Do Foreign Buyers Really Pay More? Evidence from the Miami Condo Market
by Marcus T. Allen, PhD, Kimberly R. Goodwin, PhD, and Jennifer A. O’Sullivan, PhD
PAGE 17

Applying the Case Study Method to Measure Possible Impact of Proximity to Fracking Transmission Line Facilities on Home Prices
by Richard J. Roddewig, MAI, Michael J. Samuels, MAI, Anne S. Baxendale, and Joseph R. De Marinis, MAI
PAGE 28
Contents

The Appraisal Journal | Winter 2023 | Volume XCI, Number 1

ii Mission Statement
iv Profile: The Appraisal Institute’s 2023 President
v A Message from the Editor-in-Chief

COLUMNS & DEPARTMENTS

1 Cases in Brief
Recent Court Decisions on Real Estate and Valuation
by Benjamin A. Blair, JD

60 Resource Center
Economy at a Glance: Using Bureau of Labor Statistics Local Employment Data in Market Analysis
by Donald R. Epley, PhD, MAI

67 Book Review
A Review of Gary S. DeWeese, MAI’s Land Valuation: Real Solutions to Complex Issues
by Dan L. Swango, PhD, MAI, SRA (Retired)

74 Directory of 2022 New Designees

PEER-REVIEWED ARTICLES

17 Do Foreign Buyers Really Pay More? Evidence from the Miami Condo Market
by Marcus T. Allen, PhD, Kimberly R. Goodwin, PhD, and Jennifer A. O’Sullivan, PhD

28 Applying the Case Study Method to Measure Possible Impact of Proximity to Fracking Transmission Line Facilities on Home Prices
by Richard J. Roddewig, MAI, Michael J. Samuels, MAI, Anne S. Baxendale, and Joseph R. De Marinis, MAI

ANNOUNCEMENTS

77 Appraisal Institute Continuing Education
78 New Appraisal Institute Publications
80 Article Topics in Need of Authors
81 Manuscript Guide
82 Appraisal Journal Order Form

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Craig Steinley, MAI, SRA, AI-GRS, AI-RRS, of Rapid City, South Dakota, is the 2023 president of the Appraisal Institute. He serves on the Appraisal Institute’s Executive Committee and chairs the policy-setting Board of Directors. He will serve as immediate past president in 2024. He also will serve as chair of the National Nominating Committee in 2024.

Steinley’s previous national service includes six years on the Appraisal Institute Board of Directors as a representative from Region II, both as its vice chair and chair. He served on the Audit Committee, including as chair and vice chair; on the Strategic Planning Committee; on the Professional Liability Insurance Program Committee; as Region II third director; on the Governance Structure Project Team; and on the Professional Standards and Guidance Committee. He also served as president of the Wyoming and Western South Dakota Chapter in 2012 and 2013. He participated three years in the Leadership Development and Advisory Council conference and received a 2015 Volunteer of Distinction recognition. Steinley is an education developer and instructor for the Appraisal Institute and is also an AQB-Certified USPAP Instructor.

Steinley is the principal of Steinley Real Estate Appraisals and Consulting in Rapid City, South Dakota. He has also been active in the appraiser regulatory arena since the mid-1990s, including service as the 2018 president of the Association of Appraiser Regulatory Officials. He is a graduate of the South Dakota School of Mines and Technology (SDSM&T) with bachelor's degrees in both mathematics and computer science, and a minor in electrical engineering. He also received a master's degree in mathematics and worked as an assistant professor of mathematics and computer science at SDSM&T for five years, where he instructed engineers and scientists of all ages.
Sale Price Influences

Dear Readers:

Welcome to the latest edition of The Appraisal Journal. This issue offers several articles that consider factors that may influence sale prices.

In this issue’s peer-reviewed section, you will find the cover article, “Do Foreign Buyers Really Pay More? Evidence from the Miami Condo Market.” Here, the authors use a case study approach to examine whether the old axiom that out-of-town buyers pay more still holds. The studied cohort is expanded to include international buyers, and the results suggest that there is more at play in what these buyers pay than merely information asymmetry.

Our second peer-reviewed article, “Applying the Case Study Method to Measure Possible Impact of Proximity to Fracking Transmission Line Facilities on Home Prices,” studies sale prices of homes in proximity to compressor stations and dehydration facilities related to pipelines that transmit fracked oil and gas. These facilities generate noise and can experience failures that raise environmental concerns different from the marketplace concerns associated generally with transmission pipelines. The data analyzed in four compressor station case studies indicate no generalized adverse impact on nearby home prices from proximity to compressor stations. The prices paid per square foot for the homes located closest to the pipelines were typically, but not always, comparable to the prices paid for homes located at greater distances from the pipeline. This variability indicates that location-specific and market-specific analysis is necessary in determining any possible impact.

Appraisers know that the economic health of a market has an important impact on demand and sale prices. Consequently, they will be interested in this issue’s Resource Center column. Resource Center directs readers to data compiled by the Bureau of Labor Statistics on employment within states, MSAs, and labor sectors. This timely information can be invaluable in the market analyses underpinning estimates of sale price.

The Appraisal Journal appreciates the contributions of its authors, and we encourage you to consider becoming a contributor as well.

Stephen T. Crosson, MAI, SRA
Editorial Board Chair and Editor-in-Chief
The Appraisal Journal
Recent Court Decisions on Real Estate and Valuation

Stadium assessment does not include deduction for funding reserve to prevent functional obsolescence

China Basin Ballpark Company LLC (CBBC) owns improvements consisting of a major league baseball stadium (the Ballpark) used by the San Francisco Giants. The Ballpark sits on public land leased to CBBC. The Ballpark was completed in 2000, and starting in 2001, the property tax value of the Ballpark improvements—assessed as a possessory interest by the San Francisco County Assessor (Assessor)—has been contested.

Settlements for the 2001–2010 assessments applied the cost approach to determine value. The 2011–2014 assessments were the subject of a twelve-day hearing in which both parties relied on a cost approach and income approach. In the decision for those years, the San Francisco Assessment Appeals Board (County Board) found that the Ballpark had no functional obsolescence, but nevertheless found that a $300 million deduction was warranted for expected capital improvements and renovations beyond ordinary maintenance. The County Board reconciled the two approaches, and neither party sought judicial review of the decision.

CBBC next returned to the County Board to contest the Ballpark’s value for the 2015–2017 tax years. CBBC and the Assessor stipulated that the cost approach alone would provide a reliable indicator of value and that they would rely exclusively on the cost approach.

In its written decision after a four-day hearing, the County Board agreed that the cost approach was most appropriate for the case. Using the cost approach, the County Board made findings as to land value, replacement cost, and physical deterioration. With regard to functional obsolescence, the County Board agreed with the parties that the Ballpark experienced no functional obsolescence as of the lien dates. But as with the prior findings, the County Board deducted the cost of “substantial capital expenditures” that it believed would be “necessary to prevent functional obsolescence in the future.”

CBBC showed that fan and advertiser expectations would require ongoing capital improvements and renovations beyond ordinary maintenance, and that a reasonable and prudent buyer would anticipate those costs during the term of possession. Thus, the County Board assumed a buyer would account for that future cost by funding a contingency reserve through the anticipated term of possession, which the County Board described as a reserve to prevent functional obsolescence. The County Board calculated the deduction at $180 million per year. The Assessor appealed, first to the superior court, and then to the court of appeal.

California law describes the cost approach as “applying current prices to the labor and material components of a substitute property capable of yielding the same services and amenities, and then applying a depreciation factor.” In general, depreciation is thought of as the difference between the present value of the worn-out or outmoded subject property and the present value of a hypothetical, newly built, modern property of equivalent utility.

On appeal, the Assessor argued that the cost approach considers the replacement cost of a property at the time of valuation, and thus the County Board’s consideration of future depreciation is inconsistent with the cost approach. The income approach is inherently forward-looking and may therefore be better suited to consider a factor like future expenses, but the cost approach
values property as of a specific date. In response, CBBC argued that the ultimate question is what a prudent buyer would pay for the Ballpark’s possessory interest, and substantial evidence supported the conclusion that a prudent buyer would consider the significant future expense of preventing functional obsolescence when determining how much to pay for the Ballpark.

The appellate court found the County Board’s method to be fatally flawed because it was not likely to approximate fair market value. Depreciation does not refer to a decline in the original value of the subject property, but rather to a measurement of the extent to which the subject property is, at a particular point in time, worth less than a hypothetical new property. The County Board deducted the present value of funding a reserve to prevent functional obsolescence, but because there was no current functional obsolescence, a hypothetical new stadium would have the same features as the Ballpark. Moreover, because the need to fund a reserve would be known at the time the stadium was constructed, a hypothetical new stadium would also need to fund a reserve to prevent future functional obsolescence. Accordingly, simply deducting the present value of funding that reserve does not approximate the difference in value between the Ballpark and a hypothetical new stadium.

The court did not dispute that there may be a way to compare the current value of funding a reserve for the Ballpark with the current value of funding a reserve for a hypothetical new stadium. There may also be other means of measuring the future functional obsolescence to reasonably approximate market value. For example, using principles from the income approach, the metric could potentially be the net loss of income that would be caused by future functional obsolescence if not remedied. Although the court expressly did not “direct any particular means be used here,” the court concluded that the County Board’s approach failed to approximate fair market value, and thus the court remanded for the County Board to determine how to do that.

Torres v. San Francisco Assessment Appeals Board No. 1
California Court of Appeal, First Appellate District
March 15, 2023
2023 WL 2644016

Direct, definite evidence needed to demonstrate partiality by neutral appraiser in arbitration

A group of individuals (the Landlords) own a tract of land in downtown Houston, Texas, comprising the eastern half of Block 84. The rest of the land at Block 84 is owned by Bank of America Corporation (BAC). The Bank of America Center, owned by BAC, is located on Block 84.

The Landlords and BAC are parties to a lease agreement concerning the land occupied by the Bank of America Center. The lease provides for fixed rent for the first part of the lease term, ending on December 31, 2016, followed by six revaluation periods during which the parties are required to renegotiate the annual rent due in the latter part of the lease term. The revaluation process is set at 7.5% of the fair market value of the land as of the date one year prior to the commencement of the revaluation period.
To determine fair market value, the lease requires the parties to try to reach an agreement on the value of the land. If they are unable to agree, the lease provides an appraisal process to determine fair market value. The parties each appoint an appraiser, and if the two appraisers cannot agree on a value, they jointly select a “competent and impartial” third appraiser. The decision of two of the three appraisers establishes the fair market value, and the decision is final and binding.

BAC and the Landlords were unable to agree on a fair market value, so the Landlords initiated the appraisal process in May 2016. The Landlords’ appraiser (LL Appraiser) arrived at a value of $14.4 million. BAC’s appraiser (BAC Appraiser) arrived at a value of $8.25 million. Together, LL Appraiser and BAC Appraiser selected a third-party appraiser (Third Appraiser) employed by a national valuation firm (Firm). The Third Appraiser valued the land at $8.7 million.

The point of disagreement between the three appraisers concerned whether the land should be valued with or without access to the downtown tunnel system. The appraisers proposed that each prepare another appraisal to attempt to reach a majority decision, but BAC did not agree.

In November 2016, the Landlords filed a petition seeking declaratory judgment to determine whether the property was to be valued with or without access to the adjacent tunnel. The next day, the three appraisers met, and BAC Appraiser and Third Appraiser agreed that the value of the land was $8,475,000 and confirmed the valuation to the parties. BAC filed counterclaims, and also sought declaratory judgment that the $8,475,000 valuation was binding on the parties. The Landlords then asserted additional claims, alleging that BAC and Third Appraiser did not disclose that they had negotiated Third Appraiser’s services as BAC’s party-appraiser or their significant business relationships. Specifically, the Landlords claimed that they obtained evidence of undisclosed communications and relationships between BAC, Third Appraiser, and the Firm.

After briefing, the trial court entered interlocutory orders granting BAC’s motion to enforce the appraisal award that $8,475 million was the value of the land and granting BAC’s motion for summary judgment on the Landlords’ claims of breach and fraud. The Landlords appealed.

A court must vacate an award if the rights of a party were prejudiced by evident partiality of a supposedly neutral arbitrator.

On appeal, the Landlords first contended that they had offered evidence of “evident partiality”—the neutral’s refusal to disclose critical information—that precluded confirmation of the award. A court must vacate an award if the rights of a party were prejudiced by evident partiality of a supposedly neutral arbitrator. Neutrals are required to disclose any facts that might to an objective observer create a reasonable impression of partiality, but information that is trivial will not rise to this level.

Here, the evidence showed that Third Appraiser had agreed to serve as BAC’s party-appraiser, but he had travel plans that conflicted with the timeline for the party-appraiser’s work. BAC’s personnel told Third Appraiser that if the process were to extend to a third appraiser, he would be “at the top of BAC’s list.” The Landlords argued that a reasonable person could conclude that Third Appraiser might favor BAC in hopes of gaining additional business from BAC, affecting Third Appraiser’s partiality.

The appellate court disagreed. It found that the communications were not the type of direct and definite evidence required to demonstrate an improper motive on the part of the neutral. Instead, the communications regarding Third
Appraiser’s availability and qualifications to serve were nonsubstantive; thus, they did not rise to the level of material fact requiring disclosure.

The evidence also showed that the Firm had ongoing business relationships with BAC and its affiliates, as well as with BAC’s law firm in the case, totaling around $100,000 in fees. The Landlords argued that those transactions demonstrated an ongoing and meaningful client relationship between the Firm and BAC-affiliated entities.

The court again disagreed. It noted that arbitrators and other neutrals are not disqualified merely because of a past business relationship with a party—in part because often the most capable arbitrators will be those with extensive experience in the industry. All of the contacts about which the Landlords complained involved individuals other than Third Appraiser and concerned properties and matters unrelated to the land at issue in this dispute. Third Appraiser had no involvement in those projects and did not receive financial benefit from them. These remote contacts do not demonstrate evident partiality.

The Landlords next claimed that BAC committed fraud by nondisclosure of those same facts. A duty to disclose arises in four scenarios, including when a party voluntarily discloses information that gives rise to the duty to disclose the whole truth, and when a party makes a partial disclosure and conveys a false impression, giving rise to the duty to speak. The Landlords contended that BAC had a duty to disclose under both scenarios.

The court disagreed with the Landlords. The information BAC disclosed did not create a substantively false impression nor was it otherwise misleading with regard to whether some individuals at BAC might have had contacts with other individuals at the Firm unrelated to Third Appraiser. Also, the emails contained no words to create a false impression that BAC and Third Appraiser had never spoken about the matter. The Landlords failed to establish that BAC had a duty to disclose information about BAC’s relationships or prior communications. Similarly, that BAC had a favorable impression of Third Appraiser such that he was “at the top of BAC’s list” is not evidence that BAC intentionally withheld information intending that the Landlords rely on the alleged omission.

Accordingly, finding no evidence to support the Landlords’ claims, and finding no error in the trial court’s judgment, the appellate court affirmed.

Burke v. Houston PT BAC Office LP
Texas Court of Appeals, First District
January 3, 2023
2023 WL 17497

Acquisition of hotel with assignment of contract did not change PILOT agreement

In December 2000, the Town of Harrison, New Jersey (Town) entered into a financial agreement with Harrison Waterfront Urban Renewal LLC (Waterfront) in connection with the construction of a 170-room hotel in the Town’s waterfront redevelopment area. As part of that agreement, the Town approved a long-term tax exemption (LTTE) under state law. The payment in lieu of taxes (PILOT) agreement provided that “the Entity shall make payment to the Town in lieu of taxes in an amount equal to the greater of [$170,000] or an Annual Service Charge equal to 15% of the gross revenue of the Entity.”

In the agreement, the parties expressly acknowledged that an operating entity would lease the project from “the Entity,” i.e. Waterfront, and a summary of the lease was disclosed to the Town as part of the LTTE application. The agreement thus memorialized an understanding that the “gross revenue of the Entity” would be based on the amount generated through the master lease. Since the agreement was in place, the Town consistently calculated the service charge based on the master lease rent revenues.
In May 2018, Excel Holdings Urban Renewal LLC (Excel) and its parent company acquired the hotel. As part of the acquisition, Excel assumed all the rights and obligations of Waterfront under the agreement. The sale was completed with the consent of the Town. The master lease, however, was not assigned. Instead, Excel executed a new master lease with a new affiliated entity as the tenant-operator. The terms remained the same; the only change was the name of the party.

After Excel submitted audited financial reports to the Town in December 2018, the Town sent revised invoices to Excel, significantly increasing the annual service charge. One invoice for an additional $600,947 explained that “use of a Master Lease in an attempt to limit revenue is not valid under” New Jersey law. Because Excel’s financial reports included only room rentals, and not any other income, the Town deemed Excel’s payments insufficient. The Town stated that it would no longer confine the calculation of the annual service charge to the amount of the master lease, but would instead calculate the charge based on the gross receipts of the parent company.

Excel sued, seeking a preliminary injunction for the Town to stop demanding Excel make payments in excess of the December 2000 agreement, and seeking a default under the agreement pending a determination of the annual service charge calculation. The trial court granted summary judgment in Excel’s favor, and the Town appealed.

It is well settled that courts enforce contracts based on the intent of the parties, the express terms of the contract, surrounding circumstances, and the underlying purpose of the contract. A reviewing court must consider the contract language in the context of the circumstances at the time of drafting and apply a rational meaning in keeping with the expressed general purpose.

Here, the agreement provided that “the Entity shall make payment to the Town” equal to either the minimum charge or “15% of the gross revenue of the Entity.” The Entity, for purposes of the agreement, was defined as Waterfront and any subsequent purchasers or successors in interest. Because of the approved transfer of the agreement from Waterfront to Excel, the court concluded that Excel was the Entity within the meaning of the agreement.

The Town’s argument was based on a court decision that was superseded by a statutory amendment which ratified and validated the terms and conditions of any tax exemption approved pursuant to the state law, including the methods used to calculate annual service charges. Thus, the 2018 assignment to Excel did not create a new PILOT agreement. Rather, the existing contract and its method of calculating annual service charges remained in effect. The only change from the assignment is the name of the entity obligated to perform the agreement’s substantive terms.

Accordingly, Excel was deemed to be the contract “Entity,” and thus only its gross revenues generated through the master lease were the basis for the annual service charge, not the revenues of Excel’s parent. The judgment for Excel was affirmed.

Excel Holdings Urban Renewal LLC v. Town of Harrison
Superior Court of New Jersey, Appellate Division
December 6, 2022
2022 WL 17419615
Stormwater management charge is a tax, not a fee

The Borough of West Chester, Pennsylvania (Borough), owns and operates a small municipal separate storm sewer system. In 2016, the Borough Council enacted a stormwater charge as a mechanism by which it would raise revenue to further construct, operate, and maintain its stormwater management facilities. In relevant part, the Borough Code provides that a “stream protection fee” is imposed on every developed property within the Borough that is connected with, uses, or is serviced by the Borough’s stormwater system. All sums collected from the stormwater charges are deposited into a stormwater management fund, which is used to construct and operate the stormwater system, service debt on capital projects, fund pollution remediation measures, and pay for other project costs. The charge owed by an owner of a developed property depends on the amount of impervious surface on the property.

The Pennsylvania State System of Higher Education (PASSHE), in the name of the Commonwealth of Pennsylvania, and West Chester University of Pennsylvania (collectively with PASSHE, the University) are the title owners of portions of the University’s campus that lies partially within the Borough. The Borough asserted that all of the University’s parcels are “developed” for purposes of the stormwater code and that they are connected with, used, and served by the Borough’s stormwater system.

According to the Borough, there is a direct relationship between the amount of impervious surface in a given watershed and the health and quality of the watercourse in that watershed. The Borough contended that the impervious area of the campus lying within the Borough covers 32 acres, about 8% of the Borough’s total impervious area. Accordingly, the Borough sent the University stormwater charge invoices in 2017, 2018, and 2019, which the University refused to pay.

Although the Borough did not dispute that PASSHE and the University are immune from local taxation, the Borough argued that the stormwater charge constituted a fee rather than a tax, and that therefore the University was obligated to pay it. The Borough filed a petition for declaratory judgment against the University in the Commonwealth Court seeking to establish that the Borough’s stormwater charge was a fee for a service, not a tax from which the University is immune. Both parties filed for summary judgment.

A tax is broadly imposed, and it raises money to contribute to a general fund to be spent for the benefit of the entire community. A fee, conversely, is paid to a public agency for bestowing a benefit that is not shared by the general members of the community and is paid by choice.

The court began by analyzing the distinction between a tax and a fee. A tax is an enforced contribution to provide for support of government. A tax is broadly imposed, and it raises money to contribute to a general fund to be spent for the benefit of the entire community. A fee, conversely, is paid to a public agency for bestowing a benefit that is not shared by the general members of the community and is paid by choice. Additionally, a charge is a tax rather than a fee if it is not reasonably proportional to the value or benefit received in return for its payment.

Given that framework, the Borough maintained that the stormwater charge constituted a fee for service as opposed to a tax generally benefiting the public at large, because revenue generated by
the charge funds projects providing specific, discrete benefits to owners of developed property. Owners of both developed and undeveloped properties in the Borough receive the general benefits from the projects funded by the charge.

The University countered that the Borough's stormwater system confers a general environmental benefit on all property owners within and around the Borough. As such, the charge constitutes a tax. The University maintains its own separate stormwater system to collect and manage stormwater runoff and therefore does not rely on the Borough's stormwater system for that purpose. The University has also borne the cost of implementing measures for preventing stormwater runoff, including adding trees, green roofs, rainwater gardens, and pervious paver systems around its campus. The Borough's pollution reduction plan, funded by the stormwater charge, specifically addresses issues at parks and streets away from the University's campus, and thus none of the projects will benefit the University's campus property.

The court agreed with the University. Although the Borough argued there is a direct relationship between the amount of impervious surface area and the extent of stormwater-related issues, the Borough conceded that it had no means of measuring the amount of stormwater runoff that flows from the campus. Thus, no direct measure of the University's purported use of the stormwater system exists.

Moreover, the impervious surface area of a property does not correlate to the level of benefit accorded the owner of that property. The Borough's stormwater charge therefore provides benefits that are enjoyed by the general public, such as decreased flooding, erosion, and pollution, rather than individualized services provided to particular customers. The work funded by the stormwater charge yields a common benefit shared by residents of the Borough generally. Additionally, the stormwater charge does not constitute a special assessment subsidizing a particular project of limited duration. Instead, the charge subsidizes an ongoing series of evolving tasks and projects.

Because the stormwater charge had the hallmarks of a tax rather than a fee for services, the court concluded that the University was immune from paying the charge. It is well settled that property owned by the Commonwealth and its agencies is beyond the taxing power of a political subdivision. Property owned by the Commonwealth or its agencies and instrumentalities is presumed to be immune, with the burden on the local taxing body to demonstrate taxability. Here, the Borough failed to demonstrate that the stormwater charge was a fee or that the University was taxable. Accordingly, the court granted summary judgment in favor of the University and against the Borough.

Borough of West Chester v. Pennsylvania State System of Higher Education
Commonwealth Court of Pennsylvania
January 3, 2023
2023 WL 2486168

Easement of necessity denied by express language in contract

In 2018, Kevin and Pamela Albertson bought a lot in a new subdivision in Mooresville, Indiana. After construction of a home on the lot, the Albertsons contacted Richard and Lisa Cadwell, who owned a 24-acre lot behind and east of, and contiguous with, the Albertsons’ lot. The Albertsons asked the Cadwells to sell them a portion of their property. The Albertsons gave the Cadwells a 10-foot utility easement on the north end of their
lot. And the Cadwells agreed to have “a neighborly agreement that will allow the Albertsons to have an occasional access through [the Cadwells’] remaining ground to access their property.” The agreement expressly provided that it was not a “recorded easement or recorded agreement, just a friendly agreement between neighbors.”

An easement of necessity is equitable in nature, and when the rights of parties are controlled by an express contract, recovery cannot be based on a theory implied in law.

The Albertsons hired a surveyor to prepare a legal description of the new parcel. The surveyor advised the Albertsons that he had discovered a small gap, less than three feet wide, between the Albertson lot and the Cadwell property. Although the Albertsons shared that information with the Cadwells, neither party addressed the gap issue before they closed on the sale of the new parcel on August 2, 2019.

In February 2020, the Albertsons submitted an application for a permit to build a pole barn on the new parcel. In the application, the Albertsons said that the barn would be accessed from their lot. Additionally, the Cadwells had constructed a driveway across their property that connected the Albertsons’ barn to the County Road located east of the Cadwells’ property.

Thereafter, the Cadwells found a buyer for their property, and after the Albertsons did not receive confirmation that the buyer would grant the Albertsons access as the Cadwells had done, the Albertsons sued, seeking an easement of necessity toward the County Road over the Cadwell property. Their theory was that the new parcel was landlocked by virtue of the gap parcel. The Cadwells executed a quitclaim deed to transfer title to the gap parcel to the Albertsons, which was not accepted, and then the Cadwells filed for summary judgment.

After a hearing, the trial court entered summary judgment for the Cadwells. The court concluded that no gap was intended, so no easement by necessity exists, and the parties agreed in their contract that no easement existed. The Albertsons appealed.

An easement of necessity is implied when there has been a severance of the unity of ownership of a tract of land in such a way as to leave one part without access to a public road. An easement of necessity may only arise at the time the parcel is divided and only because of inaccessibility then existing. Here, neither party disputed the unity of title element, but the necessity of the alleged easement was in dispute.

On appeal, the Albertsons contended that necessity contemplates vehicular access. While they can access the new parcel on foot by walking from the road fronting their home, across their parcel and the gap parcel, they argued that the focus of an easement by necessity is not just the ability to access the landlocked parcel on foot but also by vehicle. They also argued that the parties’ intent is not relevant to the question of necessity.

The court of appeals agreed with the Cadwells. The parties agreed at the time of the conveyance of the new parcel that the Albertsons would not have an easement across the Cadwell property. An easement of necessity is equitable in nature, and when the rights of parties are controlled by an express contract, recovery cannot be based on a theory implied in law. Thus, the Albertsons’ claim to an easement fails as a matter of law.

An implied easement of necessity will only be established where the parties’ intent regarding access to real property can only be presumed. Put simply, the law will not support an implied easement where the parties’ explicit intent is otherwise. Here, the undisputed evidence established the parties’ intention that the Albertsons would not have an easement over the Cadwell property.
It was “just a friendly agreement between neighbors” that the Albertsons would have only “occasional access” across the Cadwell property. And the Albertsons did nothing to resolve the gap issue before they closed on the purchase of the new parcel. Thus, they knowingly bought a landlocked parcel without securing an access easement.

Therefore, the court concluded that the trial court did not err when it entered summary judgment for the Cadwells. Judgment affirmed.

**Albertson v. Cadwell**  
Indiana Court of Appeals  
December 14, 2022  
200 N.E.3d 948

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**Assessment should not measure value attributable solely to owner’s use**

Walmart Real Estate Business Trust (Walmart) owns and occupies a 184,000-square-foot retail property in the City of Bad Axe, Michigan (City). Walmart challenged the 2019 property tax assessment of its property. Following an evidentiary hearing at which each party presented expert witness testimony regarding the value of the property, the Michigan Tax Tribunal (Tribunal) issued a written opinion concluding that the true cash value of the property was $4,270,000, essentially half of the value assessed by the City.

In its determination, the Tribunal found that the market analysis and methodology of Walmart’s expert would be given weight and credibility in the Tribunal’s independent determination of the property’s market value. The Tribunal found the analysis of the City’s expert was not credible, rejecting the City’s method that was based on assuming a hypothetical lease for the property. The Tribunal opined that the property’s “fee simple property rights in the context of market value does not contemplate the nonexistent lease as prescribed by” the City’s expert. The City appealed.

In Michigan, assessments are based on the property’s true cash value, which means the usual selling price that could be obtained for the property at private sale. Therefore, the assessment must reflect the probable price that a willing buyer and a willing seller would arrive at through arm’s-length negotiation, and the final value determination must represent the price for which the property would sell irrespective of the specific method employed.

On appeal, the City first argued that the Tribunal committed an error of law by relying on the improper definition of “fee simple.” The City argued that the fee simple ownership includes the right to lease the property. But the court of appeals concluded that the City “misunderstands the nature of the question at issue.” The question is not whether Walmart, as owner of the property, has a right to lease the property to some other entity. Rather, the question is how to properly appraise the fair market value of the property.

The City next argued that the Tribunal erred by rejecting its valuation methodology that valued the property as if it would be sold subject to an existing lease. The court recited its past case law that what must be valued is what would actually be sold. The property was owner-occupied and not encumbered by a lease. Under those circumstances, the hypothetical sale would be of the property without an existing lessee or operating retail business, and thus the property must be valued as if vacant and available. The Tribunal did not err in rejecting the City’s theory.

Furthermore, to the extent that the City contends that the Tribunal’s approach prohibited any consideration of leased properties as comparables, the court held that the City “again misunderstands the issue.” The City could have used sales of leased properties as comparables if appropriate adjustments had been made. But the City did not recognize the need for such adjustments since it believed that the property should be valued as if an inherent feature of the property is the existence of an allegedly successful business tenant.
that would transfer to a new owner along with the real property. The City’s attempt to conflate the distinct concepts of Walmart’s real property and Walmart’s business did not demonstrate that the Tribunal committed an error of law.

Ultimately, the City’s argument on appeal that the existing use of the property as improved should be as a continuously occupied, successful retail store attempts to include in the property’s assessment a measure of value attributable solely to the owner and the owner’s use of the property. Even if the property is in fact continuously occupied and successful, these characteristics of the property are not relevant. They are “accidents of ownership, not measures of value inherent to the property itself.”

Because the Tribunal did not err in rejecting the City’s theory that the property should be valued as though encumbered with a lease, the Court affirmed the Tribunal’s judgment in favor of Walmart.

Walmart Real Estate Business Trust v. City of Bad Axe
Michigan Court of Appeals
October 20, 2022
2022 WL 12071984

Property need not be legally owned by immune entity to be immune from taxation; equitable ownership is sufficient

The Florida State University System is established by the Florida Constitution and governed by a Board of Governors. A Board of Trustees administers each state university in the system. Each Board of Trustees is a public body corporate and a public instrumentality. The University of Florida (UF) Board of Trustees is one such entity, responsible for setting university policies in accordance with state law. UF Health is an academic medical center that fulfills part of UF’s function as a state university. UF Health is predominantly a collaboration between Shands Teaching Hospital and Clinics Inc. (Shands), two other medical centers, and related faculty practice plans, including Florida Clinical Practice Association Inc. (FCPA).

Shands was created by the Florida legislature to lease, manage, and operate the teaching hospital and clinics on UF’s Gainesville campus. Shands—which is organized for the primary purpose of supporting the UF Board of Trustees’ health affairs mission of community service and patient care, education, and training of health professionals—is a major tertiary care teaching institution licensed to operate as an acute care hospital.

Board of Governors’ regulations authorize the establishment of faculty practice plans at state university academic health science centers. FCPA is a faculty practice plan corporation formed to administer the UF College of Medicine’s faculty practice plan. FCPA holds title to medical office buildings constructed on land owned by Shands and leased to FCPA, in which UF College of Medicine clinical faculty practice, teach, and conduct research. FCPA has no employees of its own; rather, its functions are performed by UF College of Medicine employees.

Shands and FCPA requested refunds of ad valorem property taxes paid on properties they owned in Alachua County (County), but those claims were denied, so they filed a Complaint for Declaratory Judgment against the County property appraiser and tax collector. Shands and FCPA sought a declaration that their properties were immune from property taxation because they were instrumentalities of the state, and that they were immune from taxation because their properties were equitably owned by the state.

Both sides filed motions for summary judgment. The trial court denied judgment as to the first claim (that Shands and FCPA were instrumentalities of the state) but granted judgment on the second claim regarding equitable ownership. The trial court relied on the fact that both Shands and FCPA are recognized and relied upon by the state as virtually an arm of UF in fulfilling its health
affairs mission. Because UF supervises, controls, and approves their governance and financial decision making, UF necessarily controls key property rights regarding the properties, enjoys the benefits of owning them, and bears the burdens of ownership. The trial court concluded that the state, through UF, holds virtually all the benefits and burdens of ownership of the properties; the properties were therefore immune from taxation. The County property appraiser and tax collector (collectively, the County Officers) appealed.

The County Officers challenged the trial court’s determination that the properties at issue were legally owed by Shands and FCPA, but equitably owned by the State, and thereby immune from taxation. The concept of immunity from taxation connotes the absence of power to tax, while an exemption presupposes the existence of a power to tax. For purposes of property taxes, immunity for the state is limited to counties, public education entities, and agencies, departments, or branches of state government that perform the administration of state government.

Property need not be legally owned by an immune entity to be immune from taxation, but can instead be equitably owned. Earlier Florida cases concluded that it was unlikely that the Florida legislature intended that property being used for an authorized purpose should be denied a tax exemption solely because it did not hold bare legal title. Similarly, a nonprofit corporation that, as one of its charitable functions, assisted public universities in acquiring, developing, and operating student housing was found to be immune from taxation because UF directly and substantially benefits from the development, operation and management of the housing facility as an addition to the housing supply as well as to further its educational purposes and objectives.

The County Officers attempted to distinguish those cases, but the court of appeal rejected their attempt. Each of the cited cases involved a situation where the immune entity held both the benefits and burdens of ownership of the property at issue. Here, the same thing was true. Shands and FCPA are both nonprofit corporations that implement UF’s health affairs mission. The properties are used by Shands or FCPA for the delivery of health care services, medical education, and scientific research in furtherance of that mission.

The court of appeal agreed with the trial court that because the state through UF holds virtually all of the benefits and burdens of ownership, it is the equitable owner of the properties at issue. The properties are therefore immune from property taxation. The trial court’s judgment in favor of Shands and FCPA was affirmed.

Solomon v. Shands Teaching Hospital and Clinics Inc.
Florida Court of Appeal, First District
December 20, 2022
353 So. 3d 677

Party entitled to challenge condemnation where erroneously omitted from taking petition

Crescent Farms Canton LLC (Crescent) owned a 10,961-acre parcel running along the Etowah River in Cherokee County, Georgia. In 2008, the City of Canton (City) and the county water authority acquired a mitigation easement over 1.98 acres of the property directly abutting the river for conservation purposes. The mitigation easement required that the property be restricted from any further development.

At the time the mitigation easement was obtained, Crescent’s entire property was covered by a security deed to Gilmer County Bank. As part of the easement transaction, the bank released from the security deed only the easement rights and restrictions conveyed in the easement. Sometime later, the bank foreclosed on and took the entire property, except “All that tract... being that area designated as 100’ Mitigation Easement containing 1.98 acres.”
The property was eventually conveyed to Community & Southern Bank, and then to Edgewater Hall Enterprises LLC (Edgewater). The deed to Edgewater conveyed “said tract of land that contains 10.961 acres… LESS & EXCEPT all that tract… being that area designated as 100' Mitigation Easement containing 1.98 acres.”

In 2020, the City sought to acquire a permanent easement from Edgewater to construct and maintain a gravity sewer main and pedestrian trail through the area covered by the mitigation easement. The City had the easement rights appraised at $52,700 but offered Edgewater only $10,000—a figure purportedly based on other settlements it had reached for other easement rights. After negotiations, the parties could not reach an agreement.

The City filed a condemnation petition and declaration of taking in August 2021, but filed it only against Crescent and Bank of the Ozarks, a bank that was a successor in interest to Gilmer County Bank. The City sought to claim a permanent easement and maintained that Crescent and Bank of the Ozarks were the owners of the property at issue. The City deposited $3,800 in “just and adequate compensation.” In accordance with the taking statute, the trial court ordered the property condemned for the City’s use but stated that nothing in the order “is to be construed as depriving any person having an interest in, title to, or claim against said property of the right to appeal the estimated amount of just compensation or of the right” to petition to vacate or set aside the judgment.

Edgewater filed a petition to set aside the declaration of taking. According to Edgewater, it took title to the bank’s entire property interest in 2012, making it the true fee simple owner of the property underlying the mitigation easement. Edgewater argued that the City’s taking should be set aside for the City’s bad faith in dealing with Edgewater and for deliberately failing to serve it with the petition, among other reasons.

The City then filed a second condemnation action for a temporary construction easement across the entire property so it could build the sewer main and walking trail. This time, the City named Edgewater and Bank of the Ozarks as defendants. The trial court again entered an order condemning the property, and Edgewater again petitioned to set aside the declaration of taking.

The court of appeals observed that the burden for establishing bad faith, which will cause courts to interfere with the discretion of a condemning authority, is a high one.

Following a hearing, the trial court denied both of Edgewater’s petitions. The trial court found that Edgewater lacked standing to move to set aside the declaration of taking because it was not the owner of record of the property at issue, it was not the condemnee, and it had not shown it was an interested party who should be added to the action. In the second petition, the court concluded that the City did not act in bad faith or abuse its powers. Edgewater appealed.

The court of appeals observed that the burden for establishing bad faith, which will cause courts to interfere with the discretion of a condemning authority, is a high one: conscious wrongdoing motivated by improper interest or by ill will or fraud. Edgewater argued that the City’s specific acts rose to that level: the City mislabeled the property’s metes and bounds description, divided its taking into two cases, deliberately omitted Edgewater from the case where the larger amount of money was at stake, and failed to recognize Edgewater’s status as owner despite the fact that the City had been conducting ongoing negotiations with it, all in an attempt to hide that Edgewater was not agreeing to the City’s “lowball offers that were far below the appraised value of the easements.”

The court concluded, though, that the record contained at least some evidence to support
the trial court’s conclusion. The City was negotiating with Edgewater under the assumption that it was the owner of the land, but an independent title search led to an erroneous conclusion that Edgewater was not the owner of the property. Thus, the City’s change in position was not conscious wrongdoing. And the City’s “lowball offers” were justified because of a comparable settlement the City had reached with a different property owner.

Edgewater also argued that the trial court erred in concluding that Edgewater was not the owner of the property and therefore lacked standing to challenge the taking. Edgewater emphasized that it paid taxes on the entire 10.961-acre tract and held title to the property by virtue of its deed.

The court agreed. When bringing a condemnation proceeding, the condemning entity is required to file a declaration of taking, which is self-executing in nature. Because a declaration of taking automatically transfers interest in land, to ensure due process to the property owner, the statute must be strictly conformed to by the condemning entity. One requirement of the statute is to set forth the names of the persons whose property or interests are to be taken.

Looking at the deed in question—the quitclaim deed from the bank to Edgewater—the language does not support the trial court’s interpretation that the deed transferred 10.961 acres less the 1.98 acres underlying the mitigation easement. Reading the “less and except” language in its entirety, it is clear that it refers explicitly to the mitigation easement and not the fee simple entirety of the 1.98-acre tract underlying the easement. Nothing in the description says that it also excepts the fee simple underlying the easement. Thus, contrary to the City’s argument, the land underlying the mitigation easement was deeded to Edgewater, and Edgewater is therefore the correct owner of the land.

Accordingly, Edgewater was entitled to be named in the petition, and its interest in the property was sufficient to entitle it to challenge the condemnation despite not being a named party. The court therefore vacated the trial court’s order denying Edgewater’s petition and remanded for a trial on the merits of Edgewater’s petition.

Edgewater Hall Enterprises LLC v. City of Canton
Georgia Court of Appeals
November 1, 2022
880 S.E.2d 582

Privately imposed property restrictions not considered in determining property’s assessed market value for tax purposes

The City of San Francisco (City) owned two office buildings (collectively, the Property) on Mission Street in San Francisco, California. The City decided to offer the Property for sale to finance the construction of a new building. The City did not include an asking price in its offering, but as a condition of the sale, the City required that the purchaser lease the Property back to the City for a period of up to five years: three years at specified below-market rates, followed by two one-year options at market rates.

290 Division (EAT) LLC (290 Division) submitted an offer to purchase the Property for $52 million, which the City accepted. Prior to closing, 290 Division obtained a loan appraisal that valued the Property at $52 million, expressly considering the leaseback. The City obtained an appraisal that valued the property at $61,850,000 without the leaseback. In May 2017, the parties finalized the sale, entered into leases, and executed and recorded a Memorandum of Lease.

Following the transfer in May 2017, the City assessed the Property’s new base year value at $68 million for property tax purposes. 290 Division appealed that assessment, arguing that the assessor failed to consider the leaseback as an “enforceable restriction” in valuing the Property, a term that includes recorded contracts with governmental agencies. The City responded that the
leaseback was not an enforceable restriction because the City negotiated the leaseback while acting in its proprietary capacity, rather than its regulatory capacity. The general rule is that when private parties enter into a below-market lease, the property tax calculation will generally be based on market rent rather than the contract rent.

When private parties restrict a property’s use, such as by encumbering it with a below-market lease, such privately imposed restrictions are not considered in determining the property’s value.

The parties stipulated that the value of the Property was $52 million if the restriction statute applied and $63.1 million if it did not apply. Thus, in purchasing the Property, 290 Division reaped the benefit of a discount of $11 million in exchange for agreeing to the leaseback.

The Assessment Appeals Board (AAB) concluded that the statute did not apply and found the fair market value of the Property to be $63.1 million for tax purposes. 290 Division appealed to the Superior Court, which rejected 290 Division’s “overly literal reading of the statute” and held that the lease was not an enforceable restriction because it lacked a governmental or regulatory component. 290 Division appealed to the court of appeal.

The court began by evaluating the plain language of the statute, as well as the statute’s overall purpose. In California, all property is taxable and shall be assessed at the same percentage of fair market value, which means the price at which the unencumbered or unrestricted fee simple interest in the real property would transfer under typical conditions. Consistent with that principle, when private parties restrict a property’s use, such as by encumbering it with a below-market lease, such privately imposed restrictions are not considered in determining the property’s value.

California Revenue & Tax Code, Section 402.1(a) provides an exception, that the assessor shall consider the effect upon value of “any enforceable restrictions to which the use of the land may be subjected.” A non-exhaustive list is then provided, which includes zoning, environmental constraints, and “recorded contracts with governmental agencies.” Earlier cases found that term to describe “virtually any governmental restriction designed to serve the interest of public health, safety, morals, and/or general public welfare.”

Looking at the other enumerated restrictions, the court concluded that all items on the list included a public interest requirement, meaning that government’s entry into the contract must be for governmental purposes, not proprietary purposes.

290 Division’s pleadings did address that scenario. It argued that the City’s insistence on paying below-market rent advanced a governmental objective serving the public interest because it allowed City employees to continue working at the Property, while also allowing the City to receive funds to finance the construction of a new building. But while those allegations may be true, they do not demonstrate the City’s exercise of its police power. And the City itself reaped the savings from the leaseback, not the public at large.

For those reasons the court concluded that the City’s exercise of its contracting power was not a police power regulation, and thus was not addressed by Section 402.1. The superior court’s judgment in favor of the City was affirmed.

290 Division (EAT) LLC v. City and County of San Francisco California Court of Appeal, First Appellate District December 16, 2022 86 Cal. App.5th 439
Municipal water system is immune to suit involving conservation easement

In 2000, Harcourt Inc., a grantor, owned three tracts of land in Bexar County, Texas, two of which were later combined into what is referred to as the Restricted Property, with the remaining tract referred to as the Development Property. Harcourt intended to develop the Development Property as its corporate headquarters. However, the tracts were located above the Edwards Aquifer, which is the primary source of water for south central Texas. The Edwards Aquifer is vital to the residents, industry, and ecology of the region and Texas’ economy.

In 2000, the Development Property was located in the extraterritorial jurisdiction of the City of San Antonio, which subjected the property to a 15% limit for “impervious cover.” These impervious cover restrictions exist to protect the recharge of the Edwards Aquifer. As a practical matter, the 15% impervious cover restrictions rendered the Development Property incapable of being developed as Harcourt’s corporate headquarters.

As a solution, Harcourt and the San Antonio Water System (SAWS) entered into a tripartite Deed of Conservation Easement for the three tracts. The easement combined the three tracts as a means of resolving the impervious cover restrictions, placing additional restrictions on the Restricted Property so that the purpose of the restrictions remained fulfilled even after development of the Development Property.

In 2012 and 2014, Matiraan Ltd. (Matiraan) acquired property burdened by the easement. Matiraan asserted it had no knowledge of the easement prior to the acquisition. In 2015, Matiraan sought to rezone portions of the property to allow for quarrying. San Antonio refused the zoning application based on the existence of the easement, so Matiraan filed a petition to terminate the easement, to which SAWS was a party. After a hearing, the trial court denied SAWS’s plea to the jurisdiction, i.e. an assertion that SAWS was immune from suit. SAWS appealed the court’s denial of its plea.

Municipal corporations exercise their broad powers through two different roles: proprietary and governmental. The governmental/proprietary dichotomy recognizes that immunity protects a governmental unit from suits based on its performance of a governmental function but not a proprietary function. Proprietary functions subject municipal corporations to the same duties and liabilities as those incurred by private persons and corporations. Determining which functions are proprietary and which are governmental is not always a cut-and-dried task.

To answer that question in this case, the appellate court was guided by four factors: whether SAWS’s act of entering into the easement was mandatory or discretionary; whether the easement was intended to benefit the general public or only those within SAWS’s corporate limits; whether SAWS was acting on the state’s behalf or its own behalf when it entered the easement; and whether SAWS’s act of entering the easement was sufficiently related to a governmental function to render the act governmental even if it would otherwise have been proprietary.

SAWS conceded the first factor weighed in favor of being proprietary. As to the second factor, SAWS argued that the easement was intended to primarily benefit the general public, and not just residents of San Antonio, because of the importance of the conservation of the Edwards Aquifer beyond San Antonio’s boundaries. Matiraan argued that the easement was primarily entered into to facilitate Harcourt’s private development of the Development Property. The court reviewed the language of the easement and concluded that SAWS’s act of entering the easement was sufficiently related to a governmental function to render the act governmental even if it would otherwise have been proprietary.

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The same was true for the third factor. The easement did not confer any collateral benefit, like rent, to SAWS. SAWS was only granted a conservation easement and the rights necessary to enforce it. Thus, SAWS acted as an arm of the government in entering the easement.

For the fourth factor, SAWS asserted that its entry into the easement was related to three governmental functions specifically enumerated in the Texas Tort Claims Act: waterworks, reservoirs, and water and sewer service. The court agreed with SAWS that SAWS’s entry into the easement was plainly related to at least one enumerated governmental function—reservoirs—because the Edwards Aquifer is an underground reservoir of water. Because conservation and protection of the aquifer is a key component of SAWS’s provision of water service, its entry into the easement was related to a governmental function. Thus, the fourth factor weighed in favor of being a governmental act.

Given the balance of the four factors, the court agreed with SAWS that its entry into the easement was a governmental act for which SAWS was cloaked in immunity absent a waiver of such immunity, which was not asserted here. Accordingly, the court reversed the trial court’s order denying SAWS’s plea, and remanded so the trial court could render a dismissal judgment in SAWS’s favor and determine if SAWS was entitled to attorneys’ fees and costs.

San Antonio Water System v. Matiraan Ltd.
Texas Fourth Court of Appeals
March 1, 2023
2023 WL 2290301

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Do Foreign Buyers Really Pay More? Evidence from the Miami Condo Market

by Marcus T. Allen, PhD, Kimberly R. Goodwin, PhD, and Jennifer A. O’Sullivan, PhD

Abstract
Past research has suggested that some nonlocal buyers pay more than locals when purchasing homes. This is an example of information asymmetry and higher information availability for local buyers. Although there is relatively little research broadening nonlocals to foreign buyers, the premium should be even larger to account for the issues of information asymmetry and exchange rates. However, technology has revolutionized the availability of information about local housing markets. Many large companies provide potential buyers with information about local housing prices and neighborhoods (e.g., crime rates and noise levels), and Google imaging capability provides street views of distant properties. This article reconsiders the hypothesis that foreign buyers pay more than US buyers specifically within the Miami condominium market. We find evidence that technology has indeed reduced information asymmetry and that pricing premiums may be attributable to economic crisis in the buyers’ home country.

Introduction
It is generally accepted within the real estate industry that local buyers have an advantage over nonlocal buyers. Local buyers benefit from first-hand knowledge of real estate people in the community, the neighborhood dynamics, and pricing trends. Past research validated this idea, whether the buyers were simply from another town in the same state, out-of-state, or even out of the country. Distance from the location seemed to create a greater level of information asymmetry. Yet, there is an increasing amount of information on local housing markets available online. As technology has improved, this information has become timelier and more accurate. Thus, the premium nonlocal buyers pay for housing could be shrinking in proportion to the decrease in information asymmetry. In light of the new technology and availability of information, it seems appropriate to revisit the question of whether local buyers have a pricing advantage over nonlocal buyers.

To the extent such an advantage exists for local buyers at any given time in a market, appraisers should recognize this market phenomenon and give it due consideration in their analyses. For example, in the sales comparison approach, selection of comparable sales and adjustments to the prices of those sales reflecting conditions of sale (local versus nonlocal buyers) should be carefully considered to ensure adjusted sale prices provide credible indications of the subject property’s value. At the extreme, a comparable sale involving a nonlocal buyer with atypical motivation may not be suitable for use in the sales comparison approach when sufficient market support for the adjustment amount is not available. This argument is similar to the notion that cash versus contingent sales must be handled with due caution in the appraisal process.

Very little research exists on the extreme nonlocal buyer—the foreign buyer of US housing. The information asymmetry is greatest for foreign buyers in US housing markets, because they must overcome more than simply understanding the neighborhoods and local market dynamics. Foreign buyers may be dealing with additional documentation requirements, fluctuating exchange rates, and a bias (price anchoring) toward housing prices in their home country.

This study investigates a unique data set of foreign buyers in the Miami condominium market. The data is used to examine whether foreign buy-
ers pay a premium compared to US buyers and whether there is still significant information asymmetry in the market. In addition, the analysis further examines foreign buyers by their country of origin to observe where pricing premiums may be the highest.

**Review of Literature**

Prior research has established both theoretically and empirically that local buyers have advantages over out-of-town buyers. Turnbull and Sirmans presented a model in which out-of-town buyers would be expected to pay higher prices due to higher search costs and greater information asymmetry with regard to the local market. They were, however, unable to confirm this model using data from Baton Rouge, Louisiana. Baryla and Zumpano found that out-of-town buyers search for a home longer than local buyers. Elder, Zumpano, and Baryla reported that out-of-town buyers have a significantly higher search intensity compared to local buyers.

Early work by Watkins from Glasgow, UK, did not find evidence that buyers from outside the city paid more for properties compared to Glasgow residents. Later work with out-of-state buyers in the United States, however, did find evidence that such a price premium existed. Using data on Florida homes, Ihlanfeldt and Mayock confirm that out-of-state buyers pay more than locals. They find evidence that this is due to both lower information and high search costs as well as an upward bias in house price expectations associated with coming from a higher housing price area (identified as a price anchoring effect by Clauretie and Thistle, and Lambson, McQueen, and Slade). Expectations for foreign buyers should in theory be similar to those of out-of-town buyers. They are the extreme case of out-of-town buyers. Information asymmetry is even higher for these buyers, who face not only differences in market conditions but also factors such as language, currency, culture, and regulation. Miller, Sklarz, and Ordway examine Japanese buyers in Hawaii. They find that Japanese buyers paid prices around 21% higher than native Hawaiians for property and hypothesized that both information asymmetry and the dollar-yen exchange rate could explain the high premium.

Other research into out-of-town buyers addresses investment and commercial properties. These buyers tend to be more knowledgeable than the average residential buyer, so they may have less information asymmetry and lower search costs. Clauretie and Thistle confirm the premium for buyers of investment homes in Las Vegas. Clauretie and Thistle find that out-of-state buyers paid a premium compared to local buyers, but the proxies for anchoring and search costs were not significant after controlling for search duration and intensity. Allen, Rutherford, and Rutherford study discounts on distressed properties for different types of investors.

the greatest discount followed by medium investors, small investors, and institutional investors. So, investor size and bargaining power matter when it comes to price negotiations.

Lambson, McQueen, and Slade examine apartment complex sales in Phoenix and find that out-of-state buyers pay a significant premium. Although their proxies for anchoring behavior and experience are not individually significant, the combined variables suggest that inexperienced buyers from high-cost states pay a significantly higher price premium compared to experienced buyers from low-cost states. More recent work by Liu, Gallimore, and Wiley, Devaney and Scofield, and Ling, Naranjo, and Petrova confirm significant premiums that foreign investors pay for US commercial properties.

Although technology companies such as CoStar make it easier to access information about commercial real estate assets around the world, that information is expensive. Residential home buyers benefit from the fact that there are multiple providers of free information about local home markets and values. Technology, therefore, should greatly reduce the asymmetric information and search costs that out-of-town buyers face. As a result, it could be the case that residential out-of-town or foreign buyers no longer pay a premium compared to local buyers. Kandlbinder, Miller, and Sklarz suggest that the premium has indeed decreased over time. Holmes and Xie, however, show that out-of-state buyers continue to pay more than local buyers but that the premium could be fully explained by the size of the homes. In their sample, out-of-state buyers pay more because they buy bigger houses.

This study extends the current literature in a few important ways. First, it examines the potential premium paid by foreign buyers in US markets. This has largely been ignored in the literature beyond Miller, Sklarz, and Ordway. Second, foreign buyers are identified and studied by country of origin, which further investigates the propensity to pay a premium. Third, the study utilizes a data set of condominium sales, which helps to create a more homogeneous data set compared to typical single-family residential home sales data.

**Case Study of Miami Condominiums**

**Data**

The data for this study are derived from the Miami, Florida, multiple listing service from June 2011 through May 2017. This study period allows for examination of the market during a time of stability after the housing crisis of 2008 and before the COVID-19 pandemic in 2020. The data is restricted to condominium sales in order to reduce the heterogeneity of the sample and also to maximize the number of foreign buyers in the sample. After closing, brokers have the option to enter information about the buyer’s country of origin along with sale price. Brokers do not always enter this information, however. Rather than making assumptions about sales where this information was missing, such sales were excluded from the study analysis. As a result, the study utilizes a sample of 3,650 sale transactions.

Exhibit 1 provides information about the origin and numbers of foreign buyers in the sample. Some of the countries have a relatively small number of total transactions, which could be problematic when attempting to make any kind of statistically significant conclusions. Therefore, the study analysis only includes countries with a minimum of about 50 sales transactions. Exhibit 2 defines the main variables used in the regression analysis, as explained in the next section. Exhibit 3 presents the summary statistics.

---


### Exhibit 1 Sample of Foreign Buyers

The sample of foreign buyers in the data set by country of origin and number of buyers from each country.

<table>
<thead>
<tr>
<th>Country</th>
<th>Buyer Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Argentina</td>
<td>202</td>
</tr>
<tr>
<td>Australia</td>
<td>3</td>
</tr>
<tr>
<td>Brazil</td>
<td>108</td>
</tr>
<tr>
<td>Canada</td>
<td>60</td>
</tr>
<tr>
<td>China</td>
<td>25</td>
</tr>
<tr>
<td>Colombia</td>
<td>88</td>
</tr>
<tr>
<td>France</td>
<td>37</td>
</tr>
<tr>
<td>Germany</td>
<td>4</td>
</tr>
<tr>
<td>India</td>
<td>6</td>
</tr>
<tr>
<td>Italy</td>
<td>49</td>
</tr>
<tr>
<td>Mexico</td>
<td>24</td>
</tr>
<tr>
<td>Russia</td>
<td>48</td>
</tr>
<tr>
<td>Spain</td>
<td>13</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>10</td>
</tr>
<tr>
<td>Venezuela</td>
<td>163</td>
</tr>
<tr>
<td>Other Foreign Countries</td>
<td>354</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1,194</strong></td>
</tr>
</tbody>
</table>

### Exhibit 2 Variable Definitions

<table>
<thead>
<tr>
<th>Variable</th>
<th>Variable Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>LnSP</td>
<td>Natural log of sale price</td>
</tr>
<tr>
<td>LnDOM</td>
<td>Natural log of days on market</td>
</tr>
<tr>
<td>LnSQFT</td>
<td>Natural log of property square feet</td>
</tr>
<tr>
<td>BEDS</td>
<td>Number of bedrooms</td>
</tr>
<tr>
<td>FBATHS</td>
<td>Number of full bathrooms</td>
</tr>
<tr>
<td>HBATHS</td>
<td>Number of half bathrooms</td>
</tr>
<tr>
<td>OCEANVIEW</td>
<td>A dummy variable equal to 1 if the property has an ocean view</td>
</tr>
<tr>
<td>FURNISHED</td>
<td>A dummy variable equal to 1 if the property is listed as furnished</td>
</tr>
<tr>
<td>REO</td>
<td>A dummy variable equal to 1 if the property is listed as REO (owned by lender)</td>
</tr>
<tr>
<td>CASH</td>
<td>A dummy variable equal to 1 if the buyer paid cash for the sale</td>
</tr>
<tr>
<td>SHORTSALE</td>
<td>A dummy variable equal to 1 if the property is listed as a short sale</td>
</tr>
<tr>
<td>ATYPICALITY</td>
<td>A measure of how the property varies from the mean property characteristics in the sample</td>
</tr>
<tr>
<td>USA</td>
<td>A dummy variable equal to 1 if the buyer is from the United States</td>
</tr>
<tr>
<td>ARGENTINA</td>
<td>A dummy variable equal to 1 if the buyer is from Argentina</td>
</tr>
<tr>
<td>BRAZIL</td>
<td>A dummy variable equal to 1 if the buyer is from Brazil</td>
</tr>
<tr>
<td>CANADA</td>
<td>A dummy variable equal to 1 if the buyer is from Canada</td>
</tr>
<tr>
<td>COLOMBIA</td>
<td>A dummy variable equal to 1 if the buyer is from Colombia</td>
</tr>
<tr>
<td>ITALY</td>
<td>A dummy variable equal to 1 if the buyer is from Italy</td>
</tr>
<tr>
<td>RUSSIA</td>
<td>A dummy variable equal to 1 if the buyer is from Russia</td>
</tr>
<tr>
<td>VENEZUELA</td>
<td>A dummy variable equal to 1 if the buyer is from Venezuela</td>
</tr>
<tr>
<td>OTHERFOREIGN</td>
<td>A dummy variable equal to 1 if the buyer is not from the US or any country specified in other control variables</td>
</tr>
</tbody>
</table>
### Exhibit 3  Summary Statistics for Main Variables in the Regression Analysis

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Min.</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>LnSP</td>
<td>12.33</td>
<td>0.79</td>
<td>10.31</td>
<td>16.00</td>
</tr>
<tr>
<td>LnDOM</td>
<td>4.71</td>
<td>0.81</td>
<td>0</td>
<td>7.52</td>
</tr>
<tr>
<td>LnSQFT</td>
<td>6.96</td>
<td>0.38</td>
<td>5.3</td>
<td>8.88</td>
</tr>
<tr>
<td>BEDS</td>
<td>1.77</td>
<td>0.75</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>FBATHS</td>
<td>1.70</td>
<td>0.63</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>HBATHS</td>
<td>0.19</td>
<td>0.40</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>OCEANVIEW</td>
<td>0.18</td>
<td>0.39</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>FURNISHED</td>
<td>0.06</td>
<td>0.24</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>REO</td>
<td>0.13</td>
<td>0.33</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>CASH</td>
<td>0.70</td>
<td>0.46</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>SHORTSALE</td>
<td>0.04</td>
<td>0.20</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>ATYPICALITY</td>
<td>0.04</td>
<td>0.03</td>
<td>0</td>
<td>0.23</td>
</tr>
<tr>
<td>USA</td>
<td>0.67</td>
<td>0.47</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>ARGENTINA</td>
<td>0.06</td>
<td>0.23</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>BRAZIL</td>
<td>0.03</td>
<td>0.17</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>CANADA</td>
<td>0.02</td>
<td>0.13</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>COLOMBIA</td>
<td>0.02</td>
<td>0.15</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>ITALY</td>
<td>0.01</td>
<td>0.12</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>RUSSIA</td>
<td>0.01</td>
<td>0.11</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>VENEZUELA</td>
<td>0.04</td>
<td>0.21</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>OTHERFOREIGN</td>
<td>0.13</td>
<td>0.34</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>
Methodology
The study uses a standard hedonic pricing model that has been well established in the literature. Recognizing the simultaneous relationship between sale price and time on market instrumental variable, a 2SLS model of sale price was employed. In the first stage, the time on market was estimated while controlling for neighborhood (location), seasonal effects, and atypicality. The atypicality measure controls for the degree to which each individual property characteristic varies from the mean value in the sample. In this way, atypicality controls for properties that vary in a significant way from the average property in the sample. The estimator is then included in the second stage equation for the selling price. The selling price equation includes controls for distressed sales and cash sales, which are known to reduce sale price, general property characteristics directly corresponding to property value, and time trend controls. All variables of interest for country of origin are included in the second stage equation.

The general model can be expressed as follows:

$$\text{LnSP}_i = W (\text{ORIGIN}_i, \text{DISTRESS}_i, \text{PROPCHAR}_i, \text{TIME}_i, \text{LnDOM}_i)$$  \hspace{1cm} (1)

$$\text{LnDOM}_i = F (\text{AREA}_i, \text{MONTH}_i, \text{ATYP})$$  \hspace{1cm} (2)

Following this methodology, the variable of interest, ORIGIN, is examined in a few different ways. The analysis will look at whether foreign buyers pay a premium over domestic buyers and also will look closely at how foreign buyers’ behavior may differ from each other based on country of origin.

Results
This investigation begins with the question of whether foreign buyers pay a premium over domestic buyers. The variable of interest USA is a dummy variable that distinguishes US buyers from foreign buyers. A 2SLS model is used where days on market (LnDOM) is modeled in the first stage and included in the second stage regression for sale price (LnSP). Exhibit 4 presents the regression results. Although atypicality is not significant in the first stage, location control variables are unreported in the table but highly significant and indicate that certain neighborhoods are more desirable and thus sell faster than others. Control variables behave as expected with controls for size and quality increasing the sale price, while control variables for distressed properties decrease the sale price.

The variable of interest USA is significant at the 1% level and suggests that domestic buyers pay significantly less than foreign buyers. In other words, foreign buyers do pay more. This value is not only statistically significant but also economically significant. The coefficient −0.067 converts to a difference of 6.5% in the property sale price. The mean sale price in the sample is $224,134. US buyers, therefore, pay $14,570 less than foreign buyers on average for properties in this sample.

It is important to note that this 6.5% premium is considerably less than the 21% premium that Miller, Sklarz, and Ordway found when studying Japanese buyers in Hawaii. This smaller premium supports the idea that technology has driven down the information asymmetry in the residential real estate market over the past twenty years. Foreign buyers now have access to the same data as domestic buyers, which has helped to level the playing field for them in this market.

Next, the analysis takes a closer look at the difference between US buyers and foreign buyers. As in the previous model from Exhibit 4, a 2SLS regression is used to model days on market (LnDOM) in the first stage. This is included in the second stage model for sale price (LnSP). In this model, the US buyer variable is the reference variable. The variables of interest denote foreign buyers from specific locations: Argentina, Brazil, Canada, Colombia, Italy, Russia, Venezuela, and other international countries. Exhibit 5 presents the regression results.

The regression results support the idea that not all foreign buyers are the same. The results in Exhibit 4 indicating that foreign buyers pay more
Exhibit 4 2SLS Regression—Foreign Versus US Buyers

<table>
<thead>
<tr>
<th>Variable</th>
<th>First-Stage Regression</th>
<th>Second-Stage Regression</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Dependent Variable: LnDOM</td>
<td>t-Statistic</td>
</tr>
<tr>
<td>USA</td>
<td>-0.05*</td>
<td>-1.67</td>
</tr>
<tr>
<td>REO</td>
<td>0.01</td>
<td>0.33</td>
</tr>
<tr>
<td>CASH</td>
<td>-0.15</td>
<td>-5.54</td>
</tr>
<tr>
<td>SHORTSALE</td>
<td>0.84</td>
<td>12.16</td>
</tr>
<tr>
<td>FURNISHED</td>
<td>0.11</td>
<td>1.95</td>
</tr>
<tr>
<td>BEDS</td>
<td>-0.03</td>
<td>-0.92</td>
</tr>
<tr>
<td>FBATHS</td>
<td>0.00</td>
<td>-0.02</td>
</tr>
<tr>
<td>HBATHS</td>
<td>-0.05</td>
<td>-1.25</td>
</tr>
<tr>
<td>LnSQFT</td>
<td>0.23</td>
<td>3.31</td>
</tr>
<tr>
<td>OCEANVIEW</td>
<td>0.01</td>
<td>0.31</td>
</tr>
<tr>
<td>ATYPICALITY</td>
<td>0.49</td>
<td>1.10</td>
</tr>
<tr>
<td>LnDOM</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CONSTANT</td>
<td>2.82</td>
<td>6.48</td>
</tr>
<tr>
<td>N</td>
<td>3,650</td>
<td></td>
</tr>
<tr>
<td>R–SQUARE</td>
<td>0.14</td>
<td></td>
</tr>
</tbody>
</table>

Results from 2SLS regression of LnSP. LnDOM is modeled in the first stage and then used in the second-stage regression. Variables for seasonality, time, and location are included but not reported.

* and *** designate statistical significance at the 10% and 1% levels, respectively.
### Exhibit 5 2SLS Regression—US Buyers Versus Foreign Buyers by Country

<table>
<thead>
<tr>
<th>Variable</th>
<th>First-Stage Regression</th>
<th>Second-Stage Regression</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Dependent Variable: LnDOM</td>
<td>t-Statistic</td>
</tr>
<tr>
<td>ARGENTINA</td>
<td>0.10*</td>
<td>1.76</td>
</tr>
<tr>
<td>BRAZIL</td>
<td>0.11</td>
<td>1.09</td>
</tr>
<tr>
<td>CANADA</td>
<td>0.04</td>
<td>0.44</td>
</tr>
<tr>
<td>COLOMBIA</td>
<td>0.10</td>
<td>1.15</td>
</tr>
<tr>
<td>ITALY</td>
<td>0.37***</td>
<td>2.80</td>
</tr>
<tr>
<td>RUSSIA</td>
<td>0.08</td>
<td>0.75</td>
</tr>
<tr>
<td>VENEZUELA</td>
<td>-0.20***</td>
<td>-2.69</td>
</tr>
<tr>
<td>OTHERFOREIGN</td>
<td>0.05</td>
<td>1.20</td>
</tr>
<tr>
<td>REO</td>
<td>0.01</td>
<td>0.20</td>
</tr>
<tr>
<td>CASH</td>
<td>-0.15</td>
<td>-5.57</td>
</tr>
<tr>
<td>SHORTSALE</td>
<td>0.83</td>
<td>12.03</td>
</tr>
<tr>
<td>FURNISHED</td>
<td>0.10</td>
<td>1.83</td>
</tr>
<tr>
<td>BEDS</td>
<td>-0.03</td>
<td>-0.87</td>
</tr>
<tr>
<td>FBATHS</td>
<td>0.00</td>
<td>0.09</td>
</tr>
<tr>
<td>HBATHS</td>
<td>-0.04</td>
<td>-1.20</td>
</tr>
<tr>
<td>LnSQFT</td>
<td>0.23</td>
<td>3.27</td>
</tr>
<tr>
<td>OCEANVIEW</td>
<td>0.01</td>
<td>0.23</td>
</tr>
<tr>
<td>ATYPICALITY</td>
<td>0.52</td>
<td>1.17</td>
</tr>
<tr>
<td>LnDOM</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CONSTANT</td>
<td>2.80</td>
<td>6.49</td>
</tr>
</tbody>
</table>

| N              | 3,650                  | 3,650                  |
| R-SQUARE       | 0.14                   | 0.21                   |

Results from 2SLS regression of LnSP. LnDOM is modeled in the first stage and then used in the second-stage regression. Variables for seasonality, time, and location are included but not reported.

*, **, and *** designate statistical significance at the 10%, 5%, and 1% levels, respectively.
suggest that the findings may be driven by a specific set of foreign buyers. Exhibit 5 shows that buyers from Argentina, Canada, Colombia, Italy, and other foreign countries do not pay a statistically significant higher price compared to US buyers. On the other hand, statistically significant price premiums are paid by buyers from Brazil, Russia, and Venezuela. A CNBC news article reported that buyers from Brazil and Venezuela had the most foreign interest in Miami real estate according to search engine results for 2013–2015 before being replaced by buyers from Russia in 2017.

In the current study, buyers from Brazil and Venezuela paid more than US buyers, with the results significant at the 5% and 1% levels, respectively. The coefficient of 0.1537 on the Brazil variable converts to a difference of 16.6% in the sale prices paid by US buyers and buyers from Brazil. On average, that equates to a $37,233 higher sale price after accounting for time, location, and physical property characteristics. The story is even more pronounced when considering buyers from Venezuela. The coefficient of 0.3534 on Venezuela converts to a 42.4% difference in sale price. Using the average sale price in the sample, that would result in Venezuelan buyers paying $95,007 more than US buyers for the same property. It is hard to make an argument that price anchoring or information asymmetry explains such enormous premiums.

Interestingly, Russian buyers actually paid statistically lower prices than US buyers, and the result is significant at the 5% level. The coefficient of −0.2688 equates to a 23.5% lower sale price. Using the average sale price of $224,134, that corresponds to a $52,824 lower price when compared to US buyers. Since neither price anchoring nor information asymmetry can explain this result, there must be other reasons for the difference that have not been considered in the past studies that clumped all foreign buyers into one category. Russian interest in the Miami luxury real estate market increased 35% following 2016, and Russian real estate developers were involved in many new condo construction projects in Miami. Nemtsova suggests the Russian investors in Miami real estate are extremely wealthy bureaucrats and businessmen who may carry a great deal of bargaining power into their real estate purchases.

Just as real estate has been considered a tangible, stable investment for people inside the United States during times of political and economic uncertainty, US real estate seems to serve the same purpose for foreign buyers looking to move their money outside of their home countries. Both Brazil and Venezuela experienced high levels of political and economic crisis during the period of this study. For these investors, the risk of keeping their money in their home countries for even another month might have resulted in a greater loss in purchasing power than they would experience by paying a premium for their condominium purchase in Miami.

Brazil slid into a severe economic crisis in 2014. The country experienced rising unemployment, high inflation, commodity price shocks, and contracting GDP into 2017. The economic crisis was coupled with a political crisis that resulted in the impeachment of Brazilian president Dilma Rousseff. Plagued with high real interest rates and a continuous devaluation of the Brazilian currency real against the US dollar, emigration from Brazil also increased during this time, with the majority of Brazilians moving to the United States, Canada, Portugal, and Japan. The high levels of political and economic instability at home could have been of higher concern than negotiating the best price for a condominium purchase in Miami. Therefore, a 16.6% pricing premium may have been inconsequential compared to the loss of purchasing power and devaluing of the Brazilian real currency (Exhibit 6).

The political and economic problems in Venezuela were far more severe than those in Brazil during this time. Following the same reasoning, one can see why buyers from Venezuela might pay premiums of over 40% in the Miami condo-

18. Olick, “Russian Buyers.”
minimum market. The risk of loss facing these buyers may have been far greater if they did not quickly get their money into assets outside the country. The economic crisis in Venezuela began in 2013, but it is impossible to know the true extent of the economic damage since the government stopped releasing data in 2014.

Venezuela was once Latin America’s wealthiest country, but that success has been shattered by corruption and poor governance. The suffering in Venezuela is so bad that the economic collapse resembles that of a war-torn nation. Economists suggest there is nothing in recent years to compare to the crisis in Venezuela aside from the situation in 1970s Lebanon. Since 2013, Venezuela has experienced negative interest rates, increasing devaluation of its currency, and nearly a 100% decline in economic activity. In 2019, Venezuela hit a record 10 million percent inflation rate. The purchasing power of most Venezuelans was “reduced to a couple of kg of flour,” and most rely on money sent from family members who have managed to flee the country. Over 5 million people are reported to have emigrated from Venezuela since 2013. Facing such dire economic conditions, it is easy to understand why Venezuelans would desperately want to purchase real estate assets outside the country. Paying even a 46% premium for a condominium in Miami would likely be more favorable than facing losses from another month of hyperinflation in Venezuela.

**Conclusion**

This study examines the pricing premium of foreign home buyers in US markets. With data from the condominium market in Miami, a relatively similar subset of properties and a large number of foreign buyers from a variety of countries is captured for the analysis. The only similar previous study was of Japanese buyers in Hawaii; that study found that the large premium could be attributed to both information asymmetry and exchange rates. Since the time of the Hawaii study, technology has evolved allowing for vast dissemination of information about local housing markets, and therefore, it could be expected that pricing premiums for foreign buyers would have decreased in recent years.

In fact, this study finds evidence to support this hypothesis. When all foreign buyers are grouped...
together and compared to US buyers, there does appear to be a statistically significant price discount for US buyers (or price premium for foreign buyers). Looking more closely at the foreign buyers, however, reveals that buyers from two countries were driving the initial results. Only buyers from Brazil and Venezuela paid a statistically significant premium during the study period. Of special interest is the favorable prices paid by Russian buyers. Future research should focus on the possible source of the bargaining power advantage that Russian buyers experienced.

The pricing premiums identified in this study tend to be related to economic and political crises in the buyers’ home country. In these circumstances, buyers are likely more concerned with quickly converting their home currency into a physical asset valued in US dollars than they are with potentially overpaying for that asset. In other words, paying a $50,000 premium for a condominium in Miami may not be a relevant concern if inflation in the home country will reduce the buyers’ purchasing power by $100,000 in the next month.

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Additional Resources

Suggested by the Y. T. and Louise Lee Lum Library

Appraisal Institute

- Education
  Appraising Condos, Co-ops, and PUDS

- Lum Library, Knowledge Base Bibliographies [Login required]
  - Residential properties
  - Value

- Publications
  - The Appraisal of Real Estate, fifteenth edition
  - Residential Property Appraisal
  - The Valuation of Condominiums, Cooperatives, and PUDS
  - Valuation by Comparison
Applying the Case Study Method to Measure Possible Impact of Proximity to Fracking Transmission Line Facilities on Home Prices

by Richard J. Roddewig, MAI, Michael J. Samuels, MAI, Anne S. Baxendale, and Joseph R. De Marinis, MAI

Abstract

There have been many studies analyzing the effect of environmental concerns related to fracking on home prices. There have also been many studies of the generalized effect of proximity to oil and gas pipelines on nearby home prices and studies of the effect of pipeline spills on home prices and values. Residential appraisers have an obligation to consider and analyze any neighborhood environmental issues that may affect prices and values. This study looks at home prices in proximity to compressor stations and dehydration facilities related to pipelines that transmit fracked oil and gas to refineries. These facilities generate noise and can experience failures that raise environmental concerns different from the marketplace concerns associated generally with oil and gas transmission pipelines. This article applies the case study method and paired data analysis—two generally recognized methods for analyzing a detrimental condition—to analyze the effect on home prices, if any, of fracking-related facilities. Three of the case studies involve analysis of sales before and after a date when environmental incidents occurred.

Introduction: The Fracking Boom and Home Price Impact Studies

The oil shale boom in the United States has generated dozens of studies over the past twenty years analyzing the effect of fracking on prices and values of adjacent and nearby homes.1 Most of those studies involve environmental concerns and issues related to fracking, including methane emissions from the well sites, groundwater contamination by methane and fracking chemicals, leaks from frack wastewater containment lagoons, and spills of fracking chemicals at the well sites or along the roads and highways over which the chemical trucks travel to and from well sites. A number of studies have looked at claims that the

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fracking process itself or the injection of fracking wastes into deep abandoned wells or salt domes can cause earthquakes.\(^2\)

One topic that has not generated significant research to date, however, is the effect on nearby home prices from the compressor stations and dehydration facilities constructed on the connector pipelines that in turn transmit the fracked oil and gas to refineries and processing facilities. The lack of studies specifically related to fracking transmission line facilities may be due to the long history of published studies dealing broadly with the price effect of gas transmission pipelines on home prices. Those pipeline impact studies generally look at the impact of proximity to pipelines on home prices,\(^3\) and the impact of pipeline spills on home prices and values.\(^4\)

While local connector lines are pipelines, and therefore raise the same types of home price and value impact concerns as pipelines generally, the compressor stations and dehydration facilities associated with those lines generate noise and can experience failures that raise environmental concerns that may be different from the marketplace concerns associated with gas and oil transmission pipelines in general. Residential appraisers completing form reports to support mortgage loans have an obligation to conduct a visual inspection of the neighborhood and report on and analyze any environmental issues in the neighborhood that may affect prices and values.\(^5\) This article studies home prices around four compressor stations on fracking gas pipelines in New Jersey and Pennsylvania to demonstrate how case study analysis using paired data analysis can be applied to understand whether compressor station concerns are associated with home price and value impacts.

### Compressor Stations and Dehydration Facilities: Description and Purpose

Compressor stations are pipeline facilities that maintain the flow rate and pressure in a natural gas transmission pipeline. They are necessary to overcome the distance, friction, and elevation changes that can slow the transmission process and also to cool the gas as its pressure is increased.\(^6\) On large interstate transmission lines, they may be constructed at regular intervals varying from 40 to 100 miles—depending on terrain and flow

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5. See, for example, Fannie Mae, Selling Guide: Fannie Mae Single Family (February 1, 2023), which requires that as part of the neighborhood analysis, the appraiser consider “factors that affect the value and marketability of properties in the neighborhood,” including “adverse environmental influences” (page 554), https://bit.ly/41k1GqG.

capacity—and are necessary to repressurize the gas and keep it flowing.

But compressor stations are also necessary on the smaller gathering lines that collect the natural gas from the fracking wells and then connect to the larger transmission lines. A Pennsylvania State University article about compressor stations on these smaller gathering lines offers the following explanation:

Natural gas within a gathering system can arrive at a compressor station at a variety of pressures depending on the pressure of the wells feeding the system and the distance gas travels from the wellhead to the compressor. Regardless of the incoming pressure, the gas must be regulated or compressed to transmission pressures (generally 800 to 1,200 psi) before it can enter an interstate transmission system. Because compression requirements can be significant within the gathering system, these compressor systems are generally large facilities consisting of 6 to 12 compressors in several buildings. Many of these gathering system compressor stations are scaled up in size as more wells are drilled in an area, increasing the demand for compression. The permanent land requirements of a gathering system compressor are generally 5 to 15 acres, but they can exceed this, considering slope of land and other factors.7

Fueled by diesel, gas, or electric engines, compressor stations can create significant noise levels; experience failures that cause explosions, fires, and emissions of natural gas; and be subject to federal, state, or local noise and environmental regulations, depending upon the type of pipeline and where the compressor is located.8

Glycol dehydration facilities are another type of fracking-related transmission line facility. The Society of Petroleum Engineers provides the following description of the purpose of a glycol dehydration facility:

All raw natural gas is fully saturated with water vapor when produced from an underground reservoir. Because most of the water vapor has to be removed from natural gas before it can be commercially marketed, all natural gas is subjected to a dehydration process. One of the most common methods for removing the water from produced gas is glycol.9

The water in the natural gas, if not removed, can create problems. It can freeze in the pipelines, corrode the pipelines, or form hydrates with CO2 and methane and clog equipment and piping.

Like compressor stations, with which they are often co-located, glycol dehydration facilities emit noise and vibration and can be subject to failures. They are a source of emissions as well. Both types of facilities are aboveground industrial installations that are not typically visually compatible with nearby homes and seldom buffered or screened entirely by natural topography or landscaping. Exhibit 1 shows the layout of the components in a typical glycol dehydration unit.10

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7. Penn State Extension, Understanding Natural Gas Compressor Stations.
Exhibit 1 Components of Glycol Dehydration Unit

Case Study 1: Transco Compressor Station 505 Explosion and Fire, Branchburg, New Jersey (2013)

The Pipeline, the Compressor Location, and the Incident

The Williams Gas Transco pipeline running from the Gulf Coast to the northeast is shown in the Exhibit 2 map.

Transco Compressor Station 505 is the origination point for Transco’s Leidy Line, which extends west for 200 miles to Wharton, Pennsylvania, in Potter County. The Leidy Line reportedly contains four gas pipelines: pipeline “A” constructed in 1958; pipeline “B” constructed in 1971; and pipelines “C” and “D” constructed in segments beginning in 1971 and still under construction as of 2013. A 30-mile, 42-inch pipeline addition to the Leidy Line was announced in 2012 and was added to the original Leidy right-of-way between 2013 and 2016 as part of the Leidy Southeast Extension Project.

Transco Compressor Station 505, operated by Williams Gas, is located south of Case Road and west of South Branch Road (Highway 567) in Branchburg, New Jersey, as shown on the location map (Exhibit 3).

In 2009 and 2012, various alterations were made to the Branchburg, New Jersey, compressor station. In 2015, other alterations (that did not include added compression) were made to Compressor Station 505.

A Pipeline Safety Trust report claiming to list all gas transmission pipeline incidents between 1986 and 2009, including incidents in New Jersey, was reviewed, but it did not show any incidents.

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11. An August 1985 petition by Transco for an increase in pressure in its Caldwell Lateral references Compressor Station 505 and mentions that the pipeline dates to 1959.

12. Transco is a subsidiary of Williams Gas Pipe Line Company.

related to Transco Compressor Station 505 during that period. However, there was a significant incident at the facility in 2013. A minor explosion and fire on the night of May 30, 2013, injured 13 workers and required two to be admitted to a hospital. According to an investigation report by the US Department of Transportation Pipeline and Hazardous Materials Safety Administration, workers installing a new valve were welding a 30-inch diameter cap onto a section of pipe when vapor accumulating inside the pipe due to a faulty valve ignited and blew the bolts holding the cap on the pipe. The Williams Company was fined $167,000 as a result of the accident.

Media Coverage of the Incident

The explosion and fire were covered in some detail by the local press and other media. The accident was also the subject of comment at various public hearings related to the Leidy Southeast Expansion Project in the months following the incident. The hearings involved approvals for various additional loops in its pipeline system and upgrades to some of its facilities in New Jersey and Pennsylvania.

Case Study Home Price Sales Data Research

To understand the effect of the compressor station on home prices, home prices between 2000 and 2017 at various distances within one mile of the Transco Compressor Station 505 in Branchburg were collected and analyzed. Only sales of homes south of the compressor station facility were selected for analysis because the homes built immediately adjacent to the north side of the compressor facility are older and of a different

Exhibit 3 Transco Compressor Station 505 Location, Branchburg, New Jersey

14. The document is available at https://bit.ly/3VljyKF. The Pipeline Safety Trust describes itself as an organization that “promotes pipeline safety through education and advocacy, increased access to information, and partnerships with residents, safety advocates, government, and industry, resulting in safer communities and a healthier environment,” https://pstrust.org/about/mission/.

character than the subdivisions located to the south. The map in Exhibit 4 shows the locations of the sales as derived from the Garden State Multiple Listing Service for Branchburg.

Lots that were significantly larger than others were identified, and size difference adjustments were made to sale prices of lots in excess of 2.75 acres. The adjustments were based on an analysis and comparison of prices in the study area. Prices paid for homes on lots between 2.75 and 3.5 acres in size were adjusted down by $50,000, and prices for homes on lots larger than 3.5 acres were adjusted down by $75,000. The Exhibit 5 map shows the lots larger than 2.75 acres that required the downward adjustments for lot size.

A scatter plot trend line analysis of prices paid per square foot at various distances from the compressor station was undertaken. The standard deviation for each of the distance-based sales grouping was calculated and the need to remove outliers considered. The Dictionary of Real Estate Appraisal, seventh edition, defines an outlier as a data point (observation) "with an extreme value (outside of the typical range)." Real Estate Damages, third edition, on

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16. Two sales involving properties substantially larger in acreage than the other sales were also excluded. Both sales were located within 0.25 miles of the facility. One sale involved a 35.6-acre parcel located on Caruso Court that sold in July 2008 for $2 million. The other sale was located on the west side of South Branch Road and the east side of Ronan Way contained 9.31 acres that sold for $49,900 in 2002.

17. Price per square foot rather than nominal price is used in all the case studies reported in this article to eliminate some of the variability due to differences in size of homes that are reflected in the nominal prices.

18. In a Daubert challenge proceeding in a federal district court case in Florida involving trend line analysis, the court ruled that outliers that significantly affect a trend line analysis should be eliminated from a linear regression model. See John Naveški, et al. v. International Paper Company, US District Court for the Northern District of Florida, Pensacola Division, Case No. 3:14cv445/MCR/CJK, Document 93, Filed March 17, 2017.

analysis of the impact of detrimental conditions states as follows:

It is important to consider the inclusion or exclusion of outliers, since a small number of extreme values can impact some statistical analyses. However, the basis for excluding any outliers should be clearly demonstrated. Outliers should normally be excluded using a decision rule (i.e., more than two standard deviations from the mean, 10% above or below the next highest or lowest value, etc.) to minimize bias in the data selection and refinement process. At a minimum, outliers should be investigated to determine why these values differ significantly from the rest of the data.²⁰

To identify outliers, a straight-line, simple linear regression trend line model was run for each of the distance-based data sets to determine its standard deviation. Those trend lines were then graphed as scatter plots as shown in Exhibit 6.

When the two data points in excess of two standard deviations from the linear trend lines are removed, and then the data plotted as both a straight-line and a polynomial trend line,²¹ the reflection points and changing relationships between the prices over time can be seen as shown in the graphic comparisons in Exhibit 7 and Exhibit 8.

²⁰ Randall Bell, Real Estate Damages, 3rd ed. (Chicago: Appraisal Institute, 2016), 43–44.
²¹ Karen Grace-Martin, “Regression Models: How Do You Know You Need a Polynomial?,” The Analysis Factor (bit.ly/42y7Pkf), notes that a polynomial term—a quadratic (squared) or cubic (cubed) term—transforms a linear regression model into a curved line. This is useful when the real estate sale price scatter plot indicates that there is more than a simple straight-line relationship between the sale prices over the period analyzed. As Grace-Martin states, “There are some relationships that a researcher will hypothesize is curvilinear. ...Clearly, if this is the case, include a polynomial term.” A good example of such a situation is the performance of the US housing market during 2004–2015. Home prices rose rapidly between 2004 and 2007, then suffered a significant downturn in the recession, then experienced another upward price swing during the recovery. The relationship between the data points in the scatter plot for the Compressor Station 505 analysis reflects that obvious pricing pattern. For more information on polynomial linear regression modeling, see The Analysis Factor website, www.theanalysisfactor.com/resources/.
Exhibit 6  Linear Trend Line Model of Distance-Based Data Sets

![Linear Trend Line Model of Distance-Based Data Sets](image_url)

Exhibit 7  Straight-Line Trend, Outliers Removed

![Straight-Line Trend, Outliers Removed](image_url)
The $R^2$ (or $R$-squared) value\textsuperscript{22} for the 0.5-mile and 1.0-mile polynomial trend lines are 0.6044 and 0.501 respectively. The $R$-squared value for the 0.25-mile trend line is significantly higher at 0.7133. The $R$-squared value is an indicator of the degree to which there is a relationship between the variables that the trend line is attempting to show.\textsuperscript{23} A value of 1.0 would indicate a perfect correlation between the variables; a value of 0.00 would indicate there is no correlation. All three of those $R$-squared values are relatively low compared to the $R$-squared value that might emerge in a regression model with more variables, such as one that might be constructed to predict prices or values.\textsuperscript{24} However, all three of those $R$-squared values are higher than in the straight-line scatter plot, indicating that a polynomial model better reflects the changes in the marketplace over time and is superior to straight-line trend lines for the purpose of comparing price trends before and after the fire and explosion incident.

**Results of the Trend Line Analysis and Conclusion from the Compressor Station 505 Incident Case Study**

Despite the less-than-optimal $R$-squared values, the scatter plot and polynomial linear regression model indicate that proximity to Transco Compressor Station 505 was not adversely impacting home prices. The housing market within a quarter mile of the compressor consistently outperformed the 1.0-mile market and in all but a few years in the early 2000s outperformed the 0.5-mile market as well.

If the reported May 2013 accident had an adverse impact on home prices, prices for homes

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\textsuperscript{22} The $R^2$ value is also sometimes referred to as the $R$-squared value, the $r^2$ indication, or the coefficient of determination (COD). The Appraisal Institute defines it as follows: “a mathematical representation of the proportion of the variation in $y$ (the dependent variable) accounted for by the multiple linear regression equation.” Appraisal Institute, Quantitative Analysis (Version PC502GDCH-D) (2012), Part 10-286.

\textsuperscript{23} Other factors, such as lot size, date of construction, condition, etc., would also be affecting the prices paid and account for another significant portion of the variation between prices.

\textsuperscript{24} *The Appraisal of Real Estate*, fifteenth edition, contains an example of a multiple linear regression model with four independent variables; the example has an $R$-squared value of 0.830. See “Regression Analysis and Statistical Applications,” Appendix B, 8, bit.ly/3wxsZlI.
closest to the compressor within a quarter mile would be expected to drop by comparison to those located between a quarter and a half mile from the compressor. However, that did not happen—the pre-May 2013 relationship between the 0.25-mile and 0.5-mile trend lines stayed constant in the post-May 2013 period.

However, as shown in the Exhibit 8 trend line comparisons, prices for homes located between a half mile and a mile from the compressor station began to rise faster than prices for homes located closer to the compressor station in 2015. There were no new accidents or incidents at Transco Compressor Station 505 between May 2013 and 2015 that might explain this change in the pricing trend line relationship. The change in the relationship between the lines in late 2015 and early 2016 is likely due to the limited number of sales within a quarter mile (one sale) and in the 0.25-to 0.5-mile zone (two sales) compared to the 0.5-to 1.0-mile zone (four sales) after February 2016.

Case Study 2: Eagle Compressor Station, Chester, Pennsylvania, Incidents (2001 to 2015)

The Pipeline, the Compressor Location, and the Incidents

The Eagle Compressor Station is located on part of a pipeline system formed by the merger of TransCanada Corporation with the Columbia Pipeline Group Inc. in July 2016. The Columbia Pipeline Group portion of that combined system is shown in Exhibit 9. The Eagle Compressor Station has been in operation since at least the 1960s; it is located in Chester Springs, Pennsylvania, about forty miles west of Center City Philadelphia, as shown in Exhibit 10.

Over the years, as part of the Columbia Pipeline Group’s Delaware Valley Energy Expansion Project to provide natural gas to the Mantua Creek Power Plant in Gloucester County, New Jersey, various changes and upgrades were made to the pipelines utilizing the Eagle Compressor Station. These changes included replacing the 10-inch diameter Line 1856 pipeline in Chester County running from Downingtown to the Eagle Compressor Station with a 20-inch diameter line; and adding an additional 6,000-horsepower electric compressor unit as an addition to an existing compressor building at the facility.25

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The Pipeline Safety Trust report describes three Chester County pipeline incidents between 1986 and 2009.\(^\text{26}\) The first was a reported “significant” incident in Lionville on March 30, 2001, described as “corrosion” to a “body of pipe” installed in 1965. This incident caused $104,733 in property damage but did not cause injuries. The second incident was another reported “significant” incident on September 10, 2003, described as “incorrect operation” to a piece of equipment installed in 1967; this incident caused one injury but no property damage. The third incident was a reported “insignificant” incident on July 12, 2009, described as “malfunction of control relief equipment” that caused no injuries but resulted in $115,050 in property damage.

The US Department of Transportation (USDOT) reported on an emergency shutdown of the Eagle Compressor Station in August 2015 due to a fire. During the incident, material was released out of the blowdown stack. There were no injuries or fatalities as a result of this incident, and no reported evacuations. The Pipeline and Hazardous Materials Safety Administration (PHMSA) and USDOT investigated the incident, and USDOT issued a report.\(^\text{27}\)

**Media Coverage of the Incidents**

There were three incidents between 2001 and 2009 at the Eagle Compressor Station; it is not clear whether these caused any local publicity. However, the August 2015 fire and compressor shutdown incident was reported in the *Daily Local News* as follows:

An emergency shutdown system at the Columbia Gas facility in Chester Springs activated Tuesday morning, officials said. According to officials, the emergency shutdown system at Columbia Gas Transmission Eagle Compressor Station in Chester Springs activated, releasing gas into the atmosphere. [A] statement released by Columbia Pipeline Group … stressed this was not a gas leak, adding that the emergency shutdown system is designed to release the gas in the station when activated. No injuries were reported, and there was no evacuation. …Nearby residents smelled mercaptan, a colorless, flammable, invisible gas that smells like rotten cabbage. Mercaptan is often added to pipelines to make gas leaks more noticeable.\(^\text{28}\)

**Case Study Home Price Sales Data Research**

To understand the potential impact of the Eagle Compressor Station on prices for nearby properties, sales data involving single-family homes in the immediate surrounding area were collected and analyzed. The Exhibit 11 map shows single-family detached home sales\(^\text{29}\) between 2002 and 2017 in the Byers Station and the Reserve at Eagle Village subdivisions to the south and southwest of the Eagle Compressor Station and in the Windsor Ridge subdivision to the west across Fellowship Road.\(^\text{30}\) All of the sales shown on the map are within approximately one mile of the Eagle Compressor Station and are denoted by distance from the facility.

A scatter plot trend line analysis was undertaken to compare prices paid per square foot for homes within the various concentric rings between 1,000 feet and slightly more than one mile from the compressor station. As in Case Study 1, the straight-line regression for each data set was modeled to identify the standard deviation and potential outliers. That scatter plot is shown in Exhibit 12.

As in Case Study 1, outliers were then excluded and the polynomial linear regression for each data set modeled and compared graphically as shown in the Exhibit 13 scatter plot diagram.

If proximity to the Eagle Compressor Station was always adversely impacting home prices, the sale price trend line for homes located closest to the facility would be expected to be consistently below the trend lines for homes located at greater distances. Instead, as shown in Exhibit 13, the trend line for homes located closest to the compressor station was higher between 2005 and 2008, lower between 2008 or 2009 and 2014, and then trended higher again from 2014 into 2017.

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29. The outer two rings in both Byers Station and Windsor Ridge contain attached townhouses as well, and those have been excluded from the analysis to ensure an apples-to-apples comparison of prices paid in the four concentric rings.

30. These subdivisions were selected for their similarity in lot size, home sizes, and dates of construction.
**Exhibit 11** Home Sales near Eagle Compressor Station, 2002–2017

**Exhibit 12** Sale Price per Square Foot Scatter Plot Trend Line Analysis
The compressor station has been in operation since at least the 1960s. The Pipeline Safety Trust and USDOT information report no significant operational changes at the facility that might account for the steeper decline in relative sale prices for homes within 1,000 feet compared to homes at greater distances that began in 2006 and lasted till about 2011. Although there was an incident at the compressor station in July 2009 (shown with a vertical dashed line in Exhibit 13), the decline in home prices within 1,000 feet began before that date. That decline also started at least two to three years before the September 2003 incident at the facility that caused no property damage. Also, starting in 2012 or early 2013, homes located closest to the compressor at distances of less than 1,000 feet and less than 2,000 feet began increasing in value at a rate that exceeded the rate of increase for homes located at distances of 4,000 feet and a mile or more from the facility.

If the more serious August 2015 incident at the facility (that date is also shown with a vertical dashed line in Exhibit 13) was affecting home prices, it would be expected that homes located within 1,000 feet and within 2,000 feet would show a change in their pricing relationship to homes at greater distances. That did not happen. The homes closest to the Eagle Compressor Station continued to appreciate in price at a rate that exceeded that of homes farther away.

Note, however, that the R-squared values as shown in Exhibit 13 are relatively low and are the lowest for the distance grouping for 5,200 feet. That suggests there are other variables affecting the prices that are not explained by the simple polynomial trend lines using sale price per square foot and date of sale as the two variables. On-site physical inspection of the neighborhood indicated that in the Byers Station development, variations in model type, dates of construction, views and topography, as well as variations in lot size also were likely factors affecting sale prices. If a residential appraiser experienced in this marketplace was appraising a particular home in the Byers Station development, variations in model type, dates of construction, views and topography, as well as variations in lot size also were likely factors affecting sale prices. If a residential appraiser experienced in this marketplace was appraising a particular home in the Byers Station development, variations in model type, dates of construction, views and topography, as well as variations in lot size also were likely factors affecting sale prices.
2,000 feet distance from the compressor station.\textsuperscript{31} The Exhibit 14 map shows those sales.

Once again, the standard deviation and outliers were identified and removed through a straight-line regression model and a polynomial regression line model plotted as shown in Exhibit 15.

The scatter plot trend line analysis for Windsor Ridge indicates that there was no effect on home prices from proximity to the Eagle Compressor Station during the years of analysis in one subdivision located across a busy road from the compressor station. The polynomial regression lines track each other well. There is also no indication that either the insignificant incident in July 2009 or the more serious August 2015 incident (both dates shown in vertical dashed lines on the scatter plot in Exhibit 15) had any measurable effects on home prices. In fact, if anything, home prices within 2,000 feet appear to have slightly outperformed prices in the portion of Windsor Ridge located at a distance greater than 2,000 feet from the compressor station.

Average prices per square foot each year in Windsor Ridge were also analyzed, comparing the average price paid per square foot within 1,500 feet of the Eagle Compressor Station to the average sale price per square foot for homes located at a distance greater than 1,500 feet. Again, the home price trend lines track closely to each other; as shown in the Exhibit 16 graph, there appears to be no measurable correlation between the average price differential and proximity to the compressor station in response to either the July 2009 or the August 2015 incidents.

\textbf{Eagle Compressor Station Case Study Trend Line Analysis Results and Conclusion}

The trend line and sale price analysis indicate no reasonably probable evidence of an impact of the compressor station generally or the incidents at Windsor Ridge.

\textsuperscript{31} The number of homes within 1,000 feet at Windsor Ridge is limited. Therefore, the number of sales each year is small and insufficient to provide much statistical support to an analysis of impact from less than 1,000 feet distance from the Eagle Compressor Station for homes at Windsor Ridge only.
**Exhibit 15** Windsor Ridge Sales by Distance from Eagle Compressor Station, Outliers Excluded, 2,000 feet

![Graph showing sales data](image1)

- **R² = 0.4612**
- **R² = 0.5251**

**Sale Price per Square Foot, Windsor Ridge Subdivision**
Chester Springs, PA 2005–2017

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**Exhibit 16** Windsor Ridge Average Sale Price per Square Foot, 1,500 Feet

![Graph showing average sale price](image2)

- **Eagle Compressor Station**
- **Average Sale Price per Sq. Ft. 2005 to Aug. 2017**

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- Within 1,500 ft
- Outside 1,500 ft
the compressor station on adjacent or nearby home prices. While there is some evidence of a decline in price for homes located closest to the compressor station at the time of the 2009 incident, the trend line in Exhibit 13 shows that the decline began earlier than the date of the incident, then prices recovered, and were not affected later by the more serious 2015 event. It is likely that in the Byers Station development located closest to the pipeline, variations in home model type, dates of construction, views, and topography as well as variations in lot size were factors affecting prices as evidenced by the trend line and sale price analysis at the Windsor Ridge development where there are fewer variations in home size, lot size, views, topography, and dates of construction.

Case Study 3: Downingtown Compressor Station, West Bradford Township, Pennsylvania (2001 to 2015)

The Pipeline and the Compressor Location
Like the Eagle Compressor Station, the Downingtown Compressor Station is located west of Philadelphia and is operated by TransCanada Corporation (formerly Columbia Gas Pipeline Group). West Bradford Township, in which Downingtown is located, is about five miles southwest of Chester Springs where the Eagle Compressor Station is located.

The Downingtown Compressor Station reportedly was constructed in 1960 and is part of the Columbia Midstream natural gas network. According to the Federal Energy Regulatory Commission (FERC), the facility was modified by the addition of two motor-driven compressor units installed in April 2004 and modified in 2015.

Exhibit 17 shows the location of the compressor station in relation to the adjacent Highlands neighborhood. Homes in the Highlands are between approximately 400 feet and 2,150 feet from the compressor station. The homes range in size from 1,700 to 4,400 square feet on lots varying in size from 0.35 to 0.65 acres. The oldest homes in the Highlands neighborhood date to 1987, more than twenty-five years after the reported construction of the compressor station.

Unlike the Transco Compressor Station 505 and the Eagle Compressor Station, there were no reported compressor station incidents during the period of this case study analysis.
**Case Study Home Sale Price Data Research**

Highlands home sale prices between 1989 and 2017 were collected and analyzed. Exhibit 18 shows the location of the sales differentiated between those inside or outside a distance of 1,000 feet from the compressor station. There is an electrical transmission line running through the neighborhood, and in order to exclude some of the potential impact on prices from proximity to the power line, sales of homes that abut the power line were excluded from the analysis. Average sale price paid per square foot of above-grade finished space each year between 1989 and 2017 for homes within and outside a distance of 1,000 feet from the facility is shown in Exhibit 19.

To investigate whether differences in house size contributed to the differential in nominal prices, sales were also analyzed on a price paid per square foot basis. Exhibit 19 shows the average price per square foot (above-grade finished space) for the proximate sales and the control set sales.

In seven of the nine years in which a comparison can be made, homes located closest to the compressor station sold at a lower price per square foot. On average, the homes located within 1,000 feet of the compressor station sold for prices that were approximately −3.2% lower than homes in the Highlands located farther from the facility. The median price differential was −6.5% lower. The consistency of lower proximate sale prices per square foot indicates that proximity to the compressor station creates a small negative impact on residential property values.

However, there were differences between the sold homes as to age, total square footage, number of baths, number of garage spaces, and presence of a finished basement. Adjustments were made for those differences in physical characteristics, 32 and the adjusted price comparisons are shown in Exhibit 20.

32. Age adjustments were as follows: 0 to 5 years (no adjustment); 6 to 10 years (+5.0%); 11 to 20 years (+10%); and 20 to 30 years (+15%). The garage adjustment was $10,000 per space and the full bath adjustment was $10,000. Homes with finished basements were adjusted downward by $10,000 when comparing them to homes without a finished basement.
### Exhibit 19  Average Resale Price per Square Foot: Unadjusted for Differences in Physical Characteristics

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<th>Year</th>
<th>Proximate (&lt;1,000 ft.) ($)</th>
<th>Control (&gt;1,000 ft.) ($)</th>
<th>Difference (%)</th>
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<td></td>
<td></td>
</tr>
<tr>
<td>2014</td>
<td>171.88</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2015</td>
<td>202.67</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2016</td>
<td>230.49</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2017</td>
<td>225.83</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Average**  −3.19  
**Median**  −6.52

*In 2004, there was only one sale, so that year does not indicate an average price.

### Exhibit 20  Average Resale Price per Square Foot: Adjusted for Differences in Physical Characteristics

<table>
<thead>
<tr>
<th>Year</th>
<th>Proximate (&lt;1,000 ft.) ($)</th>
<th>Control (&gt;1,000 ft.) ($)</th>
<th>Difference (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1989</td>
<td>96.61</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1990</td>
<td>87.05</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1991</td>
<td>102.85</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1992</td>
<td>78.66</td>
<td>88.71</td>
<td>−11.33</td>
</tr>
<tr>
<td>1993</td>
<td>82.88</td>
<td>88.54</td>
<td>−6.39</td>
</tr>
<tr>
<td>1994</td>
<td>91.48</td>
<td>76.86</td>
<td>+15.98</td>
</tr>
<tr>
<td>1995</td>
<td>85.21</td>
<td>102.79</td>
<td>−17.10</td>
</tr>
<tr>
<td>1996</td>
<td>96.90</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1997</td>
<td>87.56</td>
<td>93.29</td>
<td>−6.14</td>
</tr>
<tr>
<td>1998</td>
<td>93.30</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1999</td>
<td>103.83</td>
<td>105.38</td>
<td>−1.47</td>
</tr>
<tr>
<td>2000</td>
<td>105.43</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2001</td>
<td>120.92</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2002</td>
<td>131.49</td>
<td>151.00</td>
<td>−12.92</td>
</tr>
<tr>
<td>2003</td>
<td>184.53</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2004</td>
<td>160.80</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2005</td>
<td>191.79</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2006</td>
<td>214.52</td>
<td>200.53</td>
<td>−6.52</td>
</tr>
<tr>
<td>2007</td>
<td>196.33</td>
<td>177.24</td>
<td>−9.72</td>
</tr>
<tr>
<td>2008</td>
<td>225.83</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2009</td>
<td>189.11</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2010</td>
<td>129.96</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2011</td>
<td>192.82</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2012</td>
<td>200.91</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2013</td>
<td>230.49</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2014</td>
<td>225.83</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Average**  −6.17  
**Median**  −6.52
In seven of the nine years in which a comparison can be made, the adjusted price per square foot for homes located closest to the compressor station was measurably lower than for those located farther away. In one year (1999), the price differential (−1.47%) was so close as to indicate no difference. The average and median differentials were −6.2% and −6.5%. Again, the consistency of lower adjusted sale prices per square foot for homes located within 1,000 feet of the compressor facility tends to indicate that there is a correlation between proximity to the compressor station and an impact on value of less than −10%.

The proximate sales were substantially closer to the Downingtown facility than the control set. The average distance from the Downingtown facility for proximate resales was approximately 690 feet while the control set distance averaged approximately 1,470 feet as shown in Exhibit 21.

To better understand the relationship, if any, between distance from the Downingtown Compressor Station and prices, a “best fit” linear regression model was also run (Exhibit 22). This shows the relationship between each “proximate” impact percentage and the average price per square foot for the control sales in the same year. The graph in Exhibit 22 indicates that as distance from the Downingtown facility increases, the effect of proximity on price decreases.

When the three outliers are removed according to the criteria discussed earlier, the relationship between impact on price and distance from the Downingtown Compressor Station can be seen, as presented in the models in Exhibit 23 (straightline model) and Exhibit 24 (polynomial model).

The removal of the three outliers significantly improves the R-squared values of the model, but even so the R-squared values are relatively low at 0.3423 and 0.3895. The polynomial trend line analysis has a slightly higher R-squared and is therefore the best-fit regression line given the data points.

The trend line regression model explains less than 40% of the variation in price impact, implying that there is either some better equation to explain the data or that the relationship between distance and impact is not that strong. There are likely additional factors other than distance to the Downingtown Compressor Station that determine the remaining 60% of the single-family home price variation not explained by the adjustments included in the model. The relatively low R-squared values are probably

---

**Exhibit 21 Average Distance of Resales to Downingtown in Feet**

<table>
<thead>
<tr>
<th></th>
<th>Proximate</th>
<th>Control Set</th>
<th>Indicated Price Differential (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1989</td>
<td>1,515</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1990</td>
<td>1,267</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1991</td>
<td>1,143</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1992</td>
<td>802</td>
<td>1,340</td>
<td>−11.33</td>
</tr>
<tr>
<td>1993</td>
<td>755</td>
<td>1,470</td>
<td>−6.39</td>
</tr>
<tr>
<td>1994</td>
<td>792</td>
<td>1,331</td>
<td>+15.98</td>
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<tr>
<td>1995</td>
<td>596</td>
<td>1,380</td>
<td>−17.10</td>
</tr>
<tr>
<td>1996</td>
<td>842</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1997</td>
<td>725</td>
<td>1,668</td>
<td>−6.14</td>
</tr>
<tr>
<td>1998</td>
<td></td>
<td>1,339</td>
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</tr>
<tr>
<td>1999</td>
<td>827</td>
<td>1,594</td>
<td>−1.47</td>
</tr>
<tr>
<td>2000</td>
<td></td>
<td>2,140</td>
<td></td>
</tr>
<tr>
<td>2001</td>
<td></td>
<td>1,367</td>
<td></td>
</tr>
<tr>
<td>2002</td>
<td>539</td>
<td>1,234</td>
<td>−12.92</td>
</tr>
<tr>
<td>2003</td>
<td></td>
<td>1,618</td>
<td></td>
</tr>
<tr>
<td>2004</td>
<td>428</td>
<td></td>
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<tr>
<td>2005</td>
<td></td>
<td>1,143</td>
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<td>2006</td>
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<td>2007</td>
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<td></td>
</tr>
<tr>
<td>2009</td>
<td>600</td>
<td></td>
<td></td>
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<tr>
<td>2010</td>
<td>960</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2012</td>
<td></td>
<td>2,019</td>
<td></td>
</tr>
<tr>
<td>2013</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2014</td>
<td>649</td>
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<td></td>
</tr>
<tr>
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<td></td>
<td>1,436</td>
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</tr>
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<td>2016</td>
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<td>2017</td>
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</tr>
<tr>
<td>Average</td>
<td>688</td>
<td>1,469</td>
<td>−6.17</td>
</tr>
</tbody>
</table>
Exhibit 22  Downingtown Linear Regression: Distance vs. Percentage Impact, Straight Line

\[ y = 0.0002x - 0.1888 \]
\[ R^2 = 0.0901 \]

Exhibit 23  Downingtown Linear Regression: Distance vs. Percentage Impact, Outliers Removed

\[ y = 0.0002x - 0.1978 \]
\[ R^2 = 0.3423 \]
also a function of the limited number of data points in the regression.

Nonetheless, the trend line describes a negative impact on property values within approximately 800 feet of the compressor station and no impact at a distance in excess of 800 feet. There is one data point indicating a potential adverse impact of about −15% at a distance under 400 feet. When the cluster of data points between 600 feet and 800 feet is considered, the average impact at that distance is about −6.75%.

The trend line indicates the predicted value impacts from the compressor station beginning 200 feet from the station as shown in Exhibit 25. It indicates no statistically measurable negative impacts on value for average distances of 950± feet from the Downingtown Compressor Station.

The marketing times (days on market) for homes within 1,000 feet were compared to the marketing times for homes located at a distance greater than 1,000 feet. If proximity to the Downingtown Compressor Station was adversely impacting the marketplace, it would be expected that homes in closer proximity to the compressor station take longer to sell. However, as indicated in Exhibit 26, homes located within 1,000 feet of the compressor station typically took less time to sell than those located farther away, an indication that proximity to the compressor station did not increase marketing time. Note that in some years there is no data or the data set is limited, so the significance of the marketing time comparison in Exhibit 26 is limited. Despite this, there is a general pattern to the comparison indicating that marketing times for homes within 1,000 feet are typically less than for homes farther away.

Conclusion for West Bradford Township, Pennsylvania TransCanada/Columbia Midstream Pipeline Case Study

Comparisons of the average sale price per square foot indicate a price differential of between −6.0% and −6.5% for homes located within...
Case Study Method to Measure Possible Impact of Proximity to Fracking Transmission Line Facilities on Home Prices

Exhibit 26 Marketing Time (Days on Market)

<table>
<thead>
<tr>
<th></th>
<th>Proximate (&lt;1,000 ft.)</th>
<th>Control (&gt;1,000 ft.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1992</td>
<td>14</td>
<td>78</td>
</tr>
<tr>
<td>1993</td>
<td>9</td>
<td>63</td>
</tr>
<tr>
<td>1994</td>
<td>18</td>
<td>23</td>
</tr>
<tr>
<td>1995</td>
<td>50</td>
<td>54</td>
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<tr>
<td>1996</td>
<td>36</td>
<td>—</td>
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<tr>
<td>1997</td>
<td>125</td>
<td>175</td>
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<tr>
<td>1998</td>
<td>—</td>
<td>126</td>
</tr>
<tr>
<td>1999</td>
<td>9</td>
<td>20</td>
</tr>
<tr>
<td>2000</td>
<td>—</td>
<td>10</td>
</tr>
<tr>
<td>2001</td>
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<td>25</td>
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<td>—</td>
<td>0</td>
</tr>
<tr>
<td>2006</td>
<td>—</td>
<td>35</td>
</tr>
<tr>
<td>2007</td>
<td>51</td>
<td>17</td>
</tr>
<tr>
<td>2008</td>
<td>—</td>
<td>—</td>
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<tr>
<td>2009</td>
<td>30</td>
<td>—</td>
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<td>2010</td>
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<td>—</td>
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<td>—</td>
<td>—</td>
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<td>—</td>
<td>91</td>
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<tr>
<td>2013</td>
<td>—</td>
<td>—</td>
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<tr>
<td>2014</td>
<td>53</td>
<td>—</td>
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<tr>
<td>2015</td>
<td>—</td>
<td>41</td>
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<tr>
<td>2016</td>
<td>—</td>
<td>9</td>
</tr>
<tr>
<td>2017</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Average</td>
<td>32.5 Days</td>
<td>49.2 Days</td>
</tr>
</tbody>
</table>

1,000 feet of the compressor station on the pipeline. The trend line analysis indicates a differential in property values of between −5.0% and −10.0% within approximately 800 feet of the compressor station and no impact at a distance in excess of 800 feet. When the cluster of data points between 600 feet and 800 feet is considered, the average impact at that distance is about −6.75%. While that differential in prices could be due to proximity to the compressor station, it could also be due in whole or in part to the presence of the power line that runs through the neighborhood. Even though sales directly abutting the power line were excluded from the analysis, it is necessary to drive under the power lines to access the properties in closest proximity to the compressor station, which could be a factor affecting prices that buyers are willing to pay.

Case Study 4: Marietta Compressor Station 24A, Lancaster County, Pennsylvania, Incident (2012)

The Pipeline, the Compressor Location, and the Incident

Marietta Compressor Station 24A is located on the 9,096-mile Texas Eastern Transmission pipeline (Exhibit 27), connecting Texas and the Gulf Coast with electric generation facilities in the northeast.

Compressor Station 24A is located in southeastern Pennsylvania close to the Susquehanna River in western Lancaster County. The station is on 29.2± acres on the north side of River Road (PA 441), west of Maytown Roads (S. River Street) in East Donegal Township, Lancaster County, Pennsylvania, as shown on the map in Exhibit 28.

A 33-mile finger of pipeline extending south from Marietta to Transco Compressor Station 195 near Delta, Pennsylvania, began construction in

Exhibit 27 Texas Eastern Transmission Pipeline

2010. As part of that project, the company also intended to replace existing compressors with more efficient units at its compressor stations. Ultimately, a 39-mile pipeline was constructed and in conjunction with the compression expansion began service on August 26, 2011.33

On April 13, 2012, there was a gas leak and explosion incident event at the Marietta Compressor Station.

**Media Coverage of the Incident**

That incident was reported in the local press, and the Pipeline and Hazardous Materials Safety Administration (PHMSA) followed up with an incident investigation and report. The incident was reported in “Lancaster Online” as involving no injuries and “the situation was declared under control within an hour.”34

The PHMSA reported that “the station operator suffered injuries during the explosion and was taken to a local hospital for treatment...Damage to the station was confined to the air piping within the main compressor building. There was no release of gas and no fire resulting from this incident.”35

| Exhibit 28 Location Marietta Compressor Station 24A |

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Case Study Home Sale Price Data Research

To understand the effect of the compressor station and the incident on home prices, sale prices between 2000 and 2017 for homes located at various distances within one mile of the Texas Eastern Compressor Station in Marietta were collected and analyzed.36 Exhibit 29 shows the locations of the sales.

The areas delineated in Exhibit 29 are respectively 500 feet, 1,000 feet, and 1,500 feet from the perimeter of the compressor facility site, and represent roughly one-tenth of a mile, two-tenths of a mile, and one-third of a mile distances.

All the residential units in this analysis were part of a single subdivision and were built in a similar time frame with units of similar design and construction. The single-family homes in the area located outside of the 1,500-foot perimeter were significantly different in character from the homes in the selected data set and therefore were excluded from the analysis.

A scatter plot trend line analysis of townhome prices paid per square foot at various distances from the compressor station was prepared. The scatter plot trend line analysis indicated that four outliers needed to be removed. Exhibits 30 and 31 show the corrected scatter plot and polynomial trend lines for the distance comparisons. Note that the average price per square foot for townhome sales within 500 feet of the compressor station is higher than for townhomes located at greater distances.

The $R^2$ (or $R$-squared) value for the polynomial trend lines for 500 feet, 1,000 feet, and greater than 1,000 feet are 0.7761, 0.6901, and 0.7587, respectively. All three of those $R$-squared values are higher than in the straight-line scatter plot, indicating that a polynomial model better reflects the changes in the marketplace over time.

The polynomial trend line model appears to show a potential temporary impact on prices about the same time as the April 2012 incident. Before 2010, the polynomial trend line for town-

---

36. There were only home sales north of the compressor station. The area is otherwise developed with industrial properties.
Case Study Method to Measure Possible Impact of Proximity to Fracking Transmission Line Facilities on Home Prices

Exhibit 29  Home Sales Proximate to Marietta Compressor Station 24A

Exhibit 30  Scatter Plot Trend Line, Townhouse Sale Price per Square Foot, Outliers Removed
home prices within 500 feet was significantly higher than for townhomes 500–1,000 feet, or those greater than 1,000 feet. In 2011 through 2013, however, the polynomial trend line for 500 feet dips to be essentially equal to the trend line for home prices between 500 and 1,000 feet from the compressor facility. After 2013, however, the relationship between the trend lines for 500 feet and for 500–1,000 feet return to the same essential relationship they had prior to 2011. Therefore, if there was an impact from the April 2012 incident on townhouse prices, it was only temporary and ended by some point in 2014. If there was an impact between 2012 and 2014, it only affected prices paid for townhomes within 500 feet of the compressor station. The relationship between the trend line for 500 to 1,000 feet and the trend line for greater than 1,000 feet was essentially the same both before and after the April 2012 event.

The single-family detached home sales were also analyzed. The linear regression trend line and polynomial regression trend line after removing the two outliers are indicated in Exhibit 32 and Exhibit 33.

The $R^2$ (or $R$-squared) values for the polynomial trend lines for 500 feet, 1,000 feet, and greater than 1,000 feet are 0.7755, 0.6999, and 0.581, respectively. All three $R$-squared values are higher than in the straight-line scatter plot, indicating that a polynomial model better reflects the changes in the marketplace over time.

The polynomial trend line comparisons for single-family homes show that prior to late 2004 or early 2005, there was little variation in sale prices for single-family homes based on distance from the compressor station. If there was a premium for single-family homes located farther from the compressor station, it was quite small. By mid-2005, however, that relationship began to change. Between 2005 and the end of 2013, sale prices for single-family homes located within 500 feet were significantly lower than sale prices for homes located farther from the compressor station. Toward the end of 2013, however, that relationship began to change again, and by 2016, sale prices for single-family detached homes located within 500 feet were trending higher than the trend line for homes located farther away.

That data indicates that if there was an impact on single-family detached home prices due to proximity to the compressor station, it was temporary and began in 2005 and ended in 2013. Since the compressor station incident occurred in
Exhibit 32  Single-Family Sale Price per Square Foot, Outliers Removed, Linear Regression

Exhibit 33  Single-Family Sale Price per Square Foot, Outliers Removed, Polynomial Regression
April 2012, it could not have been the reason for the diverging trend lines that began in 2005.

Additional analysis of the single-family detached home price data is necessary, however. Unlike the townhouse units, whose average size variation is nominal and has no impact on variations on sale price per square foot, single-family detached homes can vary in size to the extent that it has a measurable effect on the sale price per square foot. Exhibits 34 and 35 show average annual sale prices per square foot (as opposed to individual unit prices). Exhibit 34 shows average unadjusted prices and Exhibit 35 shows average annual sale prices per square foot adjusted for variations in unit size.

Exhibit 34 indicates that the average sale price per square foot for units at a distance greater than 1,000 feet were higher until 2009. After that date, the sale prices per square foot were higher for units in closer proximity to the compressor station. After adjusting for variations in unit size as shown in Exhibit 35, the relationship between the average annual price trend lines changes significantly and the divergence between prices begins as early as 2006.

After adjusting for unit size variations, the average annual sale price per square foot within 1,000 feet of the compressor station is typically higher than the average annual price per square foot for single-family detached homes located at a distance greater than 1,000 feet from the compressor station. And the premium paid per square foot has been increasing.

The average annual townhome price trend is similar to the trend in single-family detached home prices. Exhibit 36 shows that between 2001 and 2005 the relationship between townhouse unit prices was relatively consistent between the three trend lines based on distance from the compressor station. Beginning in 2005, the average annual price per square foot trend line for townhome units closest to the compressor station began to increase at a rate that exceeded the rate of increase in the slope of the trend lines for 1,000 feet and 1,500 feet.

Average annual townhome prices immediately before and after the April 12, 2012, event were also compared. As the data points in Exhibit 36 indicate, the average annual price for townhomes within 500 feet of the compressor station
Exhibit 35  Single-Family Sales Annual Average Size-Adjusted Sale Price per Square Foot

Exhibit 36  Townhouse Sales Annual Average Sale Price per Square Foot
increased in 2012, but then dropped below 2010 and 2011 levels in 2013 and dropped again in 2013 before recovering in 2014 through 2017. The average annual price paid for townhouses located between 500 and 1,000 feet from the compressor stations dropped in price in both 2012 and 2013 before recovering. Those annual price comparisons seem to confirm evidence from the townhome polynomial regression model trend line comparison—townhome prices were affected by the incident, but the impact was temporary (ending by 2015 or 2016), and did not affect homes located at a distance greater than 1,000 feet from the compressor station.

Conclusion from the Marietta, Pennsylvania Texas Eastern Transmission Pipeline Case Study
The case study analysis gives mixed signals concerning whether proximity to the pipeline adversely affected prices.

The single-family detached polynomial regression model data indicates that if there was an impact on home prices due to proximity to the compressor station, it was temporary and began in late 2004 or early 2005 and ended by 2013. Since the compressor station incident occurred in April 2012, it could not have been the reason for the diverging trend lines that began in 2004 or 2005. The impact on single-family detached home prices from proximity to the compressor station shown in the trend line comparisons over the seventeen years in the study was not more than approximately −10.0% for homes within 1,000 feet of the compressor station.

However, when single-family detached home prices are adjusted for differences in size and when average prices paid on an annual basis are considered, there is no impact from proximity to the compressor station on either townhome or single-family detached home prices.

Both the polynomial trend line model for townhome prices and the annual sale price comparison indicated a possible temporary impact on prices about the same time as the April 2012 incident. If there was an impact from the April 2012 incident on townhome prices, it was only temporary, ended by some point in 2015 or 2016, and only affected prices paid for townhomes within 500 feet or 1,000 feet of the compressor station.

Conclusions from Case Study Research and Limitations of Analysis Related to Impact of Fracking Transmission Line Facilities on Nearby Home Prices
Among the conclusions and implications that can be drawn from the compressor station and dehydration facility case study impact research are the following:

• Like the published research into the generalized effect of pipeline proximity on nearby home prices, the data analyzed in the four compressor station case studies researched indicate no generalized adverse impact on nearby home prices from proximity in location to compressor stations. The prices paid per square foot for the homes located closest to the pipelines in the case studies were typically, but not always, as high or higher than the prices paid for homes located at greater distances from the pipeline. So like the previous articles, some of the case study data indicates such impacts generally while other data indicate no such impact. That variability makes location and market-specific analysis necessary.

• Similarly, like the published research on possible price impacts of pipeline spills and leaks, the compressor case study data does not indicate that reported incidents involving fires or emissions at compressor stations automatically adversely affected nearby home prices. One case study found reliable evidence of such an impact while the other two case studies in which prices before and after an event date were analyzed were inconclusive—some of the data indicated impacts but other data did not.

• The case studies, again similar to the published pipeline spill research, indicate that when there are impacts on home prices from compressor station incidents, such impacts are temporary, lasting from a few months to a few years before prices return to the pattern they followed pre-incident.

• It is important to consider the effect of outliers in linear or polynomial regression trend line analysis. The relationships between trend
lines prices at various distances from a pipeline or compressor station can be influenced by the inclusion or exclusion of outliers.

- There can be compounding additional environmental influences affecting home prices that must be accounted for in the analysis. For example, in Case Study 3 involving the West Bradford Township compressor station, a high-voltage transmission line ran through the study neighborhood. Prices paid for homes closest to the high-voltage transmission line were eliminated from the data to minimize any effect of that potential disamenity on prices. However, it is necessary to drive under the power lines to access the properties in closest proximity to the compressor station, which could be a factor that also affected prices that buyers were willing to pay.

- Although trend line regression models based on only two variables (price per square foot and date) may have low $R^2$-squared values, a comparison of the changing relationship between the trend lines over time can be helpful when an appraiser is attempting to understand the effects of proximity to fracking transmission line facilities and to the effect of specific incidents on prices.

- The number of data points can affect the slope and direction of a polynomial regression model trend line analysis. For example, in Case Study 1 involving Transco Compressor Station 505 the change in the relationship between the distance variable trend lines in late 2015 and early 2016 is likely due to the limited number of sales within one of the distance zones after February of 2016.

- Simple linear trend line analysis showing prices at various distances from a fracking transmission line facility can also be helpful in understanding the effect of a compressor station on prices.

- Finally, the case study research indicates the importance of accounting for differences between homes, first, by using price per square foot to eliminate some of the effect of home size differences, and second by accounting, if possible, for other differences such as lot size, model type, dates of construction, views, and topography. Analysis of townhome prices rather than single-family detached home prices may provide more supportable comparisons and analytical results because townhome prices typically require fewer such adjustments for variables than single-family detached home prices.

There are limitations to this study. First, it is intended to describe and apply only case study analysis and paired-data analysis, two of the five generally accepted methods that can be used by an appraiser when confronted with an assignment involving properties in proximity to a potential environmental disamenity such as a pipeline compressor station. Multiple regression analysis, another recognized method, can also be used in situations where the number of sales is sufficient to allow differentiation of the contribution to value of omitted variables that may be affecting home prices and were not separately analyzed in the paired data analyses used in the case studies analyzed here. In some situations such a more robust statistical analysis may provide a more precise measurement of the correlation between distance from a disamenity and home prices.

Second, as in most case study research, data lim-

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37. $R^2$-squared values would be expected to be higher in a predictive value or price analysis using multivariate hedonic regression modeling, which is not the type of modeling done in this article. In multivariate hedonic regression modeling, omitted variables can be responsible for low $R^2$-squared values, and testing of such models is necessary to understand the effect of the omitted variables on the outcome of the model. Low $R^2$-squared values are not necessarily indicative of a problem in a trend line analysis. Instead, review of the residuals in the trend line analysis can be undertaken to determine if there is some other variable that is consistently accounting for over- or underestimates of the relationship between the trend lines. There is a low correlation between the residual errors in the trend lines involved in the models in the case studies.

38. Other generally recognized methods include “use of market interviews to collect data and information used in other approaches or to support or supplement the results of other analyses” and “adjustment of income and yield capitalization rates to reflect environmental risk premiums in an income capitalization analysis.” Thomas O. Jackson, “Methods and Techniques for Contaminated Property Valuation,” *The Appraisal Journal* (October 2003): 311–320.
itations affect the generalized applicability of the results to other appraisal situations. In some of the years in the case studies analyzed, there were very few sales and in some years no sales. The sales data analyzed did not include information about any seller disclosures to prospective buyers about proximity to a pipeline or a compressor station. It was not possible to determine how specific disclosure of proximity to a compressor station or to a specific environmental event may have affected some prices but not others. However, in the Pennsylvania case studies, there was no state-imposed requirement for a specific disclosure of any off-site environmental conditions.\footnote{39. Those disclosure statements were not available as part of the data set analyzed in the case studies in this article. In addition, seller disclosure requirements vary from state to state, and sometimes from one multiple listing service or residential brokerage company to another.}

\footnote{40. The state-imposed disclosure requirement in Pennsylvania only requires disclosure of environmental concerns on the property itself. As a result, a home seller in Pennsylvania would not necessarily be legally required to disclose proximity to a nearby pipeline or compressor station. In other states, the standard disclosure statement reports on some types of off-site environmental conditions that may affect the property. For example, the New Jersey standard disclosure statement asks if the seller is “aware of any condition that exists on any property in the vicinity which adversely affects, or has been identified as possibly adversely affecting, the quality or safety of the air, soil, water, and/or physical structures present on this property.” How a seller in New Jersey would interpret that requirement in relation to a nearby pipeline or compressor station could vary significantly. The New Jersey disclosure statement also warns prospective buyers that it is the buyer’s obligation “to carefully inspect the surrounding area for any off-site conditions that may adversely affect the property.” New Jersey Association of Realtors Standard Form of Seller’s Property Condition Disclosure Statement, NJAR Form 140-5/04, \url{https://www.realmart.com/pdf/SellerDisclosure.pdf}.}

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\text{SEE NEXT PAGE FOR ADDITIONAL RESOURCES >}
Additional Resources
Suggested by the Y. T. and Louise Lee Lum Library

American Gas Association—Research & Policy
https://www.aga.org/research-policy/

American Petroleum Institute—Natural Gas & Oil
https://www.api.org/news-policy-and-issues

Appraisal Institute
  http://www.appraisalinstitute.org/assets/1/7/guide-note-6.pdf
• Lum Library holdings
  • Lum Library External Resources [Login required]
    Information Files—Real estate damages, impact of fracking
• Publications
  • Real Estate Damages, third edition (Chicago: Appraisal Institute, 2016)
  • Valuing Contaminated Properties: An Appraisal Institute Anthology, vol. 2 (Chicago: Appraisal Institute, 2014)

Federal Energy Regulatory Commission—Natural Gas
https://www.ferc.gov/natural-gas

International Association of Drilling Contractors—Drilling Contractor magazine
http://www.drillingcontractor.org

MineralWise—Oil and Gas Terminology

NaturalGas.org—Shale
http://naturalgas.org/shale/

US Energy Information Administration—Natural Gas
http://www.eia.gov/naturalgas/

US Environmental Protection Agency (EPA)—Unconventional Oil and Natural Gas Development
https://www.epa.gov/uog
Economy at a Glance: Using Bureau of Labor Statistics Local Employment Data in Market Analysis

Abstract

One major component of market analysis is the examination and analysis of trends and movements in employment by area and by industry. Special attention may be given to sectors such as manufacturing, construction, or leisure and hospitality to determine if employees in these sectors could serve as drivers in real estate markets by impacting residential sales, apartment leases, and commercial space. This edition of Resource Center discusses a government resource that provides useful state and local employment figures in ten industries for many metro locations. The data is free, accurate, reliable, and available in graphical form. Such data adds value to a report on the area economic base, an estimate of value, and other analytical economic reports.

Introduction

This edition of Resource Center explains to readers where to find a valuable source of local employment data from a federal agency. This agency’s website offers reliable, accurate, free, and comprehensive workforce information. Analysts can use the employment data regularly in a variety of assignments.

The totals, trends, and specific numbers that can be used to portray an area market are extensive. The analyst makes choices as to what best describes the characteristics of the economic base. For example, a common analysis is to rank the size of the employment by industry to illustrate the trends of the largest (or perhaps top-five) industries in the area. Following these selected industries in more detail than the other industries provides important insight into future movements in other indicators. Additional data could be gathered on income generated by this specific group to produce a future picture of demand for goods and services at a particular level. In sum, gathering employment data over time will give the analyst a picture of which numbers are needed to generate an accurate and reliable illustration of the area economic base.

Tracking trends or movements in the local workforce is a typical component of a market analysis for residential and commercial properties. However, additional detail on workers by industry is extremely helpful as well since movements in the total workforce and certain sectors can explain changes in other indicators that rely on employment.

For example, residential housing demand typically begins with the expectation that a homebuyer holds a job and earns a steady income in order to be approved for a loan. Demand for commercial office space historically required a core number of office workers that was converted into office space demand per office worker. A similar methodology has been used to estimate demand for apartment space.

Employment trends are an important part of an economic impact analysis, and review of the economic performance of the local economy is an appropriate part of the professional judgment typically applied in the sales comparison approach. An economic summary including employment data is often required by a lender. Therefore, local employment data is an important part of the market analysis toolkit.

Finding the relationship between local employ-
ment and residential sales is recognized as an important step in determining the current and future demand for housing. Recently, Ratterman identified employment trends as an expected part of the market demand analysis in Step 4 of the valuation process and analysis of the area economic base.¹

The relationship between employment, housing sales, homeownership, and timing was examined by the US Bureau of Labor Statistics (BLS) in a report by Rogers and Winkler.² Using national and local data, they conclude that during the Great Recession era the labor market declined before the housing market in the majority of larger metropolitan areas. Further, they find a clear relationship existed in the larger metro areas between housing market distress and falling homeownership rates. Dvorkin and Shell in their examination of the US labor force show there are regional variations in local markets, and these often produce results contrary to trends at the national level.³ They conclude that during the national recession in 2007, counties with larger decreases in house prices experienced larger increases in the unemployment rate while the opposite held true during an expansion. This correlation is significant to appraisers.

US Bureau of Labor Statistics Economy at a Glance Website

The goal of the following discussion is to introduce valuers to the BLS “Economy at a Glance” website (www.bls.gov/eag/), which provides local employment data for many US markets. The site delivers a reliable set of monthly and annual local employment trend data by industry. Valuation specialists in need of employment information are sure to become frequent users of this resource. Potential users include those who examine employment trends regularly to understand local drivers of demand conditions. This information is often reported in assignments such as an estimate of value, projection of demand for a specific property type, economic impact analysis, and court testimony.

Economy at a Glance Website Attributes and Parameters

Users may have preliminary questions about the BLS Economy at a Glance website before they delve into its data. Before employing data from any source, users should ask about the basic framework for the website. Typical questions about the Economy at a Glance website attributes would include the following:

• What is the cost? The federal government provides state and local industry employment data free of charge.

• Is the data accurate and credible? The figures in the reports are gathered by survey by the state labor division, which reports results to the BLS. These figures are the most accurate and reliable monthly totals available.

• Are comparable local employment figures available from any other source? No, local employment resources typically are not available due to the expense and consistency challenges in gathering the information.

• Are employment totals divided into industry classifications? The BLS Economy at a Glance reports total data on employment and ten classifications by industry for local metropol-

¹ Mark R. Ratterman, “Market Analysis Data Sources in Residential Appraising,” The Appraisal Journal 90, no. 3 (Summer 2022): 161–186.
itan statistical areas (MSAs). There may be fewer than ten classifications for an area if an MSA has a smaller workforce. One very useful aspect of the data is that the ten industry classifications are consistent across areas and can be compared. This feature saves a considerable amount of time, especially when employment data is needed by industry for another region.4

- **Is the data reported monthly with annual totals?** Totals are available monthly and annually.
- **Is historical data available?** Yes, monthly and annual data from 1990 through the current month are available.
- **Are pre-prepared graphs available?** Graphs and calculations are available by clicking the box labeled “Back Data” in each industry data row. Graphs may be produced for a period specified by the user.
- **Are any calculations provided, such as a percentage change between two periods?** Yes, tables are available for each of the industry classifications. A user can calculate a one-, three-, or twelve-month percentage change as needed.
- **Does the Economy at a Glance contain further useful data or information?** Yes, the website reports additional data, and for an MSA typically covers topics such as the economy and worker income.
- **Is comparable data for other regions available to make comparisons?** Yes, comparable numbers are available in the state where the selected area is located as well as areas in other states.

### Economy at a Glance Employment Data

The BLS Economy at a Glance divides the ten reported industries into two groups: “goods-producing industries” and “service-providing industries.” The two-sector grouping is especially useful in an analysis of the area economic base and a comparison with the base in other comparable regions.

Goods-producing industries include the subsectors of natural resources and mining; construction; and manufacturing. Service-providing industries include the subsectors of trade, transportation, and utilities; information; financial activities; professional and business services; education and health services; leisure and hospitality; other services; and government. The appendix at the end of this article lists the industries with a description of what each industry category includes.

The homepage for the BLS Economy at a Glance (www.bls.gov/eag/) shows a map of the United States (Exhibit 1) followed by a list of MSAs by state. Clicking on a state in the map will produce a table for that state, with monthly data for the preceding six months for the ten industries covered by the BLS Economy at Glance. An enlarged Quick Glance map of the state will also be shown with the state’s metropolitan statistical areas marked. Click on the MSA of interest to see a table for that metropolitan area.

The data can be tabulated to produce useful trend analyses related to the overall direction of the employment base and to identify any significant changes in area employment levels. The data also will make clear what industries are the largest employers and whether these employers have seen increases or decreases in employment, which might affect real estate market demand. Data showing significant changes suggest further investigation of the market is needed.

The following example uses specific material on the website to illustrate how needed figures can be found. Suppose the location of interest is the Charlotte-Concord-Gastonia, NC, SC metro area. Clicking on North Carolina on the US map will show the state’s MSA list including

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Charlotte-Concord-Gastonia. Clicking on that MSA link will produce a table with the monthly employment totals for ten industries (Exhibit 2). The table shows that the manufacturing industry had 107,800 workers in September 2022 and 108,500 in October 2022. The October number is 2.1% higher than October of the previous year. Also, the number of employees working amounted to 1,376,500 in October from a total civilian labor workforce of 1,429,300. The difference represents the 52,800 available workers who were not employed, which produced a 3.7% unemployment rate.

Summary tables and graphs can be produced by clicking on the desired box in the column labeled “Back Data.” The reported data can be adjusted for the time period of interest, and graphs produced for selected periods. Note, additional data is shown in regional reports on consumer price indexes and wages.

Exhibit 1  Economy at a Glance Homepage: Regions, States & Areas at a Glance

Below map, scroll down to see MSAs within each state. For example, North Carolina will include the following metropolitan areas for which an Economy at a Glance table is available:

- Asheville, NC
- Burlington, NC
- Charlotte-Concord-Gastonia, NC-SC
- Durham-Chapel Hill, NC
- Fayetteville, NC
- Goldsboro, NC
- Greensboro-High Point, NC
- Greenville, NC
- Hickory-Lenoir-Morganton, NC
- Jacksonvile, NC
- New Bern, NC
- Raleigh, NC
- Rocky Mount, NC
- Virginia Beach-Norfolk-Newport News, VA-NC
- Wilmington, NC
- Winston-Salem, NC
## Exhibit 2  Example Monthly Employment Table

<table>
<thead>
<tr>
<th>Data Series</th>
<th>Back Data</th>
<th>July 2022</th>
<th>Aug 2022</th>
<th>Sept 2022</th>
<th>Oct 2022</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Labor Force Data</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Civilian Labor Force(^1)</td>
<td>(____)</td>
<td>1,430.30</td>
<td>1,418.40</td>
<td>1,419.60</td>
<td>1,429.30</td>
</tr>
<tr>
<td>Employment(^1)</td>
<td>(____)</td>
<td>1,381.10</td>
<td>1,366.70</td>
<td>1,375.00</td>
<td>1,376.50</td>
</tr>
<tr>
<td>Unemployment(^1)</td>
<td>(____)</td>
<td>49.2</td>
<td>51.7</td>
<td>44.6</td>
<td>52.8</td>
</tr>
<tr>
<td>Unemployment Rate(^3)</td>
<td>(____)</td>
<td>3.4</td>
<td>3.6</td>
<td>3.1</td>
<td>3.7</td>
</tr>
<tr>
<td><strong>Nonfarm Wage and Salary Employment</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Nonfarm(^4)</td>
<td>(____)</td>
<td>1,302.00</td>
<td>1,311.90</td>
<td>1,317.70</td>
<td>1,334.60</td>
</tr>
<tr>
<td>12-month % change</td>
<td>(____)</td>
<td>4.9</td>
<td>5.1</td>
<td>5.9</td>
<td>5.9</td>
</tr>
<tr>
<td>Mining, Logging, and Construction(^4)</td>
<td>(____)</td>
<td>73.1</td>
<td>73.9</td>
<td>74.2</td>
<td>75.1</td>
</tr>
<tr>
<td>12-month % change</td>
<td>(____)</td>
<td>1.7</td>
<td>3.2</td>
<td>4.5</td>
<td>4.9</td>
</tr>
<tr>
<td>Manufacturing(^4)</td>
<td>(____)</td>
<td>109.7</td>
<td>109.3</td>
<td>107.8</td>
<td>108.5</td>
</tr>
<tr>
<td>12-month % change</td>
<td>(____)</td>
<td>2.7</td>
<td>2.3</td>
<td>1.2</td>
<td>2.1</td>
</tr>
<tr>
<td>Trade, Transportation, and Utilities(^4)</td>
<td>(____)</td>
<td>274.1</td>
<td>274.3</td>
<td>274.2</td>
<td>277.4</td>
</tr>
<tr>
<td>12-month % change</td>
<td>(____)</td>
<td>4</td>
<td>5.1</td>
<td>5.3</td>
<td>5.2</td>
</tr>
<tr>
<td>Information(^4)</td>
<td>(____)</td>
<td>25.2</td>
<td>25.2</td>
<td>24.7</td>
<td>24.8</td>
</tr>
<tr>
<td>12-month % change</td>
<td>(____)</td>
<td>2.4</td>
<td>2.4</td>
<td>1.6</td>
<td>0.8</td>
</tr>
<tr>
<td>Financial Activities(^4)</td>
<td>(____)</td>
<td>119.9</td>
<td>120.7</td>
<td>119.9</td>
<td>120.5</td>
</tr>
<tr>
<td>12-month % change</td>
<td>(____)</td>
<td>5.5</td>
<td>6.3</td>
<td>5.1</td>
<td>5.5</td>
</tr>
<tr>
<td>Professional and Business Services(^4)</td>
<td>(____)</td>
<td>231.6</td>
<td>231.5</td>
<td>234.6</td>
<td>238.3</td>
</tr>
<tr>
<td>12-month % change</td>
<td>(____)</td>
<td>6.7</td>
<td>6.2</td>
<td>8.9</td>
<td>8.8</td>
</tr>
<tr>
<td>Education and Health Services(^4)</td>
<td>(____)</td>
<td>133</td>
<td>134.6</td>
<td>136</td>
<td>137.6</td>
</tr>
<tr>
<td>12-month % change</td>
<td>(____)</td>
<td>6.6</td>
<td>6.5</td>
<td>7.8</td>
<td>7.2</td>
</tr>
<tr>
<td>Leisure and Hospitality(^4)</td>
<td>(____)</td>
<td>147.8</td>
<td>145.8</td>
<td>142.4</td>
<td>144.1</td>
</tr>
<tr>
<td>12-month % change</td>
<td>(____)</td>
<td>9.6</td>
<td>9.8</td>
<td>12.5</td>
<td>11.3</td>
</tr>
<tr>
<td>Other Services(^4)</td>
<td>(____)</td>
<td>47.9</td>
<td>47.6</td>
<td>48.3</td>
<td>49.3</td>
</tr>
<tr>
<td>12-month % change</td>
<td>(____)</td>
<td>5.5</td>
<td>5.1</td>
<td>7.8</td>
<td>8.8</td>
</tr>
<tr>
<td>Government(^4)</td>
<td>(____)</td>
<td>139.7</td>
<td>149</td>
<td>155.6</td>
<td>159</td>
</tr>
<tr>
<td>12-month % change</td>
<td>(____)</td>
<td>0.9</td>
<td>0.7</td>
<td>0.8</td>
<td>0.9</td>
</tr>
</tbody>
</table>

Source: BLS Economy at a Glance, Charlotte-Concord-Gastonia, NC, SC

Notes:

(1) Number of persons, in thousands, not seasonally adjusted.
(2) Data were subject to revision on April 21, 2023.
(3) In percent, not seasonally adjusted.
(4) Number of jobs, in thousands, not seasonally adjusted.
Conclusion and Recommendations

A typical component of a market analysis is an examination of the total local workforce and a breakdown of industry employment by sector. Trends and movements in employment are known drivers of real estate indicators such as sales and rentals made affordable by stable employment.

This article introduces market analysts to Economy at a Glance, a free website offered by the US Bureau of Labor Statistics that contains monthly employment totals for hundreds of metro areas. This information is supported by a variety of analytical statistics and graphs that can be constructed by the user on request relative to a time period and the needed calculations. Professional appraisers will find data, graphs, and calculations that will add value to all types of reports that require a general market demand analysis or a specific estimate of value. Used regularly, this website and its data will become a valuable component of the appraiser’s toolkit.

About the Author

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SEE NEXT PAGE FOR APPENDIX >
Appendix  BLS Definitions of Industries

The BLS has organized state and local employment data into groupings labeled “supersectors” that contain detailed data for specific industries of interest. For example, the supersector Natural Resources and Mining contains data for the logging industry and for the mining industry. The supersectors are further categorized into a goods-producing group and a service-providing group as shown below. A list of all BLS industries and definitions can be found at BLS Industries at a Glance (www.bls.gov/IAG).

- Natural Resources and Mining (logging, mining)
- Construction (construction of buildings, heavy and civil engineering construction, specialty contractors)
- Manufacturing (includes over twenty specific industries, such as food, paper, chemical, and equipment manufacturing)

- Trade, Transportation, Utilities (wholesale trade, retail trade, transportation and warehousing, utilities)
- Information (publishing except internet, motion picture and sound recording, broadcasting except internet, telecommunication, data processing, hosting and related services, other information services)
- Financial Activities (finance and insurance, real estate and rental and leasing)
- Professional and Business Services (professional scientific and technical services, management of companies and enterprises, administration and support, waste management and professional services)
- Education and Health Services (education services, health care and social assistance)
- Leisure and Hospitality (arts, entertainment, and recreation; accommodation and food services)
- Other Services (repair and maintenance, personal and laundry service, religious, grant-making, civic, professional, similar organizations)
- Government (local employment, state employment, federal employment)
Meeting Land Valuation Challenges

The Appraisal Institute’s new text *Land Valuation: Real Solutions to Complex Issues* covers land valuation from the urban, suburban, or general rural parcel perspective, including those parcels with special problems and challenges. There are seven major case studies to illustrate and help expand on the points discussed.

To get a good idea about what this volume holds for the reader, let’s take a look at an overview of its content as indicated by its Table of Contents and Index.

**Table of Contents**

Chapter/Topic

1. The Role of Market Analysis in Land Valuation
2. Fundamental Demand Analysis: A Case Study
3. The Importance of Understanding Real Estate Market Cycles
4. Sales Comparison
5. The Adjustment Process
6. Sales Comparison: A Case Study
7. Market Extraction, Allocation, Land Residual Analysis, and Ground Rent Capitalization
8. Yield Capitalization
9. Yield Capitalization: A Case Study
10. Determining Highest and Best Use in an Uncertain Environment: A Case Study
11. The Use of Regression Analysis in Land Valuation: A Case Study
12. Incorporating Nontraditional Units of Comparison in Land Valuation: A Case Study
13. Valuing the Leased Fee Interest in Land Subject to a Long-Term Ground Lease

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1. This book does not give specialized attention to valuation of productive agricultural land or special-purpose land (e.g., mining, forestry) or value-in-use or value-to-user type situations. Unless otherwise stated, the term value in this review is synonymous with market value as commonly defined.
The two-page Index also provides insight into the subjects, terms, and concepts presented, and helps the text’s reader cross-reference discussions of a topic (Exhibit 1).

In assessing *Land Valuation: Real Solutions to Complex Issues* it is important to be aware of the significance of its topic. Practicing appraisers often value land, either as a separate appraisal or as a component part of an improved property appraisal. However, some believe that land is more difficult to value than improved property depending on the situation. Therefore, it is crucial for appraisers to be familiar with the tools and techniques available for valuing land.

The process of estimating land value starts with an analysis—whether formal or informal—of the market, basically measuring the difference between supply and demand (*residual demand*). Such a market study is the content of Chapter 1 of *Land Valuation*. Topics discussed there include:

- the distinction between market analysis and marketability analysis;
- the foundations of land valuation;
- the six-step market analysis process and the eight-step highest and best use analysis;
- the decision-making process;
- inferred demand analysis and fundamental demand analysis;
- the four levels of market studies;
- forecasting demand, supply, and the residual/marginal demand; and
- forecasting the subject capture portion of residual demand.

Ratio and segmentation methods of a fundamental demand study are included with rental apartment land examples.

Highest and best use is also examined in the first chapter, particularly what should be included in highest and best use conclusions. This topic is a logical follow-up to the market study discussion preceding it. Highest and best use should describe use(s), use timing, and likely buyers or land tenants. This helps in the selection of comparable sales and offerings and is of assistance in deciding on applicable tools and techniques available for appraisal of the land.

A helpful case study involving fundamental demand analysis follows in Chapter 2. The case involves a parcel with 57 developable acres, with three reasonable probable uses—multiunit rental housing, residential condominium single-unit buildings, and neighborhood shopping center use—analyzed over a five-year forecast period. The case study provides good examples of supply-demand studies for each property use and gives insight into topics discussed in Chapter 1.

The importance of understanding real estate market cycles is examined in Chapter 3. The aforementioned market study usually covers a time in the real estate market cycle, nationally
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<thead>
<tr>
<th>Exhibit 1 Land Valuation Index Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>absorption</td>
</tr>
<tr>
<td>allocation method</td>
</tr>
<tr>
<td>appropriate comparable sales</td>
</tr>
<tr>
<td>arm's-length transaction</td>
</tr>
<tr>
<td>assemblage</td>
</tr>
<tr>
<td>base rent</td>
</tr>
<tr>
<td>bulk value</td>
</tr>
<tr>
<td>capture rate</td>
</tr>
<tr>
<td>coefficient of variation</td>
</tr>
<tr>
<td>confidence interval</td>
</tr>
<tr>
<td>contaminated sites</td>
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<tr>
<td>contraction</td>
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<tr>
<td>correlation</td>
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<tr>
<td>cost-related analysis</td>
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<tr>
<td>curvilinear relationship</td>
</tr>
<tr>
<td>data sources</td>
</tr>
<tr>
<td>data verification</td>
</tr>
<tr>
<td>date of sale</td>
</tr>
<tr>
<td>demand</td>
</tr>
<tr>
<td>depreciation</td>
</tr>
<tr>
<td>development rights</td>
</tr>
<tr>
<td>discounted cash flow analysis</td>
</tr>
<tr>
<td>duration of income</td>
</tr>
<tr>
<td>ecological land</td>
</tr>
<tr>
<td>elements of comparison</td>
</tr>
<tr>
<td>end user value</td>
</tr>
<tr>
<td>entitled land</td>
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<tr>
<td>entitlements</td>
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<tr>
<td>entrepreneurial incentive</td>
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<td>environmental risk</td>
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<tr>
<td>excess land</td>
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<tr>
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and locally. The text cautions that “fundamental demand analysis may indicate a current and rising demand for office space, but if the economy is entering a contraction phase, then demand may not materialize as forecast. In addition, investment risk changes throughout market cycles, which impacts selection of the appropriate capitalization rate and discount rate. Highest and best use can, and probably will, change during market cycles.” (Page 31) The four stages of the real estate market cycle (expansion, contraction, recession, and recovery) are explained, supplemented by illustrative tables and graphs. External obsolescence and external enhancement and the dynamic nature of land value are discussed, with some thoughts about the theory of land value change versus investor behavior. (Pages 32–35)

The sales comparison approach is the gist of Chapter 4. Sales comparison is the method frequently preferred and used by appraisers (and informally by non-appraisers). However, as the author comments, “The most challenging aspect of sales comparison is finding verifiable and comparable sales data and making the correct adjustments to the comparables. A lack of data and comparability to support adjustments may weaken the resulting value conclusion.” (Page 37) Fortunately some alternative techniques are described later.

The material in this chapter covers the basics, with topics ranging from what is a comparable sale to the sales comparison process; from analysis of sales and comparison adjustments to data resources and data gathering; from types of transactions that may be considered to data verification. Special issues relating to zoning and land use controls/regulations/ restrictions are examined, providing the reader with some excellent food for thought in applying the comparison process. Units of comparison and the rationale for their use is explored.

The discussion then delves into determining the best unit of comparison using the coefficient of variation.4 The text takes up the issue of how many comparable sales are needed—a matter of frequent concern—along with elements of comparison and types of adjustments, which include transactional adjustments (property rights conveyed, financing terms, expenditures made immediately after purchase, and market conditions), and property adjustments (location, physical property characteristics, use/zoning, features and amenities, and non-realty items). (Figure 4.2)

Chapter 5, “The Adjustment Process,” follows the basic sales comparison material and addresses topics such as the sequence of adjustments, examining sales to identify the necessary adjustments, types of adjustments, adjustment grid examples, quantitative and qualitative adjustment techniques, extraction of adjustments (with examples for office and industrial properties), and grouped data analysis. Other helpful comparison adjustment topics include

• present value analysis,
• statistic and graphic analysis (with example) including curvilinear graphic analysis,
• qualitative analysis including trend and relative comparison analysis, and
• ranking analysis.

The section closes with a discussion of reconciliation of value indications.

The foundational sales comparison chapters are followed in Chapter 6 by a sales comparison case study, which adds color to the sales comparison

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4. Coefficient of variation “in statistics, [is] the ratio of a measure of absolute dispersion to the appropriate average, usually expressed as a percentage; computed from either the quartile or the mean deviation, but usually expressed as a ratio of the standard deviation to the mean; a measure of relative dispersion.” (Page 45)
picture. The case study walks readers through considerations related to location, market conditions, highest and best use, and comparable sales analysis that utilizes an adjustment grid.

**Chapter 7** covers additional land valuation methods beyond sales comparison that can be used to support an opinion of land value, depending on the situation. These include market extraction, allocation, land residual analysis, and ground rent capitalization methods. It is noted that while land residual analysis may be used for estimating land value, it is most often used in testing the feasibility of alternative uses of a site in highest and best use analysis. (Page 89) Ground rent capitalization is used primarily for parcels that are covered by a long-term land lease, or ground lease. (Page 91) The discussion in this chapter includes examples that boost understanding of the concepts and related methodologies.

**Chapters 8 and 9** logically follow the previous chapter and cover yield capitalization, which in essence values land based on the future net income-producing benefits of developing that land. In essence, the discussion takes the reader from static capitalization, on to the more dynamic yield capitalization, which may consider income specified over time, and yield rather than simple capitalization rate. Examples of discounted cash flows, the yield model, as well as extraction of entrepreneurial incentive and profit, and the yield or discount rate, are presented and discussed.

**Chapter 9** provides a case study involving yield capitalization. The illustrative case study involves alternative development uses—apartments and condominiums—and walks the reader through the market analysis and fundamental demand analysis. The yield capitalization technique can be complex, but it usually does not need to be since it reflects the actual land development process and the reasoning of developers. Yield capitalization is a basic discounted cash flow procedure; in the text, the steps are shown on pages 99–100.

This section of the book also addresses valuation challenges related to unentitled land. It notes that the uncertain impact of yet-unknown entitlements (government permissions for development intensity and requirements) on productivity—and value—arises from quantitative and qualitative productivity. For unentitled land, “the appraisal would be subject to an extraordinary assumption because the appraiser’s estimate may or may not come to fruition.” (Page 100)

**Chapter 10** uses a case study example to dive deeper into determining highest and best use in a common situation where there is an uncertain environment that is not appropriate for traditional methods of determining highest and best use. In the case study, zoning is broadly described with a wide range of possible mixed uses, and the only land sales occurred before the market underwent significant major changes. The only information available is sparse with conflicting data. It’s an interesting case study with value for the reader.

Regression analysis is the focus of **Chapter 11**. This statistical technique is for analyzing market sales (and sometimes offering information) to arrive at an indication of value of the appraised property. Land value may be influenced by many things, including physical, locational, legal and market characteristics; views; macro and micro area land uses; and various demand factors. When such influences are available for comparable properties and the appraised property, and sufficient comparable properties are available, statistical tools may sometimes be used to provide an indication of appraised land value. Statistics can be used to help find relationships between influencing factors and sales prices; the relationships may be linear or curvilinear. Chapter 11 provides an illuminating case study involving graphic and regression analysis.

**Chapter 12** tackles the challenge of incorporating nontraditional units of comparison in land valuation. The included case involves a commer-
cial building pad with the tenant pursuant to a ground lease—a situation with scarce comparable data and other rather undernourished data. The case brings out the use of the t-statistic and t-distribution, the F-statistic and distribution, tenant credit, and other helpful points.

“Valuing the Leased Fee Interest in Land Subject to a Long-Term Ground Lease” provides the grist for Chapter 13, which explores characteristics and benefits of modern long-term land leases. The various property interests under a ground lease (leased fee, leasehold, and sometimes subleasehold) are presented along with the concept of the value of financial benefits accruing to the landowner (landlord, lessor) under a ground lease. The chapter discusses income stream timing and risk, quality and duration, and applicable yield rate considering lease terms and conditions, base rent, additional rent, participation provisions, future readjustments in rent and terms, expected reversion and applicable yield rate.

Building on Chapter 13, Chapter 14 examines alternative ground lease structures utilizing a real estate consultant’s case study. Three different ground lease structures are addressed in the case. The text then moves on to use the cost approach to value land in Chapter 15. Even though a cost approach can be used to value land, it is used infrequently. Nonetheless, as the discussion demonstrates, cost approach components may have a role in several land valuation techniques.

Chapter 16 tackles a number of special issues in land valuation—items appraisers should be aware of, and take into consideration, when needed. The issues generally relate to situations involving the following:

• Contaminated sites and the associated issues of environmental risk, impaired value, remediation cost, remediation lifecycle, source and proximate sites, unimpaired value, and USPAP Advisory Opinion 9.

• A current use that is different than the highest and best use. As stated, “highest and best use is not necessarily always a current use. Highest and best use can be a future use, such that a future use value would need to be discounted to present value dollars.” (Page 173)

• Excess and surplus land; both types of land are part of an existing ownership but are not needed to support the highest and best use of the property as improved. (Page 174)

• Plottage value

• Development rights or entitlements, including air rights, subsurface rights (Page 179)

• Tax increment financing (TIF) districts (Pages 181–182, with diagram and examples)

• Ecological land, which differs from other types of land in its ability to nurture a characteristic natural plant or animal community.

Finally, wrapping up Land Valuation: Real Solutions to Complex Issues is a series of informative appendices.

Appendix A, “Applicability and Limitations of Land Valuation Methods,” describes major land valuation techniques as well as their applicability and limitations.

Appendix B, “Web Soil Survey Data,” provides information on the Web Soil Survey (WSS) of the US Department of Agriculture’s Natural Resources Conservation Service. Soil data may be pertinent to valuation of a parcel. This appendix includes data and maps, and numerous links to specialized resources. The WSS notes the role of soil quality in land valuation: “In appraising the income potential of farmland it is essential to distinguish between income differences caused by soil properties and those caused by management. If two farms are managed in much the same way and still show differences in income, it is likely that the soils differ in inherent productivity. … Soil surveys available from the Natural Resources Conservation Service can help bankers, loan
companies, tax assessors, farmers, and others who need to know about the productivity of farmland obtain reliable estimates of the potential productivity of soils in their area.” (Page 187)

While Appendix B addresses the role of soil quality on land productivity, Appendix C addresses “Government Agencies and Regulations,” which have the potential to impact productivity. This appendix provides a concise resource for locating information on state and national regulations involving land and its value.

Conclusion

*Land Valuation: Real Solutions to Complex Issues* augments *The Appraisal of Real Estate*, fifteenth edition. It provides a number of case studies and examples that help readers’ understanding and application of the land valuation tools and techniques available. Further, this publication is a good resource for students, appraisers, and others involved in land valuation and understanding land valuation techniques.

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• Clearly written introduction and conclusion sections explaining the purpose of the article and significance of the research results.
• A brief professional biography for each author, including present employment, title, degrees, designations, publishing accomplishments, and preferred email.
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