

**IN THE SUPERIOR COURT OF FULTON COUNTY
STATE OF GEORGIA**

PACIFIC COMMUNICATIONS, L.L.C.)	
)	
Plaintiff,)	
)	CIVIL ACTION
v.)	
)	FILE NO. 2000CV20099
AMERICAN WIRELESS, L.L.C.)	
)	
Defendant.)	

SECOND EXPERT AFFIDAVIT OF PETER CRAMTON

QUALIFICATIONS

1. I am Professor of Economics at the University of Maryland, President of Criterion Auctions LLC, and President of Market Design Inc. I am expert on auctions, bargaining, and market exchange. Much of my recent work has applied this expertise to spectrum policy, the restructuring of infrastructure industries (especially electricity), and e-commerce. I previously was an Associate Professor at Yale University and a National Fellow at the Hoover Institution at Stanford University.

2. With respect to spectrum management, I have served as the lead auction advisor in spectrum auctions for many clients. My auction practice is worldwide, including engagements in the United States, Belgium, the Netherlands, Italy, the United Kingdom, Switzerland, Canada, Australia, Austria, and Singapore. I have advised several foreign governments on the design and implementation of spectrum auctions.

3. From July 1997 to August 1998, I served as the U.S. Department of Justice's expert in the matter of bid signaling in the FCC spectrum auctions. As part of this work I studied

collusive bidding strategies in the FCC auctions, especially the DEF-block auction which concluded January 1997. The analysis resulted in two research papers, as well as modification of the FCC auction rules. From November 1994 to November 1995, I advised the FCC on the design and implementation of spectrum auctions. During the first broadband PCS auction I advised the FCC on a daily basis with respect to bid increments and other aspects of auction implementation. I developed a tool to help the FCC and bidders track the progress of the auction. From July 1997 to December 1997, I advised the FCC on methods to improve the FCC auctions.

3. I also have extensive consulting experience in the areas of e-commerce and electricity deregulation. I have advised e-commerce market makers on market design for business-to-business and business-to-consumer trading. For several utilities, I have led the auction design for generation asset divestiture, standard offer service, and NUG entitlements under power purchase agreements.

4. I have published numerous articles in scholarly journals, including *American Economic Review*, *Econometrica*, *Review of Economic Studies*, *Journal of Economic Literature*, *European Economic Review*, *International Economic Review*, *Journal of Regulatory Economics*, *Journal of Law and Economics*, *Journal of Labor Economics*, *Journal of Economics and Management Strategy*, *Games and Economic Behavior*, and *Journal of Law, Economics and Organization*.

5. I earned my B.S. in Engineering from Cornell University, and my Ph.D. in Business from Stanford University. A more detailed curriculum vitae is an appendix to my expert affidavit dated February 23, 2001 and filed in this action on February 26, 2001.

INTRODUCTION

6. In her *Second Affidavit*,¹ Ms. Sharon Armbrust employs an entirely new data and valuation method to reach her conclusions. In her prior testimony, Ms. Armbrust looked to prices in the FCC auctions, specifically the C & F block Auction No. 35 that ended on January 26, 2001, for her opinions relating to the value of this license. Neither Ms. Armbrust nor Mr. Redpath made any reference to the Kagan PCS Index or any other private transaction database until the *Second Affidavit* filed on April 12, 2001. Ms. Armbrust's latest approach is also not valid.

I. THE VALUE OF SPECTRUM CANNOT BE INFERRED FROM PCS STOCK PRICES

7. In her *Second Affidavit*, Ms. Armbrust—an employee of Kagan Associates—comments that as of April 3, 2001, the Kagan PCS Index had decreased nearly 20 percent since January 1, 2001. She then makes the following argument: if PCS stock prices serve as a proxy for the underlying spectrum values, it must be the case that spectrum values follow the same rate of increase or decrease as the PCS stock prices. Ms. Armbrust's approach (were it valid) proves that there is no loss—the Kagan PCS Index has actually *increased* 7.8 percent from January 1, 2001 to May 2, 2001.² Ms. Armbrust's analysis, however, is flawed for several reasons.

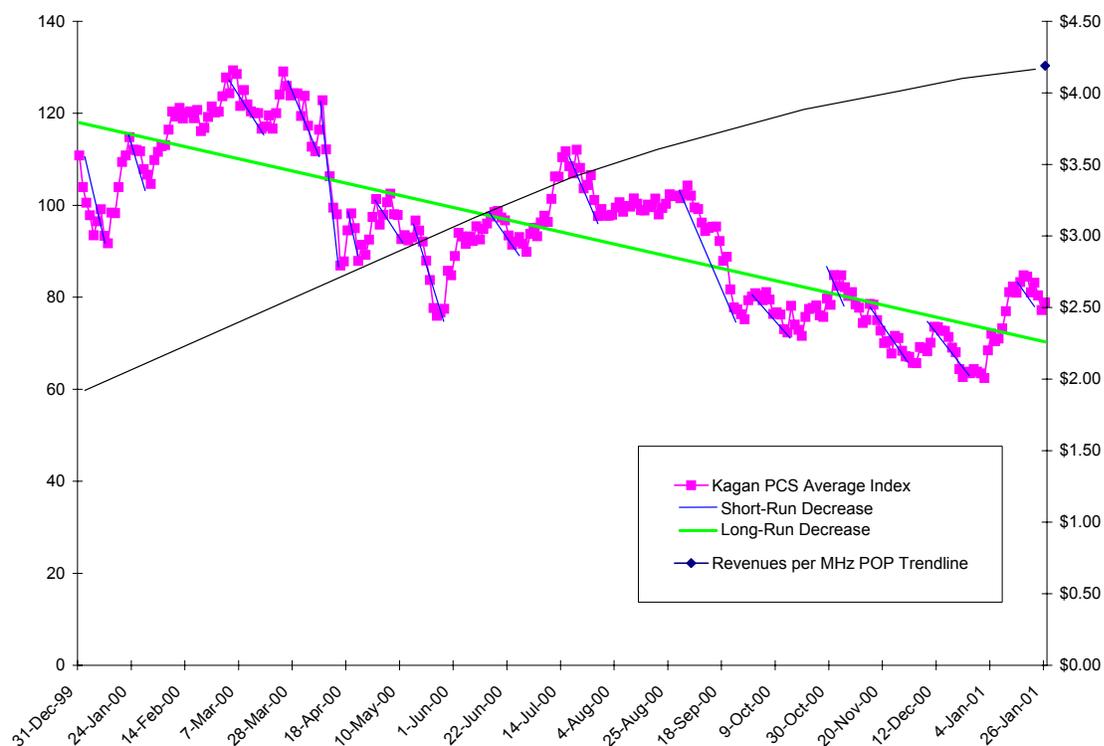
8. *First*, empirical evidence directly refutes Ms. Armbrust's claims that PCS stock prices are positively correlated with underlying spectrum values. According to her *Second Affidavit*, the Kagan PCS Index indicates that PCS stock prices have *decreased* since February

1. Affidavit of Sharon Armbrust on behalf of Pacific Communications (filed April 12, 2001) [hereinafter SECOND AFFIDAVIT].

2. Downloaded at <http://www.kagan.com/kmarket/press6.htm> on May 2, 2001. The year-to-date increases for that index were: 3.7 percent on April 25; 1.0 percent on April 26; 3.6 percent on April 27; 4.8 percent on April 30; 6.2 percent on May 1; and 7.8 percent on May 2.

2000.³ Contrary to Ms. Armbrust's logic, spectrum values *increased* during that time period, demonstrating that PCS stock prices are not a proxy for spectrum values. Figure 1 shows the relationship between the Kagan PCS Index and spectrum values⁴ since December 1999.

FIGURE 1: KAGAN PCS INDEX AVERAGE VS. SPECTRUM PRICE PER MHZ POP



Source: Auction Summaries, Federal Communications Commission, available at <http://www.fcc.gov/wtb/auctions>. Kagan PCS Average, Kagan (2001).

As Figure 1 shows, in sharp contrast to Ms. Armbrust's prediction, as the Kagan PCS Index decreased, spectrum prices *increased* significantly over the same period. In fact, a statistical analysis of the correlation between the Kagan PCS Index prices and the value of spectrum from January 2000 to January 2001 reveals that the two variables are *negatively* correlated. In particular, a regression of the Kagan PCS index on the spectrum values produces a coefficient of

3. SECOND AFFIDAVIT, *supra* note 1, at ¶ 10.

4. To devise a continuous time series for spectrum prices, I fit a fourth-degree polynomial equation to the six data points associated with each FCC broadband PCS spectrum auction.

-0.79 with a *t*-statistic that is significant and negative at the 95 percent confidence level. Hence, one cannot infer the direction of spectrum prices based on the direction of PCS stock prices.

9. Additional empirical evidence refutes the notion that PCS stock prices are a valid proxy for spectrum values. If the Kagan PCS Index were a good indicator of spectrum prices, as Ms. Armbrust alleges, then the ratio of the Kagan PCS Index to spectrum values per MHz POP would be consistent over time—that is, the ratio at one point in time should not differ significantly from the ratio at another point in time. I have computed the ratio of the Kagan PCS Index to spectrum values per MHz POP for each broadband PCS auction conducted by the FCC. The results indicate that, in contrast to Ms. Armbrust’s prediction, the ratio of the Kagan PCS index to spectrum values has varied by a factor of 40 from its smallest value (on July 16, 1996) to its largest value (on April 15, 1999). Hence, PCS stock prices are not a valid proxy for spectrum prices in general.

10. *Second*, any wireless index that represents “major spectrum holders”⁵ must include Verizon, BellSouth, and SBC. Because none of these companies has a tracking stock for its wireless division, including those companies in a PCS index does not allow one to make inferences about the health of the wireless sector—never mind the value of spectrum. Those major stock prices incorporate valuations of broadband, landline, long-distance, and several other sectors that have nothing to do with spectrum values. It is unclear whether or how Kagan attempts to “correct” for those problems, but apparently Kagan, in its discretion, attempts to allocate the valuation of those multi-sector companies into various sectors. Such a process is arbitrary and subject to manipulation, a point upon which I comment in my conclusion.

5. SECOND AFFIDAVIT, *supra* note 1, at ¶ 10.

11. *Third*, and most revealing, her own source data proves that her conclusions are wrong. According to Kagan's web site, as of May 2, 2001 the Kagan PCS Average index *increased* by 7.8 percent since January 1, 2001.⁶ Following Ms. Armbrust's approach, spectrum values are primed to increase at an annualized rate of 23.4 percent.⁷ Hence, delaying the license transfer for several months will not result in a diminution of value, even according to Ms. Armbrust's methodology.

II. THE VALUE OF SPECTRUM CANNOT BE INFERRED FROM PRIVATE DEAL ACTIVITY

12. Ms. Armbrust—an employee of Kagan Associates—also attempts to link the spectrum values to the amount and value of (unidentified) private transfers of PCS license by examining the Kagan Private Deal database. Unfortunately, the aggregate amount of private license deal activity is irrelevant in determining the value of spectrum. Deal activity is a function of many things, such as attempts by firms to fill holes in footprints or forced license sales as conditions of merger approvals.

13. With respect to the value of those transactions, the average price per pop of a *handful* of private transactions also cannot be relied upon to indicate the general value of spectrum, much less the value of this specific Honolulu license. In her attempt to prove that spectrum values have declined since the beginning of *this* year, Ms. Armbrust compares the price per pop of (unidentified) private license transactions from the first quarter of *last* year and the first quarter 2001. Ms. Armbrust makes no attempt to ensure that the licenses are comparable in the two periods. Moreover, Ms. Armbrust does not disclose any information about the transactions in her comparison, which raises concerns about whether the licenses in the two

6. Downloaded at <http://www.kagan.com/kmarket/press6.htm> on May 2, 2001.

periods are genuinely comparable. For example, the price per pop in New York City is much greater than the price per pop in Laredo, Texas. This fact—that different markets have quite different values on a per pop basis—is seen in every spectrum auction conducted to date; not controlling for the market differences makes it impossible to evaluate the transaction data. I am again troubled by the proprietary nature of the data upon which Ms. Armbrust relies.

CONCLUSION

14. Contrary to Ms. Armbrust's allegations, it is not possible to infer the value of spectrum from PCS stock prices nor private transfers of PCS licenses. Empirical evidence demonstrates that PCS stock prices and spectrum values are negatively correlated and more likely not related at all. As of May 2, 2001, the Kagan PCS Index had *increased* by 7.8 percent since the beginning of this year. According to Ms. Armbrust's logic, the value of the Honolulu license must have increased by 7.8 percent as well.

15. Most troubling about the analysis of Ms. Armbrust is that she is an employee of Kagan Associates, yet nevertheless she relies solely on proprietary Kagan data on PCS stock prices and private transactions. Kagan Associates presumably has control over (1) the various schemes used to weight companies and to account for the PCS component of multi-sector firms in the Kagan PCS Index, and (2) the inclusion of certain deals in its private deal database (the contents of which are not disclosed). In particular, I am concerned about the potential conflict of interest between Kagan's data production capabilities and Kagan's expert witness reports. Conflict aside, it is impossible to interpret the Kagan data, since it fails to account for critical determinants of spectrum valuation.

7. SECOND AFFIDAVIT, *supra* note 1, at ¶ 10.

16. In my opinion, a delay of a few months or even a few years, would not likely affect the price a major wireless carrier would be willing to pay for the Honolulu license. For the period through 2004, the price of spectrum is likely to rise with the interest rate. Hence, there is no cost of delay. I adopt herein my testimony in my *Expert Affidavit* dated February 23, 2001 and filed in this action on February 26, 2001, and in my deposition taken on March 28, 2001.

CERTIFICATION

17. To the best of my knowledge and belief, my affidavit contains statements that are true and correct and contains my independent, impartial, unbiased professional judgment, opinions, analyses and conclusions, subject only to the assumptions or limiting conditions referenced herein. I have no present or prospective interest in the property interests that are the subject of this affidavit or this litigation, and I have no personal interest with respect to the parties involved. I have no bias with respect to either the property interests or the parties involved in this litigation or the matters addressed in my affidavit. My compensation is not contingent on an action, an outcome, or an event resulting from the opinions, analyses or conclusions in, or the use of, my affidavit.

Peter Cramton

Sworn to and subscribed to before me
This ___ day of _____ 2001

Notary Public

My commission expires:
