PHOENIX CENTER RESEARCH MEMORANDUM

Applicability of Phoenix Center Research to the FCC's National Broadband Plan Notice of Inquiry (GN Docket No. 09-51)

June 2, 2009

On April 8, 2009, the Federal Communications Commission ("FCC") adopted a Notice of Inquiry ("NOI") as the first step towards developing the National Broadband Plan required by American Recovery and Reinvestment Act of 2009, Pub. L. No. 111-5, 123 Stat. 115 (2009) (Recovery Act).[1] The National Broadband Plan has the potential to be one of the most far-reaching and significant FCC proceedings in history, and certainly of recent memory. As Acting Chairman Michael J. Copps commented in voting for the item, the FCC "has never, I believe, received a more serious charge" from Congress "than the one to spearhead development of a national broadband plan. Congress has made it crystal clear that it expects the best thinking and recommendations we can put together by next February."[2]

Since our founding in 1998, the mission of the Phoenix Center has been to provide policymakers with rigorous, analytically sound, and empirically verified tools of analysis. We have explored issues related to competition, market structure, broadband policy, network neutrality, international broadband comparisons, the scope and requirements of sound regulation, and the removal of policy-relevant barriers to entry. Our work stands as some of the "best thinking" that Acting Chairman Copps has asked the public to provide. The purpose of this RESEARCH MEMORANDUM, therefore, is to provide the reader with a summary of Phoenix Center research (along with relevant links to our webpage) as it relates to relevant portions of the NOI—a type of reference guide so that our research may be used to inform the FCC's important task.

Phoenix Center's research provides four central insights that inform the debate over the National Broadband Plan:

- First, our research shows that policymakers need to have realistic expectations of market structure in the broadband communications industry. Broadband markets will, by definition, be concentrated. As a result, policymakers must be aware that public policy can exacerbate or help ameliorate that condition by

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[1] *In the Matter of A National Broadband Plan for Our Future,* GN Docket No. 09-51, Notice of Inquiry, FCC 09-31 (rel. Apr. 8, 2009) (available at: http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-09-31A1.pdf) ("National Broadband Plan NOI" or "NOI")

[2] *Id.* at 53 (Statement of Acting Chairman Michael J. Copps.

increasing or decreasing the level of fixed and sunk costs in the industry or expanding or shrinking the size of the market available to firms.

- Second, our research shows that demographic and economic conditions play a significant role in the broadband adoption and deployment—far more than public policy. This counsels for a broad, integrated approach focused upon *results* and *targets* and which does not benchmark the U.S. to naïve rankings of international data.

- Third, our research shows that focusing on removing policy-relevant barriers to entry that increase the fixed and sunk costs of the industry is apt to have a significant, positive impact on broadband deployment and adoption.

- Finally, our research demonstrates that proposals for network neutrality or "open platform" regulation need to be passed through a rigorous cost/benefit analysis, less government intervention exacerbate concentrated market conditions or result in other inefficient outcomes.

To this end, this RESEARCH MEMORANDUM provides a detailed discussion as to how our four central insights relate to several broad areas of inquiry in the NOI. We pay particular attention to questions in the NOI that relate to defining access to broadband and broadband metrics, network neutrality and open platforms, consumer welfare, and other policies.

I. Policy Should Incorporate Realistic Expectations of Market Structure

One consistent point of Phoenix Center research has been our observation that the telecommunications industry is *difficult* and *costly* to enter. Providing local telephone, wireless or broadband services to consumers requires the expenditures of tremendous fixed costs, much of which are sunk, meaning that they cannot be recovered or converted to a different use if the venture fails. As we explained in **PHOENIX CENTER POLICY PAPER NO. 12, *Why ADCo? Why Now? An Economic Exploration into the Future Industry Structure for the "Last Mile" in Local Telecommunications Markets,***[3] these costs are not confined exclusively to network plant costs, but also extend to non-plant costs as well (e.g., marketing, billing systems, taxes, regulatory, etc.). Moreover, these non-network operational costs often far exceed the network costs, which is an important policy insight.

But this insight is not simply limited to what may be an appropriate broadband infrastructure grant or subsidy program—the high fixed and sunk cost nature of the industry needs to play a central role in policymaking itself. This is because modern industrial economics teaches that in industries with large fixed and sunk costs,

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[3] *Why ADCo? Why Now? An Economic Exploration into the Future Industry Structure for the "Last Mile" in Local Telecommunications Markets*, PHOENIX CENTER POLICY PAPER NO. 12 (November 2001)(available at: http://www.phoenix-center.org/pcpp/PCPP12.pdf) *and reprinted in* 54 FED. COM. L. J. 421 (May 2002).

concentrated market structures should be expected. In general, we are not sanguine about the prospects for multiple broadband providers in most areas of the United States—entry is difficult and costly, and many areas may only be able to efficiently support one broadband network, if that.

There are several important policy consequences of this conclusion. Most importantly, *public policy can have an impact upon the number of firms that the market can support.* We call this the "equilibrium" number of firms, a concept first established in **PHOENIX CENTER POLICY PAPER NO. 11, *Changing Industry Structure: The Economics of Entry and Price Competition,***[4] and more fully explored in **PHOENIX CENTER POLICY PAPER NO. 21, *Competition After Unbundling: Entry, Industry Structure and Convergence.***[5] Our research shows that the equilibrium number of firms in the industry is a function of the size of the market, the extent of price competition in the market, and the amount of fixed and sunk costs required for entry.

Regulation can and does impact *all* of these factors and therefore affects the number of firms that the industry can support. Policy that reduces market size (such as by limiting the characteristics of products that may be sold by a network firm) or profitability (such as price regulation) will—by definition—shrink the number of firms that can profitably enter the market. Moreover, the impact of these shifts will be felt disproportionately in smaller, more rural areas, which may see their potential broadband adoptions reduced from two firms to one or, worse yet, from one to zero.[6] As a result, policies ought to be directed at ensuring that the firms in the industry compete along as many lines of business as possible.

A second consequence is more practical: policymakers should have *realistic expectations about the prospects for multiple firms* in broadband markets. While entry should certainly be encouraged, it should not necessarily be regarded as a policy "failure" if a "textbook" case of four or five firms does not occur. Equally as important, as we show in our research and as the FCC itself has recognized on numerous occasions, **high concentration does not *a fortiori* mean poor market performance.** In capital-intensive industries such as broadband, competition between even only two network providers can be quite robust and benefit consumers if the government adopts policies designed to maximize competition between those providers (and there is certainly no credible evidence of joint profit maximization). Accordingly, policies directed solely at de-concentrating the industry may be highly inefficient and reduce consumer and social welfare considerably.

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[4] *Changing Industry Structure: The Economics of Entry and Price Competition*, PHOENIX CENTER POLICY PAPER NO. 10 (April 2001)(available at: http://www.phoenix-center.org/pcpp/PCPP10Final.pdf) *and reprinted in* 7 TELECOMMUNICATIONS AND SPACE LAW JOURNAL 11 (2001).

[5] PHOENIX CENTER POLICY PAPER NO. 21, *Competition After Unbundling: Entry, Industry Structure and Convergence* (2005)(available at: http://www.phoenix-center.org/pcpp/PCPP21Final.pdf), *and reprinted in* 59 FED. COMM. L.J. 331 (2007).

[6] *See, e.g.*, PHOENIX CENTER POLICY PAPER NO. 25, *The Burden of Network Neutrality Mandates on Rural Broadband Deployment* (2006) (available at: http://www.phoenix-center.org/pcpp/PCPP25Final.pdf).

There are several important implications of this approach for the National Broadband Plan. In particular, proposals in the NOI that relate to network neutrality and "open platforms" would potentially *increase* the costs of doing business in the industry and limit the market for network firms. As a result, such proposals would likely *lower* the equilibrium number of firms—in other words, market concentration could increase. Consumers would be harmed by such a decrease in competitive choices, and, as the NOI recognizes in Paragraphs 64-69, consumer welfare is an important component of this analysis.

Therefore, while Paragraph 37 of the NOI notes that "market mechanisms have been successful in ensuring access to broadband in many areas of the country," our research shows that the market mechanism ought not to be taken for granted. The broadband industry requires the expenditure of large amounts of fixed and sunk cost investment, which therefore necessarily limits the number of firms that can successfully compete in the industry. Regulation of those firms can exacerbate that condition.

Other Phoenix Center papers that develop this point include:

- **PHOENIX CENTER POLICY PAPER NO. 24**, ***Network Neutrality and Industry Structure,***[7] where we build upon the preceding point and show that network neutrality rules—because they limit the ability of firms to differentiate their products—could exacerbate and increase industry concentration; and

- **PHOENIX CENTER POLICY BULLETIN NO. 17,** ***Wireless Net Neutrality: From Carterfone to Cable Boxes,***[8] where we apply these lessons specifically to the wireless industry and wireless *Carterfone* proposals. In this BULLETIN, we describe the "substantial risks that *Carterfone*-type regulation would commoditize wireless network services in a way that could substantially harm the prospects for entry and competition in the industry" by creating conditions for a more concentrated industry structure.

II. The National Broadband Plan should include Targets that Relate to the Demographic and Economic Conditions that Drive Broadband Adoption and Deployment

A significant part of the broadband policy debate is centered upon improving the U.S.'s status among its peers in broadband availability and penetration. In the last two years, the Phoenix Center has attempted to enrich that debate by proposing policy-

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[7] PHOENIX CENTER POLICY PAPER NO. 24, *Network Neutrality and Industry Structure* (2006)(available at: http://www.phoenix-center.org/pcpp/PCPP24Final.pdf), *and reprinted in* 29 HASTINGS COMM. ENT. L.J. 149 (2007).

[8] PHOENIX CENTER POLICY BULLETIN NO. 17, *Wireless Net Neutrality: From Carterfone to Cable Boxes* (2007)(available at: http://www.phoenix-center.org/PolicyBulletin/PCPB19Final.pdf), *portions of which are to be reprinted* in 25 SANTA CLARA COMPUTER AND HIGH TECHNOLOGY LAW JOURNAL (forthcoming Spring 2009).

relevant tools of analysis. These tools—most notably our Broadband Performance Index and Broadband Efficiency Index—do not focus upon calculating raw "rankings" but instead examine the factors that drive broadband adoption in industrialized countries. As we explain, the relevant question is *not* where do we "rank", but *where should we rank* given our demographic and economic conditions, such as population age, education level, and density?

To date, Phoenix Center staff has authored six scholarly papers on this important topic:

- **PHOENIX CENTER POLICY PAPER NO. 29,** ***The Broadband Performance Index: A Policy-Relevant Method of Comparing Broadband Adoption Among Countries*** **(July 2007);**[9]
- **PHOENIX CENTER POLICY PAPER NO. 31,** ***The Demographic and Economic Drivers of Broadband Adoption in the United States*****, (November 2007);**[10]
- **PHOENIX CENTER POLICY PAPER NO. 33,** ***The Broadband Efficiency Index: What Really Drives Broadband Adoption Across the OECD?*** **(May 2008);**[11]
- **PHOENIX CENTER POLICY PERSPECTIVES NO. 08-03 (Second Edition):** ***Broadband Expectations and the Convergence of Ranks*** **(October 1, 2008);**[12]
- **PHOENIX CENTER POLICY PERSPECTIVES NO. 09-01:** ***Normalizing Broadband Connections*** **(May 12, 2009);**[13] **and**
- **PHOENIX CENTER POLICY PERSPECTIVES NO. 09-02:** ***Econometric Analysis of Broadband Subscriptions: A Note on Specification*** **(May 12, 2009).**[14]

In addition, we have testified twice before Congress on this issue,[15] and presented our findings to various domestic and international policymakers.[16] Finally, with the

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9 http://www.phoenix-center.org/pcpp/PCPP29Final.pdf.

10 http://www.phoenix-center.org/pcpp/PCPP31Final.pdf.

11 http://www.phoenix-center.org/pcpp/PCPP33Final.pdf.

12 http://www.phoenix-center.org/perspectives/Perspective08-03Final.pdf.

13 http://www.phoenix-center.org/perspectives/Perspective09-01Final.pdf.

14 http://www.phoenix-center.org/perspectives/Perspective09-02Final.pdf.

15 Testimony of George S. Ford, PhD, Chief Economist , Phoenix Center for Advanced Legal & Economic Public Policy Studies, Before the House Committee on Commerce and Energy - Subcommittee on Telecommunications and the Internet Hearing on "Digital Future of the United States: Part IV: Broadband Lessons from Abroad" (April 24, 2007)(available at: http://www.phoenix-center.org/FordRankingTestimony24April2007.pdf); Testimony of George S. Ford, PhD, Chief Economist, Phoenix Center for Advanced Legal & Economic Public Policy Studies, Before the House of Representatives Committee on Energy and Commerce, Subcommittee Telecommunications and the Internet, Hearing on H.R. ___, A Discussion Draft Addressing Broadband Mapping and Data Collection (May 17, 2007)(available at:: http://www.phoenix-center.org/FordBroadbandMappingTestimony507.pdf).

generous support of the Governments of Portugal and Brasil, we are currently developing a new **"Broadband Adoption Index" or "BAI",** which we will unveil at a conference at the National Press Club on July 15, 2008.[17] The purpose of the BAI will be to provide a methodology to develop country-specific benchmarks based upon the social value of various Internet access technologies.

As we explain in our research, one fault of the OECD approach to rankings is that of normalization of raw data. The OECD simply divides the number of broadband connections in a country by population, even though wireline broadband service is typically consumed at the household or business premise level. As a result, the OECD broadband rankings are skewed. To wit, we first showed in Congressional testimony and in **POLICY PAPER NO. 29** the fallacy of a **"Broadband Nirvana"**—i.e., even if every home and place of business in every OECD country subscribed to broadband service—in other words, 100% adoption—then under the OECD's ranking methodology, the United States *would rank 20th* solely because households in the United States are larger than in most OECD countries.

Our econometric research in **POLICY PAPERS NOS. 29 and 31** indicate that factors like income inequality and education matter substantially in the rate of broadband adoption. The table below summarizes those demographic and economic findings. In it, we describe what would happen to the rate of broadband adoption in a society if that particular demographic or economic factor (such as average population age) would increase by 10%. **POLICY PAPER NO. 29** examined factors that explained different adoption rates across OECD countries, while **POLICY PAPER NO. 31** examined factors within the United States.

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[16] *See, e.g.,* Thomas M. Koutsky, *Demand Side Drivers of Broadband Adoption*, Presentation before Federal-State Joint Conference on Advanced Services (Nov. 6, 2008)(available at: http://www.phoenix-center.org/koutsky_tom_11-6-08.pdf).

[17] *See* Presentation of Phoenix Center Chief Economist George S. Ford before the OECD Expert Workshop on Measuring Mobile/Wireless Service Data: *Evaluating Broadband Adoption (*19 and 20 February 2009 – Lisbon, Portugal)(available at: http://www.phoenix-center.org/FordOECDLisbon.pdf);

International Factors Policy Paper No. 29		Domestic Factors Policy Paper No. 31	
Factor	Impact	Factor	Impact
Income Inequality (GINI)	-12.0%	Income Inequality (GINI)	-15.1%
Income	5.8%	Income	3.8%
% Tertiary Education	2.0%	% College Degree	2.4%
		% HH w/children in school	28.1%
% Population over 65	-5.5%	% Retired Households	-4.0%
Population Density	0.3%	Rural Households	-0.7%
		% Farm HH	-0.8%
% Population in Biggest City	-2.0%	% Population in Cities > 100k	0.6%
HH Size	3.5%	% English Speaking HH	.9%
Business Size	-2.3%	Foreign-Born Population	2.3%
Telephone Penetration	20.0%		

This exploration of the demographic and economic factors that affect broadband adoption is particularly relevant to the national broadband plan, because it indicates that certain communities and conditions have a particular impact upon the adoption of broadband. Therefore, demand-side programs targeted at these conditions are likely to provide more "bang for the buck" than other programs. For example, our studies show that income, income inequality and education are significant factors. As a result, a program targeted at poor families with school children would likely have a significant impact on adoption rates—much more so than targeting the elderly poor. We recognize, however, that solutions to these more significant barriers to broadband adoption may prove administratively difficult and costly.

III. Policy Can Improve Welfare by Removing Policy-Relevant Barriers to Entry and Lowering the Fixed or Sunk Costs of the Industry

Paragraph 50 of the NOI specifically asks about other FCC policies that may impact broadband deployment, and Phoenix Center research encourages U.S. policymakers not to rest on their laurels. From our inception, we have shown that public policy that is directed at solving the fundamental challenge of the industry—that of fixed and sunk costs—can provide significant benefits to consumers and society. Policies that reduce fixed and sunk costs will promote and incent entry into the industry.

For example, our research shows that:

- The rates to attach broadband equipment to utility poles out to be unified and sharply reduced for *all* carriers. **PHOENIX CENTER POLICY PAPER NO. 34, *The Pricing of Pole Attachments: Implications and Recommendations* (December 2008);**[18]

- Unifying the rates for termination of all voice calls would promote broadband deployment. **PHOENIX CENTER POLICY BULLETIN NO. 22, *Do High Call Termination Rates Deter Broadband Deployment?*(October 2008);**[19] and

- A national policy framework for wireless services would be efficient, due to the extra-jurisdictional effects of state regulation. **PHOENIX CENTER POLICY BULLETIN No. 19, *An Economic Approach to Evaluating a National Wireless Regulatory Framework,* (October 2007),**[20] ***and reprinted as Developing a National Wireless Regulatory Framework: A Law And Economics Approach*, 16 COMMLAW CONSPECTUS 391 (2008).**

IV. Network Neutrality Regulation Should Pass Through an Informed Cost-Benefit Analysis

Phoenix Center research has consistently stated that policymakers should pass proposed regulation through a rigorous cost-benefit analysis. This is particularly important in the case of network neutrality regulation. In the NOI, the Commission specifically asks parties to provide evidence "on the value of open networks" including, "specifically, the impact on investment, innovation and entrepreneurship, content, competition and affordability of broadband . . ."[21] Phoenix Center research provides both *empirical* and *theoretical* evidence of the actual and potential harms from such regulation.

We have shown that network neutrality or open platform proposals, while they would represent a transfer of profits from one industry segment to another, could cause considerable harm to consumers and thus cause a net reduction in consumer and social welfare. Moreover, the burdens of these mandates would be felt disproportionately in rural areas, where the costs of deploying broadband service may be at best marginally profitable. **PHOENIX CENTER POLICY PAPER NO. 25, *The Burden of Network Neutrality Mandates on Rural Broadband Deployment,***[22] also shows that not only would neutral networks be costlier to build, the consequences of those costs would fall disproportionately on rural areas. In particular, ***increased costs of complying with network neutrality mandates would affect incentive to deploy broadband in rural areas***

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18 http://www.phoenix-center.org/pcpp/PCPP34Final.pdf.

19 http://www.phoenix-center.org/PolicyBulletin/PCPB22Final.pdf.

20 http://www.phoenix-center.org/PolicyBulletin/PCPB19Final.pdf.

21 National Broadband Plan NOI at ¶¶ 47, 48.

22 PHOENIX CENTER POLICY PAPER NO. 25, *The Burden of Network Neutrality Mandates on Rural Broadband Deployment* (2006) (available at: http://www.phoenix-center.org/pcpp/PCPP25Final.pdf).

6x more than in urban areas. This finding is highly significant for the National Broadband Plan.

In particular, our research has shown that network neutrality regulation would affirmatively limit the revenue opportunities for broadband network providers and would reduce competition by restricting their ability to differentiate their products from one another.[23] As such, those proposals would by definition reduce the equilibrium number of firms in a market, reduce competition, and therefore harm consumer welfare. It is the task of policymakers to weigh those welfare effects against purported benefits of such regulation.

In addition, our initial review of the evidence indicates that the costs and welfare harms of network neutrality mandates would be quite high. In **PHOENIX CENTER POLICY BULLETIN NO. 16,** ***The Efficiency Risk of Network Neutrality Rules,***[24] we show that the costs of deploying the neutral, "stupid" network that network neutrality proponents advocate would be $300-400 per month per subscription higher than the cost of building an "intelligent" network.

Similarly, in **PHOENIX CENTER POLICY PAPER NO. 28,** ***Network Neutrality and Foreclosing Market Exchange: A Transaction Cost Analysis,***[25] we show that categorical, *ex ante* rules that prohibit efficient commercial transactions between content and broadband service providers could, in fact, be bad for *all* participants: consumers would pay higher prices, the profits of the broadband service provider would decline, and the sales of Internet content providers would also decline. Moreover, rules that prohibit the market from contracting efficiently may shift sales from content providers to the broadband provider's content affiliate, a result entirely inconsistent with the stated desire of network neutrality proponents.

With specific regard to the appropriateness of reasonable network management tools, **PHOENIX CENTER POLICY PAPER NO. 32,** ***The Welfare Impacts of Broadband Network Management: Can Broadband Service Providers be Trusted?***[26] demonstrates that it is socially desirable to charge a congestion premium or utilize other traffic management techniques when congestion-causing applications like BitTorrent impose a congestion externality and degrade the experience of other users. Such charges benefit consumers as a whole and are not simply an attempt to increase profits at the expense of

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[23] PHOENIX CENTER POLICY PAPER NO. 24, *Network Neutrality and Industry Structure* (2006)(available at: http://www.phoenix-center.org/pcpp/PCPP24Final.pdf), *and reprinted in* 29 HASTINGS COMM. ENT. L.J. 149 (2007).

[24] PHOENIX CENTER POLICY BULLETIN NO. 16, *The Efficiency Risk of Network Neutrality Rules,* (2006)(available at: http://www.phoenix-center.org/PolicyBulletin/PCPB16Final.pdf).

[25] PHOENIX CENTER POLICY PAPER NO. 28, *Network Neutrality and Foreclosing Market Exchange: A Transaction Cost Analysis* (2007) (available at: http://www.phoenix-center.org/pcpp/PCPP28Final.pdf).

[26] PHOENIX CENTER POLICY PAPER NO. 32, *The Welfare Impacts of Broadband Network Management: Can Broadband Service Providers be Trusted?* (March 2008) (available at: http://www.phoenix-center.org/pcpp/PCPP32Final.pdf).

consumers. Furthermore, economic theory indicates that firms will engage too little in consumer-friendly congestion management since congestion is an externality. As a consequence, it is "appropriate to presume that this type of traffic management by a private firm is legitimate and welfare enhancing."

Our empirical research has also rebutted one key study cited by network neutrality proponents. In particular, Phoenix Center Chief Economist Dr. George Ford has shown in **PHOENIX CENTER POLICY PERSPECTIVES NO. 07-01, *University of Florida Study Shows Only Winners from Network Neutrality Regulation to be Content Providers, Consumers Lose*** that a University of Florida study by network neutrality proponents in fact shows that consumers would likely pay higher prices and that such policies would only transfer rents from one industry segment to another.[27]

We have also extended this logic to wireless *Carterfone* regulation and have empirically shown that "open platform" mandates have can chop the profitability of CMRS networks by nearly one third. In particular, **PHOENIX CENTER POLICY BULLETIN NO. 20, *Using Auction Results to Forecast the Impact of Wireless Carterfone Regulation on Wireless Networks,***[28] utilizes auction bids from the 700 MHz auction to demonstrate that "open platform" regulations on the C block cost U.S. taxpayers $3.1 billion in auction revenue. Moreover, these lower bids that industry regarded the "open platform" mandate on the C block made commercial operations on that spectrum 32% less profitable. Applying such mandates across the board to the entire CMRS industry could have a similar effect and reduce wireless infrastructure investment by $50 billion over the next decade—an amount several times the magnitude of the stimulus funding in the Recovery Act.

V. Conclusion

As noted above, the National Broadband Plan has the potential to be one of the most far-reaching and significant FCC proceedings ever. The Phoenix Center's mission is to inform the policy debate with timely, solutions-based, and academic-level analytical studies that are grounded in sound economic and legal principles. By providing this RESEARCH MEMORANDUM, we hope to provide the public with a useful annotation of our research as it relates to the NOI in order to continue to contribute positively to, and to help elevate, this important debate.

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[27] PHOENIX CENTER POLICY PERSPECTIVES NO. 07-01, *University of Florida Study Shows Only Winners from Network Neutrality Regulation to be Content Providers, Consumers Lose* (2007)(available at: http://www.phoenix-center.org/perspectives/Perspective07-01Final.pdf).

[28] PHOENIX CENTER POLICY BULLETIN NO. 20 (2d Ed.), *Using Auction Results to Forecast the Impact of Wireless Carterfone Regulation on Wireless Networks*, (May 2008)(available at: http://www.phoenix-center.org/PolicyBulletin/PCPB20Final2ndEdition.pdf).