

APPENDIX 5
Report on Estimated Economic Impacts, Richard Voith, Ph.D.

**Review of Estimated Economic Impacts of the Proposed
St John Marina**

**Richard Voith Ph.D
President, Econsult Solutions Incorporated**

February 25, 2015



Richard Voith

2/25/2015

Date

1. My name is Richard P. Voith, Ph.D. I am President and Founding Principal of Econsult Solutions Inc. (ESI), based in Philadelphia, Pennsylvania. I received a Bachelor of Science degree in Economics from Haverford College in 1977 and a Master of Science in Energy Management and Policy from the School of Public Policy and Management of the University of Pennsylvania in 1980. I was awarded a Ph.D. degree in Economics by the University of Pennsylvania in 1986. Prior to my current position, I was Senior Vice President and Principal at Econsult Corporation from 2001 through 2012. Prior to that position, I was an Economic Advisor for the Federal Reserve Bank of Philadelphia, where I was employed from 1987 to 2001.
2. In addition to my current position at ESI, I have been an adjunct professor in the Real Estate Department of the Wharton School of the University of Pennsylvania. I teach courses in Real Estate Economics, Real Estate Investment, Cost Benefit Analysis, and Economic Development there. I have also held appointments in the Department of Business and Public Policy at the Wharton School. In addition, I am a faculty fellow at the University of Pennsylvania Institute for Urban Research and a member of the Counselors of Real Estate.
3. I am the author or co-author of over 40 professional articles, book chapters, and book reviews. A substantial number of these writings deal with the functioning of real estate markets, including analyses of the determinants of real estate value. I frequently provide peer reviews for scholarly articles addressing economic development, transportation, and real estate issues. I was a member of the editorial board of *Real Estate Economics* until 2006. My Curriculum Vitae is attached as Exhibit A of this report.
4. Over the last 2 years at ESI and the preceding eleven years at Econsult Corporation, I have conducted numerous studies that have evaluated the functioning of real estate markets. These engagements have included the assessment of business interruption on property values, the effects of environmental disamenities on real estate markets, as well as investigations into the economic viability of development projects. ESI and its principals have provided economic analysis in cases involving a diverse set of matters including real estate markets, business interruption, local market analysis, transportation, labor market discrimination, personal injury, intellectual property rights, price fixing, taxation, and lost profits.

Assignment

5. A 145 slip marina is proposed to be developed at Coral Bay, St. John, US Virgin Islands. The development team, led by Summer's End Group, LLC (SEG) produced *The St. John Marina Market Study, Feasibility and Economic Analysis* ("SEG Report," 2014), which argues that the proposed project is economically feasible and will have significantly positive economic impacts on the St. John economy. I have been asked to examine the economic impact claims presented in the SEG Report. In a previous report, I examined the economic feasibility analysis presented in the SEG Report.

6. SEG also submitted a different set of economic impacts in its application for a Boating Infrastructure Grant (BIG) in 2013. I have reviewed the information contained in that application as well as that in the in SEG Report.
7. Other ESI principals and associates, under my direction, have also provided research and analytical support for this report.
8. My Curriculum Vitae, Exhibit A, lists all publications I have authored in the previous ten years and all cases in which I have testified as an expert at trial or by deposition in the previous four years.
9. I have reviewed all materials referenced in this report. Should additional information come to light, I reserve the right to update or modify my opinions.

Summary of Findings

10. The SEG Report suggests an array of positive impacts of the Marina project, including increases in economic activity, jobs, mentoring and intern positions, consumption opportunities, and real estate benefits. The SEG Report does not evaluate the likelihood of realizing those impacts, the potential distribution of benefits across St John residents, the implications of changes in the structure of the St. John economy, the potential negative impacts of the project, or the risks to the economy and environment associated with the project.
11. The economic impacts claimed in the SEG Report are either based on flawed economic data, unsubstantiated opinion, or conjecture about potential new business ventures.
12. The estimated impacts on economic activity and jobs in the SEG Report are based on outdated (2006-08) data that apparently focus on the Florida boating market.
13. The economic impacts presented in the SEG report are not consistent with the economic impacts presented in SEG's BIG application of 2013. The analysis described in the BIG application is based on extremely old data from a 1979 publication and hence is unreliable.
14. The proposed marina development will change the basic character of Coral Bay. These changes are likely to have significant negative impacts on existing businesses in the Coral Bay area. Based on 107 letters commenting on the proposed marina development, there is a significant risk that the development will adversely affect existing businesses.
15. The SEG report claims that real estate property values will increase 10 to 20 percent within 3 to 5 years, but this claim is based solely on opinions of unnamed "qualified brokers." Similarly the SEG Report states that it is "not an unrealistic *goal*" (my emphasis) that the time on the market for area real estate properties would fall by 50 percent. The report's claims with respect to the real estate market implications of the project are wholly unsubstantiated. Further, the existence of significant opposition to the project among

property owners who would potentially benefit from real estate price increases, casts significant doubt about veracity of the claimed real estate market benefits.

16. The suggested potential opportunities for internship and mentoring are based only on an assertion that “The St. John Marina will establish internships and mentorships to support and assist local youth.” While this may be true, there is no indication of the size, duration or type of program that is contemplated. Similarly, the SEG report claims that St. John residents’ consumption opportunities will be enhanced by a new fish and farmer’s market that would be developed as part of the project. As with the internship and mentoring program, there is no information provided about the timing, scale or feasibility of the proposed market.
17. There is no evidence about the extent to which current St. John residents would be recipients of the claimed benefits if in fact the hypothetical benefits were to be obtained. On the contrary, there are good reasons to expect that the claimed economic benefits would not accrue in large measure to St. John residents.
18. The report is silent on potential negative impacts on the tourist industry during the construction period. Based on the comment letters reviewed, these negative impacts could be considerable. Additionally, there is no discussion of potential negative impacts on the existing business after the marina opens.
19. There is virtually no discussion of economic or environmental risk in the SEG Report. If the expanded activity associated with the marina resulted in significant environmental degradation, St. John’s eco-tourism reputation could be tarnished, adversely affecting existing businesses. Additionally, there is the potential for significant construction risk, weather-related risk, and market risk which could significantly extend the construction period and its associated disruption and negative economic impacts, or in a worst case scenario, result in a half completed project which would become an eyesore for Coral Bay.

Marina-Related Economic and Employment Impacts are Substantially without Basis.

20. The SEG Report states that the St. John Marina’s “economic contribution to the economy of St. John and the USVI” will be \$8,786,500. Moreover, “a minimum of 90 jobs will be created, with the vast majority of them made available to qualified St. Johnians.”
21. The SEG Report’s estimates of the St. John Marina’s economic impact appear to be based on a model developed to assess the impacts of the Florida recreational boating industry.¹ Page 3-1 of the SEG Report asserts that the analytical model used to calculate the impacts was developed by Drs. Ed Mahoney, Dan Stynes and Yue Cui of the Recreational Marine Research Center with the “considerable assistance of Dr. David Harding” of the Florida Fish and Wildlife Conservation Commission. These researchers developed the “Florida Online Boating Economic Impact Model” which is based on “approximately 30,000 surveys of registered Florida boat owners...Information was collected on about 17,300 Florida boating trips and the annual craft spending (e.g., storage, insurance, boat payments) of almost 3,800

¹ The analytical model is not explicitly referenced except by the names of its authors.

boat owners.²” These survey data appear to be the data referenced in the SEG study, which reports exactly the same number of surveys, boating trips, and boat owners. Thus, I conclude that this Florida boating survey was the basis for the for the SEG analysis.

22. From a technical standpoint, the estimated economic impacts are problematic for at least 4 reasons:

- The analysis is based on outdated survey data
- The survey data are for Florida, not St. John
- The vessel classifications in the survey do not properly reflect the vessel types expected at the proposed St. John Marina
- It is unclear whether the specific version of the IMPLAN model for the USVI was used or whether the Florida based IMPLAN model was used.³

Each of these points is addressed below.

Data Used to Estimate Economic Impacts are Outdated

23. As stated in the SEG Report, the data used for the calculations are 7-8 years old and therefore do not result in reliable impact estimates.

24. The Michigan State-based model development team that created the Florida Online Boating Economic Impact Model had previously (2006) created a marina impact model in association with the Association of Marina Industries, Great Lakes Commission, U.S. Coast Guard and the National Marine Manufacturers Association called the Marina Economic Model. That model, which was based on similar survey data collected only a year earlier than the Florida Online Boating Economic Impact Model, has been deemed unreliable by its authors because the data are outdated, and this flaw cannot be fixed through simple adjustments, such as adjusting for inflation.

25. According to the website for the Marina Economic Model, the authors of the model believe that their own model is now unreliable because the structure of the boating industry has changed too much to use the data from the 2006 survey:

“We regret, however, to inform you that the Marina Economics Model will no longer be available because the data that supplied the model and generated the economic impact estimates are seriously outdated and cannot be made current any longer by simply applying inflation rates.

Over the last few years, there have been many economic, fiscal and other changes in the marina industry, and also in the practices, activities and spending patterns of recreational

² See <http://www.floridaboatingeconomics.com/index.html> for a discussion of the Florida Online Boating Economic Impact Model. The survey was collected as part of the *Florida Boating Access Facilities Inventory and Economic Study* which was undertaken in 2007 and 2008, and completed in 2009.
http://myfwc.com/media/1162720/About_Econ_BAFI_Full_09.pdf

³ IMPLAN Group, LLC, IMPLAN System

boaters (storage fees, boat upkeep, etc.) which caused us major concern that the model may not properly reflect current situation anymore. That has led to the decision to close the Marina Economic Model...”⁴

26. The developers of the Marina Economic Model point to the Florida Boating Economic Impact Model as a more up to date alternative to their Marina Economic Model, but the Florida model is based primarily on data collected in 2007, only one year after the earlier model. Given the structural changes in the industry and the changes in boating spending patterns described above, the Florida Boating Economic Impact Model is not more reliable in 2014, let alone 2015.
27. Thus, based on the views of the economic impact model developers, the economic impacts presented in the SEG Report are not reliable because their source data is outdated.

Data for the Economic Impact Model Are for Florida, Not St. John

28. The survey data described in the SEG report are for boat owners in Florida, not St. John. There are numerous reasons why the spending patterns of Florida boat owners might be different from those using the Marina at St. John.
29. The St. John Marina is likely to have a significant market for visiting boats. It is highly unlikely that the spending patterns of boaters visiting St. John for a short period would have similar spending patterns as those boating nearby their homes.
30. The spending patterns on maintenance and other vessel-related expenditures, which are a part of both economic models developed by the Michigan State team, are likely to be very different for those visiting St. John as opposed to vessel related expenditures made where the boat is based.
31. The Florida economy is much more robust and diversified than the St. John economy, offering more opportunities for boat related expenditures and the associated spillover impacts.
32. For the reasons listed above, it is unlikely that the data about Florida boating expenditures are transferable to the St. John context, and thus the economic impacts derived from those data are not reliable.

Vessel Classifications Used in the Florida Survey Are Not Well-Matched to the Anticipated Market for the St. John Marina

33. The Florida boating model classifies boats into 6 categories:
 - Power boats less than 23 feet
 - Power boats between 23 and 28 feet

⁴ <http://www.marinaeconomics.com/>

- Power boats between 29 and 40 feet
- Power boats greater than 41 feet
- Sail boats less than 36 feet
- Sail boats 36 feet or larger

34. According to the SEG Report, 27 slips in the Marina are designed to accommodate yachts that range in size from 121 to 225 feet. An additional 17 slips are designed for yachts ranging from 70 feet to 121 feet. Thus 44 slips at the St. Marina (30 percent) are for boats that are significantly larger than the starting point of the largest categories available in the survey upon which the economic impact model is based.

35. While it is true that there *may* be some boats in the survey that are reflective of the size contemplated by the SEG Marina, it is unlikely that there are many. The following table from the *Florida Boating Access Facilities Inventory and Economic Study* describes the distribution of boat sizes in the Florida survey of boat owners.⁵

Boat segments	March sample
Power boats < 16'	170
Power boats 16-19'	654
Power boats 20-22'	821
Power boats 23-28'	965
Power boats 29-40'	540
Power boats ≥ 41'	193
Sailboats < 23'	66
Sailboats ≥ 23'	513
PWC	65
Canoes/Kayaks	43
Total	4,030

36. The survey data is clearly not reflective of the size of boats expected to visit the Marina in St John. Less than 5 percent of the survey responses are from power boat vessels greater than 41 feet, while the Marina is expecting to have 30 percent of slips with vessels greater than 70 feet. Thus the data upon which the economic impact model is based is not appropriate for the task.⁶

⁵ P.85, the *Florida Boating Access Facilities Inventory and Economic Study*.

⁶ To the extent SEG argues that the survey collects information on smaller boats and that means the economic impact estimates are understated, that conclusion is inaccurate because larger boats provide all that are needed for travel—lodging, food, and crew and will have less positive economic impacts.

Appropriateness of the Model of the Local Economy

37. Standard economic impact models are based on economic models called input-output models. These models reflect the basic structure of the local economy and are used to estimate the direct, indirect, and induced impacts of the expenditures associated with projects. For example the model used to assess the economic impacts of Florida boating is the 2006 version of IMPLAN, a standard input-output model. Although out of date for the current period, it represents the basic structure of the economy for counties in Florida in 2006.
38. Input-output models are based on the unique structure of the local economy, and as such it is not appropriate to use an input-output model developed for one geography to undertake an economic impact analysis in a different geography. The St John, and USVI economy, is an island economy and has a vastly different scale and structure than the economy of Florida. It is likely much more import dependent, which will drastically reduce the potential indirect economic impacts.
39. Input-output models are used to determine the indirect impacts of the activity of a project business. Indirect impacts arise because a business needs to purchase goods and services from other businesses. Those businesses, in turn need to hire labor and purchase other goods and services. This gives rise to the familiar multiplier concept where one dollar of direct spending yields more than one dollar of economic activity.
40. It is unclear in the SEG report whether an input-output model tailored specifically to St. John or the US Virgin Islands (USVI) was used. If the Florida models were used, the structure of the economy reflected in the model will be inappropriate and the results of the analysis unreliable.
41. Note that IMPLAN does provide an input-output model for the USVI based on 2009 industry data and soon will make 2013 data available. The IMPLAN economic model results, if properly based on the USVI data, would reflect the economic impacts of the marina on the entire set of USVI. Since St. John is only a very small part of the USVI (less than 5 percent of the population), one would expect the vast majority of the indirect economic impacts of the Marina to be external to St. John. Thus the statement that “a minimum of 90 jobs will be created, with the vast majority of them made available to qualified St. Johnians” is almost certainly not true because a large fraction of the indirect economic impacts associated with the Marina will not be in St. John. Further, there is no SEG description of what skills and services will be offered by these 90 jobs
42. The estimated economic impacts presented in the SEG report are significantly different than those presented in the SEG’s application for the BIG grant one year earlier. The BIG application indicated that the initial phase of the project which was the subject of the BIG grant would generate between \$1.06 million and \$1.61 million in economic impacts. The subsequent phase would generate an additional \$1.65 million in expenditures that flow to the

local economy.⁷ The two phases total to a range of \$2.71 to \$3.26 million in spending. These figures are less than half the amount claimed by the SEG Report. While both analyses are suspect because of the age of the studies upon which they are based, the differences in the claimed economic impacts should further call into question the validity of the economic impact claims.⁸

43. The SEG BIG Proposal concedes that the construction activity for the Marina will have virtually no positive economic impact on the St. John economy:

“Due to the rural, undeveloped nature of St. John it is assumed that a majority of local materials and workforce will likely come from neighboring St. Thomas and not be concentrated on St. John. Further, there are no known local marine contractors on St. John that can appropriately perform on a project of this magnitude.”⁹

The SEG Report Ignores Potential Negative Economic Impacts and Risks

44. During the Army Corps Public Comment period, over 13,000 letters were sent by individuals to the USACE. Of these, approximately 1,000 were composed by individuals, and approximately 12,000 were form letters signed by (and in some cases modified by) individuals. The 1,000 individually written letters were reviewed and a representative sampling of 107 letters composed by business owners, residents and visitors to St John were selected for analysis. The major concerns of residents and tourists are summarized in the Table below.

<u>Main concerns</u>	<u>Business Owners</u>	<u>Residents</u>	<u>Visitors</u>
Total Responses	11	19	88
"Project will ruin what the St. John community"	11	18	85
"Project will harm the ecosystem"	9	18	78
"I would stop visiting the area"			43
"Project will hurt the economy"	8	11	31
"I personally will lose business"	8	8	
"Current infrastructure cannot support a project of this scale"	4	7	35
"Construction period will disrupt the area"	3	6	19
"Project will bring less tourism to the area"	4	6	19
"Project will commercialize the area"		1	25
"I will no longer would purchase property on the island"			19

⁷ SEG proposal

⁸ The SEG BIG proposal economic impacts are based on an extrapolation of a 1979 study.

⁹ Page R-5 of BIG Proposal

"Alternatives are available nearby"	1	2	23
"Project will have negative cultural and historical impacts"	2	2	6
"Project is not feasible"			4
"Project would attract different tourists"			12
"Project seems poorly managed"	1	2	4

45. Despite the claims of positive economic impacts by the SEG group, business owners and residents alike express concerns that the project will result in a downturn in business and result in less tourism in the area. Many vacationers agree that they would no longer visit Coral Bay. The factors that are driving these sentiments regarding negative economic impacts are concerns about environmental degradation, insufficient infrastructure, construction noise, additional traffic, and general disruption of St. John's peaceful nature.
46. During construction of the Marina, which even the SEG group admits will likely not confer positive economic impacts to St. John, businesses, residents and vacationers all express concern that the construction will cause disruptive noise. Significant construction delays could exacerbate negative noise impacts during an extended construction period.
47. Note that construction in the Caribbean islands is expensive and uncertain. Many projects remain unfinished as unexpected costs exceed project budgets. It is extremely common that constructions schedules significantly overshoot pre-construction estimates, often by a number of years.
48. Environmental risks are large concerns for the island. The current economic structure of the island is largely dependent on visitors seeking a quiet, environmentally pristine environment. Any potential for environmental degradation poses a threat to the current economy.
49. The SEG Report claims that the local real estate market will benefit from substantial, 10 to 20 percent, increases in price over a 3 to 5 year period as well as shorter times on the market for property sellers. These predictions are offered without any support. Moreover, visitors to the island report the exact opposite i.e., that they would be less likely to purchase property if the Marina project is undertaken. Similarly, Current business owners and residents are worried about declining business and tourism. Many rental property owners expressed that their current customers were likely to reconsider visiting Coral Bay during and after construction of the Marina. Given these concerns, SEG offers no basis for their property value appreciation argument.

Summary

50. The economic impact estimates provided in the SEG Report are based on seriously flawed, unreliable data.

51. The positive economic impacts, to the extent they exist, are unlikely to flow in large measure to St. John residents.
52. Many businesses, residents, and visitors do not anticipate the type of gains projected by the SEG Group.
53. The SEG economic impact analysis ignores any potentially negative economic impacts resulting from construction noise, environmental degradation, or changes in the overall character of the island.
54. It is my opinion as an expert in real estate economics and economic development that the SEG analyses are completely inadequate to demonstrate any potential positive economic impacts from the Marina project on the St. John economy.

RICHARD P. VOITH, PhD, CRE

Econsult Solutions, Inc.

1435 Walnut Street, Suite 300, Philadelphia, PA 19102
phone: 215.717.2777 | email: voith@econsultsolutions.com

CURRENT POSITIONS

President and Principal, Econsult Solutions, Inc. | Philadelphia, PA (2013 – present)

Senior Vice President and Principal, Econsult Corporation | Philadelphia, PA (2001 – 2012)

Faculty Fellow, University of Pennsylvania Institute for Urban Research | Philadelphia, PA (2013–present)

PAST POSITIONS

- **Executive Director, Greater Philadelphia Transportation Initiative**, Philadelphia, PA. June 2002-2004.
- **Adjunct Professor, Real Estate Department, The Wharton School, University of Pennsylvania**, Philadelphia, PA, 2001-2002.
- **Adjunct Professor, Business and Public Policy, The Wharton School, University of Pennsylvania**, Philadelphia, PA, 1998-2000, 2003, 2009, 2011
- **Board of Directors, Southeastern Pennsylvania Transportation Authority**, Philadelphia, PA, September 1992 – 2000. (Vice Chairman, February 1996-February 1999).
- **Assistant Director of Research, Public/Private Ventures**, Philadelphia, PA, March 1986-January 1987.
- **Research Assistant, Professors Jere Behrman and Paul Taubman, Department of Economics, University of Pennsylvania**, Philadelphia, PA, June 1981-March 1986.
- **Research Associate, The Futures Group**, Glastonbury, CT, September 1979-May 1981.

TESTIMONY/DEPOSITION/ARBITRATION

- Commonwealth of Pennsylvania Environmental Hearing Board, EHB Docket No. 2012-148-L, Borough of St. Clair v. Commonwealth of Pennsylvania Department of Environmental Protection, and Blyth Township, September 2013.
- United States District Court for the Western District of Michigan, Case no. 1:11-cv-00483, Georgia-Pacific Consumer Products, LP v. NCR Corporation, February 2013. Judge Jonkers ruled favorably, noting "...GP's expert in real estate economics, Dr. Richard Voith persuasively testified...." in his judgment.
- Deposition: Georgia-Pacific Consumer Products, LP v. NCR Corporation, July 2012.



- Deposition: Nora Williams, et al., vs. City of Jacksonville, et al. (2010) Case No. 16-2003-CA-003263, Circuit Court of the Fourth Judicial Circuit in Duval County, FL
- Philadelphia Court of Common Pleas (2008), Goldman v. SEPTA.
- Wallace Township Zoning Review Board (2008), for Greenfield Development Co.
- Hudson County Superior Court (2009), Bloomfield 209 v. Rent Leveling Board

RELEVANT SKILLS/AFFILIATIONS

- Member, Counselors of Real Estate
- Founding Board Member, PENTRANS (Pennsylvanians for Transportation Solutions) 2004-present
- Commission Member, Pennsylvania Transportation Funding and Reform Commission, 2005
- Transportation Research Board—Institute of Medicine Advisory Panel on Transportation, Land Use, Physical Activity and Health, 2003-2005
- Editorial Board, Real Estate Economics, 1999-2006
- NSF Advisory Panel for Transit Cooperative Research Programs 1992-1997
- Invited panels and conferences for groups such as The Brookings Institution, Lincoln Institute for Land Policy, Urban Land Institute, Department of Housing and Urban Development
- Peer Reviewer for Journal of Urban Economics, Real Estate Economics, Journal of Regional Science

PUBLICATIONS

- "The Affordability Challenge: Inclusionary Housing and Community Land Trusts in a Federal System," (2012) in *Value Capture and Land Policies*, Edited by Gregory K. Ingram and Yu-Hung Hong, Lincoln Institute of Land Policy.
- "The Economics of Recovery," (2011) in *Managing Urban Disaster Recovery: Policy, Planning, Concepts And Cases*, Edited by Edward J. Blakely, Eugenie L. Birch, Roland V. Anglan and Harou Hayashi, Crisis Response Publications.
- "Rents Have Been Rising, Not Falling, in the Postwar Period," (2010), *Review of Economics and Statistics*, Vol. 3, No. 3, pp. 628-4, with Leonard Nakamura and Theodore Crone.
- "HOPE VI and Neighborhood Economic Development: The Importance of Local Market Dynamics," (2010), *Cityscape*, Vol. 12, No. 1, pp. 99-131, with Sean Zielenbach.
- "Estimating the Local Economic Impacts of HOPE VI," (2010), *Housing Policy Debate*, Vol.20, Issue 3, pp. 485-522, with Sean Zielenbach and Michael Mariano.

- "Urban Growth and Housing Affordability: The Conflict," (2009), *The ANNALS of the American Academy of Political and Social Science*, No. 626 with Susan Wachter.
- "The New Economics of Downtown," (2006) in *New Downtowns: The Future of Urban Centers*, Jonathan R. Oakman, Editor: Princeton University, Policy Research Institute for the Region.
- "Comments on "The Effects of Urban Rail Transit Expansions: Evidence for Sixteen Cities, 1970-2000"" (2005) *Brookings-Wharton Papers on Urban Affairs*, Edited by Gary Burtless and Janet Rothenberg Pack, Brookings Institution Press.
- "Hedonic Estimates of the Cost of Housing Services: Rental and Owner-Occupied Units," (2005) in *Price and Productivity Measurement*, Edited by W. Erwin Diewert, Bert M. Balk, Dennis Fixler, Kevin J. Fox and Alice O. Nakamura, Trafford Press, with Theodore Crone and Leonard Nakamura.
- "Smart Growth and Affordable Housing" (2004) in *Growth Management and Affordable Housing: Do They Conflict?* Edited by Anthony Downs, Brookings Institution Press, with David L. Crawford.
- "Capitalization of Federal Taxes, the Relative Price of Housing, and Urban Form: Density and Sorting Effects," (2002), *Regional Science and Urban Economics*. Vol.32, No. 6. with Joseph Gyourko.
- "Measuring Housing Services Inflation," (2000) *Journal of Economic and Social Measurement*, Vol. 26, pp. 153-171. with Theodore Crone and Leonard Nakamura.
- "Expectations, Development, and Transportation Investment," Conference Proceedings of "Bridging the Divide" sponsored by the Department of Housing and Urban Development (2000).
- "The Determinants of Metropolitan Development Patterns: What Are the Roles of Preferences, Prices and Public Policies?" (2000) In *Urban-Suburban Interdependencies*, Edited by Rosalind Greenstein and Wim Wiewel, Cambridge: Lincoln Institute of Land Policy.
- "Zoning and the Tax Treatment of Housing," *Brookings-Wharton Papers on Urban Affairs*, Edited by Douglas Gale and Janet Pack (2000) The Brookings Institution.
- "The Suburban Housing Market: The Effects of City and Suburban Employment Growth," (1999) *Real Estate Economics*, Vol. 27, No. 4 (Federal Reserve Bank of Philadelphia Working Paper #96-15).
- "Risk and Return in the Single-Family Housing Market," (1999) *Real Estate Economics*, Vol. 27, No. 1 (Federal Reserve Bank of Philadelphia Working Paper #98-4).
- "Do Suburbs Need Cities?" (1998) *Journal of Regional Science*, Vol. 38, pp. 445-464 (Federal Reserve Bank of Philadelphia Working Paper No. 93-27/R).
- "Parking, Transit and Employment in a CBD," (1998) *Journal of Urban Economics*, Vol. 44, pp. 43-58 (Federal Reserve Bank Working Paper No. 95-11).
- "Fares, Service Levels, and Demographics: What Determines Commuter Rail Ridership in the Long Run," (1997) *Journal of Urban Economics* Vol. 41 pp.176-97 (Federal Reserve Bank of Philadelphia Working Paper No. 94-21).
- "The Effects of Exchange Rate and Relative Productivity Changes on U.S. Industrial Output at the State Level" (1994) *Urban Studies*, Vol. 31 pp. 219-232 (Federal Reserve Bank of Philadelphia Working Paper, No. 91-16).



- "Can Regionalization of Local Public Services Increase a Region's Wealth?" (1993) *Journal of Regional Science*, Vol. 33, No. 1, pp. 279-301, (Federal Reserve Bank of Philadelphia Working Paper, No. 90-17, with James McAndrews).
- "Leasing as a Lottery: Implications for Rational Building Surges and Increasing Vacancies" (1993), *AREUEA*, Vol. 21, No. 1, (Federal Reserve Bank of Philadelphia Working Paper, No. 92-10, with Joseph Gyourko).
- "Estimating House Price Appreciation: A Comparison of Methods" (1992) *Journal of Housing Economics*, Vol. 2, pp. 324-338. (Federal Reserve Bank Working Paper, No. 92-21 with Theodore M. Crone).
- "Changing Capitalization of CBD-Oriented Transportation Systems: Evidence from Philadelphia, 1970-1988," (1993) *Journal of Urban Economics*, Vol. 33, pp. 361-76. (Federal Reserve Bank of Philadelphia Working Paper, No. 91-19).
- "Accounting for Differences in Aggregate State Productivity" (1992) *Regional Science and Urban Economics*, Vol. 22, No. 4, pp. 597-618 (Federal Reserve Bank of Philadelphia Working Paper No. 90-1, with Gerald Carlino).
- "Local and National Components in House Appreciation" (1992) *Journal of Urban Economics*, Vol 32, pp. 52-69. (Federal Reserve Bank of Philadelphia Working Paper No. 90-10, with Joseph Gyourko).
- "A Note on Natural Office Vacancy Rates" (1992) *Journal of Urban Economics*, Vol. 31, pp. 138-139.
- "The Long Run Elasticity of Demand for Commuter Rail Transportation" (1991) *Journal of Urban Economics*, Vol 30, pp. 360-372, (Federal Reserve Bank of Philadelphia Working Paper No. 87-18: "Commuter Rail Ridership: the Long and Short Haul").
- "Transportation, Sorting, and House Values," (1991), *AREUEA*, Vol. 19, pp. 117-137 (Federal Reserve Bank of Philadelphia Working Paper No. 90-22/R).
- "Capitalization of Local and Regional Attributes into Wages and Rents: Differences Across Residential, Commercial and Mixed-Use Communities" (1991), *Journal of Regional Science*, Vol. 31, pp. 127-145. (Federal Reserve Bank of Philadelphia Working Paper No. 87-18: "Compensating Variation in Wages and Rents").
- "Hedonic Price Functions and Home ownership Capitalization Rates" (1991), *Journal of Urban Economics*, Vol. 30, pp. 100-111, with Peter Linneman (Federal Reserve Bank of Philadelphia Working Paper No. 88-6).
- "Regional Impacts of Exchange Rate Movements" (1990) *Regional Science Perspectives*, Vol. 20, No. 1, with Gerald Carlino and Brian Cody (Federal Reserve Bank of Philadelphia Working Paper No. 90-6).
- "Natural Vacancy Rates and the Persistence of Shocks in the U.S. Office Market" (1988) *Journal of the American Real Estate and Urban Economics Association*, Vol. 16, No. 4, with Theodore M. Crone (Federal Reserve Bank of Philadelphia Working Paper No. 88-4).
- "Would Mortgage Borrowers Benefit from the Provision of APR Schedules?" (1985) *Housing Finance Review*, Vol. 4, pp. 569-576, with Peter Linneman.
- "The California Conservation Corps: and Analysis of Short-term Impacts on Participants" (1987) *Public/Private Ventures*, with Wendy Wolf and Sally Leiderman.

- "The California Conservation Corps: A Report on Attrition" (1986) Public/Private Ventures, with Sally Leiderman.

Selected Consulting Publications

- "The Development Impact of the East River Ferry," Submitted to Steer Davies Gleave for the New York City Economic Development Corporation, November 2013, with Adam Ozimek.
- "The Impacts of SEPTA Regional Rail Service on Suburban House Prices," Submitted to SEPTA, October 2013, with Dan Miles.
- "Understanding SEPTA's Statewide Economic Value," Submitted to SEPTA, with Economy League of Greater Philadelphia (2013).
- "Review of Location Affordability Index Housing Cost Model," Submitted to the Manhattan Strategy Group and the Department of Housing and Urban Development, with Adam Ozimek and Susan Wachter (Penn Institute for Urban Research) (2012)
- "Review of the Center for Neighborhood Technology's Housing and Transportation Affordability Index," Submitted to the Manhattan Strategy Group and the Department of Housing and Urban Development, with Susan Wachter (Penn Institute for Urban Research) (2012)
- "Vacant Land Management in Philadelphia: The Costs of the Current System and the Benefits of Reform," Submitted to the Philadelphia Redevelopment Authority and the Philadelphia Association of Community Development Corporations, (With Lee Huang, September 2010.)
- "The Economic Impact of Digital Exclusion," Commissioned by the Ford Foundation (With Lee Huang and the Digital Impact Group, March 2010).
- "Allocating Growth to Municipalities," Projection of Municipal Housing and Employment Growth for All Municipalities in New Jersey in support of development of new affordable housing regulations by the New Jersey Council on Affordable Housing (January 2008).
- "Compensatory Benefits to Developers for Provision of Affordable Housing." Prepared for the New Jersey Council on Affordable Housing (With Lee Huang and Stephen P. Mullin, December 2007).
- "Counting Jobs at the Local Level" This project for the New Jersey Council on Affordable Housing developed a survey based methodology for evaluating the employment associated with commercial buildings (with Lee Huang and The Reed Group, December 2007).
- "Estimating the Degree to which Filtering Is a Secondary Source of Affordable Housing." Prepared for New Jersey Council on Affordable Housing (Kevin Gillen, principle author, November 2007).
- "Analysis of Proposed Greenfield & Co. Development vs. By-Right Development for Wallace Township, PA. This analysis evaluated the economic and fiscal impacts of the proposed Greenfield development. The analysis was conducted in the context of the complex zoning and environmental constraints associated with the development site. (October 2007).
- "Dynamic Neighborhood Taxonomy," Analysis of the evolution of real estate prices and determinants of change at the neighborhood level for RW Ventures (2007).
- "Transit-Oriented Development in Philadelphia: Using a Proven Strategy to Create More Vibrant, Livable Neighborhoods," Prepared for Neighborhoods Now (With Lee Huang, October 2007).



- "Transportation Needs Assessment and Financial Analysis in Pennsylvania," Prepared for Delaware Valley Regional Planning Commission (With Lee Huang, June 2007).
- "Evaluating the Economic and Fiscal Impacts of SEPTA Service Cuts and Fare Increases," Analysis prepared for the Economy League of Greater Philadelphia. This work was used by the Economy League to produce *The Price of Inaction: An Analysis of Economic Impacts Associated with SEPTA's FY 2008 Operating Budget "Plan B" Alternative* (May 2007).
- "Assessing the Benefits of Public Housing," Prepared for the Council on Large Public Housing Authorities (January 2007).
- "Philadelphia Tax Abatement Analysis," Prepared for the Building Industry Association, this comprehensive study examines the economic and fiscal impacts of Philadelphia's tax abatement program. (With Stephen P. Mullin, Kevin Gillen and David L. Crawford, September 2006).
- "Potential Fiscal Impacts of the Proposed Development on the Borough of Haddonfield," prepared for Bancroft Nuero Health (October 2006)
- "Downtown Strategic Development Plan," prepared by Hillier Architecture for the City of Manchester, NH. Econsult Corporation provided economic and strategic analysis (December 2005).
- "Pine Grove Landfill Pad 12 Expansion Harms-Benefit Analysis," Prepared for Pine Grove Landfill Inc. (June 2005).
- "Philadelphia City Tax Structure and the Metropolitan Economy," Prepared for the Pennsylvania Economy League. (2004).
- "Choosing the Best Mix of Taxes for Philadelphia: An Econometric Analysis of the Impacts of Tax Rates on Tax Bases, Tax Revenue, and the Private Economy," Final Report to the Philadelphia Tax Reform Commission (With John DelRoccili and David L. Crawford, October 2003).
- "The Funding System for Surface Transportation: Implications for the Philadelphia Region," (February 2003) with Kevin Babyak, David L. Crawford, and Peter Javsicas. Prepared for the Greater Philadelphia Transportation Initiative.
- "Developing a Strategic Framework for Assessing the Potential of Commercial Corridors" (2003) with the Pennsylvania Economy League, Funded by the William Penn Foundation.
- "Working Together to Fix the Pennsylvania Convention Center," (June 2002) with Bernard A. Anderson, Peter Cappelli, and David L. Crawford. Prepared for the Pennsylvania Convention Center Authority.
- "Philadelphia Tax Rates and Their Relationship to Tax Bases and Tax Revenues," (February 2002). Prepared for the Pennsylvania Economy League.
- "An Evaluation of the Impacts on Commuter Rail Operators and Commuters of a Shift in Maintenance Costs from Amtrak to the Commuter Authorities," (January, 2002) Prepared for Amtrak.

Reports in Support of Litigation

- *RJ Florig v. Redevelopment Authority of Montgomery County, et al, Civil Action – 06 – 1671* "Report on Alleged Damages to R&J Holdings and RJ Florig Industrial Company" (December 2013, Rebuttal Report, February 2014).



- "Report on the Economic Feasibility of the Proposed St John Marina" A review of *The St. John Marina Market Study, Feasibility and Economic Analysis* produced by Summer's End Group, LLC (January 2015).
- "Review of Estimated Economic Impacts of the Proposed St John Marina" A further review of *The St. John Marina Market Study, Feasibility and Economic Analysis* produced by Summer's End Group, LLC (February 2015).
- *Georgia-Pacific Consumer Products LP, et al., v. NCR Corporation, et al.* "Economic Analysis of the 1956 Lease Between St. Regis and Thor Corporation for the Bryant Paper Mill in Kalamazoo, Michigan." In the United States District Court for the Western District of Michigan. Expert report prepared for Georgia-Pacific, June 2012.
- *Tower v. Lexington Insurance.* "An Analysis of Aria Condominium Sales in the Context of the Center City Philadelphia Condominium Market," Expert report prepared for Lexington Insurance. This report provided a detailed evaluation of the condominium market in Center City Philadelphia (March 2008).
- "Updated Projected Economic Impacts of the Proposed Brads C&D Landfill" (October 2007).
- *Goldman v. SEPTA.* These reports prepared for SEPTA evaluate the role of Pennsylvania in the viability of SEPTA and the importance of SEPTA to the state economy. This work was in support of SEPTA's claim of sovereign immunity in a FELA case. (June 2007, Rebuttal Report, August 2007).
- *Holt Cigar et al. v. City of Philadelphia et al.* Report prepared for the Plaintiff analyzing the impact of legislation on the cigar industry and consumers. (January 2007).
- *Toman v. Alliance Landfill Inc.* "Impacts of the Alliance Landfill on Property Values in Taylor, Old Forge and Moosic Boroughs," Expert Report Prepared for Alliance Landfill Inc. (January 2006).
- *Toman v. Alliance Landfill Inc.* "An Assessment of the Property Value Impacts of the Alliance Landfill Expansion Project," Expert Report prepared for Alliance Landfill Inc. (June 2005).
- "Rent Control in Morristown, New Jersey," Expert Report prepared for Wolf-Block for plaintiffs in opposition to the Township of Morristown (November 2004).
- *Rodriguez, et al. v. Ford Motor Credit Company* (No. 01 C 8526), "Analyzing the Disparate Impact Produced by Ford Motor Credit Company's Finance Charge Markup Policy," (May 2002).

Federal Reserve Publications

- "Has Suburbanization Diminished the Importance of Access to Center City?" (2000) Business Review, May/June.
- Does the Tax Treatment of Housing Affect the Pattern of Metropolitan Development?" (1999) Business Review, March/April.
- "Does the Tax Treatment of Housing Create an Incentive for Exclusionary Zoning and Increased Decentralization?" Federal Reserve Bank of Philadelphia Working Paper #99-22.
- "Measuring Housing Services Inflation," (1998) Federal Reserve Bank of Philadelphia Working Paper # 99-9R, with Theodore Crone and Leonard Nakamura.
- "The Tax Treatment of Housing: Its Effects on Bounded and Unbounded Communities," Federal Reserve Bank of Philadelphia Working Paper # 98-23, with Joseph Gyourko.
- "Transportation Investments in the Philadelphia Metropolitan Area: Who Benefits? Who Pays? And



What Are the Consequences?" Federal Reserve Bank of Philadelphia Working Paper # 98-7.

- "The Downtown Parking Syndrome: Does Curing the Illness Kill the Patient?" (1998) Business Review, January/February.
- "Does the U.S. Tax Treatment of Housing Promote Suburbanization and Central City Decline," (1997) Federal Reserve Bank of Philadelphia Working Paper # 97-13.
- "The Suburban Housing Market: The Effects of City and Suburban Job Growth" (1996) Business Review, Federal Reserve Bank of Philadelphia, November/December.
- "Central City Decline: Regional or Neighborhood Solutions?" (1996), Business Review, Federal Reserve Bank of Philadelphia, March/April.
- "Public Transit: Realizing Its Potential," (1994) Business Review, Federal Reserve Bank of Philadelphia, September/October.
- "City and Suburban Growth: Substitutes or Compliments?" (1992) Business Review, Federal Reserve Bank of Philadelphia, September/October.
- "Is Access to Center City Still Valuable?" (1991) Business Review, Federal Reserve Bank of Philadelphia, July/August.
- "Property Taxes, Home Ownership Capitalization Rates, and Housing Consumption" (1991) Federal Reserve Bank of Philadelphia Working Paper, No. 91-13.
- "Consumer Choice With State-Dependent Uncertainty about Product Quality: Late Trains and Commuter Rail Ridership" (1989) Federal Reserve Bank of Philadelphia Working Paper No. 90-7.
- "Unequal Subsidies in Highway Investment: What Are the Consequences" (1989) Business Review, Philadelphia Federal Reserve Bank, November/December.
- "Concentration, Prices, and Output in the Automobile Industry" (1988) Federal Reserve Bank of Philadelphia Working Paper No. 88-6, with Peter Linneman.
- "Commuter Rail Ridership" (1987) Business Review, Federal Reserve Bank of Philadelphia, November/December.

Book Review

- Dynamics of Office Markets: Empirical Findings and Research Issues, by John M. Clapp, 1993. American Real Estate and Urban Economics Association Monograph Series, No. 1: Washington: Urban Institute Press.

EDUCATION

University of Pennsylvania, Philadelphia, PA

Ph.D. Economics, 1986

Dissertation Fellowship: Mellon Seminar on the Future of Cities, 1985.

M.S. Energy Management and Policy, 1980, School of Public and Urban Policy,
NCAA Scholarship for Graduate Study.



Haverford College, Haverford, PA.

B.A. Economics, 1977

Scholar-Athlete of the Year, 1977,

First Team All-American Basketball, Division III, 1977.

