



**BEFORE THE
FEDERAL COMMUNICATIONS COMMISSION
WASHINGTON, D.C. 20554**

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**FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY**

In the Matter of

GTE CORPORATION, Transferor

And

BELL ATLANTIC CORPORATION, Transferee

For Consent to Transfer of Control

CC Docket No. 98-184

DECLARATION OF JACQUES CRÉMER AND JEAN-JACQUES LAFFONT

ON BEHALF OF

GTE CORPORATION AND BELL ATLANTIC CORPORATION

DECEMBER 15, 1998

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I. INTRODUCTION

A. Purpose of Declaration

1. The large interexchange carriers (“IXCs”) have filed numerous expert declarations in support of their allegations that the merger of GTE and Bell Atlantic will be counter to the public interest. In particular, the bulk of these allegations can be found in the Declaration of Stanley M. Besen, Padmanabhan Srinagesh, and John R. Woodbury,¹ which relies on a declaration previously submitted by Michael L. Katz and Steven C. Salop in opposition to the SBC-Ameritech merger proceeding before this Commission.²

2. In our declaration, we show that the Katz-Salop analysis—which concludes that a merger between incumbent local exchange carriers (“ILECs”) will induce the parties to engage in increased exclusionary behavior—is incomplete and misleading on theoretical grounds and rests on shaky empirical evidence. The allegations in the Besen-Srinagesh-Woodbury Declaration are therefore irrelevant, based as they are on an insufficient theoretical foundation. Likewise, the Commission should give little weight to other submissions that rely on arguments similar to those proposed by Katz and Salop, including the Declaration of Kenneth C. Baseman and A. Daniel Kelley,³ and the Affidavit by David L. Kaserman and John W. Mayo.⁴ We also address

¹ Declaration of Stanley M. Besen, Padmanabhan Srinagesh, and John R. Woodbury: An Economic Analysis of the Proposed Bell Atlantic/GTE Merger (filed on behalf of Sprint Communications Company L.P., Nov. 23, 1998), hereinafter *Besen-Srinagesh-Woodbury Declaration*.

² Declaration of Michael L. Katz and Steven C. Salop: Using a Big Footprint to Step on Competition: Exclusionary Behavior and the SBC-Ameritech Merger, Applications for Consent to the Transfer of Control of Licenses and Section 214 Authorizations from Ameritech Corporation, Transferor, to SBC Communications Inc., Transferee, CC Dkt. No. 98-141 (filed on behalf of Sprint Communications Company L.P., Oct. 14, 1998), hereinafter *Katz-Salop Declaration*.

³ Declaration of Kenneth C. Baseman and A. Daniel Kelley (filed on behalf of MCI WorldCom, Inc., Nov. 23, 1998), hereinafter *Baseman-Kelley Declaration*.

⁴ Affidavit of David L. Kaserman and John W. Mayo (filed on behalf of AT&T Corp., Nov. 23, 1998), hereinafter *Kaserman-Mayo Affidavit*, specifically referring to its similarity with the Katz-Salop declaration at note 21, p. 21.

miscellaneous allegations made in these other declarations, which are based on an improper understanding of the literature or on erroneous facts. We conclude that, as the Katz-Salop hypothesis is deficient in both fact and theory, the Commission should dismiss the notion that this merger would lead to increased exclusionary behavior by Bell Atlantic and GTE.

B. Summary

3. In their declaration, Katz and Salop speculate the possible existence of a spillover effect of exclusionary behavior across markets. In particular, they argue that exclusionary behavior is prevalent among ILECs, and that this behavior generates artificial competitive advantages for incumbents and thwarts entry by competitors. Further, they argue that the merger would increase the incentives of the constituent firms to engage in exclusionary behavior because of a so-called “externality effect.” We find the analysis wanting on two counts.

4. First, Katz and Salop do not provide empirical evidence of exclusionary behavior with a spillover effect. Moreover, the spillover itself cannot exist unless a single firm has the capacity and incentives to engage in exclusionary behavior on its own. We review the alleged evidence to this effect and, in light of the facts we have seen, find it lacking.

5. Second, we demonstrate the weakness of Katz and Salop’s crucial theoretical allegation that the merger would increase the level of exclusionary behavior. Their analysis is incomplete, as they do not attempt to define precisely the exclusionary behavior that would lead to the spillover effect they hypothesize. We complete their analysis in two directions, discussing possible alleged, yet unproven, exclusionary tactics and a more precise analysis of the actions of different players in the “entry game.” This more precise analysis shows that there is no convincing argument that the merger will increase exclusionary behavior.

6. Finally, we review miscellaneous allegations by other commenters that are based on erroneous facts, theory and analysis. We focus particularly on the allegations that the transaction will somehow allow the combined entity to dominate the Internet, demonstrating how this transaction is substantially different from the MCI WorldCom transaction and therefore does not present substantive competitive concerns in the market for Internet services.

C. Statements of Qualifications

1. Jacques Crémer

7. My name is Jacques Crémer. I am Professor of Economics at the École Polytechnique, specializing in industrial organization and regulation, and Directeur de Recherche au Centre National de la Recherche Scientifique (CNRS) at the University of Toulouse, where I am also Director of the Graduate Program in Economics. I was formerly Professor of Economics at Virginia Polytechnic Institute & State University, as well as Assistant Professor of Economics at the University of Pennsylvania.

8. I have been an Associate Editor of *Rand Journal of Economics*, *International Journal of Industrial Economics*, and the *European Economics Review*. I have published a number of books and articles, including: “Incentives and the Existence of Pareto-Optimal Revelation Mechanisms” (with Claude d’Aspremont and Louis-André Gérard-Varet), “Manipulation by Coalition Under Asymmetric Information: The Case of Groves Mechanisms”, and “Unique Implementation in Auctions and in Public Goods Problems” (with Claude d’Aspremont and Louis-André Gérard-Varet).

9. I have consulted on regulatory issues for France Telecom, the World Bank, the OECD, and for the European Commission, contributing to a major survey of regulatory practices

for Directorate-General II. On behalf of GTE in the recent merger of MCI and WorldCom, I prepared a submission to the European Commission's Competition Directorate.⁵ I have an Ingénieur diplômé from the École Polytechnique in 1970, and have a M.S. in Management from the Massachusetts Institute of Technology in 1973, and a Ph.D. in Economics from the Massachusetts Institute of Technology in 1978. A copy of my curriculum vitae is attached as Attachment 1.

2. *Jean-Jacques Laffont*

10. My name is Jean-Jacques Laffont. I am Professor of Economics at the University of Toulouse, specializing in industrial organization and regulation, and a Professor at the Institut Universitaire of France. Former academic appointments include Taussig Research Professorship at Harvard University, and a Sherman Fairschild Fellowship at the California Institute of Technology. I have been president of the Econometric Society and president of the European Economic Association.

11. I have been an Associate Editor of the *Journal of Mathematical Economics*, *Journal of Economic Theory*, *European Economic Review*, *Social Choice and Welfare*, and the *Journal of Public Economy Theory*. I have published a number of books and articles in scholarly journals, including: *Incentives in Public Decision Making* (with J. Green), *Fundamentals of Public Economics*, *Economics of Uncertainty and Information*, *A Theory of Incentives in Procurement and Regulation* (with J. Tirole), "Reciprocal Supervision, Collusion and Organizational Design" (with M. Meleu), "Collusion Under Asymmetric Information" (with D. Martimort), "Creating Competition Through Interconnection," "Access Pricing and Competition," and "Network Competition: I & II" (with P. Rey and J. Tirole).

⁵ See Jacques Crémer, Patrick Rey, and Jean Tirole, "The Degradation of Quality and the Domination of the Internet."

12. I have consulted on regulatory issues for France Telecom, Electricité de France, the World Bank, and the European Commission, contributing to a major survey of regulatory practices for Directorate-General II. I am also currently a member of the Council of Economic Analysis to the Prime Minister of France and the founder and director of l'Institut d'Economie Industrielle (Institute for Industrial Economics) in Toulouse, one of the premier academic economic research institutes in Europe. I received a degree in Engineering from the Ecole National de la Statistique et de l'Administration Economique in 1970, and a Ph.D. in Economics from Harvard University in 1975. A copy of my curriculum vitae is attached as Attachment 2.

II. EXCLUSIONARY BEHAVIOR – CASE UNPROVEN

A. Technical Considerations

13. Before plunging into a review of the evidence on exclusionary behavior, we consider it instructive to examine how an incumbent local exchange carrier (ILEC) might implement non-price exclusionary behavior. As we are not telecommunications engineers, we rely on the regulatory record, which is nonetheless highly instructive.

14. ILECs have already demonstrated through previous filings with this Commission that they cannot selectively degrade the quality of traffic transmitted to rival long distance or local operations while leaving traffic transmitted to their own affiliates unaffected. To take the most common example of alleged quality degradation, it has been shown that ILECs do not have the ability, with current technology, to add “noise” to a subscriber line only when it is being used to provide terminating access to an unaffiliated interexchange carrier (IXC).⁶

⁶ See Affidavit of Daniel J. Kocher on behalf of Ameritech Michigan, CC Docket No. 97-137, filed July 2, 1997, hereinafter *Kocher Affidavit*, and Reply Affidavit of William C. Deere on behalf of SBC Corp. And Ameritech Corp., CC Docket 98-141, filed November 12, 1998, hereinafter *Deere Affidavit*.

15. Another commonly alleged form of exclusionary behavior is "slow-rolling"—failure to provide in a timely manner interconnection, unbundled network elements (“UNEs”), or wholesale services for resale to their competitors. However, a large array of FCC regulations and provisions in the 1996 Telecommunications Act are aimed at preventing ILECs from foreclosing access to rival competitive services carriers (“CSCs”).⁷ The U.S. regulatory framework comprehensively prohibits exclusionary behavior on the part of ILECs in the provision of required inputs to their competitors. In addition, any ILEC wanting to attempt exclusionary behavior would also have to find a way around technical obstacles and monitoring by competitors and regulators.

16. The buyers of inputs from ILECs are not passive consumers. Instead, they actively audit the quality of services to ensure that they are not subject to discrimination. AT&T, for instance, monitors the quality of ILEC-provided services through its Access Supplier Assessments (“ASAs”).⁸ In its ASAs, AT&T evaluates the performance of its access vendors, including Bell Atlantic, GTE and the other Bell Companies across a wide variety of services, using pre-established “expected performance” figures to evaluate the vendor’s performance.

17. The unbundling and local service resale mandated by the 1996 Act have significantly improved the ease of entry into local exchange markets and decreased entry-detering sunk costs. Not only do these provisions provide further safeguards against foreclosure by ILECs, but they can also allow an entrant to counteract discrimination by self-supplying certain elements and combining them with ILEC-supplied UNEs. For example, a competitor dissatisfied with the quality of switched access could respond by unbundling the customers’

⁷ See Communications Act of 1934 (47 U.S.C. 151 et seq.), as amended by the Telecommunications Act of 1996, Public Law 104–104—Feb. 8, 1996, 110 STAT. 56., hereinafter *1996 Telecommunications Act*. The Act’s safeguards require that all local exchange carriers not discriminate on the resale of their telecommunications services (251.b.1); provide number portability, dialing parity, and nondiscriminatory access to ancillary services, poles, ducts, conduits, and rights-of-way to competing providers of telephone service (251.b.2-4); and that incumbent LECs negotiate in good faith (§251.c-1); provide interconnection and nondiscriminatory access to UNEs at any technically feasible point at least equal in quality to that provided to itself (§251.c.2-3); and provide nondiscriminatory physical collocation for interconnection or access to unbundled network elements (§251.c.6).

⁸ MCI operates a similar program.

loops and combining those loops with self-supplied switching and transport. The Act specifically requires very granular unbundling of the ILECs' network.

18. UNEs and interconnection services are provided by ILECs to their competitors (CLECs, IXCs, ISPs and CSCs) pursuant to state and federally regulated tariffs, which usually specify the quality level and the timeframes within which these services must be provided.^{9,10} Interconnection contracts between ILECs and their competitors can contain additional commitments on performance standards such as quality and timeliness, with direct quantitative measurements of quality, as well as private arbitration procedures to resolve disputes and determine potential damages.

B. Evidence of ILEC Discrimination and Integration

19. The behavior of ILECs that are vertically integrated into long distance suggests that there is little likelihood of the alleged discrimination, cross-subsidization, and non-cooperation. If these risks were as great as alleged by commenters, we would expect to see the harmful effects of integration on competitors of these firms. However, no such evidence exists. GTE owned the third largest IXC (Sprint) between 1983 and 1986. Starting in 1986 GTE gradually divested Sprint to United Telephone (which then renamed itself Sprint to form an integrated local/long-distance carrier). An empirical test by McChesney of interstate long distance quantities and prices did not find any evidence of discrimination resulting from GTE's ownership of Sprint.¹¹ The DOJ came to a similar conclusion in its 1986 review of the GTE-United joint-ownership of Sprint:

⁹ For example, in the Bell Atlantic South region, cages for physical collocation must be made available to entrants within 120 business days of the request (60 business days for virtual collocation). See Bell Atlantic Network Services FCC Tariff #1 Sec. 19, pp. 945-947, 13th Rev., transmitted Dec. 3, 1998.

¹⁰ As specified by the Telecommunications Act, Bell Atlantic (or any other ILEC) has to provide physical collocation unless it demonstrates to state authorities that these requests cannot be granted because of technical reasons or space limitations. See 1996 Telecommunications Act, 47 U.S.C. § 251.(c)(6).

¹¹ Specifically, McChesney found that GTE's ownership of Sprint did not lead to a statistically significant increase in the price of interstate long distance, as measured by the Message Telephone Service Consumer Price Index, nor did it lead to a statistically significant decrease in the quantity of interstate long distance, as measured by the

“We found no evidence, however, of any pattern of discrimination (by Sprint)

...

Perhaps most significant to our assessment of the consent decree’s efficacy is that none of the interexchange carriers have complained to either the Department or the FCC concerning the GTOCs’ provision of exchange access to them, even in response to our solicitation of such complaints.”¹²

20. Other local exchange carriers, such as Frontier and SNET, have expanded *de novo* into long distance service, and the evidence to date does not indicate that these ILECs have acted to manipulate quality to reduce competition in the long distance market.¹³

21. ILECs compete with other firms, primarily CSCs, in a number of other markets, such as intraLATA (or local) toll service, high-capacity transport, ISP service and wireless. The indications from these markets strongly suggest that ILECs have not excluded their competitors. We find the experience in intraLATA toll particularly probative, as intraLATA toll service is provided in essentially the same way as interLATA interexchange service, except that the Bell Operating Companies are allowed to compete in intraLATA service. One might expect that if quality discrimination against the IXC’s were possible, it would occur for the provision of competitive intraLATA service.

total quarterly interstate switched access minutes. See Fred McChesney, “Empirical Tests of the Cross-subsidy and Discriminatory-access Hypotheses in Vertically Integrated Telephony,” *Managerial and Decision Economics*, Vol. 16, 493-505, 1995. See also Affidavit of Fred S. McChesney in Support of the Motion of Bell Atlantic Corp., BellSouth Corp., Nynex Corp., and Southwestern Bell Corp., to Vacate the Decree, Civil Action No. 82-0192 (HHG), July 6, 1994. Also see Affidavit of Robert G. Harris and Carl Shapiro in support of Pacific Telesis Group’s Request for a Waiver to Permit It to Provide Interexchange Services to Customers in California, January 26, 1995, and Reply Affidavit of Robert G. Harris and Carl Shapiro, May 24, 1995, in *U.S. v. Western Electric & AT&T*, Civil Action No. 82-0192 (HHG), p. 4.

¹² See Report to the Court of the Approval by the US Department of Justice, Pursuant to Paragraph VI(A) of the Final Judgment in *United States v. GTE Corporation*, of the Proposed Joint Venture Between GTE Corporation and United Telecommunications Inc., Civil Action No. 83-1298, June 30, 1986, p. 10.

¹³ A limited survey of the New York and Connecticut public utility commissions carried out by Gilbert and Panzar in 1997 found that no complaints had been filed by IXCs alleging quality discrimination on the part of Frontier or SNET in the provision of access. See Affidavit of Richard J. Gilbert and John C. Panzar on behalf of Ameritech Michigan, CC Docket No. 97-137, at ¶ 45, hereinafter *Gilbert and Panzar Affidavit*.

22. Both Bell Atlantic and GTE have lost a substantial share of intraLATA carriage to competitors,¹⁴ especially with the implementation in certain exchanges of intraLATA toll dialing parity, which suggests an absence of effective discrimination in intraLATA toll.¹⁵ As discussed by Crandall and Sidak,¹⁶ an analysis of competition in the provision of voice-mail, wireless or ISP service indicates that competitors have not been excluded. They find that wireless operators affiliated with Bell Atlantic do not have higher market shares than unaffiliated competitors, and that the GTE and Bell Atlantic have rather small shares in the provision of Internet service. These findings are difficult to reconcile with a pattern of widespread and successful exclusionary behavior by ILECs.

C. Katz and Salop do not provide evidence that non-price discrimination is pervasive

23. Not only is there evidence that discrimination would be very difficult, but commenters fail to provide persuasive evidence to support their claim that ILEC non-price discrimination is pervasive.

24. For instance, Katz and Salop claim that “there is considerable evidence of exclusionary behavior”¹⁷ provided by Besen, Srinagesh, and Woodbury, while closer reading shows that this evidence is not at all convincing. Besen, Srinagesh and Woodbury argue that discrimination is established by the fact that Bell Operating Companies have not yet succeeded in obtaining approval for a Section 271 application.¹⁸ This fact is in no way a proof that exclusionary behavior is taking place, as most of the delays of Section 271 approval can be

¹⁴ See *Crandall-Sidak Declaration* at ¶ 32.

¹⁵ See P.S. Brandon and R. Schmalensee, “The Benefits of Releasing the Bell Companies from the Interexchange Restrictions,” 15 *Managerial and Decision Economics*, pp. 349-364, for further discussion of the lack of evidence of anticompetitive behavior by Bell Operating Companies in intraLATA toll.

¹⁶ See *Crandall-Sidak Declaration* at ¶ 51, ¶ 31, ¶¶ 38-50, respectively.

¹⁷ See *Katz-Salop Declaration* at note 27.

¹⁸ See *Besen-Srinagesh-Woodbury Declaration* at p. 15

traced to the requirement that Bell Companies allow competitors seamless electronic ordering of unbundled network elements, and these electronic interfaces have proved difficult to implement. Besen-Srinagesh-Woodbury have presented no evidence that the slower than hoped Section 271 approval is due to exclusionary behavior by ILECs.¹⁹

25. Besen et. al. then point to complaints by AT&T and MCI alleging that Bell Atlantic has proposed UNE tariffs that are not TELRIC compliant.²⁰ This evidence is hardly persuasive, because complaints by competitors can in no case be taken as persuasive evidence of discrimination, and furthermore, because Besen et. al. fail to recognize that the 1996 Act does not require UNE prices to be TELRIC compliant, but merely cost-based. And even if the allegation were true, the 1996 Act specifically set up an arbitration process with fixed timelines to assure that UNE prices would be cost-based. Finally, Besen et. al. discuss some hypothetical examples of non-price exclusionary behavior.²¹ These do not amount to evidence that this behavior exists in practice, and, as we will demonstrate below, the theory behind these hypothetical examples is likewise not convincing.

D. Conclusion: Evidence of ILEC exclusionary behavior is lacking

26. Our review indicates that there is good reason to believe that it is very difficult for ILECs to engage in exclusionary behavior, and that there is no evidence in the literature that such behavior is occurring. We conclude that the so-called “evidence” cited by Katz and Salop is devoid of any empirical foundation, and is not persuasive as to the ability of ILECs to engage in exclusionary behavior. That on its own should be sufficient to dispose of the Katz-Salop hypothesis. Nevertheless, we now show that its theoretical justification is flawed too.

¹⁹ See Peter W. Huber, Local Exchange Competition Under the 1996 Telecom Act: Red-Lining the Local Exchange Customer, November 4, 1997. Report prepared for BellSouth and SBC Corp.

²⁰ See *Besen-Srinagesh-Woodbury Declaration* at pp. 16-17.

²¹ See *Besen-Srinagesh-Woodbury Declaration* at pp. 17-19.

III. ASKING THE RIGHT QUESTIONS

A. Statement of the Katz-Salop argument

27. Katz and Salop examine potential exclusionary behavior that an ILEC might exercise to disadvantage a CSC. The CSC may offer a wide array of services, including local or long-distance, fixed or wireless, and voice or data communications. Katz and Salop hypothesize that a spill-over effect between markets may exist, that is, assuming a CSC operates in markets A and B, if the ILEC discriminates against the CSC in market A, then the CSC is competitively disadvantaged in market B. They argue that as a result of this discrimination, the CSC would be prevented from entering both markets by the merged ILEC, whereas it would enter absent the merger.

28. As we have shown above, there is little or no evidence that exclusionary behavior exists at all in the present U.S. regulatory climate. Nevertheless, we will assume for purposes of argument that exclusionary behavior is possible, and show that even under this assumption the merger is not likely to increase the incentives of the parties to exclude competitors.

B. The Correct Threshold Question

29. If we accept the working hypothesis that exclusionary behavior is possible, the correct question to ask is whether the merger will increase the likelihood of exclusionary behavior by GTE and Bell Atlantic. Given that none of the commenters has argued that the merger will make new types of exclusionary behavior possible, the threshold question that must be examined is whether the merger would increase the asserted incentives to engage in pre-existing types of exclusionary behavior. We therefore need to analyze the merger's effect on incentives and opportunities for exclusionary behavior, including responses by competitors, regulators, and the excluded party.

30. In their analysis, Katz and Salop do not ask the correct questions. Specifically, they overlook the existence of regulation (state and federal regulation, statutory safeguards under the Telecom Act of 1996, antitrust scrutiny by the U.S. Department of Justice, and the possibility of private antitrust enforcement), the role of expectations, and the presence of sunk costs to entry. Once these factors are considered, a properly completed analysis predicts no change in exclusionary behavior as a result of a merger between two ILECs. In the following section of this declaration, we analyze rigorously the theoretical basis for the Katz-Salop hypothesis.

IV. THERE IS NO SPILLOVER EFFECT IN PRICE EXCLUSIONARY BEHAVIOR.

31. Exclusionary behavior can be categorized as price or non-price. Price exclusionary behavior is behavior that aims either at providing competitive advantage to the incumbent or at preventing entry by selling inputs to competitors at prices that are above cost. We deal with price exclusionary behavior first, as the analysis of this category is straightforward.

A. Regulation constrains price exclusionary behavior

1. Statutory Requirements

32. Section 251 of the Telecommunications Act requires that ILECs provide competitors access to their networks in two forms.²² Competitors can either buy basic building blocks such as interconnection services and unbundled network elements, or can instead purchase at wholesale rates entire services for resale to end-users. Rather than directly set prices, Congress prescribed a basic default rule that governs when the ILEC and its competitor are unable to reach a negotiated agreement. In such an instance, either the ILEC or the competitor can petition for compulsory arbitration under the provisions of section 252. The arbitration

²² Additionally, further protection against discrimination targeting long-distance carriers is provided by Sections 251(g) and 272 of the Telecommunications Act, imposing equal access, non-discrimination and access charge imputation requirements.

provisions of the Act prescribe cost-based rates for interconnection services and unbundled elements,²³ and wholesale rates for purchase of wholesale service that are based on the retail rates charged by the ILEC minus the ILEC's avoided marketing, billing, collection, and other costs.²⁴

33. In practice, when arbitration has been required, interconnection and UNEs have been priced by State commissions broadly following the FCC's long-run incremental cost methodology.²⁵ State commissions have commonly priced wholesale services by applying a standard percentage discount to the applicable retail rates (often setting one discount for business rates and another for residential rates). Although there is continuing dispute as to whether the FCC exceeded its statutory powers in its original August 1996 order, it is beyond doubt that the resale, UNE and interconnection prices set by the state commissions are not exclusionary. Local telephone companies have now successfully negotiated over 5,400 interconnection agreements, more than double the number of agreements negotiated just a year ago.²⁶

2. Price regulation is so comprehensive that prices for inputs to competitors may even be below cost

34. The comprehensive price regulation of inputs to competitors introduces the strong possibility that the effective prices of inputs to competitors are actually below cost. Wholesale services are priced at the ILEC's retail rate minus avoided cost, which ensures that wholesale services are provided to entrants below cost if retail rates are unbalanced. Moreover, the entrant can always elect to build facilities. Because the entrant will select the mode of entry which tends to minimize costs (build vs. unbundle vs. resale, or any combination thereof), and wholesale

²³ "[T]he just and reasonable rate for network elements for purposes of [interconnection and UNE pricing] (A) shall be (i) based on the cost (determined without reference to a rate-of-return or other rate-based proceeding) of providing the interconnection or network element (whichever is applicable), and (ii) nondiscriminatory, and (B) may include a reasonable profit." See Telecommunications Act of 1996, *op. cit.*, at § 252.d.1.

²⁴ See Telecommunications Act of 1996, *op. cit.*, at § 252.d.3.

²⁵ See FCC Report & Order in the Implementation of the Local Competition Provisions of the Telecommunications Act of 1996, CC Docket No. 96-98, FCC 96-325, Aug. 1, 1996.

²⁶ See USTA Local Competition Report, December 9, 1998. Executive Summary, p. 1.

services have serious potential for being underpriced, it is likely that the effective price for the input to the CLEC is often below the ILEC's actual cost. Conversely, it is unlikely that the effective input price to the CLEC will ever significantly exceed the ILEC's actual cost.

3. Even the opponents to the merger do not believe in price exclusionary behavior

35. Katz and Salop implicitly recognize this point by restricting their statement about price exclusionary behavior to unregulated access services. While they claim that “[f]or unregulated access services, SBC and Ameritech will have the ability to raise access prices,”²⁷ the only example that Katz and Salop offer refers to a hypothetical future where some broadband services might not be regulated.²⁸ Furthermore, the externality model that they present is adapted (although, as we show below, misleadingly so) to non-price exclusionary behavior. Similarly, Besen, Srinagesh, Woodbury recognize that regulation essentially reduces the analysis to non-price exclusionary behavior: “Because both the FCC and the states regulate interconnection prices, Bell Atlantic and GTE may also choose to deny, delay or degrade the provisioning of inputs in their downstream rivals.”²⁹ We therefore conclude that price exclusionary behavior should not be an issue given the statutory provisions of the 1996 Act and the role of federal and state regulators.

B. The merger is unlikely to increase price exclusionary behavior

36. Even if regulation were not able to lower prices to the level of costs, the merger would still not lead to an increase in any supposed price exclusionary behavior. Indeed, there is no disagreement with the fact that prices are regulated at levels far below monopoly price, and that the ILECs are therefore constrained by the prices set by regulators. The merger does nothing

²⁷ See *Katz-Salop Declaration* at p. 21.

²⁸ See *Katz-Salop Declaration* at note 29.

²⁹ See *Besen-Srinagesh-Woodbury Declaration* at pp. 11.

to lift this constraint, and a merged entity would also set prices at the level imposed by regulators. Price exclusionary behavior is therefore not a concern in this merger. The Commission reached this very same conclusion in the *Bell Atlantic/Nynex Order*:

“[W]e believe that price squeeze tactics are likely to fail under the circumstances presented here as a predatory tactic aimed at eliminating competition among interexchange competitor...MCI has not explained how the combined entity will reap a greater share of the benefits of a price squeeze than would the two firms separately.”³⁰

37. Furthermore, because of regulatory response, which is overlooked by Katz and Salop, the merger could lead to *lower* interconnection prices. Regulators are more likely to examine carefully the prices set by a larger firm. Furthermore, prior to the merger, a firm that wants to enter a location in GTE's territory and complains about interconnection rates will obtain, if it prevails, a reduction in GTE rates. Given that any revision in GTE rates will likely affect its rates in other locations, it provides a positive externality to all other entrants in GTE's territory. After the merger, this effect will also extend to locations where Bell Atlantic is the incumbent. Because the incentives to enter regulatory proceedings will not have decreased, and will have increased for firms interested in entering locations where GTE is the incumbent *and* locations where Bell Atlantic is the incumbent, the merger can actually reduce any price exclusionary behavior, under the unproved hypothesis that such behavior can exist.

38. All this discussion points out a major flaw in the “formal” model of Katz and Salop. They present an equation (eqn. 7) that summarizes the gain from exclusionary behavior by the incumbent.³¹ The regulatory cost is represented by the term $S(d)$, which represents “the expected sanctions when the ILEC engages in amount d of exclusionary behavior.” In their model, this regulatory cost is the same for the merged firm as it would have been for either of the

³⁰ See *Bell Atlantic NYNEX Memorandum Opinion and Order*, Aug. 14, 1997, ¶ 117-118.

³¹ See *Katz-Salop Declaration* at p. 82.

component ILECs. One would expect it to be higher, if only because the changes in practices ordered by the regulator would be more extensive.

V. NON-PRICE EXCLUSIONARY BEHAVIOR FOR COMPETITIVE ADVANTAGE DOES NOT INDUCE ANY SPILLOVER EFFECT.

39. We now turn to a discussion of non-price exclusionary behavior, and first examine its use to acquire or reinforce competitive advantage against competitors who have already entered. We will show that the merger will not increase the prevalence of such conduct. To do so, we begin by classifying the type of exclusionary behavior along two dimensions: its verifiability and the type of communications to which it applies.

A. Classification

40. Some exclusionary behavior would be detectable, allowing regulators and the courts to take appropriate remedial action. On the other hand, Katz and Salop speculate that there may be some exclusionary behavior, which would not be detectable by regulators.³² It seems implausible that exclusionary behavior that cannot be detected by regulators (or reported to regulators by competitors) could be detected by consumers and thus have a meaningful impact on their purchase decisions. As discussed above, the paucity of hard evidence provided by the merger's opponents suggests that regulation handles verifiable exclusionary behavior well, and that any possible remaining exclusionary behavior must be non-verifiable.

41. For simplicity, consider a situation where ILEC A is present in market A. Its potential merger partner, ILEC B, is present in market B, and the CSC operates or plans to operate in both markets A and B. We will examine the exclusionary behavior that ILEC A may

³² See *Katz-Salop Declaration* at ¶ 52.

theoretically practice against the CSC in market A. Exclusionary behavior could (1) degrade the interconnection for communications that go from A to B through the CSC ('outbound' exclusionary behavior); (2) degrade at the same time the interconnection for communications that go from A to B and those that go from B to A through the CSC ('two way' exclusionary behavior); or (3) degrade the interconnection for communications that go from B to A through the CSC ('inbound' exclusionary behavior).³³ In the case where the CSC does not carry traffic between the two markets, but simply competes head-to-head with the ILEC in both markets for local service, the alleged exclusionary behavior could theoretically affect the CSC in (1) market A only; (2) both markets A and B; or (3) market B only.

A. Theoretical Analysis

42. Where exclusionary behavior is verifiable, any increase would lead to an increased detection rate by regulators. Regulators could then respond appropriately. Preempting this type of asserted exclusionary behavior does not require any advance action; a regulator could simply announce that it would not tolerate any increase in detected exclusionary behavior. This is precisely the approach taken by the FCC when restructuring access charges³⁴ and removing affiliate transaction requirements,³⁵ to mention just two examples, and by Judge Greene when allowing the Bell Operating Companies to enter a number of vertically related product markets,

³³ Other communications could be considered: for instance some calls are done from consumers in market A to other consumers in market A through the CSC (for instance intraLATA long distance), or again some calls coming from or going out to third markets can be made through the CSC. It should be clear that in none of these cases the merger would have any effect.

³⁴ See *Access Charge Reform Order*, FCC 97-158 280-82.

³⁵ See Order In the Matter of *Amendment of the Commission's Rules to Establish Competitive Service Safeguards for Local Exchange Carrier Provision of Commercial Mobile Radio Services*, WT Docket No. 96-162, rel. October 3, 1997.

such as information services.³⁶ Note that all that is required is a credible threat of action by the regulator.

43. If neither ILEC A nor ILEC B provides the type of communications that the CSC provides, then there are no incentives for exclusionary behavior, verifiable or not, before or after the merger. If ILEC A competes with the CSC before the merger on this type of communications, and ILEC B does not, then ILEC A would already have incentives to engage in the hypothetical exclusionary behavior to the maximum possible amount, as this behavior cannot be detected by the regulator. Thus, the merger would not change anything.

44. Thus, the only case according to the Katz-Salop theory when the merger may create an additional incentive for outbound or two-way exclusionary behavior clearly does not apply. That would be in the case where ILEC B is competing with the CSC and ILEC A is not competing with the CSC, nor is planning to compete with the CSC in the future. Both GTE and Bell Atlantic clearly have plans to compete with CSCs across all product markets. Accordingly, the merger will not provide any such additional incentives. We also point out that the hypothesis we make for the sake of argument—that ILECs have the ability and incentive to degrade outbound calls—has been rejected by the Commission:

“[C]ommenters argue that the incumbent LEC will be able to ... degrade the service of IXC competitors, by blocking calls at its own switch. Based on this record, we conclude that these concerns are not well-founded ... incumbent LECs have compelling incentives to deliver interstate calls to an IXC's POP.”³⁷

³⁶ See Removal of Section II(D)1 Restrictions on the Provision of Information Services, *United States v. Western Electric Co.*, Civil Action No. 82-0192 (HHG), (D.D.C. Oct. 17, 1990).

³⁷ See FCC *First Report and Order*, In the Matter of Access Charge Reform, Price Cap Performance Review, Transport Rate Structure, End-User Common Line Charges, Dockets No. CC 96-262, CC 94-1, CC 91-213, CC 95-72, May 7, 1997, at ¶142.

45. In the case of non-verifiable inbound exclusionary behavior ILEC A would not benefit directly from the degradation of interconnection, because the communications to which this behavior applies are communications initiated by customers of ILEC B, not customers of ILEC A. Hence, before the merger, ILEC A would not engage in any such exclusionary behavior. If ILEC B does not compete with the CSC, ILEC A will also have no incentives for exclusionary behavior after the merger. On the other hand, if ILEC B does compete with the CSC, the merger is unlikely to increase exclusionary behavior by ILEC A, as ILEC A has again, by itself, incentives for maximizing its exclusionary behavior in cases where ILEC A operates or plans to operate a service that can be accessed by customers of ILEC B. In this case, the merger would not change anything.

B. Conclusion: Non-Price Exclusionary Behavior and Spillovers

46. This theoretical analysis thus shows that the incentives hypothesized by Katz and Salop could only arise in the very restricted case where the exclusionary behavior practiced by ILEC A is both non-verifiable and benefits only ILEC B, not ILEC A. We note that Congress has already examined the question of whether ILECs have standalone incentives to discriminate against inbound calls, and found it wanting, thus authorizing Bell Operating Companies to provide interLATA service originating out-of-region but terminating in-region.³⁸ Similarly, we find that the commenters have not specifically identified any form of exclusionary behavior that would benefit the 'other' ILEC while not benefiting the perpetrator.

47. We therefore do not find that there exists—in reality—an exclusionary practice that conforms to the requirements of the Katz-Salop hypothesis. The burden is on the commenters to identify cogently a type of exclusionary practice for which this merger might realistically make a difference, a burden they have not met.

³⁸ See 1996 Telecommunications Act, 47 U.S.C. § 271 (b)(2) and (4).

VI. THE EXTERNALITY ARGUMENT OF KATZ AND SALOP THAT SPILLOVER EFFECTS WILL INCREASE THE INCENTIVES TO PREVENT ENTRY IS NOT CONVINCING.

48. We have demonstrated so far that the analysis of exclusionary behavior for competitive advantage is not costly to incumbents. We now examine the case for costly price exclusionary behavior that might be undertaken to prevent entry.

A. The Katz-Salop argument

49. Katz and Salop argue that the merged ILECs will have greater incentives to engage in exclusionary behavior to prevent entry by competitors. To explain their argument, we will again consider a situation in which ILEC A is the incumbent in market A, while its potential merger partner, ILEC B, is the incumbent in market B. A CSC is a potential entrant in both markets. Katz and Salop argue that exclusionary behavior by ILEC A would reduce the incentives of the CSC to enter and hence would generate "positive externalities" toward ILEC B. Before the merger, ILEC A would not take into account in its computations of profits the benefits its exclusionary behavior would generate for ILEC B. On the other hand, after the merger, it would take these benefits into account, Katz and Salop assert, and therefore would have incentives to conduct more exclusionary behavior, even if it is costly. Therefore the merger, according to Katz and Salop, would increase the equilibrium level of exclusionary behavior.

50. Although the argument looks convincing *a priori*, it does not withstand a closer analysis. The essence of their "externality argument" is that exclusionary behavior by firm A will profit firm B and vice versa. When they are owned separately, they will each decide whether or not to engage in exclusionary behavior without taking into account the benefit provided to the other. Once they have merged, they will take into account these external benefits, and therefore will supposedly have an increased incentive to exclude.

51. As we have shown above, there is no compelling evidence that ILECs can engage in exclusionary behavior. Even if there were compelling evidence, though, it would be extremely difficult to determine the empirical validity of an argument like the one made above. One would need to measure the cost of exclusionary behavior, and its benefits to the incumbent firms, as well as to the potential entrant. This would clearly be a formidable task. However, such a difficult empirical undertaking is not necessary because a detailed examination of the Katz and Salop theory shows that it is not robust, exaggerating the risks of exclusionary behavior because its description of the “entry game” is flawed, and not applicable to most cases of entry. Entry is an all or nothing decision. There is no such thing as a little bit of entry; either the CSC enters or it does not. In reality, although a new firm could choose different strategies for entering into a market, there is still a fixed investment that it must make to enter, and it will have to make the decision to invest or not. This is actually stressed by Katz and Salop: “[E]ven if the multiple local markets are distinct, there may be common research, product development, supporting software development, and promotional costs for a CLEC entrant.”³⁹

52. Katz and Salop’s analysis assumes that the incumbent firms in their theoretical model can commit to exclusionary behavior before the CSC has made the decision to enter. It is not the threat of exclusionary behavior that scares away the entrant, but the fact that exclusionary behavior has already occurred. On the other hand, in their institutional descriptions of entry, as the quote above shows, Katz and Salop stress sunk common costs. These costs are not linked to entry into a single market, and once they have been expanded, the CSC can enter both markets A and B. Therefore, the fact that these costs are incurred is a necessary condition to enter even one market and a sufficient condition to enter all.

³⁹ See *Katz-Salop Declaration* at p. 43.

53. To see this, let us be more explicit about the hypothetical sequence of events:

- (a) The CSC decides whether or not to make the investment needed to enter.
- (b) ILECs A and B decide whether or not to engage in exclusionary behavior.
- (c) The CSC decides whether or not to actually enter in the market.

54. The outcome of this sequence of decisions will be the same with or without merger. Consider first the situation without a merger. At the third stage, the CSC will decide to enter a market only if the profits from so doing are positive, taking into account the fact that the investment done at the first stage cannot be recovered. At the second stage, each ILEC will independently choose to engage in exclusionary behavior only if a) this makes the profits from entry negative (which implies that exclusionary behavior indeed prevents entry) and b) the costs of exclusionary behavior are less than the benefits of preventing entry (which implies that preventing entry is worthwhile). If for each ILECs at least of these conditions is not true, the CSC knows that it need not fear exclusionary behavior and will choose to enter in the first stage of the game.

55. Assume now that the ILECs have merged. At the third stage, the CSC will use the same criterion than without merger to decide whether to enter each of markets A and B. Indeed, at this point, given that the joint costs have already been incurred, the profit from entering one market is independent of the decision to enter or not to enter the other market. The merged entity will find it worthwhile to engage in exclusionary behavior on, say, market A if and only if a) this makes the profits from entry in market A negative and b) the costs of this exclusionary behavior are less than the benefits from preventing entry in market A. These are the same conditions under which ILEC A would have engage in exclusionary behavior absent the merger. Therefore, the CSC will know in the first stage of the game that it will face exclusionary behavior under the same conditions than without the merger, and will take the same decision.

56. The crucial point in the reasoning is the assumption, made by Katz and Salop, that the main impediment to entry is the necessity to recover important sunk common costs. After these costs are sunk, the link between the different markets is broken, and even a merged firm will decide whether or not to let the CSC enter a particular market by looking only at the situation in that market.

57. It is easy to see that in the framework we are using, the result is very general: if we keep the same structure but let the different costs and profits vary, we find in the model that there would be exclusion by a merged firm if and only if there would be exclusion when the firms act independently.

58. It should be stressed that the Katz-Salop hypothesis is very dependent on the assumption that the hypothetical exclusionary behavior takes place before any entry decision is taken. We have already seen that if such behavior took place afterwards, then there would be exclusion with the merger if and only if there would be exclusion without the merger. The same result holds true if exclusionary behavior and entry were to happen “at the same time.” This would be the relevant framework if the CSC were preparing for entry at the same time that firms A and B were preparing exclusionary behavior, with none of these parties able to commit to any action before the others.⁴⁰

59. To see why the above argument holds true, assume that the profits of ILEC A depended on the actions that it takes and the actions taken by the CSC in market A. Similarly, assume that the profits of ILEC B depended on the actions that it takes and on the actions taken by the CSC in market B. The profits of the CSC would depend on the actions that it takes in

⁴⁰ For an analysis of entry that stresses the fact that firms make simultaneous decisions in entry games, see Luís M. B. Cabral, “Entry Mistakes,” CEPR Discussion Paper 1729, November 1997.

both markets as well as the actions taken by both of its competitors, with no restrictions on the way in which these actions interact with each other in its profit function.

60. Consider now an equilibrium of the game without the merger. The three firms in theory will choose optimal actions given the actions taken by the two other firms. Assume now that ILECs A and B merge, and that the CSC does not change its behavior. Because the profits of firms A and B would not depend directly on the actions taken by the other ILEC (they are in separate markets), the merged ILEC would have no incentive to change the actions taken by its two component firms. Hence, the CSC also would have no incentive to change its behavior, and the equilibrium would not be affected.⁴¹

VII. THERE IS NO EVIDENCE THAT MERGERS BETWEEN MAJOR ILECs WILL HAVE A NEGATIVE IMPACT ON THE INTERNET.

61. Baseman et al. argue that the merger would create a risk to competition in the Internet. Their analysis is not convincing. Most of Baseman et al.'s discussion focuses on the negative consequences that would result if two ISPs owned by two ILECs succeeded in dominating the market for dial-up connections. There is very little explanation about the way in which these two ISPs would come to dominate the market, except for unsubstantiated allegations that the introduction of xDSL would exacerbate the problem of discrimination against ISPs that are not owned by ILECs. All these hypotheses are clearly at odds with the current structure of the market for dial-up connections. As shown in the Crandall-Sidak Declaration, the combination of GTE and Bell Atlantic would not form a dominant ISP,⁴² and it is extremely unlikely that the combined company could come to dominate this segment, given the existence of

⁴¹ Formally, we assume that the profits of the CSC are of the form $\pi^C(x_A, x_B, y_A, y_B)$, the profits of firm A of the form $\pi^A(x_A, y_A)$ and the profits of firm B of the form $\pi^B(x_B, y_B)$, where x_A and x_B are the actions taken by the CSC in markets A and B respectively and y_A and y_B are the actions taken by firms A and B (these actions could be multidimensional). In the absence of the merger each, of the firms maximizes its profits.

⁴² See *Crandall-Sidak Declaration* at ¶¶46-48.

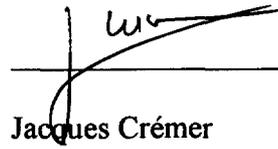
other ISPs which are several times larger and the numerous regulatory protections currently in place.

62. The analogy that Baseman et al. draw between the MCI WorldCom merger and the proposed Bell Atlantic-GTE merger is also fundamentally misleading. First, the MCI WorldCom merger yielded instantaneously a share of the backbone market of approximately 50%.⁴³ In the case of the GTE-Bell Atlantic merger, Baseman et al. can only imagine that the merger will enable the combined firm to reach market dominance over an undetermined horizon. Second, the type of network externalities is very different in the two cases, and even in the unlikely case where GTE-Bell Atlantic succeeds in dominating a large proportion of dial-up connections, the threat to interconnectivity would be limited. Dial-up customers do not connect mainly to communicate with each other. They connect to communicate with Web sites owned and managed by corporations, governments and non-profit organizations. Degrading the connection between its dial-up customers and these sites will not improve the competitive advantage of the merged firm.

63. If a large ISP were to pursue this targeted degradation, dial-up customers of small ISPs would not benefit from switching to the large ISP, as traffic exchanged between dial-up customers consists mainly of e-mail messages, for which the quality of interconnection will always be satisfactory. Therefore, the Crémer, Rey and Tirole selective degradation argument does not apply to ISPs, as larger ISPs would not gain a competitive advantage by degrading their own customers' connections to the Internet. Thus, even if Bell Atlantic and GTE were to dominate ISP service (which they will not), it would not be rational for them to pursue a targeted ISP degradation strategy.

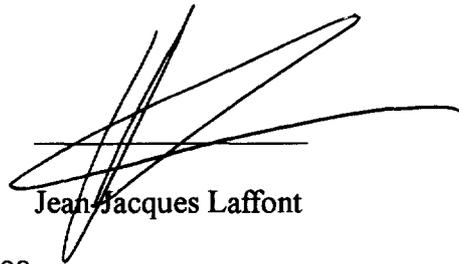
⁴³ See *Internet Affidavit of Robert G. Harris on Behalf of GTE in the MCI WorldCom merger*, CC Docket No. 97-211, March 13, 1998, Figure 3, p. 21.

We hereby swear, under penalty of perjury, that the foregoing is true and correct.



Jacques Crémer

Executed on this 15th day of December 1998.



Jean Jacques Laffont

Executed on this 15th day of December 1998.

Jacques Crémer *Curriculum Vitae*

Mailing Addresses

IDEI Université des Sciences Sociales Place Anatole France 31042 Toulouse cedex France	45 Route de Pibrac 31700 Cornebarrieu France
+ 33 (0)5 61 12 85 89 Fax + 33 (0)5 61 12 86 37 jcremer@cict.fr	+ 33 (0)5 61 85 89 44

Personal Data

Born in Hyères, France, May 18, 1949
French citizen, US permanent resident
Social Security Number 013-48-0072
Married, three children

Education

Ingénieur diplômé de l'Ecole Polytechnique, 1970
M.S. Management, Massachusetts Institute of Technology, 1973
Ph. D. Economics, Massachusetts Institute of Technology, 1978

Regular Positions

Stagiaire de Recherche, Ecole Polytechnique, 1976-1978
Assistant Professor of Economics, University of Pennsylvania, 1978-1984
Associate Professor of Economics, V.P.I. & S.U., 1983-1985
Professor of Economics, V.P.I. & S.U., 1988-1989
(Director of Graduate Studies, V.P.I. & S.U., 1984-1989)
Director of Research, GREMAQ, Université des Sciences Sociales de Toulouse,
1991-present.
Professor, Ecole Polytechnique, 1996 -present.

Other Positions

Research Associate, Center for Policy Alternatives, MIT, 1973-1975
Consultant, World Bank, 1976
Chercheur visitant, Ecole Polytechnique, Paris, 1985-1986
Visiting Professor, ESSEC, 1985
Visiting Professor, Université Paris I (Sorbonne), 1986
Visiting Professor, Université Paris IX (Dauphine), 1986

Visiting Professor, Université de Toulouse, 1990-1991
Visiting Professor, Université d'Aix-Marseille, 1991
Adjunct Professor of Economics, Virginia Polytechnic Institute & State University,
1992-1995
Adjunct Director of the GREMAQ, Université des Sciences Sociales de Toulouse,
1997-
Director of the Ecole Doctorale de Sciences Economiques, Université des Sciences
Sociales de Toulouse, 1995-
Director of Research, Institut d'Economie Industrielle, Toulouse, 1991-
Visiting Professor, University of Southampton, 1995-

Editorial Positions

Member, Editorial Board, *Journal of Comparative Economics*, 1989-1991
Associate Editor, *International Journal of Industrial Economics*, 1993-
Membre du Comité de Rédaction, *Annales d'Economie et de Statistiques*, 1993-
Membre du Comité de Rédaction, *Mathematical Social Sciences*, 1996-
Associate Editor, *Rand Journal of Economics*, 1995-
Associate Editor, *European Economic Review*, 1997-

Grants and Awards

Summer Research Fellowship, University of Pennsylvania, Summer 1979.

Principal Investigator, National Science Foundation Grant # SES-8408942, « Two Frameworks for the Theory of Organizations: Overlapping Games & Multiparty Contrat », 15/11/84-30/4/87.

Principal Investigator, National Science Foundation Grant # SES-8722014, « Economic Theory and Corporate Culture », 15/2 88-31/7/90.

Excellence in Teaching Award 1988-89, Virginia Tech Economics Club.

« 1991 Scholar Award in Economics », Virginia Social Sciences Association.

Research Fellow of the Centre for Economic Policy Research (January 1, 1993-December 31, 1994).

Fellow of the Econometric Society (1992).

Refereeing

At least one referee report for the following journals: *American Economic Review*, *Annales de l'INSEE*, *Bell Journal of Economics*, *Econometrica*, *Economic Journal*, *European Economic Review*, *International Economic Review*, *Journal of Comparative Economics*, *Journal of Economics and Business*, *Journal of Economic Behavior and Organization*, *Journal of Economic Theory*, *Journal of Industrial Economics*, *Journal of Law, Economics and Organization*, *Journal of Policy Modeling*, *Journal of Public Economics*, *Management Science*, *Mathematical Social Sciences*, *Quarterly Journal of Economics*, *Rand Journal of Economics*, *Review of Economic Studies*; as well as proposal

reviews for the NSF and the World Bank and pre-publication book reviews for a number of publishers.

Seminars

Seminars presented in the following universities: Boston University, California Institute of Technology, CenTER (Tilburg), CEPREMAP (Paris), Columbia University (New York), CORE (Louvain la Neuve), GREQE (Marseille), London School of Economics, MIT, Northeastern University, Princeton University, Rutgers University (New Brunswick), Stanford University, Tulane University (New Orleans), University College London, University of Florida, Université de Namur, Université Laval, Université Paris IX Dauphine, Universitat Autònoma de Barcelona, University of Florida, University of Illinois at Champaign, University of Indiana, University of Michigan, University of North Carolina, University of Pennsylvania, University of Southampton, University of Texas, University of Virginia, University of Washington, University of Western Ontario, Virginia Polytechnic Institute & State University, Wesleyan University, Yale University, ainsi que dans de nombreuses conférences internationales.

Publications

« Planning with Non-Decreasing Returns to Scale », unpublished Ph. D. dissertation, MIT, 1975.

Principal Contributor, « National Support for Science and Technology, an Examination of Foreign Experience », Center for Policy Alternatives, MIT, 1975.

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« Unique implementation in auctions and in public goods problems » (with Claude d'Aspremont and Louis-André Gérard-Varet », forthcoming in *Games and Economic Behavior*.

« Strategic information gathering before a contract is offered » (with Fahad Khalil and Jean-Charles Rochet », forthcoming in *Journal of Economic Theory*.

Working papers

« A theory of vertical integration based on monitoring costs »

« Correlation, independence and Bayesian implementation » with Claude d'Aspremont and Louis-André Gérard-Varet.

« Political Confederation » with Thomas R. Palfrey

Jean-Jacques Laffont

11, Chemin des Tuileries
31770 COLOMIERS
Tel.: 61.78.69.22

EDUCATION

Harvard University
Ph. D., Economics; Wells Prize – 1975

University of Paris
Third Cycle of Doctoral Studies in Applied Mathematics – 1972
D.E.A. Mathematical Economics – 1970
Diploma from the National School of Statistics and Economic Administration– 1970
D.E.A. Stochastic Analysis – 1969

University of Toulouse – 1968
M.A., Mathematics
B.A., Economic Science

PRESENT POSITION

Université de Toulouse

Position: Professor
Period: 1979 - present

Position: Professor in l'Institut Universitaire de France
Period: 1991 - present

Ecole des Hautes Etudes en Sciences Sociales

Position: Director of Research
Period: 1980 - present

PROFESSIONAL EXPERIENCE

California Institute of Technology

Position: Sherman Fairschild Fellow
Period: 1987 - 1988

Australian National University

Position: Visiting Scholar
Period: Summer 1988

Harvard University

Position: Taussig Research Professor
Period: Fall 1988

University of Pennsylvania

Position: Visiting Professor
Period: 1980

Université de Toulouse

Position: Lecturer
Period: 1978 - 1979

Université d'Amiens

Position: Professor
Period: 1977 - 1978

Centre National de la Recherche Scientifique

Position: Director of Research
Period: 1976 - 1977

Paris, Ecole Polytechnique

Position: Lecturer
Period: 1975 - 1987

Paris, Université Dauphine

Position: Teaching Assistant-- Mathematics
Period: 1970 - 1972

Centre National de la Recherche Scientifique

Position: Associate Researcher
Period: 1975 - 1976

Professional Associations

1978 Fellow of the Econometric Society-
1976 – 1985 Regional Advisor for France and Spain in the Econometric Society
1984 – 1985 President of the European Program Committee of the Econometric Society -
1984 – present Member of the Advisor Counsel of the Econometric Society -
1982 – present Member, Committee of Directors of the French Association of Economic Science
1985 – present Member of the Counsel of the European Economic Association
1990 – 1991 Vice-President of the Econometric Society
1992 President of the Econometric Society
1990-1994 President of the European Committee of the Econometric Society
1996-1997-1998 Vice-President, President Elect, President - European Economic Association -
1996- present Member, Directors Committee of the French Association of Economic Science

Administrative Positions

1981 – 1987	Director of the UA C.N.R.S. 947 -
1983 – 1986	Member of the University Counsel of Superiors -
1984	President of the Board of Qualification in Quantitative Economic Methods of the Universities of Tunisia
1981 – 1987	Director of the Center of Economic Research and Statistics at the University of Toulouse and the School of Advanced Studies in the Social Sciences
1986 – 1987	Chair of the Department of Economists and Statisticians -
1990 – present	Director of the Institute of Industrial Economics
1993 – present	Vice-President of the Scientific Counsel in Toulouse I
1992 - present	Director of Scientific, Social, Judicial and Economic Research at CCRDT Mid-Pyrenees
1997 - present	Member of the Counsel of Economic Analysis of the Prime Minister, Advisor of Economic Analysis to the Prime Minister, France

Awards

1990	Silver medal of C.N.R.S.
1991	Chevalier of the Legion of Honor
1991	UAP Scientific Laureate
1991	Honorary Member of the American Economic Association
1993	Foreign Honorary Member of the Academy of Arts and Sciences
1993	Prize Yrjö-Jahnsson of the Association of European Economists
1993	Economist of the Year, <i>Nouvel Economiste</i>
1996	Rossi Prize of the French Institute
1996	Prize of the Academy of the Jeux Floraux de Toulouse
1997	Utility Research Center Distinguished Award, University of Florida

PUBLICATIONS

Books

Translation of *Théorie de l'équilibre général*
J.Quirk and R. Saposnick, Dunod, (with G. Laroque), 1974.

Effets externes et théorie économique
Editions du C.N.R.S., 1977.

Incentives in public decision making, (with J. Green),
North-Holland, 1979.

Editor, *Aggregation and revelation of preferences*
North-Holland, 1979.

Essays in economics of uncertainty
Harvard University Press, 1980.

Fondements de l'économie publique

Economica, 198, Spanish Edition, 1982, M.I.T. press revised ed. 1988.

Economie de l'incertain et de l'information

Economica, 1985, M.I.T. press revised ed. 1988.

Co-editor, *Dynamique, information incomplète et stratégies industrielles*

Economica, 1988, English Edition Basil-Blackwell.

Co-editor, *Microeconometrics, Surveys and Applications*

Basil-Blackwell, 1990.

Editor, *Advances in Economic Theory, Proceedings of the 5th World*

Congress of the Econometric Society, Barcelona, 2 Volumes,

Cambridge University Press, 1992.

A Theory of Incentives in Procurement and Regulation

(with Jean Tirole), MIT Press, 1993

Price Controls and the Economics of Institutions in China

(with Claudia Senik-Leygonie), Development Centre Studies, Organisation for Economic Co-operation and Development Publications, 1997.

Articles

1971 "Note sur le concept de noyau dans une économie avec effets externes",
Bulletin de Mathématiques Economiques, Université de Paris IX.

1972 "Effets externes et théorie de l'équilibre général",
(with G. LAROQUE),
Cahiers du Séminaire d'Econométrie, C.N.R.S., Paris.

"Sur la cohésion économique d'une société",
l'Actualité Economique, Montréal.

"Une note sur la compatibilité entre rendements croissants et concurrence parfaite",
Revue d'Economie Politique, Paris.

1973 Commentaire sur "Dualité microéconomique et théorie du second best",
Revue Canadienne d'Economie.

1974 "Efficient estimation of nonlinear simultaneous equations with additive
disturbances",
(with D. JORGENSEN),
Annals of Social and Economic Measurement, N.B.E.R.

- 1975 "First order certainty equivalent with instrument dependent randomness",
Review of Economic Studies.
- "On moral hazard in general equilibrium theory",
(with E. HELPMAN),
Journal of Economic Theory.
- "Optimism and experts against adverse selection in a competitive economy",
Journal of Economic Theory.
- "Macro-economic constraints, economic efficiency and ethics : an introduction to
Kantian economics",
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Revue d'Economie Politique.
- "Une note historique sur les effets externes",
L'Actualité Economique, Montréal.
- 1976 "Existence d'un équilibre général de concurrence imparfaite : une introduction",
(with G. LAROQUE),
Econometrica.
- "La théorie économique de l'auto-protection",
La Revue Economique.
- "Decentralization with externalities",
European Economic Review.
- "Collective factors of production under uncertainty",
Journal of Public Economics.
- "Courts against moral hazard",
Journal of Mathematical Economics.
- "More on price versus quantities",
Review of Economic Studies.
- "Risk, stochastic preference and the value of information : a comment",
Journal of Economic Theory.
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Journal of Public Economics.
- "Méthodes d'estimation pour les modèles d'équilibre avec rationnement",

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"Characterization of strongly individually incentive compatible mechanisms for the revelation of preferences for public goods",
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"Disequilibrium econometrics for loans markets",
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"Révélation des préférences pour les biens publics. Première partie.
Caractérisation des mécanismes satisfaisants",
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Cahiers du Séminaire d'Econometrie.

"A note on the Cramer-Rao bound in non linear systems",
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1978 "Advantageous reallocation of initial resources",
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"A new incentive compatible mechanism for the production of public goods",
(with J. GREEN),
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1979 "Taxing price makers",
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"On coalition incentive compatibility",
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"A general equilibrium entrepreneurship theory on the firm based on risk aversion",
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paru dans "*Aggregation and Revelation of Preferences*", North-Holland.

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"Planning with externalities",
(with P. SAINT-PIERRE),
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"On the difficulty of attaining distributional goals with imperfect information about consumers",
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"Disequilibrium econometrics in multiple equation systems",
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- "Théorie des incitations : un exemple illustratif",
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- "Economie publique et information imparfaite",
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- "On the irreversibility effect",
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"Public control of a labor managed firm under incomplete information",
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"Information imparfaite et rationalité collective",
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"Stock et déséquilibre : une analyse comparative et internationale",
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1985 "Fix price models : a survey of recent empirical work",
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"On the welfare analysis of rational expectations equilibria",
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(with J. C. ROCHET),
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- "Partially verifiable information and mechanism design",
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- "Disequilibrium econometrics on micro data",
(with M.B. BOUISSOU and Q. VUONG),
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- "Incentive theory with data compression",
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- "Using cost observability to regulate firms",
(with J. TIROLE),
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- "Une théorie normative des contrats Etat-Entreprises,
(with J. TIROLE),
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- "Bordeaux contre gravier : une analyse par les anticipations rationnelles",
(with M. MOREAUX),
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G. Gaudet and P.Lasserre ed., p. 231-253.
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(with J. GREEN),
Econometrica, 55, 69-94.
- "Le risque moral dans la relation de mandat",
Revue Economique, 38, 5-23.
- "Toward a normative theory of incentive contracts between government
and private firms",
The Economic Journal, 97, 17-31.

"Symétrie et équilibre concurrentiel",
(with L. A. GERARD-VARET),
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"Comparative statics of the optimal dynamic incentive contract",
(with J. TIROLE),
European Economic Review, 31, 901-926.

"Auctioning incentive contracts",
Journal of Political Economy, 95, 921-937.

"Optimal taxation of a discriminating monopolist",
Journal of Public Economics, 33, 137-156.

Articles "Externalités" et "Révélation des Préférences"
dans Encyclopédie Palgrave.

"Limited communication and incentive compatibility",
(with J. GREEN),
Ch. 11, 308-329 in *Volume in Honor of L. Hurwicz*,
T. Groves, R. Radner S. Reiter ed., University of Minnesota Press.

"Incentive compatibility of insurance contracts and the value of information",
(with J.P. CRESTA),
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"Optimal Nonlinear Pricing with Two-Dimensional Characteristics",
(with E. MASKIN and J.C. ROCHET),
Ch. 8, 256-266 in *Information, Incentives, & Economics Mechanisms*,
Volume in Honor of L. Hurwicz,
T. Groves, R. Radner, S. Reiter ed. University of Minnesota Press.

"Incentives and the allocation of public goods",
Ch. 10 in *Handbook of Public Economics*, Feldstein, M. and A. Auerbach,
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"Monopoly with asymmetric information about quality",
(with E. MASKIN),
European Economic Review, 31, 483-489.

"Une analyse économique de l'usage de faux prix réguliers en publicité",
(with M. BOYER),
Actualité Economique.

- 1988 "The dynamics of incentives contracts",
(with J. TIROLE),
Econometrica, 56, 1153-1175.
- "Repeated auctions of incentive contracts, investment, and bidding parity with
an application to takeovers",
(with J. TIROLE),
Rand Journal of Economics, 19, 516-537.
- "Testing the democratic hypothesis in the provision of local public goods",
(with Y. ARAGON, J. Le POTTIER),
Journal of Public Economics, 36, 139-151.
- "Sunspot equilibria in finite horizon models",
(with R. GUESNERIE),
117-144, *Volume en l'honneur de Ed. Malinvaud*,
Economica and MIT Press.
- "Optimal banking contracts and macroeconomics",
(with X. FREIXAS),
381-412, *Volume en Honneur de Ed. Malinvaud*.
- "Hidden gaming in hierarchies : Facts and models",
Economic Record, december, 295-306.
- "Test de l'hypothèse démocratique dans les décisions budgétaires communales",
(with Y. ARAGON, J. Le POTTIER),
Revue Economique, 39, 405-420.
- "Equilibre bayésien parfait",
Ch. 3 dans "*Dynamique, Information Imparfaite et Stratégies Industrielles*",
A.A. Gremaq ed. Economica.
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Ch. 9 dans "*Dynamique Information Imparfaite et Stratégies Industrielles*",
A.A. Gremaq éditeur, Economica.
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(with J.C. ROCHET),
Scandinavian Journal of Economics, 90(3), 435-447.
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(with M. BOYER),
Canadian Journal of Economics, 22, 217-227.
- "Existence of a spatial equilibrium",

- (with A. GRIMAUD),
Journal of Urban Economics, 25, 213-218.
- "A brief overview of the economics of incomplete markets",
Economic Record, 54-65.
- "Rational expectations with imperfect competition : A Bertrand - Edgeworth example",
(with E. MASKIN),
Economic Letters, 30, 269-274.
- 1990 "The efficient market hypothesis and insider trading on the stock market",
(with E. MASKIN),
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- "Adverse selection and renegotiation in procurement",
(with J. TIROLE),
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- "Analysis of hidden gaming in hierarchies",
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(with J. TIROLE),
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- "Optimal bypass and creamskimming",
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(with J. TIROLE),
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The Journal of Law, Economics and Organization, 7, 84-105.
- "The politics of government decision making : A theory of regulatory capture",
 (with J. TIROLE),
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- "Provision of quality and power of incentive schemes in regulated industries",
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- (with E. AURIOL),
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