re: *Connect America Fund*, WC Docket No. 10-90, *A National Broadband Plan for Our Future*, GN Docket No. 09-51, *Establishing Just and Reasonable Rates for Local Exchange Carriers*, WC Docket No. 07-135, *High-Cost Universal Service Support*, WC Docket No. 05-337, *Developing an Unified Intercarrier Compensation Regime*, CC Docket No. 01-92, *Federal-State Joint Board on Universal Service*, CC Docket No. 96-45, *Lifeline and Link-Up*, WC Docket No. 03-109, *Universal Service – Mobility Fund*, WT Docket No. 10-208,

Initial Comments of the NECA, NTCA, OPASTCO, and WTA (filed January 18, 2012) - **ERRATUM**

Dear Ms. Dortch:

Yesterday, the National Exchange Carrier Association (NECA), the National Telecommunications Cooperative Association (NTCA), the Organization for the Promotion and Advancement of Small Telecommunications Companies (OPASTCO), and the Western Telecommunications Alliance (WTA) filed their Initial Comments in response to the Commission's Further Notice of Proposed Rulemaking, FCC 11-161, released on November 18, 2011.

Please find attached a corrected version of Appendix B that properly displays seven equations on pages 14-19 of the Appendix, which did not appear in the original filing due to a PDF conversion error.

Kindly substitute the attached Appendix B of the Rural Associations' Initial Comments.

Sincerely,

A handwritten signature in black ink, appearing to read "Richard A. Askoff", is written over a light blue horizontal line.

Attachment:

Cc: Best Copy

## **Appendix B**

Professor Barbara Cherry & Professor Steven Wildman, Paper: The Rate of Return for RLECs Must be in the Upper Range for Reform Under the Connect America Fund Order to Ensure Sustainable Policy Goals

**The Rate of Return for RLECs Must be in the Upper Range for Reform Under the *Connect America Fund Order* to Ensure Sustainable Policy Goals**

By

Prof. Barbara Cherry  
Department of Telecommunications  
Indiana University  
and

Prof. Steven Wildman  
James H. Quello Professor of Telecommunication Studies  
Director, Quello Center for Telecommunication Management and Law  
Department of Telecommunication, Information Studies and Media  
Michigan State University

**I. INTRODUCTION**

The FCC intends to address multiple policy goals in the universal service and intercarrier compensation reform set forth in the *CAF Order*.<sup>1</sup> These policy goals include: (1) enhancing the sustainability while ensuring continued availability and affordability of universal service in rural and remote areas based on explicit funding support to eligible telecommunications carriers (ETCs);<sup>2</sup> (2) expanding universal service policy to more prudently and efficiently target investment in broadband in rural and remote areas;<sup>3</sup> and (3) modernizing the policy by addressing outdated assumptions that give rise to inefficiencies, wasteful arbitrage, and competitive distortions.<sup>4</sup> Within a multifaceted framework of reform created in the *CAF Order*, the FCC “agree[s] that it is appropriate at this time to

---

<sup>1</sup> *Connect America Fund*, WC Docket No. 10-90, *A National Broadband Plan for Our Future*, GN Docket No. 09-51, *Establishing Just and Reasonable Rates for Local Exchange Carriers*, WC Docket No. 07-135, *High-Cost Universal Service Support*, WC Docket No. 05-337, *Developing an Unified Intercarrier Compensation Regime*, CC Docket No. 01-92, *Federal-State Joint Board on Universal Service*, CC Docket No. 96-45, *Lifeline and Link-Up*, WC Docket No. 03-109, *Universal Service – Mobility Fund*, WT Docket No. 10-208, Report and Order and Further Notice of Proposed Rulemaking, FCC 11-161 (rel. Nov. 18, 2011) (*CAF Order* or *FNPRM*).

<sup>2</sup> *Id.* ¶ 285

<sup>3</sup> *Id.* ¶ 7

<sup>4</sup> *Id.* ¶¶ 6,9

re-examine the rate of return as part of comprehensive reform of the universal service fund.”<sup>5</sup> The FCC seeks comment regarding represcription of the interstate rate of return in the FNPRM.

Aside from the desire to reform universal service policy, FCC determination of rates of return for regulated companies is itself a policy decision<sup>6</sup> that must meet long-established legal standards. The fundamental legal standard is that “a regulated company must be allowed a return that is sufficient to attract new capital to the business, and that is comparable to the return that would be expected for an unregulated enterprise having the same degree of risk.”<sup>7</sup> In this regard, the FCC determines both a floor and ceiling to the rate of return: “The return must not be so low as to produce rates that are confiscatory in the constitutional sense nor so high as to produce excessive rates for consumers.”<sup>8</sup> The FCC’s task “thus involves balancing investor and consumer interests and then selecting an appropriate rate of return that is within a broad ‘zone of reasonableness’ established by the judicial standards.”<sup>9</sup> Therefore, this longstanding legal standard requires that the FCC determine a zone of reasonableness for a rate of return, and within that zone select a rate of return, that allows the firm to be financially viable.

As explained in this paper, the Commission’s goals for universal service and intercarrier compensation reform in the *CAF Order* can only be sustained in rural and remote areas if RLECs remain financially viable. This means the FCC must make sure that the combination of the many

---

<sup>5</sup> *Id.* ¶ 1044.

<sup>6</sup> “[R]ate of return decisions are policy determinations in which agencies must exercise their judgment and expertise.” *Refinement of Procedures and Methodologies for Represcribing Interstate Rates of Return for AT&T Communications and Local Exchange Carriers; and Represcribing the Authorized Rate of Return for Interstate Services of Local Exchange Carriers*, Order, 5 FCC Rcd. 197 (1989) ¶ 38 (footnote omitted).

<sup>7</sup> *Id.* ¶ 37 (footnote omitted).

<sup>8</sup> *Id.*

<sup>9</sup> *Id.*

components of universal service and intercarrier compensation reform – only one of which is the prescription of the rate of return – as well as their coexistence with other aspects of federal and state regulation do not preclude financial viability for RLECs. For this reason, the sustainability of universal service goals in rural and remote areas and the financial viability of RLECs are inextricably intertwined, and the economic and legal constraints for satisfying both must be simultaneously addressed.

**II. DETERMINATION OF RATE OF RETURN FOR RLECS MUST MEET ECONOMIC AND LEGAL CONSTRAINTS FOR SUSTAINABILITY OF UNIVERSAL SERVICE POLICY AND FOR OVERALL FINANCIAL VIABILITY OF RLECS, WHICH IS A CHALLENGING AND COMPLEX TASK.**

Preventing a confiscatory rate of return (a constitutional taking of property) for RLECs is a necessary but not a sufficient condition for ensuring sustainability of universal service policy in rural and remote areas. A taking is simply the constitutional limit on how far government intervention may go so as to not threaten the financial viability of the overall firm. However, the continued availability and affordability of voice and broadband services to certain customers and certain areas may be at risk if the Commission prescribes a rate of return that is too low to attract investment, even if not so low as to be unconstitutionally confiscatory. Faced with such a rate prescription, RLECs may need to make prudent business decisions to discontinue service or defer investments to certain customers and/or areas in order to maintain financial viability. This may render universal service goals unachievable for those customers and/or areas. As we explain in this paper, such financial risks to which RLECs may need to respond may arise from flaws in design of universal service and intercarrier compensation reform contained in the *CAF Order*.

We discuss how to recognize the design flaws in the *CAF Order* and their potential and likely effects on the financial viability of RLECs and the sustainability of the FCC's policy goals in the *CAF*

*Order* through several analytical steps. We start in this section with application of our previously-developed framework for designing sustainable universal service policies based on a distinction between *bilateral rules* as opposed to *unilateral rules*.<sup>10</sup> We emphasize the importance of understanding how to properly construct bilateral rules to better ensure their sustainability. In the next section we discuss specific flaws in the policy reforms in the *CAF Order*.

We continue the analysis in section III, explaining how setting the rate of return in the upper range can help ensure both financial sustainability of RLECs and sustainability of revised universal service policy in rural and remote areas. Prescribing a rate of return in the upper range of a zone of reasonableness is consistent with precedent and is justified by the circumstances and environment that RLECs face. Finally, we present a multi-period model demonstrating the need to ensure that RLECs have a fair opportunity to earn a reasonable rate of return means many of the choices they make are linked and cannot be set independently. However, the *CAF Order* reads as if the FCC is treating them as if they are independent. The result is that higher funding support – effectuated through use of a higher rate of return – in earlier periods must be provided to address the various flaws in the *CAF Order*, such as uncertainty of obligations, funding levels and financial risk in subsequent periods.

**A. Flaws in Policy Design Can Threaten Sustainability of Universal Service Policy in Rural and Remote Areas. The FCC Needs to Properly Construct Universal Service Policy as a Bilateral Rule.**

Regulation takes many forms. But, if we exclude direct supply of a product or service by government, all forms of regulation can be classified as either unilateral or bilateral rules. Unilateral

---

<sup>10</sup> Cherry, B. A., & Wildman, S. S. (1999), “Unilateral and Bilateral Rules: A Framework for Increasing Competition While Meeting Universal Service Goals in Telecommunications,” in, *Making Universal Service Policy: Enhancing the Process Through Multidisciplinary Evaluation* (Cherry, B. A., Hammond, A., & Wildman, S. S., editors), Mahwah, NJ: Lawrence Erlbaum & Associates, pp. 39-58; Cherry, B. A. (1998), “Designing Regulation to Achieve Universal Service Goals: Unilateral or Bilateral Rules,” in *Telecommunications Transformation: Technology, Strategy and Policy* (Levin, S. & Bohlin, E., eds.), Amsterdam, Netherlands: IOS Press, pp. 343-359.

rules are “performance requirements imposed by government on firms as a condition for providing service without any assurance by government that the affected firms will be able to generate revenues sufficient to cover the associated costs.”<sup>11</sup> Government simply imposes unilateral rules on firms as a condition for doing business. Examples of unilateral rules are workplace safety requirements, minimum wage laws, taxes, and product reliability and safety standards.

Bilateral rules are usually accepted by the affected firms, and “differ from unilateral rules in that ... firms receive some form of compensation or special consideration in exchange for meeting government-specified performance obligations.”<sup>12</sup> Bilateral rules, in turn, are of two types. “*Bilateral agreements* are government-specified performance requirements that are coupled with financial compensation for costs associated with meeting the requirements.”<sup>13</sup> However, other than providing the pre-specified level of compensation, government assumes no responsibility for the financial health of the firm. Lifeline and Link-up programs for telecommunications services, whereby ETCs provide service to low-income customers at discounted rates in exchange for funding, are example.

However, “[*b*]ilateral commitments are performance obligations accepted by firms in exchange for which government accepts some degree of responsibility and provides some form of assurance for the financial health of the firms taking on these requirements, including safeguards against the threat of regulatory expropriation of the investments required to provide service.”<sup>14</sup> Bilateral commitments arise in circumstances where one or both parties are vulnerable due to having long-term sunk investments at risk in a situation where each has only imperfect alternatives to the other.

---

<sup>11</sup> Cherry and Wildman, *supra* note 10, at 41.

<sup>12</sup> *Id.*

<sup>13</sup> *Id.* at 42 (emphasis in original).

<sup>14</sup> *Id.* (emphasis in original).

Historical monopoly franchises of public utilities, often described as “regulatory contracts”, are a form of bilateral commitment. Under the franchise monopoly, government imposed numerous obligations, such as restrictions on prices and earnings as well as carrier of last resort (COLR) obligations. Government assurance took the form of restrictions on competitive entry and allowing the utility to recover prudently-incurred costs in its rates.

Sustainability of bilateral rules requires a proper matching of obligations imposed on a private entity with the form of compensation or government assurance that the entity will be able to perform such obligations. The FCC intuitively recognizes this necessity when it states that it “seek[s] comment on what Commission action may be appropriate to adjust ETC’s existing service obligations as funding shifts to these new, more targeted mechanisms. We aim to ensure that obligations and funding are appropriately matched, while avoiding consumer disruption in access to communications services.”<sup>15</sup> For bilateral agreements, sufficient compensation to fulfill the performance obligation is required. For bilateral commitments, government assurance includes providing conditions that enable the affected firm to remain a financially viable entity while taking on the performance obligations.<sup>16</sup> Flaws in designing a bilateral rule can render the obligations unachievable – and thus the rule unsustainable.

**B. Rate of Return Represcription in the *CAF Order* Affects Sustainability of Interdependent Bilateral Rules.**

The FCC’s traditional policy determination of interstate rate of return for RLECs is made within a bilateral rule, and in particular a bilateral commitment. As reflected by the legal standards for FCC’s determination of RLECs’ rate of return, the FCC must select a rate of return within a zone of reasonableness with the assurance that the return will not be so low as to produce confiscatory rates while RLECs operate under the various state and federally imposed obligations.

---

<sup>15</sup> *CAF Order* ¶ 1089.

<sup>16</sup> Cherry and Wildman, *supra* note 10, at 42.

Prior to the Telecommunications Act of 1996 and elimination of local exchange monopolies, the obligations associated with traditional universal service policy were embedded within the underlying bilateral commitment between government (requiring federal and state coordination) and telecommunications providers. The bilateral commitment remains for RLECs because in rural markets economies of scale still limit consumers' options for telecommunications and broadband services and RLECs are vulnerable to expropriation of sunk investments in plant and equipment.

With federal preemption of state franchise monopolies under the Telecommunications Act of 1996, universal service policy was also amended in Section 254 to better enable its sustainability in a competitive environment.<sup>17</sup> In section 254, Congress requires the creation of a new set of bilateral rules for achieving various universal service goals. These bilateral rules consist of creating various categories of universal service, whereby performance obligations are imposed on eligible telecommunications carriers (ETCs) in exchange for funding from associated federal universal service support mechanisms. One of these bilateral rules is the high cost funding support mechanism.

In the *CAF Order*, the FCC reforms the high cost support mechanism as well as intercarrier compensation, one component of which involves potential represcription of the RLECs' rate of return. The FCC's determination of the rate of return may affect the amount of funding that RLECs receive as ETCs under the *CAF Order*, both for high cost support and for transition of intercarrier compensation to a bill-and-keep system. In so doing, the FCC links the determination of the rate of return (a component of the underlying bilateral commitment) to the high cost support funding (which is a bilateral rule). The result is that rate of return represcription in the *CAF Order* simultaneously affects the sustainability of interdependent bilateral rules.

---

<sup>17</sup> Cherry, B. A. (1998), "Designing Regulation to Achieve Universal Service Goals: Unilateral or Bilateral Rules," in *Telecommunications Transformation: Technology, Strategy and Policy* (Levin, S. & Bohlin, E., eds.), Amsterdam, Netherlands: IOS Press, pp. 343-359, at 343-345.

### **III. SETTING THE RATE OF RETURN IN THE UPPER RANGE CAN HELP ENSURE BOTH FINANCIAL SUSTAINABILITY OF RLECS AND SUSTAINABILITY OF REVISED UNIVERSAL SERVICE POLICY IN RURAL AND REMOTE AREAS.**

There are several reasons why setting the rate of return in the upper range is the appropriate choice for sustainable universal service policy under the revised high cost support funding mechanism. Setting the rate of return in the upper range is consistent with precedent. In this regard, RLECs are differently situated from price cap LECs. The prescribed rate of return must reflect these differences. In addition, there are numerous design flaws and uncertainties under the *CAF Order* for which a rate of return in the higher range can, at least in part, compensate.

#### **A. There is Precedent for Prescribing a Rate of Return in the Upper Range**

There is precedent for prescribing a rate of return in the upper range as protection against investment risks created by a rapidly evolving technology with consequences difficult to anticipate. In its *1990 Rescription Order*, the FCC selected a rate of return in the upper end of the “zone of reasonableness” based on concerns about a lag in infrastructure development.<sup>18</sup> Such concerns are even more compelling today, particularly given the FCC’s imposition of new obligations on RLECs to expand investment to provide broadband in rural and remote areas.

There are also substantial changes in circumstances since the 1980’s when the FCC prescribed the rate of return of 11.25%. Competition is now permitted as a matter of law, with the elimination of monopoly franchises for RLECs under the Telecommunications Act of 1996, creating greater uncertainty as to expected RLEC revenues. The threat of competition is much greater than the more limited form of bypass that existed when the FCC issued its *1990 Rescription Order*, as reflected in

---

<sup>18</sup> “[O]ur concern about the possibility of a lag in the deployment of advanced technologies counsels that we should exercise our judgment to select a rate of return in the upper part of the range of reasonable cost of capital estimates.” *Rescribing the Authorized Rate-of-Return for Interstate Services of Local Exchange Carriers*, Order, 5 FCC Rcd. 7507 (1990) ¶ 203 (*1990 Rescription Order*).

the declining demand for switched access lines due to substitution by mobile and VoIP services. Moreover, the FCC expressly acknowledges that the “existing regulatory structure and competitive trends have placed many small carriers under financial strain and inhibited the ability of providers to raise capital.”<sup>19</sup>

### **B. RLECS are Differently Situated from Price Cap LECs.**

RLECS are differently situated from price cap LECs in several respects, which renders an appropriate rate of return for price cap LECs an inappropriate surrogate for the rate of return of RLECS. First, price cap LECs are under a different legal standard for prescription of rate of return, for which the FCC sees a narrower range of reasonable estimates of the cost of capital than for rate-of-return (ROR)-regulated companies.<sup>20</sup> Under this legal standard, the FCC requires the price cap LECs to accept the risk that they may experience earnings somewhat below the prescribed rate of return in exchange for the possible rewards of price cap regulation.<sup>21</sup>

Second, in the competitive environment promoted by the Telecommunications Act of 1996, the telecommunications industry is certainly less monolithic in its risk profile as compared to the franchise monopoly era. In the *CAF Order*, FCC recognizes the difference in financial risk to RLECS relative to price cap LECs, as illustrated by its bifurcated design of both universal service and intercarrier compensation reform for price cap LECs and ROR carriers.

---

<sup>19</sup> *CAF Order* ¶ 285 (footnote omitted).

<sup>20</sup> “We see the range of reasonable estimates of the cost of capital that we have identified as considerably narrower than the broad zone of reasonableness described for [rate-of-return regulated companies].” *1990 Represcription Order* at note 314.

<sup>21</sup> “[W]e believe it is reasonable to balance the possible rewards of price cap regulation, and to reinforce the positive incentives those rewards provide, by requiring the carrier to accept the risk that it might experience earnings somewhat below the prescribed rate of return.” *1990 Represcription Order* ¶ 218.

**C. There are Numerous Design Flaws and Uncertainties under Universal Service and Intercarrier Compensation Reform in the *CAF Order* that Affect Sustainability of Universal Service.**

There are numerous problems and challenges in the *CAF Order* that the FCC needs to address in further developing universal service reform. Opportunities to do so include reconsideration of the *CAF Order* and future reform of the contribution mechanism for federal universal service funding.

One problem is the imposition of the new obligation to provide broadband service to customers in rural and remote areas upon reasonable request, but with no increase in universal service funding support – making this a new mandate with no apparent provision for funding.<sup>22</sup>

As a general matter, there is no apparent attempt to determine whether the combination of new service requirements and limitations on support will provide sufficient funding to meet basic universal service policy goals. Sources of uncertainty and unpredictability in the *CAF Order* (including the *FNPRM*) raised in the *RLECs Petition for Reconsideration* include uncertainty regarding the adequacy of funding under the yet-to-be determined CAF mechanism for RLECs, the unknown impacts of new regression-based limitations on reimbursable capital and operating expenses, the potential reduction in the authorized rate of return, loss of support based on instances of competitive overlap (where “unsubsidized competitors” supposedly provide service), and potential increases in problems with phantom traffic and access avoidance behaviors during the transition to a mandatory zero rate for all switched services (except transit).

New stringent standards for obtaining waivers of support reduction rules and for requesting additional CAF ICC support heighten these concerns. The FCC’s general rule on waiver requests permits filing of relatively brief, straightforward and inexpensive petitions for waiver. However, the

---

<sup>22</sup> There is also uncertainty as to the scope of this new obligation. For example, what does the standard “upon reasonable request” mean for broadband service, which the FCC has determined to be an information service and not a Title II common carriage service?

new high-cost waiver petition process requires submission of extraordinarily detailed information that appears extremely burdensome, if not impossible, for small companies to assemble and submit. The *CAF Order* does not appear to assess the impacts of these burdens on small companies. If this stringent waiver process is retained, it may be necessary for RLECs to terminate service to portions of their service areas if their petitions for additional USF and/or ICC support are denied. A waiver process operates like a safety valve by providing a mechanism to address a change in circumstances or unintended consequences. By imposing new stringent standards on the waiver process, the FCC appears to be closing off the use of this mechanism to address such situations.

One means of compensating for the above uncertainties is for the FCC to prescribe a rate of return in the upper range of the zone of reasonableness. A model illustrating how the various requirements and obligations specified in the *CAF Order* dictate a more generous rate of return is discussed in the following section.

#### **D. Examining the Effects of Rate of Return in a Multi-Period Economic Model**

Because rural carriers must turn to private capital markets to secure the funds required to invest in telecommunications infrastructure, providing support payments sufficient to enable rural carriers to earn fair returns on their investments was a necessary condition for a successful universal service program built around rural carriers.

In its recent *CAF Order*, the FCC has substantially changed the federal high cost fund for support to ETCs in several ways. Among, these changes, the FCC requires that ETCs supply broadband service in their service territories if they are to continue to receive support through the universal service program. Given that the changes differ between price cap LECs and RLECs, the following discussion will focus on changes applicable to RLECs. More specifically, the FCC's proposed changes involve six sets of policy decisions:

- Prices charged customers for services provided by rural LECs.
- Changing the maximum rate of return that RLECs would be allowed to earn on qualified assets.
- The amount of federal support that will be available to help cover the cost of providing service in rural areas is capped at approximately its current level, yet there is an additional obligation to provide broadband service.
- The conditions that must be satisfied for rural carriers to qualify for universal service support.
- Service requirements for participating ETCs, including COLR obligations.
- The requirement that participating RLECs provide broadband service within their service territories.

In this section of our paper, we present a formal model to illustrate how the unavoidable necessity of giving RLECs reasonable opportunities to earn fair returns on privately-financed capital investments while meeting new universal service obligations makes it impossible to make these decisions independent of each other. Because policy choice questions raised by the new broadband service requirement are for the most part similar to those that must be addressed through universal service policy to ensure the provision of basic telephone services in rural areas, we develop the model for a single service, which for convenience we will call telephony, to show the impact of the first five sets of policy issues listed above. However, the model also provides an appropriate framework for examining the implications of adding the broadband service requirement to the other requirements and restrictions in the *CAF Order*.

We start by pointing out the obvious: that prices and allowed rates of return cannot be set independently. Price is a critical factor in determining a company's earnings, and thus its rate of return. This reality is explicitly recognized in the legal standard "[t]he return must not be so low as to produce

rates that are confiscatory in the constitutional sense nor so high as to produce excessive rates for consumers.”<sup>23</sup> *Assuming there is a range of prices that permit a LEC to earn a fair return on invested capital, within that range price and rate-of-return vary inversely.*

When the cost of providing service is sufficiently high that it is impossible for a LEC to be financially viable while charging prices deemed fair and appropriate by policymakers and while meeting service coverage goals, price and rate of return cannot be determined independently of policy decisions on the amount and allocation of external funds that can be used to help offset the cost of providing service in high cost areas. The model presented below illustrates this point and is used as a vehicle for demonstrating how other policy choices impact the relationship between price, rate of return, and the amount of external support required to ensure that RLECs and remain financially viable while contributing to the realization of universal service goals.

### *1. Financial viability as a constraint on policy*

Let  $K$  be the cost of the physical plant required to supply voice service to residents in a representative rural market. The plant can be used to provide service for two periods before becoming obsolete or failing due to physical deterioration. It takes one period to get the plant in place and during this period, period 1, it cannot be used to provide service. Service is offered to customers during periods 2 and 3. Let  $p$  be the price charged for service and define  $R(p)$  as predicted net revenue (revenue minus variable cost) each period if price is  $p$  and no customers are lost to competitors not present during period 1. Define  $p^*$  and  $p_j$ , respectively, as the price that maximizes  $R$  and a price determined by the regulatory authority to be just and reasonable (what we also refer to as fair). For local telephone markets that are less than fully competitive, it is generally accepted that  $p^* > p_j$ .

---

<sup>23</sup> See note 7, *supra*.

Finally let  $r$  be the minimum rate of return required to elicit RLEC investment in a monopoly market and define  $d = 1/(1+r)$  as the discount rate associated with  $r$ .

To begin, consider the investment calculus if there is no government contribution to revenue or cost coverage and there is zero risk that customers will be lost to new competitors, so remaining risk is due entirely to factors other than competition that might impact demand or the cost of providing service. Assuming there are no policy constraints on the price it might charge, the (potential) LEC would invest  $K$  and serve the market if

$$R(p^*)d + R(p^*)d^2 \geq K. \quad (1)$$

If, as is generally assumed,  $p^* > p_j$ , and policy requires that LECs charge no more than a fair price, the LEC will invest in plant and serve the market only if the present discounted value of net revenues when price is  $p_j$  are greater than  $K$ . The altered investment calculus is reflected in the difference between equations (1) and (2).

$$R(p_j)d + R(p_j)d^2 \geq K. \quad (2)$$

Throughout much of the history of telephone regulation in the United States, regulation of prices and rates-of-return regulation were the standard response to situations described by both equations (1) and (2). Today the preferred policy response is to impose a cap close to an estimated fair price on the price a LEC might charge its customers. If (2) is not satisfied when price is  $p_j$ , the cost of plant exceeds the presented discounted value of expected net revenues and a LEC will be formed to offer local exchange service only if government provides sufficient support to make up the difference. This is the only situation for which there is a good policy justification for providing support, and we assume this to be the case for the analysis that follows.

## 2. *Designing policies that allow for competition*

Let  $G$  be the present discounted value of payments during periods 2 and 3 that a LEC must receive if it is to offer service because it cannot cover its own costs at the government-determined fair price. The influence of the selection of a fair price and the need for private investors' to realize a fair return on their investment on the total amount of support that must be provided is reflected in equation (3).

$$G = K - R(p_j)d - R(p_j)d^2. \quad (3)$$

Because  $R(p^*) > R(p_j)$ , selecting a higher value for  $p_j$  increases net revenues and reduces the amount of support that is needed. Thus, given the fair return on investment constraint and a policy objective that LEC investors not receive more than a fair return on investment due to over generous government support, price and the level of support must vary inversely and be jointly determined.

To this point we have ignored the possibility of competitive entry and its consequences. The reality is that ILECs serving most rural markets anticipate that competition from some combination of new entrants and firms already serving portions of their market will increase in the future, but the pace at which the new competition will emerge and geographic coverage that competitors will offer remain highly uncertain and likely will vary substantially among rural markets. To allow for possible, but uncertain, entry and its effect on LEC net revenues, assume that the probabilities the LEC faces new competition in its market in periods 2 and 3 are  $h$  and  $q$ , respectively, with both positive but less than one.  $q > h$  if technological progress increases the likelihood of profitable entry over time, as is generally assumed. Let  $z$  be the fraction of  $R(p_j)$  retained by the ILEC when a competitor also serves the market. As before,  $d$  is the per-period discount rate. For this modified and more realistic description of a RLEC's market, the level of support the LEC would require to financially justify the investment necessary to serve the market is given by equation (4), where  $d$  and  $d^2$  are the discount factors applied to period 2 and period 3 revenues,  $(1-h)$  is the probability that the ILEC will not face

new competition in period 2,  $(1-q)$  is the corresponding probability that its market will not be more competitive in period 3, and  $h$  and  $q$  are the period 2 and period 3 probabilities that the LEC will suffer this loss in net revenue on sales.

$$G = K - R(p_j)d[1 - h + zh] - R(p_j)d^2[1 - q + zq]. \quad (4)$$

It is intuitively obvious, but also apparent from inspection of (4), that (because  $z < 1$ ) the support required for a LEC to invest and offer service in the market must increase if either  $h$  or  $q$  increases (or if both increase) because this reduces expected future net earnings on sales. On the other hand, increasing  $z$  reduces required support.

*3. The consequences of reducing RLEC support in the event of competitive entry or increasing RLEC obligations without increasing support*

Note that the *CAF Order's* proposal that future entry may be justification for reducing or terminating support for rural carriers is 180 degrees counter to the logic expressed in equation (4). For markets where support is already required, the appropriate policy response to the possibility that a RLEC's net revenues may be reduced by competition in the future is to increase the level of promised support so ILECs will be willing to invest in the plant required to ensure that service will be provided in the future. The alternative is to make the availability of telephone service in the future contingent on uncertain entry by unregulated firms currently not serving the market.

Because support is not provided in a single lump sum up front, but is delivered through a series of smaller disbursements over time, if entry prompted a reduction or elimination of support payments the value of actual support received by the ILEC would be some fraction of  $G$ . To ensure that infrastructure investments remain financially justified, the per-period level of support must be

increased to compensate for the possibility that in either or both of periods 2 and 3 they will not be received.

To formally demonstrate that the amount of per-period support must be increased to compensate for the possibility that it will not be received, assume that from period 2 on the ILEC receives a per period payment of  $g$  as long as there is no new competition. On the other hand, should competition materialize, the payment is received with probability  $\alpha$ . If  $\alpha=1$ ,  $G=gd+gd^2$ , and the situation is exactly as described by equation (4). If  $\alpha=0$ , support payments cease entirely when the ILEC faces new competition. As before, the probabilities the market will be served by competitors in periods 2 and 3, respectively, are  $h$  and  $q$ , and entry reduces the ILEC's per period net revenue to fraction  $z$  of its level without competition. Equation (5) is a modified version of (4) that allows for per period support payments to be terminated with probability  $\alpha$  in the event the ILEC faces new competition.

$$K = d[R(p_j) + g][1 - h + d(1 - q)] + d\{[zR(p_j) + \alpha g]h + d[zR(p_j) + \alpha g]q\} \quad (5)$$

The variable representing support payments,  $\alpha$ , appears twice in the second set of terms multiplied by  $d$  on the right side of equation (5). This is the present discounted value of expected net revenues (including support payments) should the ILEC face competition during either or both of periods 2 and 3 with net revenues weighted by the likelihood the ILEC will face competition in each period. Clearly as  $\alpha$  gets smaller and the probability of continuing to receive universal service support when the market is more competitive falls, expected net revenues under competition decline. To maintain the equality of the two sides of (5), the lower policymakers set  $\alpha$ , the higher must be either per period support,  $g$ , or the just and reasonable price,  $p_j$ . Or both might be increased by smaller

amounts, but in combination. In any case, ensuring that ILECs find it attractive to invest in infrastructure requires an adjustment that will result in a higher rate of return on investment in the eventuality that the market does become more competitive.

Equation (5) was used to examine the implications of reducing assistance to RLECs charged with supporting universal service goals. It should be obvious that imposing costly new service obligations on these carriers, such as requiring provision of broadband service, without increasing support would similarly require an offsetting increase in the allowed rate of return.

*4. The allowed rate of return must reflect the impact of policy changes and ambiguities on risk-averse private investors*

To this point we have focused on the effects of alternative regulatory policies on a LEC's expected earnings and their implications for policy design. But RLECs, like other firms, are sensitive to financial risk. Like other risk-averse investors, to justify investments they require higher expected rates of return the less predictable are anticipated earnings and the larger is the range over which actual earnings may vary. Given the investment feasibility constraint represented by equation (5), the effect of reducing  $\alpha$  is to increase the difference between the LEC's profits when there is no entry and its profits when entry occurs. LECs will respond to higher variability in realized profits by more heavily discounting future earnings. To ensure incumbent RLECs continue to invest in their markets' communications infrastructure, they must be compensated for this increase in risk by raising the allowed rate of return, again through some combination of higher per-period support payments and an increase in the price a LEC is allowed to charge. Ambiguity in official universal service policy regarding how support levels or permitted prices are to be determined will similarly increase uncertainty regarding earnings in different states of the world and also dictate a higher allowed rate of

return if rural ILECs are to make the investments needed to ensure that high quality communications services will be available to rural residents in the future.

### *5. The consequences of more stringent COLR waiver requirements*

Waivers are a potential form of protection against the financial harm a rural ILEC would suffer should it find itself obligated as part of a bilateral commitment to provide service to customers for whom the sum of subscriber charges and attributable support payments fall considerably short of the cost of continuing their service. Changed procedures that diminish the likelihood of obtaining such a waiver or that delay its grant diminish the value of this source of protection to the LEC. If not compensated by offsetting reductions in the costs of meeting other requirements, the LEC would require increases in support payments, prices, or some combination of these two adjustments, if universal service obligations are to be sustained for the long term.

We close this section with a variation on the version of the model described by equation (4). But for a single new expression,  $(d+d^2)R_L$ , on the right side of the equal sign, equation (6) is identical to equation (4).  $R_L$  is the net revenue realized on customers for whom a RLEC seeks release from COLR obligations. Because customers who generate revenue in excess of the cost of serving them make a positive contribution to a LEC's bottom line, we can safely assume that RLECs are losing money (i.e.,  $R_L < 0$ ) on an ongoing basis on those customers for whom they request that COLR obligations be waived. Furthermore, a RLEC would not need to seek waiver of COLR obligations for customers it was losing to competing service providers.

$$G = K - (d + d^2)R_L - R(p_j)d[1 - h + zh] - R(p_j)d^2[1 - q + zq] \quad (6)$$

From (6) it is clear that the larger is the ILEC's loss on COLR customers ( $R_L$ ), the larger must be  $G$  if service is to be continued for non-COLR customers without raising their rates. Similarly, the

longer the wait for relief from COLR obligations after a request for waiver is filed, the larger will be the LEC's accumulated loss on COLR customers which will have to be made up through either an increase in  $G$  or by raising the price of service.

6. *The implications of financial viability as an unavoidable constraint on policy*

The economic analysis presented in this sub-section provided a more formal demonstration of an unavoidable truth reflected in the legal principles discussed in the preceding sub-sections. Reliance on private firms as critical instruments for achieving policy goals requires that the financial viability of those firms be taken into account in policy design. The implications for communications policy are just as clear. If universal service policy is to continue to rely on RLECs to help achieve its goals for provision of communication services in rural areas, the impacts of various policy options on RLEC finances must explicitly be taken into account. Failure to recognize the legitimate financial needs of RLECs in the design of universal service policy unavoidably puts the policy goals themselves at risk. Nothing in the *CAF Order* suggests that such an analysis has been performed.

It is absolutely critical that the FCC recognize that the rate of return prescribed for RLECs cannot be established independent of the other elements of universal service policy. As demonstrated with the model presented in this subsection, reductions in support, costly new obligations like the provision of broadband service, and more stringent COLR waiver requirements must all be offset in a higher allowed rate of return. The same is true for other requirements and obligations for RLECs introduced as universal service policy is redesigned. Uncertainties regarding interpretation and implementation of new policies should be similarly compensated.

The model also showed that competition anticipated in the future is a reason to increase the allowed rate of return, not reduce it, because infrastructure investments made today must be repaid through future earnings. Because competition reduces the expected return on investment and increases

uncertainty about realized returns, needed infrastructure investments will be forthcoming only if allowed rates of return are increased. It is also critical that policymakers recognize that if support is to be reduced as competition emerges, even larger increases in the allowed rate of return will be required to compensate investors for placing an additional stream of revenues at risk. Because the consequences of failure in policy design would be diminished service to rural residents whose lives universal service policy is supposed to improve, policy officials would be wise to err on the high side in setting the upper bound on RLECs' permitted rate of return.

#### **IV. Conclusion**

The FCC's reform of universal service and intercarrier compensation in its *CAF Order* affects the *simultaneous sustainability* of multiple policy goals. In particular, when represcribing the rate-of-return for RLECs, the FCC is, by regulatory design, creating interdependencies between the financial viability of RLECs and the availability of affordable universal service to rural and remote areas. For both legal and economic reasons, this regulatory design must enable the RLECs to remain financially viable firms.

To enhance our understanding of how to properly construct regulatory rules to better ensure their sustainability, we apply our framework of unilateral and bilateral rules. We explain why the legal standard for rate of return regulation of RLECs is a bilateral rule, requiring government assurance that the RLECs have the reasonable opportunity to remain financially viable firms. We also explain that universal service policy relying on funding support for its fulfillment is also a bilateral rule requiring government assurance that the amount of funding support is sufficient for the private firms to meet the obligations that have been imposed. Represcription of RLECs' rate of return in the *CAF Order*

therefore creates interdependent bilateral rules, and for which sustainability of the underlying policy goals requires that the RLECs remain financially viable.

We show that setting the rate of return in the upper range can help ensure both the financial sustainability of RLECs *and* sustainability of revised universal service policy in rural and remote areas. There is long-standing legal precedent for prescribing rate of return in the upper range for RLECs, and both legal and economic reasons for treating RLECs differently from price cap LECs. Furthermore, we apply a multi-period economic model to show that numerous design flaws and uncertainties under the *CAF Order* can be addressed, at least in part, by prescribing a rate of return in the upper range. Reductions in funding support, costly new obligations, more stringent waiver requirements, and uncertainties regarding interpretation and implementation of the *CAF Order* must all be offset by a higher rate of return.