

Be Careful What You Ask For (Redux):

A Comment on the New America Foundation's Mobile Price Metrics

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Introduction

In a recent analysis of international mobile phone prices conducted and released by the New America Foundation ("NAF") entitled *An International Comparison of Cell Phone Plans and Prices*, the Survey's authors, Chieh-yu Li and Bincy Ninan, conclude that the United States has among the highest prices for mobile phone services in the world.¹ This conclusion, which controverts evidence presented in the latest *Annual CMRS Competition Report*² published by the Federal Communications Commission, is based on a comparison of crudely measured "prices" for voice, texting, and data, across eleven countries. The NAF Survey concludes that prices are lower in countries they describe as "more competitive" and "more regulated" than the United States, yet the Survey fails to provide any indication as to the level of either competition or regulation in the sampled countries, making such a conclusion impossible to confirm.

For many reasons, the NAF Survey represents a giant leap backwards in the effort to compare mobile telephony prices in an international context. It is, by far, more defective than the faulty mobile price survey conducted by the Organization of Economic Cooperation and Development ("OECD"). For a review and critique of the OECD approach, see my analysis in PHOENIX CENTER POLICY PERSPECTIVE NO. 09-

03, *Be Careful What You Ask For: A Comment on the OECD's Mobile Price Metrics*.³

In this PERSPECTIVE, I demonstrate a few of the NAF Survey's more severe defects. Also, I am able to show that in contrast with the Survey's conclusions, mobile prices in the U.S. are much cheaper than in many other countries. Based on the plans listed in the NAF Survey, a U.S. consumer paying about \$40 for mobile voice service would pay twice that in, for example, Denmark, Korea, and Sweden—three countries the Survey claims have relatively low-prices in comparison with the U.S.

NAF's bungling attempt to compare the prices of mobile services across countries, and to draw strong conclusions therefrom, is just one more example of the lack of seriousness with which some approach the complex problem of communications regulation.

Few would contest that the communications sector is a significant component of the U.S. economy, and increasingly so. As such, public policy must exercise great care in its

interventions, since policymakers risk doing great harm with misguided rules. Moreover, the legal institutions and economic conditions of the sector are very complex. In this environment, sound economic, technical and legal analysis is essential to good policy formation.

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Yet, the quality of analysis submitted to the policy debate is often abysmally poor (and, unfortunately, increasingly so). NAF's bungling attempt to compare the prices of mobile services across countries, and to draw strong conclusions therefrom, is just one more example of the lack of seriousness with which some approach the complex problem of communications regulation. Fortunately, the NAF Survey is so obviously deficient that I suspect it will draw little attention by policymakers. In the current policy environment, however, it is hard to say.

Poor Price Metrics

An effort to address all the numerous technical defects in the NAF Survey would be overkill, so I will focus on just a few. Most of the problems arise in the construction of the "price" index, which is the central statistic of interest in the Survey. Prices are measured in the NAF Survey by first selecting, apparently at *random*, a *single* pricing plan from a *single* carrier in each country, for different services. The NAF Survey makes no attempt to compare prices paid by a representative consumer for the same service at the same usage levels, choosing instead to

compare the "price" paid by a consumer with a 100 minute plan in one country to the "price" paid by a consumer with a 600 minute plan in another. As such, the NAF Survey makes no effort to find the lowest price for the usage level of a representative customer, ignoring the basic fact that consumers seek to minimize the level of cost for their given mobile phone usage. The NAF Survey ignores entirely the large number of alternative offerings by the carrier featured in the Survey that may produce different "prices" using their calculation. Also ignored are the competitive offerings of the sometimes many other carriers that serve the sampled countries, which may have very attractive offerings for particular demand profiles. These defects alone are sufficient to dismiss the Survey as relevant.

Further, no account is given for unrated minutes resulting from such features as free "on-net" calls or free nights and weekends, though such plans are important for the determination of per-minute prices and the availability of such offerings varies widely across countries. The treatment of "calling party pays" is entirely arbitrary and applied inconsistently.

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Some of the consequences of these errors are illustrated below. As in PERSPECTIVE 09-03, I also will again demonstrate that U.S. consumers would pay far more if they faced the pricing plans from other "low cost" countries.

Analysis of Post-paid Voice

To begin, consider first the NAF Survey's comparison of mobile voice plans, as reported in Table 1 of the Survey. The authors conclude,

For postpaid voice plans, the U.S. and U.K. are in the high price tier of countries surveyed [with prices of] \$0.30 and \$0.18 per minute respectively; almost 30 times higher than Hong Kong (\$0.01/minute).⁴

(I will ignore the fact that \$0.18 is not 30 times higher than \$0.01.) The legitimacy of NAF's conclusion depends on how accurately and consistently prices are calculated and on what basis they are compared. To calculate price, for each country the NAF Survey chooses, apparently at random, a single pricing plan from a single carrier. For the U.S., the chosen plan is an AT&T plan that includes 450 minutes of voice at a price of \$39.99 per month.

The NAF Survey chooses to compare per-minute prices, and division applied to the bucket size of the AT&T plan renders a per-minute price of \$0.09. Note that this rate is half that reported in the NAF Survey (\$0.18). The difference is based on the fact the NAF Survey doubles the U.S. per-minute rate because the pricing regime in the U.S. means both incoming and outgoing calls are deducted from a U.S. consumer's bucket of minutes ("Mobile Party Pays" or "MPP"), whereas in many European countries the principle of "Calling Party Pays" ("CPP") applies. Under the CPP regime, the mobile consumer only pays for outgoing, not incoming, calls. (As an aside, CPP has been identified as one of the reasons European consumers do not use their mobile devices as much as their American counterparts.)

Obviously, the *full* cost of mobile service includes both inbound and outbound charges, regardless of who pays, since the revenues of the firm include all charges (and it is the revenues of the firm that enters the profit

function). Also, from two-sided markets theory, we know that as the mobile termination rates rise, the incentive to offer lower rates to mobile users increases, because having more mobile users becomes more profitable in terms of termination fees.⁵ So the CPP payment model can have a significant influence on price comparisons, though this fact is entirely ignored by NAF.

Also troublesome is that the "doubling" approach for CPP is inconsistently applied. Hong Kong, a country included in the NAF Survey, is a MPP country. Yet, the authors apparently do not apply the "doubling" adjustment to that country's rates.⁶

Another serious problem is that the NAF Survey provides no indication as to the parameters used to choose a pricing plan. There is no representative consumer (like the Low-, Mid-, and High-usage categories used by the OECD),⁷ so there is no effort to find the lowest price plan for a given level of usage (as the OECD purportedly aims to do). The "bucket" sizes across countries in the NAF Survey vary from as little as 100 minutes to as much as 600 minutes, with no explanation as to why the particular levels of usage are chosen or the potential problems with measuring price across such large differences.⁸ This arbitrary selection of pricing plans is a big problem; mobile prices typically depend heavily on a customer's usage profile.

For example, had the NAF Survey picked AT&T's 900 minute plan for \$59.99, the U.S. per-minute rate as they calculate it would be only \$0.6 per minute (33% less than the plan chosen), or \$0.12 per minute using their improper "doubling" adjustment. This rate is substantially below the reported rate, and brings the U.S. price much closer to the other countries. Choosing this plan would lead very different conclusions than those made by NAF, illustrating how random plan selection easily succumbs to researcher bias.

Third, no real reason is given for choosing AT&T as the carrier of choice. There are many well-known and well-regarded mobile phone carriers in the U.S. For example, T-Mobile offers a plan including 1,000 minutes for the same \$39.99, rendering a per-minute price less (\$0.04) than half that of the chosen AT&T plan. At \$0.04 per minute, it is among the lowest prices in the NAF sample (even at \$0.08, applying the doubling adjustment, this per-minute rate falls in the middle of the pack).

Moreover, the NAF Survey ignores the issue of unrated minutes, a practice that is widespread in the U.S. For example, calls made between AT&T customers, and calls on nights and weekends, do not count against the bucket of 450 minutes. For AT&T, this implies that about 65% of a customer's minutes are not rated (or counted against the bucket).⁹ An AT&T customer could use 1,285 minutes per month without any additional charges when subscribed to a 450 minute plan.¹⁰ The effective rate at this larger number of minutes is only about \$0.03, among the lowest in the sample (even at \$0.06 the price is relatively low). For the T-Mobile plan, including unrated minutes renders, on average, a per-minute rate of about \$0.025. While carriers in some other countries have similar unrated minutes, many do not. The pricing plan used by the NAF Survey for Denmark, for example, appears to have no unrated minutes. In any case, this important feature of calling plans is entirely ignored in the NAF Survey.

Considering any one of these defects alone, much less all of them together, implies the NAF Survey offers no meaningful empirical evidence for public policy purposes (or any other purpose). Sadly, the analysis is careless, incomplete and unprofessional.

Be Careful What You Ask For?

In PERSPECTIVE 09-03, I addressed the question of a proper methodology for comparing mobile

phone prices across countries. In that study, the comparison of mobile prices across OECD countries was evaluated in terms of asking what U.S. consumers would pay for mobile service if they, as a group, faced the pricing plans from other countries. If U.S. consumers pay (as a group) less using foreign prices rather than U.S. prices, then this fact may serve as useful evidence that U.S. prices are relatively high. In PERSPECTIVE 09-03, I answered this very question, using a somewhat sophisticated analysis based on the distribution of usage for a sample of U.S. consumers. That analysis found that the prices faced by U.S. consumers are the lowest for U.S. consumers.

Making a similar representative-consumer comparison based on the price information provided in the NAF Survey is a sensible approach to evaluate their claim that prices are higher in the U.S. than in other countries. I do not repeat the more sophisticated level of analysis used in PERSPECTIVE 09-03 (though I recommend it for a more serious study of relative prices). Rather, in keeping with the naïve approach of the NAF Survey, I will adopt a more simple, representative-consumer calculation here. (This is the approach used by the OECD in its mobile price comparisons.) I direct the reader to that PERSPECTIVE 09-03 for a more complete and analytically robust analysis of this problem.

An essential starting point to comparing mobile prices is to define the customer of interest—the representative consumer. Ideally, a distribution of usage would be employed, as in PERSPECTIVE 09-03, so that all customers are evaluated simultaneously. Instead, since I limit myself to the pricing plans in the NAF Survey, here I specify the representative customer to be one that might find the AT&T Plan used in the NAF Survey suitable for her level of usage. This AT&T plan includes 450 minute plan for a monthly fee of \$39.99. As mentioned above, an average customer on this plan could use up to 1,286 minutes per month without any additional

charge. So, I assume the consumer makes 1,000 minutes of calls per month, which is equivalent to about 308 calls at the average call length.¹¹ The total cost of this level of usage in the U.S. is \$39.99 per month (before taxes, fees, and so forth), or about \$0.04 per minute (for all minutes).

What would this American consumer's usage cost if she faced the mobile phone prices available in Denmark? Using the pricing plan in the NAF Survey, and the Survey's assumption that half of all calls are inbound and the other outbound,¹² the total cost of service for this U.S. consumer in Denmark is the equivalent of about \$80 per month (or \$0.08 per minute), which is about *twice the cost* in the United States.¹³ These charges include the payments for outbound minutes, including overages, and the payments made for inbound calls at the country's mobile termination rate. That is, the costs include the carrier's total revenue of the mobile phone minutes, which is the relevant measure of price. Obviously, using the NAF Survey evidence, prices in Denmark are not better for U.S. consumers (at least the one modeled here). The share paid by the mobile customer alone in Denmark (about \$47) exceeds the total paid in the U.S. (\$39.99)

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What would this consumer pay at South Korea's prices? Again using the plan in the NAF Survey, the consumption of 1,000 minutes of calling produces a monthly charge of about \$77

(again \$0.08 per minute), which is *twice* the full price for the level of calling in the United States.¹⁴ The share of total revenue paid by the mobile user alone in South Korea (\$48) exceeds the \$39.99 fee in the AT&T plan.

And for Sweden? Given the plan chosen in the NAF Survey for Sweden, the full monthly cost of this customer's mobile service is \$80 (or 0.08 per minute), again *twice the rate* in the States.¹⁵ (The mobile user pays \$47 of that total.) So, while the NAF Survey claims that Denmark, South Korea, and Sweden are all cheaper than the U.S., the fact is that they are considerably more expensive, at least based on the pricing information provided in the NAF Survey and the usage levels of the chosen representative consumer.

Importantly, I do not claim this analysis tells the whole story, and these findings *should not* be used to make general arguments about relative prices. I suspect there are probably lower priced plans in all the countries for this representative consumer, and perhaps some subtleties of the plans and termination regimes have been ignored in my calculations. A proper analysis would consider many pricing plans in each country and apply lowest price option for any given consumer demand profile. In fact, a thorough analysis would consider the distribution of consumers within a given country, rather than simply pick out a single representative consumer (or even a few, as the OECD does). PERSPECTIVE 09-03 outlines such an approach, and illustrates the dangers of more limited efforts. In this PERSPECTIVE, I have chosen to use the plans reported in the NAF Survey merely to demonstrate the defects with its analysis and the invalidity of its conclusions. (I would not recommend using the methods of the NAF Survey for any purpose.)

What can be said about this approach to measuring the relative cost of mobile phone services is that it is much more sensible than that used in the NAF Survey. Here, I have defined

the representative consumer, rated all the dimensions of usage, and included all carrier revenues from the minutes used. This is an apples-to-apples comparison, to the extent feasible when limiting myself to the data in the NAF Survey.

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Obviously, the “price” for each country is highly sensitive to the choice of calling plan, the choice of carrier, the treatment of unrated minutes, and the treatment of the full costs of a call. For the simplistic approach taken in the NAF Survey, the final “price” is unacceptably sensitive to the choice of the researcher.¹⁶ The potential for researcher bias to drive the results is very high. I leave it to the reader to make their own decision as to whether bias plays a role in the NAF Survey; my purpose is only to point out the defects in NAF’s unskilled analysis.

Pre-Paid Analysis

The defective comparison of prices extends likewise to the authors’ analysis of pre-paid plans. Again, the authors pick a single prepaid offer by a single provider. For the U.S., AT&T is again chosen and the NAF Survey reports a per-minute rate for prepaid calling of \$0.25. A look at the AT&T website, however, reveals that the company offers a pre-paid plan (“Pay as You Go”) with a rate of only \$0.10 per minute, which is well below the reported rate of \$0.25.¹⁷ Furthermore, U.S. consumers can easily obtain rates of \$0.03 per minute in pre-paid plans with buckets.¹⁸ In the case of Pre-Paid services, the

NAF Survey’s errors appear so careless as to not warrant further discussion.

Texting and Data

The same problem of plan/provider selection that renders the NAF Survey worthless for voice service price comparison carries over to their comparisons of texting and data prices.

Alternative Measures of Price: ARPM

Average revenue per minute (“ARPM”) is frequently used as a measure of price in telecommunications studies, and is also used an input to the calculation of price indexes. ARPM has many desirable properties, but also has its own limitations. Under some circumstances, ARPM may be a very valid measure of relative prices; ARPM is derived from total revenues, and total revenues represent the full cost to buyers of a given product or service.¹⁹ Nevertheless, it is frequently used and is often the best measure available. The Bureau of Labor Statistics, for example, uses some average revenue figures to construct the Consumer Price Index (“CPI”) for mobile telephone services.²⁰

Country	FCC (2010) ARPM
Canada	\$0.09
Finland	\$0.12
Hong Kong	\$0.04
Japan	\$0.26
South Korea	\$0.08
Sweden	\$0.10
U.S.	\$0.05
U.K.	\$0.12

Table 1 summarizes ARPM figures reported in the FCC’s 14th Annual CMRS Report.²¹ For the sample of countries chosen by NAF Survey and also reported in the FCC’s Report, the U.S. has the second to lowest ARPM, much lower than South Korea and about the same as Hong Kong, which are two countries the NAF Survey claims

have much lower prices than those observed in United States. The source cited by the FCC for these ARPM values reports an ARPM for Denmark of \$0.17, more than four-times larger than that in the U.S.²²

While I do not mean to suggest that ARPM is the perfect measure of price for mobile services, it is worth noting that this alternative measure of price (ARPM) presents a very different story than the overly simplistic and carelessly constructed price measures found in NAF Survey. This inconsistency deserves some explanation.

Competition and Regulation

Based on the NAF Survey's price comparisons, the authors make claims about the relationship between prices and relative competitiveness and regulatory burdens in the sample countries. The authors state,

In other countries it appears that a significantly more competitive market than what exists in the United States has resulted in innovative offerings and lower pricing for consumers. In contrast, in countries where competition is less and regulation more lax, higher prices and a limited choice of plans prevail.²³

Nowhere in the NAF Survey, however, is either a measure of competition or regulation for the sample of countries provided. For a headline conclusion, it is reasonable to expect the authors to provide at least some supporting data and analysis. Absent measures of either competition or regulation, it is impossible to make any claim about relative prices and relative competition or regulation, even assuming the price calculations are valid (which they obviously are not).

In fact, drawing on information from other research on relative competitiveness, the NAF Survey's pricing calculations appear to contradict their own conclusions. In the 14th Annual CMRS Report, the FCC reports data on

market concentration for a number of countries, including the United States. Of the ten countries listed, the U.S. has the lowest Hershman-Herfindahl Index ("HHI"), which is standard measure of market concentration and often used as a proxy for competitiveness.²⁴

While there is insufficient data between the two studies for a meaningful statistical comparison of prices and concentration, it is possible to look at a few comparisons. Take Sweden, for example. The HHI in Sweden is 3370, and the NAF Survey computes a "price" of \$0.04. In Finland, the "price" is \$0.07 and the HHI is 3490. For both countries, the "price" is lower but the HHI higher than in the U.S., with a "price" of \$0.18 and an HHI of 2220. Taking the NAF prices as legitimate (which is ill-advised) and

Taking the NAF prices as legitimate and the HHI as an indicator of relative competitiveness, the NAF Survey essentially concludes that more competition leads to higher prices—a result most would find absurd.

the HHI as an indicator of relative competitiveness, the NAF Survey essentially concludes that *more competition leads to higher prices*—a result most would find absurd. Of course, this perverse result is just a consequence of the flawed analysis in the NAF Survey.

As for the claim that more regulated markets fare better, the NAF Survey provides no supporting evidence; there is no measure of relative regulatory burden reported. I am unaware of any effort to quantify in a meaningful way the relative regulatory burdens on the wireless market across countries. On what basis the NAF Survey draws such a conclusion is a mystery.

Conclusion

Comparing mobile telephone prices, or any price for that matter, across countries is very difficult work. The demand for, supply of, and regulation of communication services can vary substantially across countries, and these factors determine, in large part, the offerings of mobile service providers.²⁵ Accounting for all the vagaries of economic and regulatory conditions presents a number of significant difficulties.

The recent effort by the New America Foundation to conduct such a comparison of mobile prices across a number of countries is, put bluntly, embarrassingly bad. Their methods are consistently crude, often invalid, and inconsistently applied. Perhaps NAF's conclusion that the U.S. has high prices because

U.S. carriers are insufficiently regulated matches their political interest, but once most of the analytical defects of the Survey are remedied, U.S. carriers are shown to offer very low prices to U.S. consumers. That is not to say, however, that consumers in Denmark (or any other country) would be better off with U.S. pricing plans. U.S. carriers serve U.S. consumers; Denmark's carriers serve Danish consumers. The pricing plans best suited for one country may not be suitable for the demand, supply, and regulatory profile of another country. A formal recognition of this basic fact is essential to devising a meaningful price comparison of mobile telephone prices across countries.

NOTES:

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¹ C. Li and B. Ninan, *An International Comparison of Cell Phone Plans and Prices*, New American Foundation (October 14, 2010) (available at: http://oti.newamerica.net/publications/policy/an_international_comparison_of_cell_phone_plans_and_prices) (“Canada, U.S., U.K. and Japan mostly fall in the high to middle price tiers”; “U.S. is in the highest price tier in the postpaid and prepaid text plans”; “U.S. and Canada feature in the high to medium price tiers”).

² *In the Matter of Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993 Annual Report and Analysis of Competitive Market Conditions With Respect to Mobile Wireless, Including Commercial Mobile Services*, FOURTEENTH REPORT, FCC 10-81, __ FCC Rcd. __ (rel. May 20, 2010)(hereinafter “Fourteenth CMRS Report”).

³ G. S. Ford, *Be Careful What You Ask For: A Comment on the OECD’s Mobile Price Metrics*, PHOENIX CENTER PERSPECTIVE NO. 09-03 (September 16, 2009) (available at: <http://www.phoenix-center.org/perspectives/Perspective09-03Final.pdf>), p. 4.

⁴ Li & Ninan (2010), *supra* n. 1.

⁵ See, e.g., J. Rochet and J. Tirole. *Two-Sided Markets: A Progress Report*. 35 RAND JOURNAL OF ECONOMICS 645-667 (2006); see also S. Littlechild, *Mobile termination charges: Calling Party Pays versus Receiving Party Pays*, 30 TELECOMMUNICATIONS POLICY 242-277 (2006).

⁶ In Hong Kong, payment is determined by a mobile-party-pays rule. See, e.g., B. Hansen, J. Kroken, H. Rohr and O. Wasenden, *Regulation of Mobile Termination Rates – Possible Effects of a Bill and Keep Regime*, TELENOR: R & I RESEARCH REPORT (2009) (available at: http://www.telenor.com/no/resources/images/r4_09_tcm26-37882.pdf).

⁷ The simplistic approach to usage baskets used by the OECD is problematic when the average level of usage varies substantially across countries. What is “high usage” in one country may be “low usage” in another. See Ford, *supra* n. 3.

⁸ *NAF Survey*, *supra* n. 1, at Table 1.

⁹ Ford, *supra* n. 3, at p. 4.

¹⁰ Assuming 65% unrated minutes, 450 is 35% of 1,285. For customers calling few numbers, the number of minutes could be much more than this due to free on-net calls.

¹¹ <http://www.zdnet.com/blog/itfacts/average-cell-phone-conversation-lasts-3-minutes-15-seconds/10337>.

¹² This assumption is the only one consistent with the “doubling” adjustment.

¹³ The consumer has 500 minutes each of inbound and outbound calling. Given the bucket of 240 minutes, the extra minute rate applies to 260 minutes. Total charges are \$47.07 for these calls (\$18.47 + 0.11*260). The inbound minutes, assuming a mobile termination rate for Denmark of \$0.065 per minute, costs a total of \$32.50. Mobile termination rate supplied by A. Schiff and J. Small, *Benchmarking Mobile Termination Rates* (2009) (available at: <http://www.comcom.govt.nz/assets/Imported-from-old-site/industryregulation/Telecommunications/Investigations/MobiletoMobileTermination/ContentFiles/Documents/Covec-MTR-Benchmarking-Report-090506.pdf>).

¹⁴ Equivalent to \$10.68 flat rate plus \$0.096 per outbound minute (<http://www.tworld.co.kr/outsitens.jsp>) and \$0.0371 per inbound minute. The mobile termination rate of \$0.0371 provided by Hansen *et al.* (2009), *supra* n. 6.

¹⁵ The Plan has a monthly fee of 7.32 plus 0.0433 per minute plus \$0.118 per call (we assume each call is 3 minutes, 15 seconds, *supra* n. 12). The Mobile termination rate, by Schiff and Small, *supra* n. 13, is \$0.065 per minute. I assume the per-call rate applies only to outbound calls.

¹⁶ If a representative consumer is permitted to choose the best plan across a large number of included alternatives, the sensitivity of price to researcher preference is much less severe.

¹⁷ No CPP adjustment is applied to the Pre-Paid data.

NOTES CONTINUED:

- ¹⁸ Straight Talk offers 1,000 minutes for \$30 (www.straight-talk.com).
- ¹⁹ T. Beard, G. Ford, R. Hill, and R. Saba, *The Flow Through of Cost Changes in Competitive Telecommunications: Theory and Evidence*, 30 EMPIRICAL ECONOMICS 555-573 (2005).
- ²⁰ <http://www.bls.gov/cpi/cpifactc.htm>.
- ²¹ *Supra* n. 2, Table 40, p. 195.
- ²² G. Cambell, *Global Wireless Matrix 3Q10*, Merrill Lynch/Bank of America (Sept. 2010).
- ²³ *NAF Survey*, *supra* n. 1.
- ²⁴ For a critical review of the HHI as a measure of competitiveness, see, e.g., G.S. Ford and L.J. Spiwak, *The Need for Better Analysis of High Capacity Services*, PHOENIX CENTER POLICY PAPER NO. 35 (June 2009) (available at: <http://www.phoenix-center.org/pcpp/PCPP35Final.pdf>) and to be reprinted in JOHN MARSHAL JOURNAL OF COMPUTER AND INFORMATION LAW (Winter 2010); G. S. Ford, T. M. Koutsky and L.J. Spiwak, *Competition After Unbundling: Entry, Industry Structure and Convergence*, PHOENIX CENTER POLICY PAPER NO. 21 (Jul. 2005) (available at: <http://www.phoenix-center.org/pcpp/PCPP21Final.pdf>) and reprinted in 59 FED. COMM. L.J. 331 (2007) (and citations therein).
- ²⁵ On mobile rates, see, e.g., Littlechild, *supra* n. 5.