

**Before the
Federal Communications Commission
Washington, D.C. 20554**

_____)	
In the Matter of)	
International Comparison and Consumer)	
Survey Requirements in the Broadband)	GN Docket No. 09-47
Data Improvement Act)	
)	
A National Broadband Plan for)	GN Docket No. 09-51
Our Future)	
)	
Deployment of Advanced)	GN Docket No. 09-137
Telecommunications Capability to All)	
Americans in a Reasonable and Timely)	
Fashion and Possible Steps to Accelerate)	
Such Deployment Pursuant to Section 706)	
of the Telecommunications Act.)	
_____)	

**SUPPLEMENTAL DECLARATION OF
ROBERT W. CRANDALL, EVERETT M. EHRLICH, JEFFREY A. EISENACH, AND
ALLAN T. INGRAHAM REGARDING THE BERKMAN CENTER STUDY (NBP PUBLIC
NOTICE 13)**

MAY 10, 2010

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I. INTRODUCTION

1. On February 15, 2010, the Berkman Center for Internet and Society submitted a report entitled *Next Generation Connectivity: A Review of Broadband Internet Transitions and Policy from Around the World* (“Final Report”) to the Federal Communications Commission (FCC),¹ as part of the Commission’s Omnibus Broadband Initiative. An earlier draft of this report (the “Draft Report”) had been submitted to the FCC in October 2009, and the FCC had solicited comments on the draft.² The FCC received a number of critical responses to the Initial Report, including the Declaration of Robert W. Crandall, Everett M. Ehrlich, and Jeffrey A. Eisenach (“Crandall-Ehrlich-Eisenach”), which was filed November 16, 2009.³ The Final Report attempts to respond to these comments. Specifically, Annex 4.14.1, entitled “Follow-up Note on Estimating the Impact of Unbundling on Internet Penetration Rates,” contains a partial response to the empirical analyses presented in the Crandall-Ehrlich-Eisenach critique.

2. One of the central issues addressed in the Draft Report was whether empirical evidence supports the notion that “unbundling” policies have increased broadband penetration in other nations. The Draft Report contained a partial review of the empirical literature on this question, and also conducted a number of cross-country regression analyses. It concluded that

¹ *Next Generation Connectivity: A Review of Broadband Internet Transitions and Policy from Around the World* (February 15, 2010) (available at: <http://cyber.law.harvard.edu/pubrelease/broadband/>) (hereafter, Final Report).

² *Next Generation Connectivity: A Review of Broadband Internet Transitions and Policy from Around the World*, October 2009 (Draft) (available at http://www.fcc.gov/stage/pdf/Berkman_Center_Broadband_Study_13Oct09.pdf) (hereafter, Draft Report).

³ *Declaration of Robert W. Crandall, Everett M. Ehrlich and Jeffrey A. Eisenach Regarding the Berkman Center Study (NPB Notice 13)*, GN Docket 09-51 (November 16, 2009) (hereafter, Crandall-Ehrlich-Eisenach) (available at <http://fjallfoss.fcc.gov/ecfs/document/view?id=7020348482>). The curriculum vitae of Drs. Crandall, Ehrlich and Eisenach were attached to the Crandall-Ehrlich-Eisenach declaration. Allan T. Ingraham, Ph.D. is a Director at Navigant Economics, LLC. Since the Crandall-Ehrlich-Eisenach declaration was filed, Dr. Eisenach has changed affiliation and is now a Managing Director at Navigant Economics LLC. We are grateful to Kevin Caves and Andrew Card for research assistance, to several commenters for helpful suggestions, and to Verizon Communications for support. The opinions expressed here are our own, as is responsibility for any remaining errors.

the empirical evidence demonstrated that “unbundling had a positive and significant effect on levels of [broadband] penetration.”⁴ The Draft Report referred to its conclusion that “‘open access’ policies ... are almost universally understood as having played a core role ... in most of the high performing countries” as its “most surprising and significant finding.”⁵

3. Crandall-Ehrlich-Eisenach, based on a more complete review of the existing literature, a careful analysis of the Draft Report’s econometric analyses, and additional, original econometric analyses based on an expanded data set, concluded that “the weight of the evidence demonstrates that mandatory unbundling has reduced broadband penetration and deterred investment in broadband telecommunications infrastructure....”⁶

4. The Final Report acknowledges the Crandall-Ehrlich-Eisenach declaration, and, apparently in response to this critique, omits the language in the Draft Report asserting there is empirical support for unbundling. However, rather than conceding that the empirical evidence actually weighs *against* unbundling, the Berkman authors say they no longer “believe that

⁴ Draft Report at 115 (“Our conclusion is that unbundling had a positive and significant effect on levels of penetration; that this effect was somewhat larger, more statistically significant, and more robust than previously thought; and that some of the ambiguity in prior studies can be attributed to the large influence that Switzerland’s experience had in dampening the observed effect of unbundling.”)

⁵ Draft Report at 11. On the basis of its econometric results, the Draft Report also claimed to have established a tie between unbundling policies and economic growth. See Draft Report at 117 (“While unbundling does not explain the entire growth differential, then, it appears to have a statistically significant, robust, effect, of about 1% per year of effective enforcement. In any given year, such an effect may not be considered significant. However, if our analysis is correct, then adding unbundling could, over a decade after introduction, add 10% penetration points. When one recalls that the World Bank study, described in Section 2.5 above, found that a 10 point increase in penetration per 100 translated into 1.21% growth in GDP, and that total GDP growth in the United States between 1997 and 2008 averaged 2.8%, one might consider the long term benefits to growth caused even by increasing penetration by 1 per 100 every year, over and above the effect of all other influences, to be an effect worth considering. This of course assumes that there are no other positive spillovers from high penetration, not captured by GDP growth.”).

⁶ Several other commenters also offered criticisms of the Draft Report’s empirical analysis, including New Zealand telecommunications economist Bronwyn Howell. See Bronwyn Howell, *Comments to the Federal Communications Commission, Washington D.C. on Broadband Study Conducted by the Berkman Center for Internet and Society NPB Public Notice # 13* (November 13, 2009) (available at <http://fjallfoss.fcc.gov/ecfs/document/view?id=7020348357>).

cross-country empirical work, given the several data and model specification issues, can reliably inform questions of policy efficacy.”⁷ Moreover, despite acknowledging the absence of empirical support for its pro-unbundling findings, the Final Report continues to insist that “the positive impact of [unbundling] is strongly supported by the evidence of the first generation broadband transition.”⁸

5. In this declaration, we review the Final Report’s empirical analyses, focusing specifically on the changes made in response to the Crandall-Ehrlich-Eisenach declaration and similar critiques. We conclude, first, that the Final Report omits all of the empirical results contained in the Draft Report, thus acknowledging (either tacitly or explicitly) the validity of the Crandall-Ehrlich-Eisenach and other critiques. Second, we note that the one remaining empirical analysis in the Final Report consists of a failed effort to reverse the results of one of the Crandall-Ehrlich-Eisenach regressions, and, as we demonstrate below, does not provide an empirical basis the Berkman Center’s contention that unbundling increases penetration.

6. Perhaps as a result of the Final Report’s failure to provide empirical support for unbundling policies, it is not prominently featured in the FCC’s National Broadband Plan

⁷ Final Report at 212. While the Draft Report expressed caution about relying on such empirical analyses, it nevertheless proffered a strong and unqualified conclusion. See Draft Report at 113 (“We are cautious about the results of such analyses because of the small number of countries, the small number of observations, the thin specification of the variables, and the potential interaction effects among these variables, as well as other unobserved variables. Nonetheless, this mode of analysis has been an important source of insight and debate, and properly placed in context of the qualitative analysis, can offer valuable insights. Here, we offer an independent assessment. *Our conclusion is that unbundling had a positive and significant effect on levels of penetration; that this effect was somewhat larger, more statistically significant, and more robust than previously thought; and that some of the ambiguity in prior studies can be attributed to the large influence that Switzerland’s experience had in dampening the observed effect of unbundling.*”) (emphasis added).

⁸ Final Report at 13.

(NBP),⁹ which instead focuses on new research suggesting that infrastructure competition is leading to increased investment and higher broadband speeds.¹⁰ However, despite the lack of empirical support for unbundling, the Commission proposes in the NBP to “comprehensively review” its wholesale competition policies;¹¹ and, the Berkman Center continues to proselytize for unbundling.¹² Accordingly, the results we present below – which we believe are definitive regarding this particular aspect of the telecommunications policy debate – continue to have relevance to the debate over broadband policy in the years ahead.

II. THE EMPIRICAL ANALYSES OF UNBUNDLING CONTAINED IN THE DRAFT REPORT WERE WITHDRAWN FROM THE FINAL REPORT

7. The empirical analysis in the Berkman Center’s Draft Report focused on a previous study written by John de Ridder, which concluded, based on a cross-country regression analysis, that unbundling policies had increased broadband penetration.¹³ Acknowledging that previous critiques of the de Ridder study had invalidated its results, the Draft Report set out to perform a “re-analysis” of the de Ridder data, ultimately presenting the results of roughly two dozen new regression models, which it claimed showed not only that de Ridder’s original conclusion was correct, but that the effects were actually larger than de Ridder originally concluded.¹⁴

⁹ See Federal Communications Commission, *Connecting America: The National Broadband Plan* (March 2010) (hereafter, NBP Report). The Berkman Report is referenced only once in the NBP Report. See NBP Report at 63.

¹⁰ See NBP Report at 37-9.

¹¹ See NBP Report at 48.

¹² Yochai Benkler, “Ending the Internet’s Trench Warfare,” *The New York Times*, March 21, 2010, at WK12 (available at: <http://www.nytimes.com/2010/03/21/opinion/21Benkler.html>).

¹³ John de Ridder, “Catching-up in Broadband – What Will it Take?” *Organisation for Economic Co-Operation and Development* (July 25, 2007) (hereafter, de Ridder Study).

¹⁴ Draft Report at 115-117, 138-151.

8. Crandall-Ehrlich-Eisenach presented several critiques of the Draft Report's regression analysis. First, they noted that the Draft Report unnecessarily excluded a significant amount of data from its analysis; to remedy this problem, they gathered a larger and more complete data set, to which they applied three different regression analysis models, all of which found that unbundling reduced rather than increased broadband penetration. Second, they applied a Hausman Test to the Draft Report's mixed effects and random effects models, demonstrating that both approaches were inappropriate for the data set being used. Third, they noted that the regression analysis in the Draft Report relied inappropriately on altered data.

9. The Berkman Center's response to the Crandall-Ehrlich-Eisenach critique is summarized in Table 1 below. The Final Report explicitly acknowledges that the use of altered data in the Draft Report was inappropriate, and omits all regressions that relied on the altered data; and, in a tacit admission that virtually all of the Draft Report's other regressions were misspecified, it omits them from the Final Report as well.

10. However, as indicated in the table, the Final Report's response to the Crandall-Ehrlich-Eisenach Fixed Effects and Random Effects regression analyses is to attack the validity of the underlying data and imply some observations should be dropped from the data set – a surprising suggestion given the Final Report's concession (discussed below) that altering data in this way is inappropriate. In addition, the Final Report presents a re-estimate of the Crandall-Ehrlich-Eisenach Generalized Least Squares (GLS) analysis, which it claims reverses the sign of the coefficient on unbundling (and thus shows, once again, that unbundling increases penetration). In this way, the Final Report attempts to preserve a vestige of legitimacy for its belief that unbundling policies increase Internet penetration.

11. In Section III below, we review the Crandall-Ehrlich-Eisenach regression analyses and explain why the Final Report’s effort to reverse the results of one of the three models is erroneous. Before doing so, however, we briefly revisit the critiques that apparently led the Berkman Center to omit its original regression analyses from the Final Report.

**TABLE 1:
BERKMAN CENTER’S RESPONSES TO CRANDALL-EHRLICH-EISENACH ANALYSES**

Crandall-Ehrlich-Eisenach Analysis	Crandall-Ehrlich-Eisenach Conclusion	Berkman Center Response
1. Fixed Effects Regression	Effect of unbundling on penetration is negative	Attack validity of data
2. Random Effects Regression	Effect of unbundling on penetration is negative	Attack validity of data
3. GLS Regression	Effect of unbundling on penetration is negative	Attempted to re-estimate regression to preserve pro-unbundling result
4. Hausman Specification Tests	Draft Report’s regressions were misspecified	Misspecified regressions omitted from Final Report
5. Altered Data	Regressions on altered data are invalid	Acknowledged and corrected (the altered data is not used in the Final Report)

12. First, as the Crandall-Ehrlich-Eisenach declaration explained,¹⁵ mixed-effects models (such as those used in the Draft Report) are appropriate only under certain statistical conditions. A Hausman Specification Test is the accepted method for determining whether those conditions are met. Crandall-Ehrlich-Eisenach applied the Hausman Test and found that the Berkman Center’s regressions failed – that is, that the mixed-effects statistical approach

¹⁵ Crandall-Ehrlich-Eisenach at 15-16.

used in the Draft Report was inappropriate.¹⁶ Moreover, Crandall-Ehrlich-Eisenach found that when the appropriate (fixed-effects) regression analysis was applied to the Draft Report's data, the results no longer supported the finding that unbundling enhances broadband penetration.¹⁷ While the Final Report does not specifically acknowledge this problem, it does omit all of the regression analyses in the Draft Report to which it applied.

13. Second, Crandall-Ehrlich-Eisenach (and several other reviewers) noted that the regression analyses in the Draft Report were performed on altered data – specifically, that the Berkman Center adjusted 17 of 30 observations for its unbundling variable. To its credit, the Berkman Center acknowledged being “fairly criticized in several of the comments for injecting too much subjectivity into the analysis and thereby leaving open the possibility that our own biases would influence the results.”¹⁸ These regression results were also omitted from the Final Report.

III. THE REMAINING EMPIRICAL EVIDENCE SHOWS UNBUNDLING REDUCES BROADBAND PENETRATION

14. The Final Report contains none of the regression analyses contained in the Draft Report. It does, however, contain a brief section that attempts to re-cast one of the Crandall-Ehrlich-Eisenach regression models and to reverse its result. In addition, the Final Report responds to the other regression models in the Crandall-Ehrlich-Eisenach declaration by attacking the validity of the data. (All three of the Crandall-Ehrlich-Eisenach regression analyses found statistically significant evidence that unbundling reduces broadband penetration.)

¹⁶ Crandall-Ehrlich-Eisenach at 15-17.

¹⁷ Crandall-Ehrlich-Eisenach at 17.

¹⁸ Final Report at n. 319.

15. Like the Draft Report, Crandall-Ehrlich-Eisenach estimate a model similar to that originally estimated by de Ridder, which hypothesizes that broadband penetration (Q_{tot}) might be related to the presence of an unbundling regime (GU) and a variety of other economic and demographic variables:¹⁹

$$Q_{tot_{it}} = a_0 + a_1 GU_{it} + \sum_{j=1}^n b_j X_{j,it} + e_{it}$$

16. To capture the effect of unbundling, both the de Ridder and Draft Report analyses used the number of years unbundling had been in place ($GUyrs$), hypothesizing that the effect of unbundling would grow over time. As discussed further below, Crandall-Ehrlich-Eisenach ran regressions using both the $GUyrs$ variable and a zero-one indicator variable ($Unbundling$), which is equal to 1 if unbundling is in place and 0 if it is not.

17. Like the de Ridder study, the Draft Report limited its data set to countries where there were reliable data on broadband prices, even though the Draft Report concluded that price data were *not* necessary for estimating the appropriate model. Crandall-Ehrlich-Eisenach, therefore, expanded the data sets used by de Ridder and the Draft Report to include the countries omitted for absence of price data, allowing them to amass a dataset of 168 observations (as opposed to the 54 observations used in the Draft Report). They then ran three different panel data regressions: (1) a fixed-effects model; (2) a random-effects model; and, (3) a generalized-least squares model, correcting for both autocorrelation and heteroskedasticity. In addition, following previous work by Boyle, Howell and Zhang, the Crandall-Ehrlich-Eisenach regressions included a new variable, $DSLYears$, which is defined as the number of years since

¹⁹ The other demographic variables are captured in the X vector. In the de Ridder Study, these variables included urbanization, average age, and median income.

broadband was first introduced into the market, and which is intended to control for the natural diffusion of broadband service over time.²⁰ This corrects for the misspecification in the Draft Report's equation that leads the authors to misinterpret the market-driven, consumer choice to adopt broadband over time as being the product of an "unbundling" policy.

18. The Berkman Center's misspecification of the relationship between "unbundling" and broadband diffusion should be apparent, even to non-technical readers. Their equation seeks to explain broadband diffusion by examining how long a policy of unbundling was in place. But this way of looking at the problem fails to account for the fact that people might have adopted broadband over time *anyway*, and that measuring each additional year that unbundling was in place might simply capture the effects of an additional year of broadband availability *in general*. Crandall-Ehrlich-Eisenach, in contrast, start from the view that more consumers will adopt broadband the longer broadband is available (which is obviously true, as broadband has been adopted in countries both with and without unbundling), and then seek to observe whether an unbundling policy *changes* the rate of broadband adoption that would have occurred regardless. And, when the data is applied to this specification of the problem, unbundling *does* change the rate at which consumers adopt broadband – it *reduces* it. Thus, specifying the problem in the right way leads to a different, and more reliable, conclusion in the Crandall-Ehrlich-Eisenach analysis.

19. Thus, once the general availability of broadband was accounted for, each of the Crandall-Ehrlich-Eisenach regressions found that the *additional* effect of the *Unbundling* variable is negative and statistically significant. That is, countries that adopted unbundling had

²⁰ Glenn Boyle, Bronwyn Howell and Wei Zhang, "Catching Up in Broadband: Does Local Loop Unbundling Really Lead to Material Increases in OECD Broadband Uptake?" *New Zealand Institute for the Study of Competition and Regulation Working Paper* (July 2008) at 7-9.

lower rates of broadband penetration than countries that did not, after controlling for other variables that explain broadband penetration.

20. The Final Report offers two critiques of the Crandall-Ehrlich-Eisenach regression models. First, it insinuates that certain data points are illegitimate and should be dropped from the data set. Second, it attempts to reverse the results of the Crandall-Ehrlich-Eisenach GLS analysis by applying a panel corrected standard errors model, which the Final Report argues is more appropriate than GLS.²¹

21. The Final Report's first critique seeks to delegitimize the underlying data by questioning the identity of countries without unbundling (i.e., for which the *Unbundled* variable is zero). Specifically:

As a reality check, it is first important to recognize the value for the 'unbundling' variable is 1 for almost all countries in the dataset. Only Turkey, Mexico, the Czech Republic, Hungary, New Zealand, and Switzerland have a value of 0 for any appreciable amount of time in this dataset. The conclusions of the analysis, in other words, are that the rest of the countries have been doing something wrong, and this particular set of countries have done better by not adopting unbundling. The analysis suggests that the results of one country in the top quintile, plus four countries from the bottom quintile and one from the fourth quintile, should lead us to follow those countries' strategy of rejecting unbundling.²²

22. Given its acknowledgement of the inappropriateness of the data manipulation in the Draft Report, it is remarkable that the Berkman Center would adopt this line of argument. Simply put, having just admitted that the attempt to alter the data to fit its preconceptions was wrong in the Draft Report, the Final Report now bases its critique of the Crandall-Ehrlich-Eisenach analysis on the notion that some data points are more legitimate than others. Apparently, the Berkman Center believes that the experiences of countries like Turkey, Mexico,

²¹ Final Report at 214.

²² Final Report at 213.

the Czech Republic, Hungary, New Zealand and Switzerland are somehow less valid or valuable than the experiences of countries that have adopted unbundling, such as (for example) Australia, Iceland, Italy, Poland and Portugal. This is precisely the type of subjective bias empirical analysis is designed to avoid.

23. The Final Report also overreaches in suggesting that Crandall-Ehrlich-Eisenach would have the U.S. “follow these countries’ strategies,” despite the fact that they are generally not in the top tier of broadband adoption. To the contrary, the Crandall-Ehrlich-Eisenach analysis says nothing about adopting or rejecting the “strategies” of other countries. It simply concludes, based on an unbiased empirical analysis of the data, conducted according to generally accepted professional standards of statistical analysis, that there is no empirical support for unbundling – indeed, that the weight of the empirical evidence suggests unbundling reduces broadband penetration.

24. The Berkman Center’s second critique of the Crandall-Ehrlich-Eisenach regressions is more substantive, but equally unsuccessful. Noting that certain of the Crandall-Ehrlich-Eisenach regressions utilized the *Unbundling* variable (a simple indicator of whether an unbundling regime was in place) rather than the *GUyrs* variable (which is equal to the number of years unbundling has been in place), the Final Report argues that using *Unbundling* unnecessarily omits additional information from the regressions. Further, the Final Report argues that the Parks GLS regression method used by Crandall-Ehrlich-Eisenach may result in underestimating standard errors, and that a panel corrected standard errors approach would be superior. Accordingly, the Final Report presents the results of a single regression, applying a panel corrected standards error model to the Crandall-Ehrlich-Eisenach data set and including both the *GUyrs* and *DSLyrs* variables. In contrast to the Crandall-Ehrlich-Eisenach result, the

Final Report finds that the coefficient on *GUyrs* in this specification is positive and significant – i.e., that unbundling appears to increase broadband penetration.²³

25. There are several problems with this result. First, as pointed out by Howell in her comments, the underlying presumption behind the *GUyrs* specification – that unbundling becomes more effective over time – is highly questionable and, indeed, conflicts with at least some empirical evidence.²⁴ Second, the Final Report does not adequately address the problem of multicollinearity associated with the presence of *DSLyrs* and *GUyrs* in the same regression²⁵ – i.e., the fact that *DSLyrs* and *GUyrs* are highly correlated.²⁶

26. One of the effects of multicollinearity is to make regression results overly sensitive to very small changes in the underlying data.²⁷ One measure of this problem is called the Condition Index, which measures the sensitivity of coefficient estimates to changes in the data.²⁸ We calculated the Condition Index for the Final Report’s panel corrected standard errors model and found that a one percent change in the underlying data would result in an 11 percent change in the coefficient estimates – indicating a moderate to high degree of multicollinearity.

27. As a further indicator of the sensitivity of the Final Report’s regression analysis to changes in underlying data, as an experiment, we excluded the Berkman Center’s list of “problematic” observations (Turkey, Mexico, etc.) from the data set and re-estimated the model

²³ Final Report at 213-214.

²⁴ See Howell at 16.

²⁵ For a more complete discussion of this issue, see *Id.* at 14-18.

²⁶ See Draft Report at 213 (“A multicollinearity test reveals that including both *GUyrs* and *DSLyears* in the model does not bias the results.”) However, neither the type of test used nor the results are reported. Moreover, bias is not the only (or even primary) problem caused by multicollinearity.

²⁷ See, e.g., Peter Kennedy, *A Guide to Econometrics* (Blackwell Publishing, 2008) at 198-199 (“In addition to creating high variances of coefficient estimates, multicollinearity is associated with the undesirable problem that calculations based on the data matrix are unstable in that slight variations in the data matrix, such as addition or deletion of an observation, lead to large changes in parameter estimates.”)

²⁸ *Id.* at 199.

using both random-effects²⁹ and the panel-corrected standard errors model preferred by the Berkman Center. The regression results are shown in Table 2 below.

Table 2: Regressions Focusing on Countries with Established Unbundling Regimes

Variable	Coefficient	Z-Stat	Coefficient	Z-Stat
	Random Effects		Panel Corrected SE	
GUyrs	0.69	1.10	0.498	0.95
DSLyears	2.74***	4.41	2.968***	4.87
pop dens	0.011	1.50	0.0084**	2.40
Pops	-0.0205	-1.14	-0.019	-1.62
Gdp	0.0002	1.89	0.0001*	1.76
Constant	-9.854***	-3.30	-7.328***	-3.51
	N = 132		N = 132	
	R-squared (within) = 0.87		R-squared = 0.49	
	R-squared(between) = 0.32		Chi-Squared = 220.77	
	R-Squared (overall) = 0.68			

* Significant at 10 percent
 ** Significant at 5 percent
 *** Significant at 1 percent

28. Based on the Final Report’s argument that these data points were somehow biasing the results, one would expect to find that omitting them would tend to show a positive effect for unbundling. To the contrary, as the regression results indicate, after focusing solely on the countries that were more active in unbundling, one finds that *GUyrs* is – once again – statistically insignificant.

²⁹ For this sample a Hausman Specification Test between the fixed and random-effects models results in a Chi-Squared statistic of 24.87 and an associated p-value less than 0.01. Therefore, the fixed-effects model is rejected and one can conclude that the random-effects model is efficient (relative to fixed-effects).

IV. CONCLUSIONS

29. In the Draft Report, the Berkman Center specifically concluded that its statistical analyses showed the adoption of unbundling policies would increase broadband penetration by one percent per year.³⁰ Moreover, it concluded that its statistical analysis bolstered its non-statistical analysis of selected “case studies,” which found that unbundling positively affected broadband penetration. The Final Report, on the other hand, drops any pretense of relying on empirical support, basing its conclusions entirely on qualitative analysis of these case studies. Case studies, however, are subject to selective interpretation and subjective opinion. Indeed, the entire purpose of statistical analysis in matters such as these is to avoid the subjectivity that is involved with a summary of case studies.

30. Crandall-Ehrlich-Eisenach presented both a summary of existing empirical analyses and new empirical analyses of their own showing that unbundling policies reduce investment in communications infrastructure and suggesting that they reduce broadband penetration. The Final Report fails to rebut this evidence. Moreover, the FCC’s National Broadband Plan itself adds to the body of empirical evidence on unbundling by providing new analyses showing that *intermodal* competition (rather than intra-modal competition based on unbundling) has induced service providers to invest in improvements to their networks, and that Internet speeds are faster in areas with more facilities-based broadband providers.³¹

31. The unbundling of telecommunications networks is a complex and costly undertaking, and proposals to adopt such policies must be evaluated in this light. Absent clear

³⁰ Final Report at 117.

³¹ See NBP Report at 38 and at 62, n. 6 (“Finally, we do not count CLECs providing service over another company’s lines because we focus on facilities-based providers, and their inclusion would overstate the extent of competition.”).

and convincing empirical evidence that unbundling produces economically desirable results, such policies should not be seriously considered. The Berkman Center's inability to put forward a plausible (let alone persuasive) empirical case for unbundling should, we believe, put an end, at least for now, to the debate over whether such policies should be adopted in the United States.