

Analysis of Downtown Loft Development on Property Values in Macon, GA

Economic Impact Study for NewTown Macon, Inc.

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NEWTOWN MACON



Executive Summary

This report analyzes the economic impact of loft apartment development within the city of Macon, GA and the role played by NewTown Macon in co-financing loft renovations. The objectives of this report are to measure the effects of loft development on property values, estimate the resulting change in the local tax base, and evaluate the effectiveness of loft investment as a tool for citywide economic development. This study considers assessed property value data to measure the effects of eighteen loft projects completed between 2012 and 2016. These total effects are then compared with the capital invested in loft construction to determine a return on investment percentage. All of these indicators are calculated for both the aggregate of all eighteen loft projects and the seven lofts which NewTown Macon co-financed through its revolving bond fund.

The results of this analysis demonstrate that loft development has had a large impact on property values within downtown Macon. The total cost of development (including the cost of property acquisition) for all lofts completed between 2012 and 2016 was \$35,778,262. Of that, \$3,700,440 was financed through NewTown Macon’s revolving bond fund. The table below displays the resulting increase in assessed property values attributable to loft developments completed between 2012 and 2016. All effects are projected to 2020 to account for the two-year lag in the realization of property value changes by the tax assessor. These are followed by the increase in city tax revenues due to loft development from 2016 to 2020. These two effects are combined to generate a total added value, which is used to determine the return on investment for all loft developments and the return on NewTown’s bond fund investment. The second table shows the potential value added by the five lofts scheduled for completion between 2017 and 2018.

Variable	All Lofts	Lofts using Bond Fund
Increase in Assessed Values by 2020 for Lofts Completed 2012 - 2016	\$52,381,606	\$21,768,133
Additional City Tax Revenues by 2020 for Lofts Completed 2012 - 2016	\$3,896,629	\$1,634,392
Return on Investment	57.3%	532.43%

Variable	All Lofts	Lofts using Bond Fund
Increase in Assessed Values by 2020 for Lofts Planned for 2017 - 2018	\$14,753,064	\$6,649,922
Additional City Tax Revenues by 2020 for Lofts Planned for 2017 - 2018	\$461,538	\$238,798

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Introduction

Attracting residents to live in the center of downtown Macon is a key component of the city's economic development strategy. Recent investments in mixed-use apartment complexes have brought about a pivotal shift for Macon's urban core, drawing new customers for local businesses and contributing to the local tax base. A number of key partners helped facilitate this turning point, from the local government to private property developers, but NewTown Macon stands out among them for its vision and leadership. NewTown, a nonprofit urban revitalization organization, has coordinated multiple efforts to encourage loft development downtown, such as commissioning feasibility studies and leveraging bond funds to mitigate risk for project developers. Their work has done more than simply encourage investment; it has brought together a range of diverse actors around a common goal: making downtown Macon a place where people can live, work, and play.

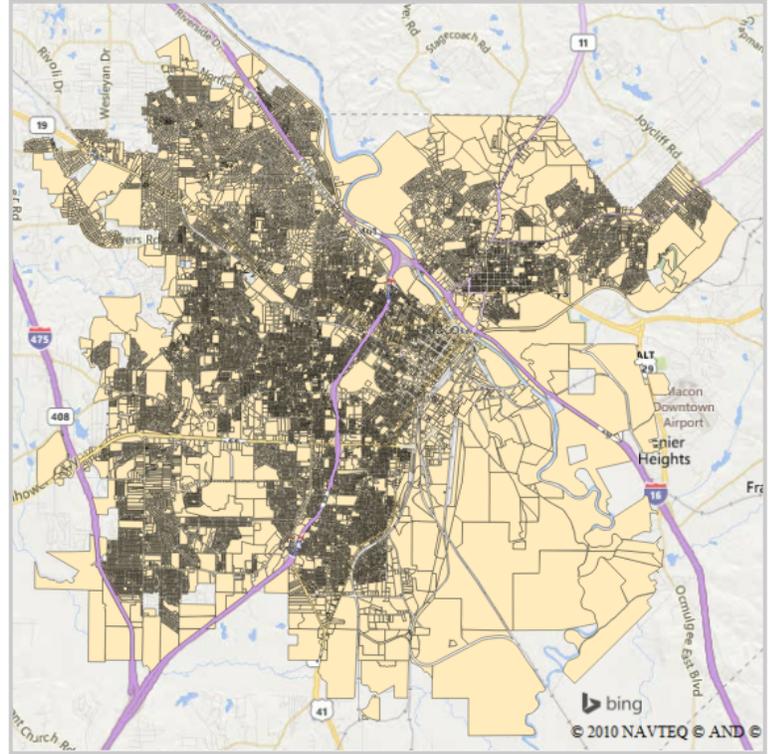
The successes of loft development in downtown are apparent. What is less obvious, however, is how much of a return these projects have generated for the city as a whole, and how efficiently NewTown Macon utilized its funds to facilitate this transformation. The next step in analyzing NewTown's performance is to predict whether their projects will create self-sustaining changes to the local economy, or how much more investment is needed to pass that critical threshold. Answering these questions is critical in evaluating the success of loft construction initiatives and determining whether they should continue.

This report seeks to answer these important questions, utilizing econometric analysis to understand the quantitative impact of loft development on property values within the city. Our research focuses on measuring three performance indicators: the direct effect of redevelopment on loft properties themselves, the indirect effect of loft construction on nearby properties, and the resulting changes in the local tax base. We then evaluate these variables against the estimated cost of loft development as well as the capital leveraged through NewTown's revolving bond fund to determine return on investment statistics. Finally, we use historical impact models to predict what effect loft construction will have on future property values, estimating the value added from lofts which are still under construction.

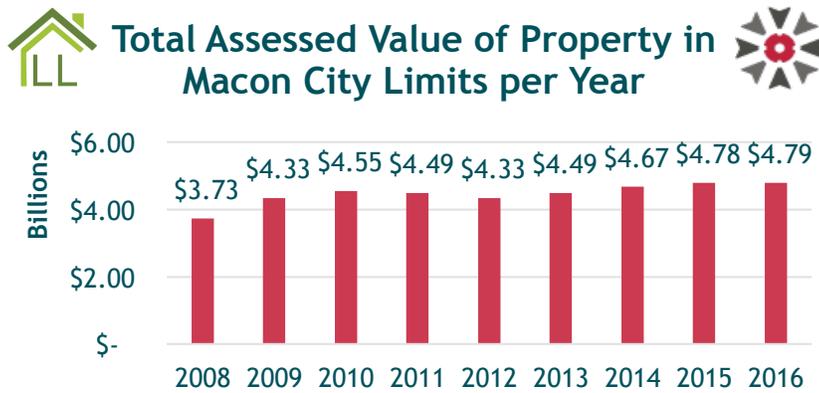
Our findings indicate that loft redevelopment efforts have made significant contributions to the overall value of property downtown. Combining the direct changes to loft properties, their indirect effect on nearby parcels, and the accrued addition to the local tax base, the value added from lofts completed up to 2016 totals an estimated \$56.3 million between 2012 and 2018. Restricting those figures to only lofts co-financed by NewTown's bond funds yields an estimated total value added of \$23.4 million over the same period. These totals reflect a return on investment of 57.3% compared to the total cost of loft developments, estimated at \$37.8 million, and a return of 532.4% on NewTown's contribution of \$3.7 million in bond funds. These numbers do not take into account loft projects currently under construction; projections of their future impact increase estimated returns further. The conclusion of this report is that loft construction has been a worthwhile investment for the local economy. NewTown's strategic bond fund has created exponential returns for the city, leveraging public and private sector partners to generate self-sufficient transformations. NewTown still has a pivotal role in ongoing and future projects to ensure that benefits to the city are both comprehensive and long lasting.

Overview of Study Area

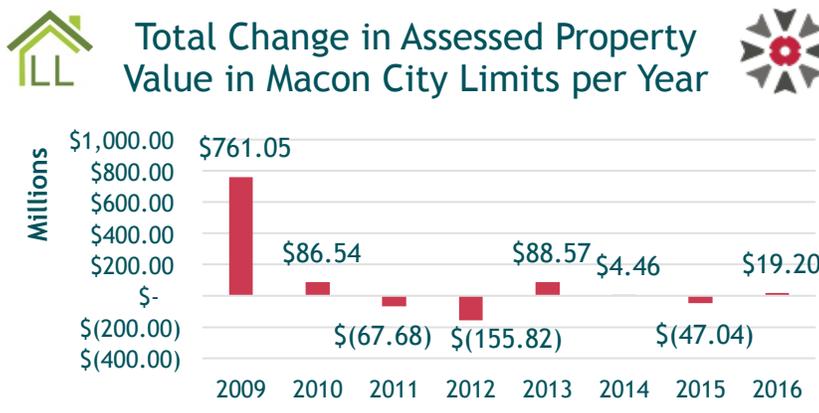
This study focuses on the wider economic impact of loft development in the city of Macon. As such, while our primary geographic area of concern is the downtown business district, we have collected data on property values within the entire city, defined by the municipal boundary prior to the consolidation with the county. This border was chosen to ensure that our data accurately reflects market trends for the area. The rural periphery of Macon-Bibb County is excluded because of differing property market conditions, such as infrequent transactions and valuations based on the presence natural resources, as opposed to property values within the city limits which are defined more by location and improvements. We used the border defined by the Macon-Bibb County Tax Assessors office, which provided data on both geography and valuations.



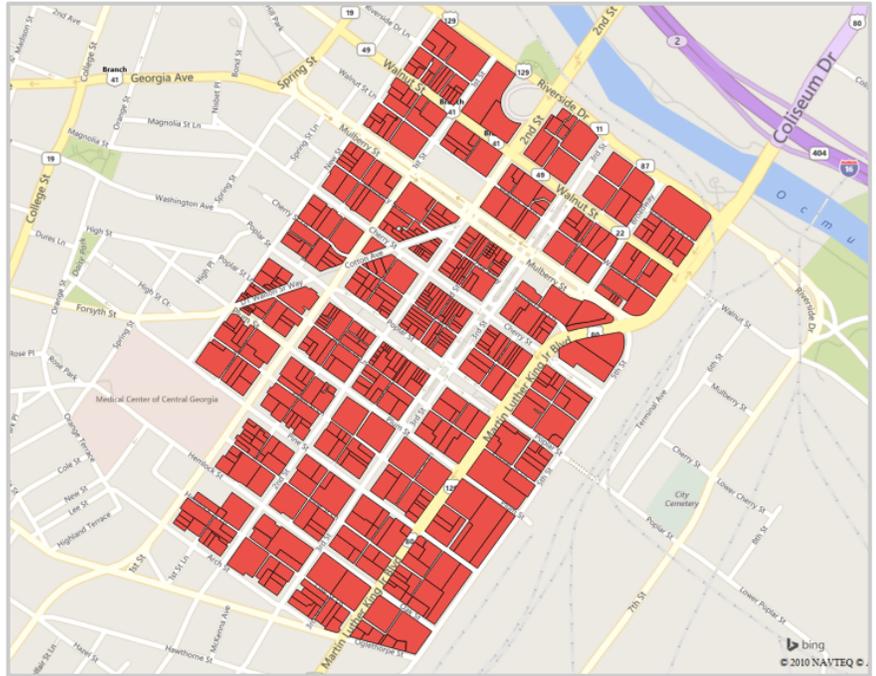
Map of Properties within Old Macon City Limits



The first step in our study was to establish a baseline of property value data across the city. After aggregating the assessed values of every property for each year from 2008 to 2016, the timespan for which digital records are kept by the tax assessor, we observed that Macon is on a gradual increase in assessed value. The biggest year of observed change was in the period from 2008 to 2009, when the aggregated value increased by \$761,053,870 to \$4.33 billion, a 20% jump. This increase was likely due to the initial recovery from the property market crash of 2007, reflecting a return to stable values after housing prices tumbled in the recession. Changes since then have been less dramatic, adding up to a 10% increase in assessed values from 2009 to 2016.



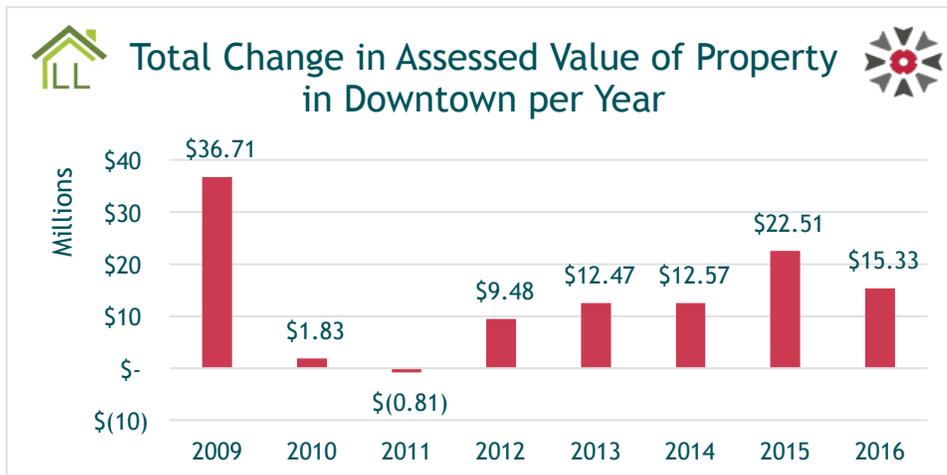
The next step in our study was to isolate properties within downtown. For this we used the boundary as defined by the city's central business district, bordered by Riverside Drive, Pine Street, Plum Street, and MLK Jr. Boulevard. We excluded several properties as outliers, including the Navicent Health Center and public land adjacent to the Ocmulgee River, due to their size or legal restrictions on assessed valuation. Removing these properties from the study improves the accuracy of later predictions since their values are highly resistant to change, distorting the effect of development. Some other properties were removed due to their abnormally large changes in value, which may have been wrongly attributed to the lofts.



Map of Properties within Downtown (Outliers Removed)



The trend in property values for downtown demonstrates stronger growth than the city as a whole, with a 58.9% increase from 2009 to 2016 following an initial jump of 11% in 2008. Downtown as a whole represents a growing share of the city's property value, increasing from 5.3% of total value in 2008 to 7.3% in 2016. The only decrease in values occurred between 2010 and 2011, but downtown resisted the negative trends in 2012 and 2015, gaining a total of \$9.5 and \$22.5 million despite drops in citywide values. Downtown represented a large share of total property appreciation, increasing by \$129 million from 2009 to 2016, a full 27.8% of the citywide increase

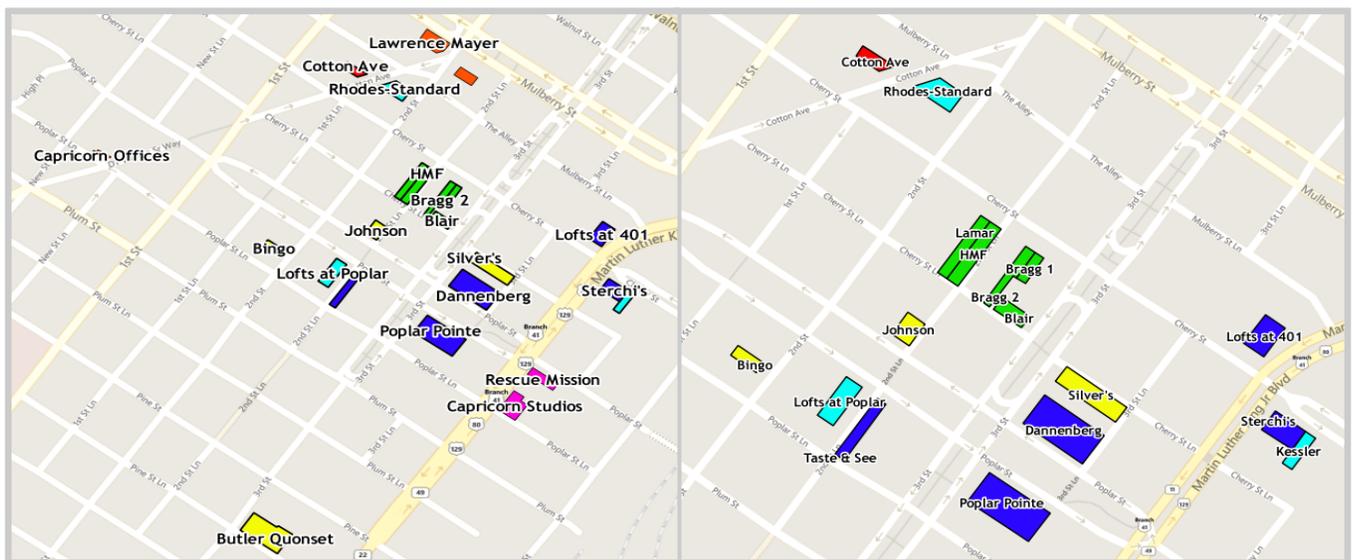


Downtown Compared to Macon	Citywide	Downtown	Downtown Compared to Citywide (%)
Number of Parcels in 2016	\$39,792	\$552	1.4%
Assessed Value of Properties in 2009 (Millions)	\$4,328	\$219	5.1%
Assessed Value of Properties in 2016 (Millions)	\$4,792	\$348	7.3%
Change in Assessed Value 2009 to 2016 (Millions)	\$464	\$129	27.8%

of \$464 million. Even though the urban core only represents 1.4% of Macon’s parcels, it has clearly made a large impact on the city’s recent overall growth.

Loft Developments

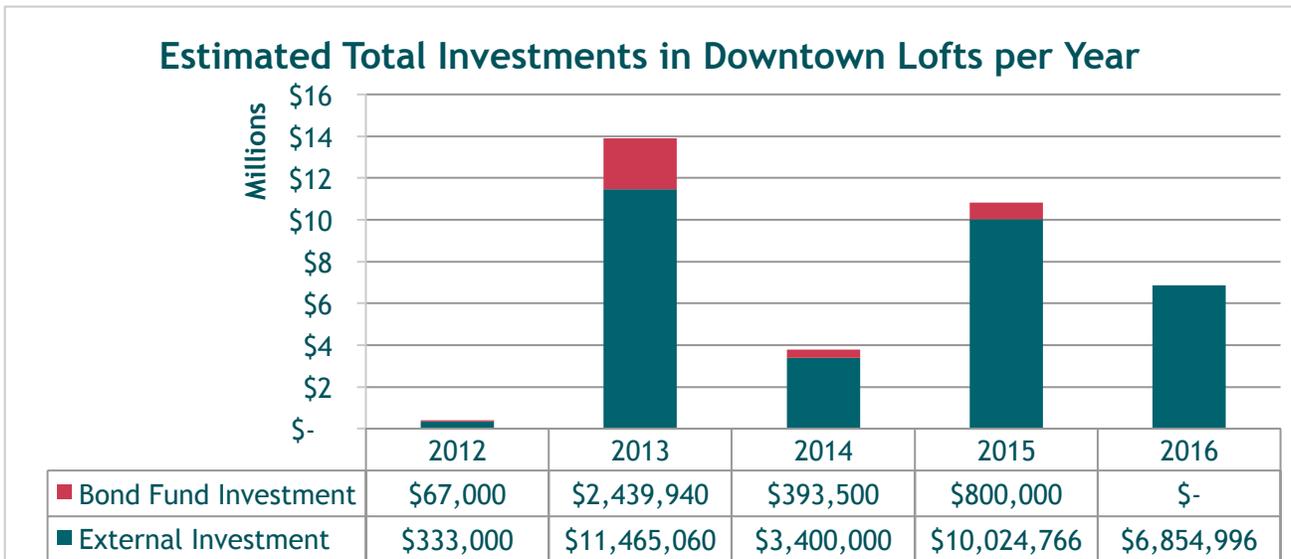
The redevelopment of eighteen mixed-use loft units over the past five years has generated visible investment in the downtown business district. Many of the lofts are concentrated in the center of downtown, though more recent construction has focused on the periphery, such as the Butler Quonset lofts on the corner of Third Street and Pine Street Lane. This reflects NewTown’s strategy of creating a strong foundation in the core of the city and extending the benefits of investment outwards. The most recent examples of this pivot towards the outskirts of downtown are the two Capricorn lofts planned for completion in 2018, which are expected to become anchor points for further property investment in less developed regions of the urban core. The eighteen lofts completed up to 2016 represent an estimated \$35.7 million in construction costs, with a little over \$3.7 million of that funding originating in NewTown’s revolving bond fund, a strategic investment



Loft Projects Downtown by Year



account that encourages developers to undertake projects by reducing financing costs and mitigating the risk of large capital outlays. NewTown directly assisted with the completion of seven lofts up to 2016 and has two more loft units scheduled for assistance in 2017.



Study Methodology

To determine the quantitative impact that loft investments have made in the Macon property market our study uses a variety of statistical techniques to isolate the effect of loft development from other trends. The key feature of our work is a multivariate panel regression model that estimates the impact of several key variables, including the direct investment in loft properties and the indirect “spillover” effect that these renovations have on their surrounding area. These estimates are then used to create a prediction model that we measure against historical changes in property value to assess the overall accuracy of our methods. For variables with a sufficient level of accuracy we are then able to make projections of what effect loft investments will have in the near future. These projections are then combined with the estimated impact of developments up to 2016 to generate the total added value from loft renovations. These total values are used to estimate the amount of additional tax revenue generated for Macon by this increase in property value, a key benefit for the city. We conclude by comparing the combined total impact with the estimated capital investment in loft apartments to generate a return on investment percentage for lofts completed up to 2016.

Data Sources

The property data used in this study was provided through a public records request from the Macon-Bibb County Tax Assessors office. While digital records are only available from 2008 onwards, they include valuations, geographies, acreage, and ownership information, which we used as the basis of our variables. The only additional categorization made by our team was designating the neighborhood of each property, in order to capture the trends of various regions in the city. Our definitions for neighborhoods were taken from the websites of the Macon Action Plan and Historic Macon Foundation; while neighborhood boundaries are artificial they are useful as general indicators of how different segments of the city are changing in value. We used property values as defined by

the tax assessor, which makes estimates of exact value difficult due to the infrequency of property assessment, but provides uniform data that is directly applicable for tax calculations.

Multivariate Panel Regression

The primary analysis technique employed by this study was a multivariate panel regression, which assesses the average effect of independent variables on a single dependent variable. The dependent variable in our study is the change in value for a property by year. The independent variables which affect the change in a property’s value are given by the following formula:

$$CV_{it} = \beta_t T_t + \beta_n N_n + \beta_a A_a + \beta_0 \text{Treatment}_0 + \beta_1 \text{Treatment}_1 + \beta_2 \text{Treatment}_2 + \beta_3 \text{Treatment}_3 + \beta_{ldy} SR_{ldy} + e$$

Variable	Explanation	Variable	Explanation
CV_{it}	Change in Value in Property i in Year t	A_a	Acreage of Property
T_t	Year Fixed Effects Factor for Each Year t	Treatment_x	Loft Property Completed x Years After Current Year
N_n	Geographic Neighborhood Factor for Each Neighborhood n	SR_{ldy}	Spillover Radius of Loft Property l within Distance Ring d at Years Since Completion y

Regression Coefficient Estimates

The results of the above equation yield estimates for the coefficients related to each variable; the β symbols before each effect. These estimates explain the average effect of each variable on the average property, controlling for all of the other effects. This technique isolates the impact of loft development from annual market trends or neighborhood specific trends, as well as the impact of acreage on property value increases. The most relevant coefficients are summarized in the table

Variable	Coefficient Estimate	Standard Error	P-Values
Average Value (intercept)	\$40,012.25	\$2,195.50	2.00E-16
Year 2010	\$(16,960.05)	\$813.13	2.00E-16
Year 2011	\$(20,835.74)	\$813.12	2.00E-16
Year 2012	\$(23,049.51)	\$813.13	2.00E-16
Year 2013	\$(16,770.61)	\$815.71	2.00E-16
Year 2014	\$(18,947.67)	\$816.47	2.00E-16
Year 2015	\$(20,622.44)	\$816.39	2.00E-16
Year 2016	\$(18,741.07)	\$816.42	2.00E-16
Acres	\$270.89	\$16.76	2.00E-16
One Year Since Loft Completed	\$504,303.04	\$30,727.53	2.00E-16
Two Years Since Loft Completed	\$831,150.28	\$38,290.49	2.00E-16

below, with the average value representing the change in value in an average downtown property for any given year. This average, at \$40,012 per year at first seems high, but accounting for the negative estimates for each year and most neighborhoods reduces the estimate to a reasonable level. The standard errors and p-values are relatively small for all of these key variables, which indicate that these estimates are highly significant, predicting property changes with almost 100% confidence. The

neighborhood variables were all similarly significant, indicating that location is a key determinant of property appreciation. The spillover variables were intermittent in their significance, an effect we attribute to the proximity of loft developments to each other in both time and space.

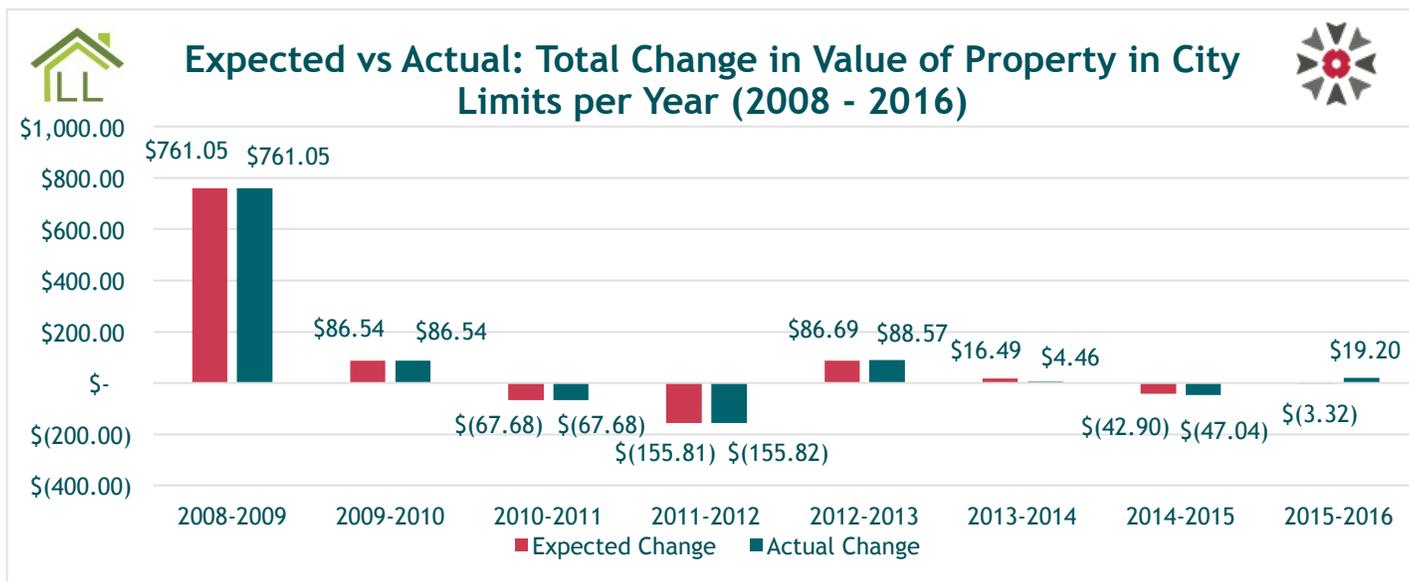
The most critical variables we found are the years since completion. No pattern was found in the change in value for a property in the same year or third year since loft completion. The first and second year after completion, however, demonstrated large increases in value, at an average of \$504,303 in the first year and \$831,150 in the second. This indicates that the average loft appreciates by \$1.35 million within two years of redevelopment, even controlling for market trends.

Results

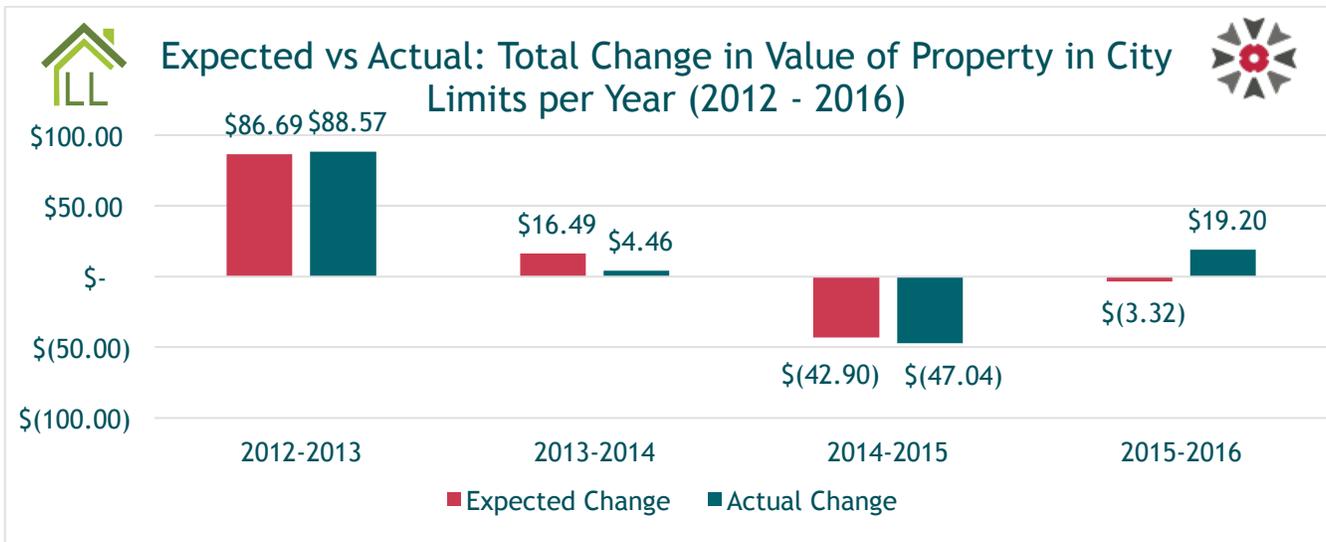
The results of the regression coefficients are optimistic but not convincing on their own. As such we have used the estimates generated to create a model that estimates the change in value for every property in the city over each year from 2009 to 2016. This model allows us to observe the effect of multiple variables, such as the overlapping effects of loft spillover, on each property and aggregate the results. These aggregated figures are then used to estimate the specific effects of loft development per year from direct investment and indirect spillover; these two estimates are then combined to calculate a total value added for all lofts and NewTown supported lofts specifically.

Accuracy of Regression Model

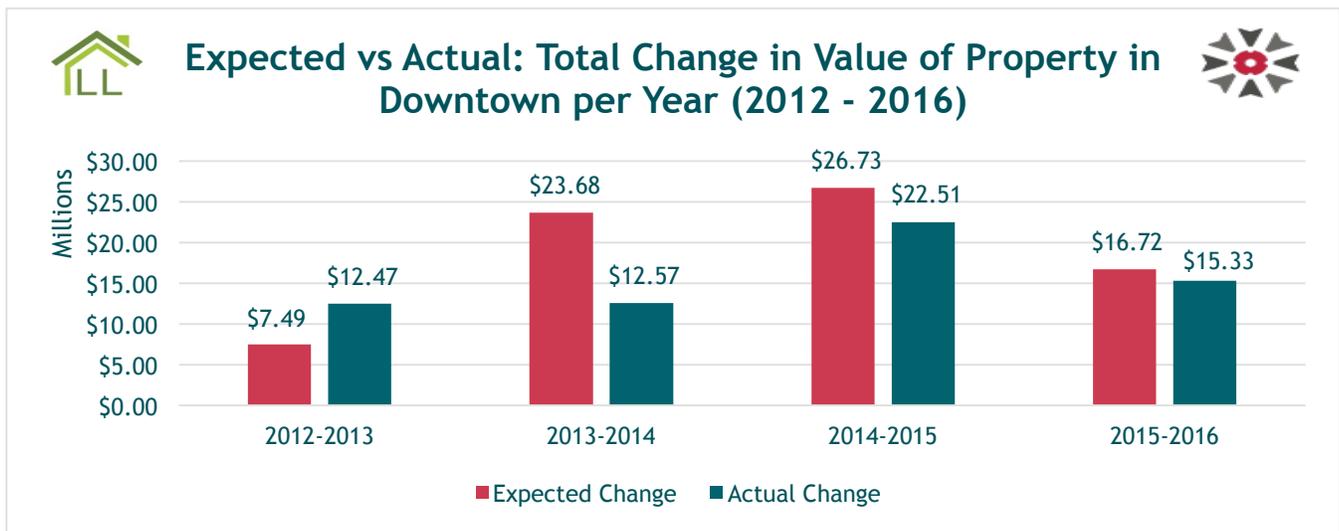
Our model estimating the change in property values per year is relatively accurate in its predictions for citywide trends, particularly in the years leading up to the first loft development project in 2012. After this point, the difference between the expected change and actual change in value is greater, but we believe this is due to the averaging effect of different years. The model overestimated growth by \$12 million in 2013 but underestimated the decline in 2014 by \$4.14 million. The biggest difference came in 2016 when our model predicted a decline of \$3.32 million when values actually increased by \$19.2 million; this difference is explained partially by the scarcity of data available in



2016, during which the tax assessor recorded only 1,010 changes in value for the 39,790 properties across Macon. Despite these irregularities, we believe this model is an effective predictor of value changes across the city and therefore a useful tool for isolating the effects of loft developments.



The model was also a fair predictor for values within the boundaries of downtown. While it overestimated the change in property values for the years from 2014 to 2016, we attribute this difference more to the lag in valuation from the tax assessor than a statistical error. Since the assessor evaluates properties on a rolling basis they are not able to capture the effects of property change immediately, particularly for those properties which haven't been sold recently. We believe that property downtown is currently undervalued and will correct back upwards in the coming years. This undervaluation refers specifically to assessments for tax purposes and does not necessarily indicate a potential increase in sale values, though the two are closely correlated.

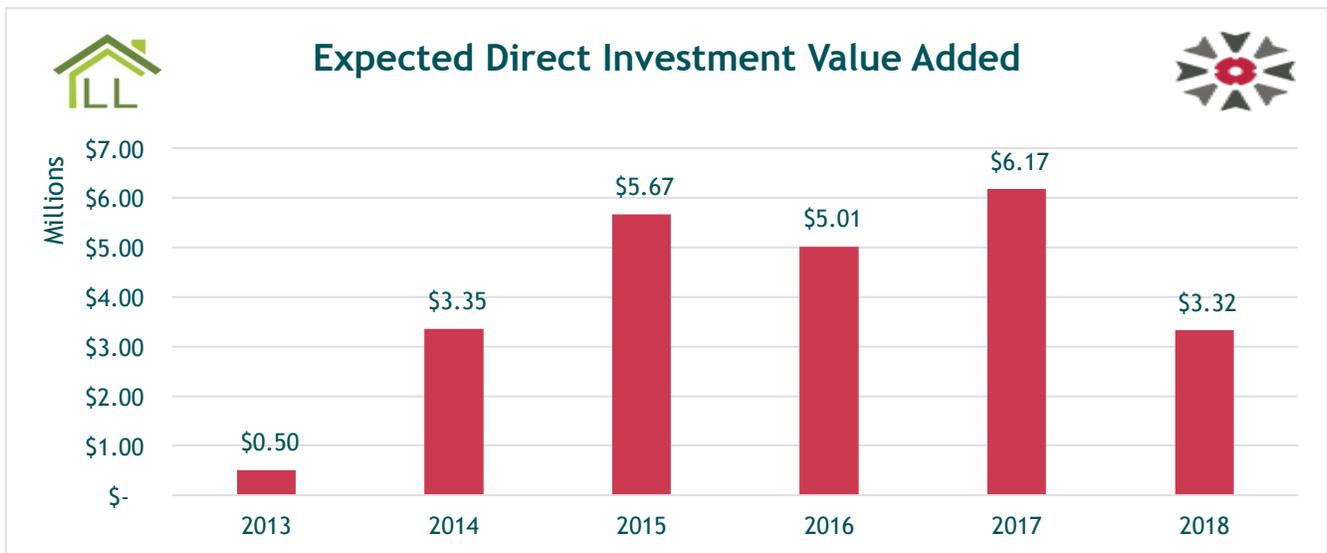


Projection of Impact to 2018

One key limitation of the regression model we used is that it cannot predict the accuracy of loft impacts beyond 2016. Since the effect of property investments are typically not realized until years after their completion, and four of the lofts included were finished in 2016, we had to rely on historical effects to project the impact of these lofts into the future. To do this we calculated the average effect of each change per year after the completion of each loft project, controlling for the different market trends per year and size of each property. We applied these averages to the recently completed lofts and projected their impact out through 2018. All of the following figures and graphs include these projected values, which are necessarily less accurate than historical estimates, but critical to account for in determining the total impact of loft developments.

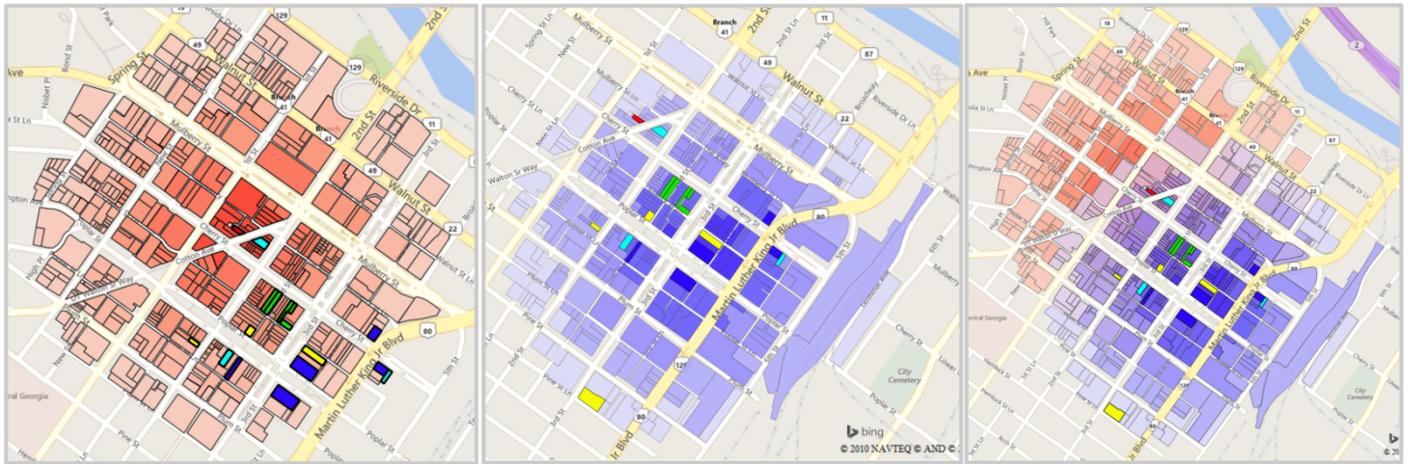
Direct Impact

The direct impact of loft development on the properties themselves is the most statistically significant effect we detected, which is unsurprising considering the properties received large investments. The scale of value added from direct improvements matches the number of loft projects completed in the years previous, following the one and two-year coefficient estimates.



Spillover Impact

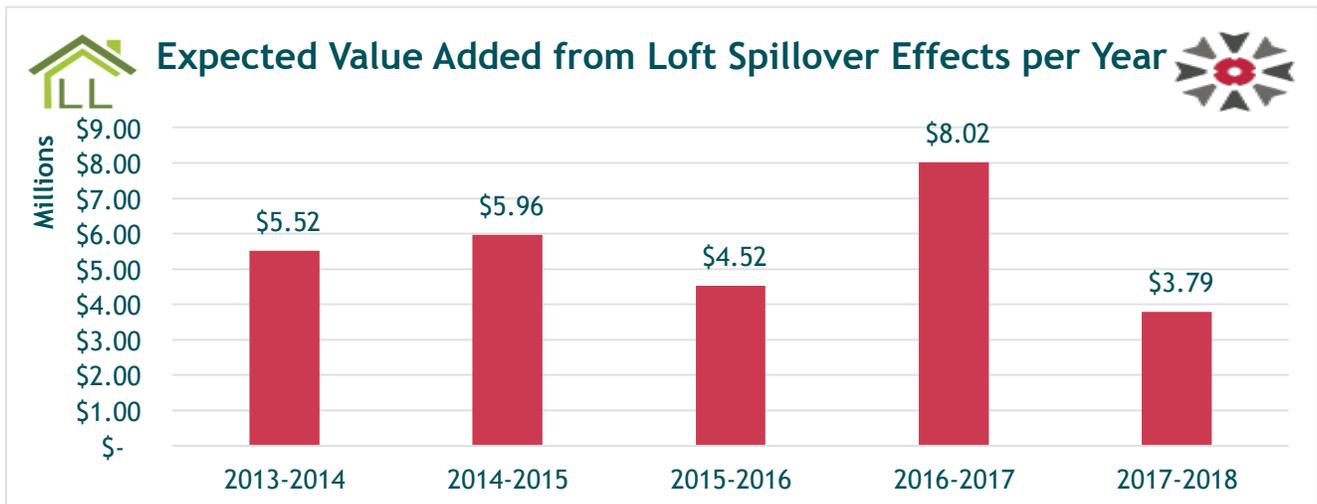
The most difficult impact measurement to estimate was the effect of loft development on surrounding properties. The main challenge was separating the effect of each loft from other nearby renovation projects, since many properties were nearby each other and development took place within a four-year timespan. After evaluating the accuracy of different distance and time effects, our regression analysis determined that only properties within 500 meters of a loft property exhibited an increase in value due to their relative proximity, and those increases also took place in the first and second year following loft completion. We then separated this 500 meter limit into five concentric rings surrounding each loft, to indicate properties between 0 to 100 meters, 100 to 200 meters, etc. The spillover effect within each ring was measured individually for each year following the completion of the relevant loft. The regression analysis was not sensitive enough to capture each loft’s individual impact due to the high degree of overlap between the rings encompassing each loft, as can be seen in the accompanying maps. The overall effect of the loft spillover per year after loft completion was captured, however, and by plugging these estimates into the predictive model we were able to generate an average spillover for each distance ring and each year.



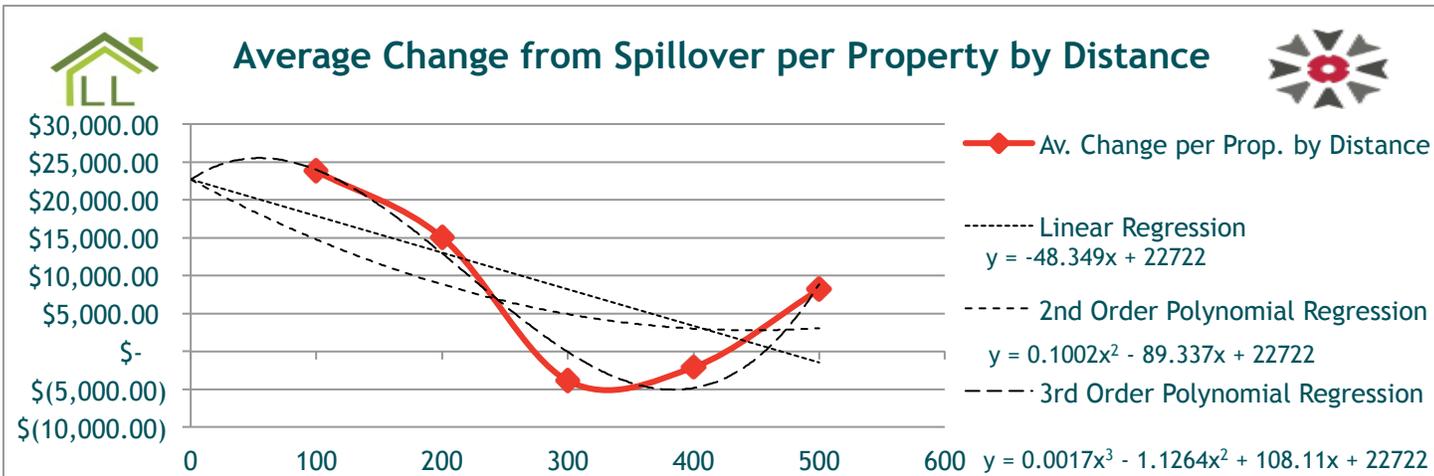
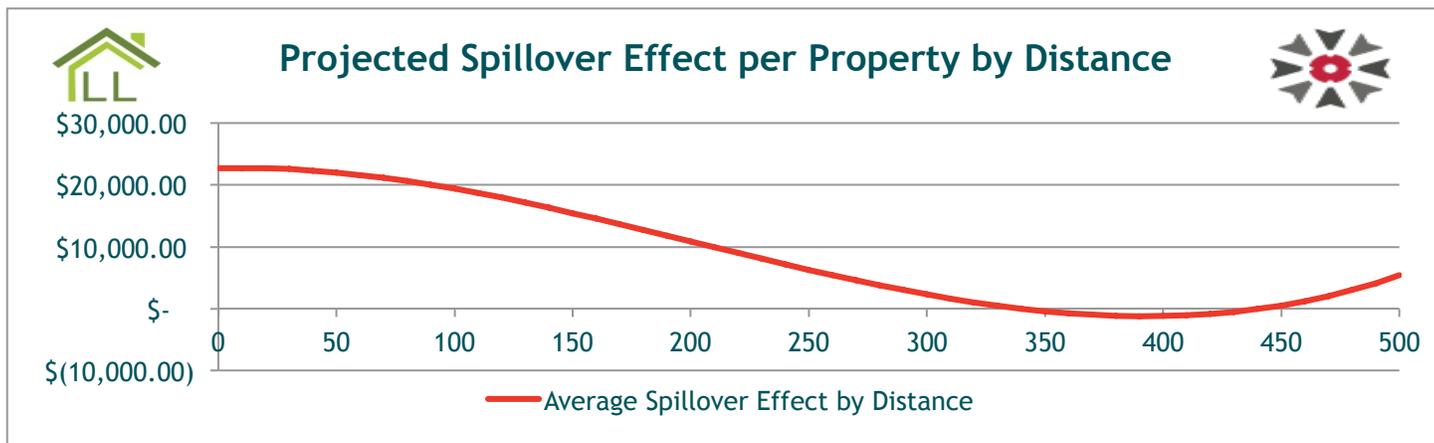
Spillover Rings for Cotton Ave. Loft

Spillover Rings for Dannenberg Loft

Overlapping Spillover Effects



The overall trend of the spillover matched the results of similar studies: a large positive effect in close proximity to the investment with diminishing returns as distance increases. Our spillover estimates included one irregularity, however: they estimated that properties within 300 and 400 meters were decreasing in value as a result of the lofts, but those further away at 500 meters were increasing again. We believe that this counterintuitive trend can be explained by the degree of overlap between different lofts, through which the positive effect of nearby lofts overshadows the smaller effect of more distant ones. To account for this irregularity we ran additional regression tests on the overall trend of the spillover effect, to determine a more accurate measure of different distances. We used the average of the second and third order polynomial regressions of the irregular spillover to estimate the new effect, which is graphed below. The resulting trend line matches more closely the standard spillover observed by other economic researchers studying property investment.



Combined Impact

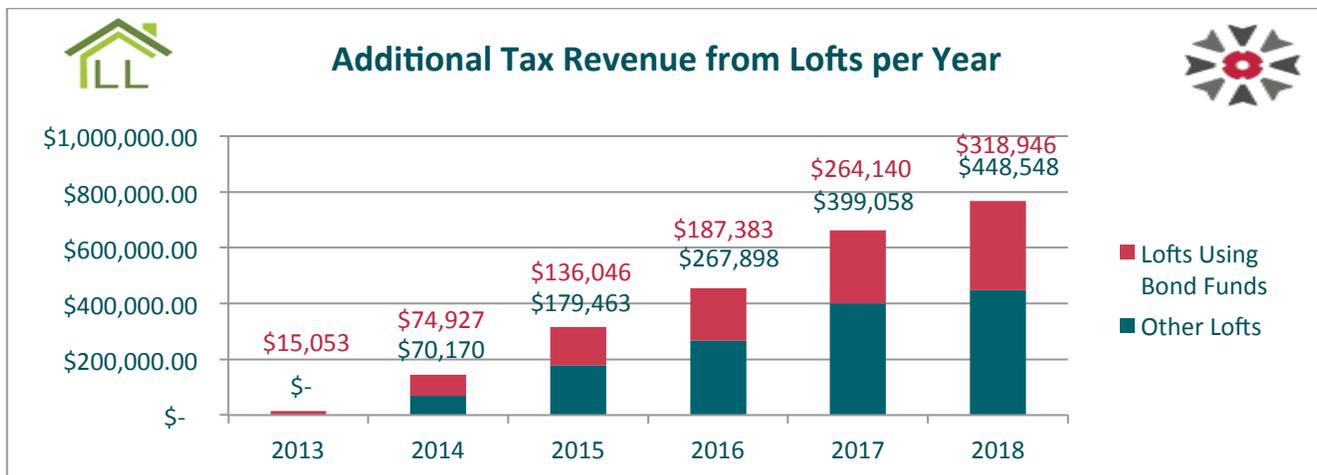
After applying both the direct investment effect and spillover effect to every property in Macon we estimated the change in value for the city and downtown both with and without loft development. While the model overestimates the change in value compared to the actual assessed values, we attribute this to undervaluation. Since the tax assessor can only evaluate properties on a rolling basis

their assessed value is systemically lower than the actual market rate. Our estimates reflect the correction that will take place once assessed values capture the increase caused by development.

Variable	Citywide	Downtown
Expected Change in Value without Lofts (09 - 16)	\$681,188,002	\$101,350,107
Plus: Expected Direct Value Added (13 - 16)	\$14,540,595	\$14,540,595
Plus: Expected Spillover Value Added (13 - 16)	\$16,532,466	\$13,546,541
Expected Total Change (09 - 16)	\$712,261,064	\$129,437,243
Actual Total Change in Value (09 - 16)	\$689,283,626	\$110,087,969

Impact on Tax Base

The final key impact figure in our study is the effect of loft developments on the city’s tax base. The added value to public services from increasing the amount of revenue generated by property taxes is an important effect of investment. We calculated the change in tax base using the average downtown millage rate of 14.625 per \$1,000 in property value, or a multiplier of 0.014625, on the combined change in value from direct and spillover effects. This calculation does not take into account tax freezes or other legal mechanisms that reduce tax obligations, and therefore may be overvalued. While the value of each additional tax dollar raised is not directly equivalent to the effect of increases in property values, we include them our calculations of total return to account for their contribution to the impact generated by loft developments.

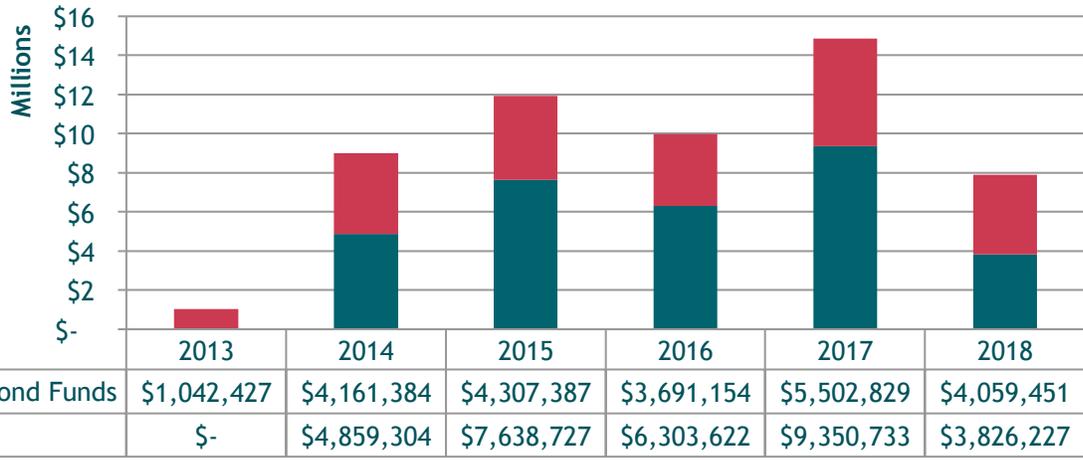


Return on Investment

In order to measure the efficiency of loft development as an economic improvement mechanism, we compared the total value added from the direct, spillover, and tax base impacts with the amount invested. We separated those lofts which received financial support from NewTown’s revolving bond fund from other developments to analyze the return on their contribution independently. The total estimated amount invested in loft construction from 2012 to 2016 was \$35.8 million, with \$3.7 million of the financing originating in NewTown’s bond fund.



Total Value Added from Direct, Spillover, and Tax Revenue per Year



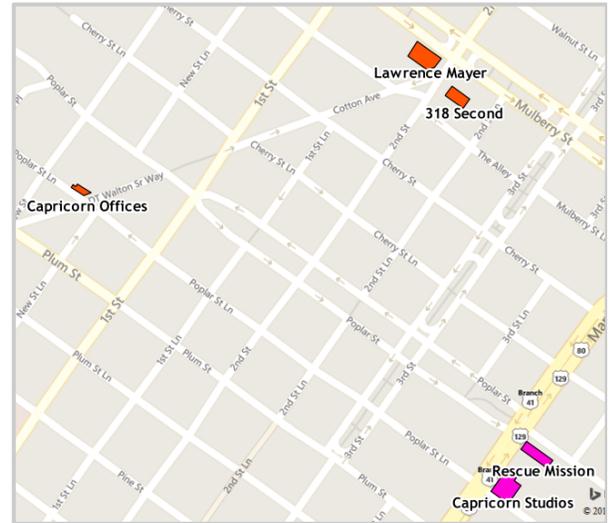
Using these investment figures as inputs and their total impact as outputs, we calculated the return on investment for each, including the projected impact of those lofts built in 2015 and 2016 that will be realized in 2017 and 2018. The percentage return figures in the table below reflect the impact of the lofts on the city's property values, including and excluding tax base improvements, projected to 2020. It is important to note that NewTown's return reflects the total effect of lofts which they co-financed and does not take into account the percentage of their contributed; we believe this return figure is a fair estimate as without the support of the bond fund or the market research conducted by NewTown it is likely that these lofts would not have been built.

Total Impact from Currently Completed Projects	All Lofts	Lofts using Bond Funds
Total Amount Invested	\$35,778,262	\$3,700,440*
Total Expected Change in Value with Tax Revenue	\$56,278,235	\$23,402,525
Total Return on Investment	57%	532%
Total Return on Investment without Added Tax Revenue	46%	488%
*Total Invested by New Town Macon Revolving Bond Fund - Not Total Cost of Co-Financed Lofts		

Projections for Future Loft Projects

The final variable considered in this study is the impact of future loft projects. From 2017 to 2018 five lofts are scheduled for completion, two receiving support from NewTown’s revolving bond fund: the Lawrence Mayer Lofts and the Lofts at 318 Second Street. These lofts reflect a critical shift in the city’s urban development strategy, as the benefits of a revitalizing downtown spread outwards towards the periphery of the district it becomes financially sustainable for investors to develop new properties in economically depressed areas. These large renovation projects will attract new residents and businesses to these zones, stimulating growth and broadening the base of viable property. While our projections only capture the effects of property value changes they are important indicators of the potential these lofts bring. Our projected figures are derived from the historical averages from previous lofts; these may actually be underestimating the impact of new lofts since the scale of investment in these projects is greater and the baseline property values in the surrounding area lower than the center of downtown.

Ongoing Loft Projects by Year



Future Impact of Lofts by Year	Projected Spillover Impact	Projected Direct Investment Impact	NTM Only Projected Spillover Impact	NTM Only Projected Direct Impact
2018	\$3,090,568	\$1,512,909	\$1,989,508	\$1,008,606
2019	\$4,037,899	\$3,502,057	\$1,989,508	\$1,662,301
2020	\$947,331	\$1,662,301	\$-	\$-
Total Impact	\$8,075,798	\$6,677,267	\$3,979,016	\$2,670,907

Conclusion

This report set out to answer four main questions: the return on loft investments for the city, the efficiency of NewTown’s revolving bond fund, whether loft development will lead to self-sustaining transformation, and what further investment is required to ensure long term benefits for the city. The total return for the city’s property market from loft development is certainly positive, and the high rate of return on NewTown’s investment demonstrates that the bond fund has contributed significantly to this achievement. Considering all loft construction from 2012 to ongoing projects scheduled for completion in 2018, over \$65.7 million will have been added to the city’s property values. The success of previous loft apartments both in attracting and retaining residents indicates that these improvements are self-sufficient, thanks largely to developers in the private sector managing and maintaining the properties. The increasing pace and scale of investments also supports the sustainability of development thus far, and while overinvestment is always a possibility,

consistently rising residency rates and high demand for loft living make it unlikely that a bubble is forming around mixed-use apartment construction. Finally, given the cyclical nature of NewTown’s bond fund, with repayments from previous beneficiaries going to support new borrowers, enough flexibility exists in the allocation of capital that NewTown will be able to respond to changes in market conditions. All of these factors lead us to believe that loft development downtown, and NewTown’s role in particular, are self-sustaining transformations that will have long term benefits.

The final question this report seeks to answer is whether or not more investment is required to achieve a robust market for loft apartments in Macon. The best indicator to answer this question is through the free market; if the cost to developers of acquiring land increases but competition in the loft market forces lease and rental rates down, the return on investment will no longer be enough to justify the capital outlay. Considering that the periphery of downtown still contains enough low value properties and demand by new residents is still rising there is still slack within the market, meaning that continued investment is still necessary. This investment opportunity has been seized by private property developers without the need for additional incentives, as the three lofts scheduled for completion in 2018 without NewTown assistance demonstrate, indicating that there is no longer as much need for NewTown to assist developers with subsidized financing. That does not mean that NewTown’s leadership and coordination is still not required for the years to come, only that they have accomplished their mission of leveraging a self-sustaining loft market downtown.

Expected Value Added by Direct and Spillover per Year	All Lofts	Lofts with Bond Funds Only
2013	\$ 504,303	\$ 504,303
2014	\$ 8,875,590	\$ 4,856,181
2015	\$ 13,630,604	\$ 4,975,139
2016	\$ 4,700,431	\$ 3,086,114
Projections for 2017	\$ 16,133,397	\$ 5,238,688
Projections for 2018	\$ 11,721,660	\$ 6,738,612
Projections for 2019	\$ 7,539,956	\$ 3,651,808
Projections for 2020	\$ 2,609,631	\$ -
Total (13 - 20)	\$ 65,715,571	\$ 29,050,851

There is still much work left to be done to ensure Macon continues to develop as a vibrant, inclusive city. Mixed-use loft development means that storefronts need to be filled with new entrepreneurs, talented young professionals need to be introduced to the unique culture of the city, and public spaces need to be maintained and improved to ensure walkability. Leveraging strategic investments to ensure that Macon has high quality housing in prime locations is only the beginning; an entire urban ecosystem needs to surround those developments in order to ensure their long-term success. Fortunately, if NewTown can continue to create innovative solutions for the city’s ever evolving challenges, Macon will continue to be a city where all are encouraged to live, work, and play.

Variable	All Lofts	Lofts using Bond Funds
Total amount Invested	\$ 35,778,262	\$ 3,700,440
Impact on Assessed Value from Currently Completed Lofts		
Direct 12-16	\$ 14,540,595	\$ 5,846,116
Spillover 12-16	\$ 16,532,466	\$ 6,942,825
Direct + Spill 12-16	\$ 31,073,061	\$ 12,788,941
Added Tax Revenue 12-16	\$ 930,944	\$ 413,411
Direct + Spill + Tax 12-16	\$ 32,004,005	\$ 13,202,352
Impact on Future Assessed Value from Currently Completed Lofts		
Direct Completed 17-18	\$ 9,497,565	\$ 3,502,057
Spillover Completed 17-18	\$ 11,810,980	\$ 5,477,135
Direct + Spill Completed 17-18	\$ 21,308,545	\$ 8,979,192
Added Tax Revenue Completed 17-18	\$ 2,965,686	\$ 1,220,981
Direct + Spill + Tax Completed 17-18	\$ 24,274,230	\$ 10,200,173
Future Assessed Value from Uncompleted Lofts		
Direct Projected 17-20	\$ 6,677,267	\$ 2,670,907
Spillover Projected 17-20	\$ 8,075,798	\$ 3,979,015
Direct + Spill Projected 17-20	\$ 14,753,064	\$ 6,649,922
Added Tax Revenue Projected 17-20	\$ 461,538	\$ 238,798
Direct + Spill + Tax Projected 17-20	\$ 15,214,602	\$ 6,888,720

About the Authors

Aaron Scherf

Aaron is co-founder and owner of LandLink Systems, an analytics and technology company with a vision to make property information accessible for all. Aaron and his partners launched LandLink during his senior year at Mercer University, winning initial funding for the venture from a pitch competition at the Mercer Innovation Center. After graduating *summa cum laude* with a Bachelor of Business Administration in May of 2017 Aaron became a Donald M. Payne International Development fellow, placing him on a unique path to join the United States Agency for International Development. Before starting his postgraduate education, Aaron will serve for one year in Heidelberg, Germany as a Fulbright Scholar, conducting research on refugee housing conditions in German cities. While furthering his education Aaron remains dedicated to the work of LandLink, contributing to the company's economic models and long term strategy.

Brandon Hancock

Brandon is a senior at Mercer University working towards a Bachelor of Science in Engineering with a specialization in Electrical Engineering and a Master's Degree in Software Engineering. Currently, Brandon is a part of Mercer's Engineering Honors Program which has allowed him to work closely with peers solving real world problems. Brandon extends his passion for applied technology through his role in the Binary Bears programming team, which competes in coding events across the region. Brandon is also a co-founder and owner of LandLink Systems, and plans to work full time applying his knowledge of data analytics and artificial intelligence to the company after graduation.

Appendix

Table of Regression Coefficients

Variable	Estimate	Std. Error	t-value	Pr(> t)	Sign.	Variable	Estimate	Std. Error	t-value	Pr(> t)	Sign.
(Intercept)	40012.25	2195.5	18.225	2.00E-16	***	11_500m_1	53350.76	19351.45	2.757	0.005835	**
Year2010	-16960.05	813.13	-20.858	2.00E-16	***	18_500m_1	46146.43	17838.16	2.587	0.009683	**
Year2011	-20835.74	813.12	-25.624	2.00E-16	***	2_100m_1	-103673.47	42266.26	-2.453	0.014173	*
Year2012	-23049.51	813.13	-28.347	2.00E-16	***	2_200m_2	-155348.05	62597.77	-2.482	0.013077	*
Year2013	-16770.61	815.71	-20.559	2.00E-16	***	4_200m_1	135320.73	56745.86	2.385	0.017095	*
Year2014	-18947.67	816.47	-23.207	2.00E-16	***	6_300m_2	66814.48	26661.87	2.506	0.012211	*
Year2015	-20622.44	816.39	-25.261	2.00E-16	***	2_400m_1	-41594.22	17774.79	-2.34	0.019281	*
Year2016	-18741.07	816.42	-22.955	2.00E-16	***	7_500m_1	45521.83	20433.18	2.228	0.025892	*
Payne	-22312.58	2388.48	-9.342	2.00E-16	***	9_500m_1	-49841.69	19856.64	-2.51	0.012071	*
Lynmore	-22604.21	2695.69	-8.385	2.00E-16	***	2_100m_2	-155377.51	84913.89	-1.83	0.067277	.
MaconMall	-22094.49	2441.39	-9.05	2.00E-16	***	18_100m_1	-111571.75	60444.28	-1.846	0.064913	.
Mercer	75601.55	11143.32	6.784	1.17E-11	***	1_200m_1	-27024.82	15220.84	-1.776	0.075814	.
Montpelier	-21596.69	2432.51	-8.878	2.00E-16	***	18_200m_1	-88891.59	49044.6	-1.812	0.069915	.
NorthHighlands	-23727.74	2703.22	-8.778	2.00E-16	***	2_300m_2	-79023.52	47899.26	-1.65	0.098988	.
Pleasant	-20478.77	2400.14	-8.532	2.00E-16	***	6_300m_1	-31855.44	17208.15	-1.851	0.064144	.
RoseHill	-344	5501.94	-0.063	0.950146		9_300m_1	-71716.04	42775.41	-1.677	0.093627	.
ShirleyHills	-18212.21	2499.15	-7.287	3.17E-13	***	1_400m_2	-21114	11618.55	-1.817	0.069177	.
SouthMacon	-24076.03	2261.17	-10.648	2.00E-16	***	18_400m_1	-48197.15	28060.66	-1.718	0.08587	.
Tattnall	-20147.03	3970.47	-5.074	3.89E-07	***	6_500m_2	-21098.82	11718.98	-1.8	0.071799	.
TindallHeights	-18957.25	2374.47	-7.984	1.42E-15	***	8_500m_2	-26595.04	13776.4	-1.93	0.053548	.
VillaCrest	-21798.23	2439.58	-8.935	2.00E-16	***	1_100m_1	-20829.81	23043.72	-0.904	0.366036	
VillageGreen	-24071.85	2440.33	-9.864	2.00E-16	***	4_100m_1	119295.24	79135.12	1.507	0.131687	
Vineville	-20108.69	2458.79	-8.178	2.89E-16	***	4_100m_2	43539.06	37216.32	1.17	0.242046	
Wesleyan	-17533.4	2362.2	-7.422	1.15E-13	***	6_100m_1	-17416.61	30065.96	-0.579	0.562401	
WestOak	-20285.5	2850.26	-7.117	1.10E-12	***	7_100m_1	-27661.53	63218.93	-0.438	0.661712	
Westgate	-24777.23	2347.08	-10.557	2.00E-16	***	9_100m_1	-104033.53	71205.99	-1.461	0.14401	

Westminster	-22314.35	2250.4	-9.916	2.00E-16	***	9_100m_2	-82644.25	74932.4	-1.103	0.270064	
Whitehouse	-21969.39	2643.39	-8.311	2.00E-16	***	11_100m_2	59307.52	69707.1	0.851	0.394875	
WimbishHills	-21782.23	2267.44	-9.607	2.00E-16	***	1_200m_2	-3160.83	20905.81	-0.151	0.879823	
AnthonyRidge	-20118.75	2365.02	-8.507	2.00E-16	***	4_200m_2	20649.05	29075.87	0.71	0.477594	
Bealls	-13761.73	2777.3	-4.955	7.23E-07	***	6_200m_1	13542.63	22110.35	0.613	0.540206	
Bloomfield	-23929.9	2301.87	-10.396	2.00E-16	***	7_200m_1	-31630.29	53813.4	-0.588	0.556682	
CherokeeHeights	-24263.69	3656.81	-6.635	3.25E-11	***	8_200m_2	40857.94	26032.54	1.569	0.116534	
EastHinterland	-25921.42	2911.93	-8.902	2.00E-16	***	9_200m_1	-83783.62	58907.1	-1.422	0.15494	
EastMacon	-22424.36	2301.71	-9.742	2.00E-16	***	9_200m_2	53587.3	61305.11	0.874	0.38206	
FortHill	-22420.8	3054.84	-7.339	2.15E-13	***	11_200m_2	-9371.4	49349.21	-0.19	0.849388	
Griswoldsville	-22890.11	2365.57	-9.676	2.00E-16	***	1_300m_2	13653.3	14287.4	0.956	0.339266	
Groveland	-21344.65	2525.36	-8.452	2.00E-16	***	4_300m_1	43921.79	43580.76	1.008	0.313539	
Huegenin	-19453.16	5266.56	-3.694	0.000221	***	4_300m_2	-15152.3	21266.86	-0.712	0.476166	
Industrial	-18243.39	3101.79	-5.882	4.07E-09	***	7_300m_1	-26759.98	36437.93	-0.734	0.462706	
Ingleside	-17874.08	2468.64	-7.24	4.48E-13	***	8_300m_2	36801.64	24136.45	1.525	0.127327	
Intown	-9929.39	2555.62	-3.885	0.000102	***	9_300m_2	-70408.82	43679.11	-1.612	0.106972	
TOTALACRES	270.89	16.76	16.165	2.00E-16	***	11_300m_2	-20441.42	39325.25	-0.52	0.603201	
Years_Since_1	504303.04	30727.53	16.412	2.00E-16	***	18_300m_1	-32461.52	39880.1	-0.814	0.415658	
Years_Since_2	831150.28	38290.49	21.706	2.00E-16	***	1_400m_1	-9701.26	10038.38	-0.966	0.333836	
Years_Since_3	-21031.09	46871.84	-0.449	0.653653	***	2_400m_2	-52796.2	36747.63	-1.437	0.150797	
1_100m_2	121374.73	31736.38	3.824	0.000131	***	4_400m_1	19613.62	33927.55	0.578	0.563195	
8_100m_2	461674.1	41181.48	11.211	2.00E-16	***	6_400m_1	3906.52	13041.46	0.3	0.764523	
2_200m_1	-119036.02	33440.55	-3.56	0.000371	***	6_400m_2	-9220.5	17918.23	-0.515	0.606842	
7_200m_2	199998.59	56259.79	3.555	0.000378	***	7_400m_1	-34885.24	28880.61	-1.208	0.227082	
11_200m_1	180243.62	48760.93	3.696	0.000219	***	8_400m_2	1955.42	18185.77	0.108	0.914373	
1_300m_1	-66967.72	11426.93	-5.861	4.62E-09	***	9_400m_1	-44377.86	33394.92	-1.329	0.183888	
2_300m_1	-91365.21	25241.79	-3.62	0.000295	***	9_400m_2	-36730.38	32804.47	-1.12	0.262853	
7_400m_2	101574.39	28932.31	3.511	0.000447	***	11_400m_2	-7999.43	27265.43	-0.293	0.769224	
6_100m_2	113642.32	42169.94	2.695	0.007042	**	1_500m_2	-12686.61	11050.89	-1.148	0.250962	
7_100m_2	188910.5	65328.82	2.892	0.003832	**	2_500m_1	5555.22	12664	0.439	0.660906	

11_100m_1	205040.65	68355.69	3	0.002703	**	2_500m_2	-14429.04	26377.02	-0.547	0.584358	
6_200m_2	106872.63	35369.51	3.022	0.002515	**	4_500m_1	-3143.86	24707.06	-0.127	0.898746	
7_300m_2	100303.85	37807	2.653	0.007977	**	4_500m_2	-17112.4	12779.46	-1.339	0.180554	
11_300m_1	120086.01	38156.1	3.147	0.001648	**	6_500m_1	12971.36	11057.42	1.173	0.24076	
4_400m_2	-48570.57	16433.37	-2.956	0.003121	**	7_500m_2	15063.43	20115.46	0.749	0.453949	
11_400m_1	77020.73	27048.46	2.848	0.004407	**	9_500m_2	-8573.2	20018.79	-0.428	0.668464	
1_500m_1	26706.74	10250.02	2.606	0.009174	**	11_500m_2	-6111.97	19817.34	-0.308	0.757766	

Calculation of Projected Spillover Effect

Meters	Average Change per Property by Distance	Poly 2 Change	Poly 3 Change	Average Spillover Projection per Property by Distance
100	\$ 23,785.74	\$ 14,790.30	\$ 23,969.00	\$ 19,379.65
200	\$ 15,055.48	\$ 8,862.60	\$ 12,888.00	\$ 10,875.30
300	\$ (3,849.71)	\$ 4,938.90	\$ (321.00)	\$ 2,308.95
400	\$ (2,084.24)	\$ 3,019.20	\$ (5,458.00)	\$ (1,219.40)
500	\$ 8,181.24	\$ 3,103.50	\$ 7,677.00	\$ 5,390.25