

Towards A New Real Estate:
Innovative Financing for a Better Built Environment

By

Matthew J. Lister

M. Arch II, Suburb & Town Design, University of Miami, 2003

M. Arch I, University of Miami, 2003

B.A, Humanities, University of Colorado, 1997

Submitted to the Department of Architecture
in partial fulfillment of the requirements
for the degree of

Master of Science in Real Estate Development

at the

Massachusetts Institute of Technology

September 2007

© Matthew J. Lister All Rights Reserved.

The author hereby grants MIT permission to reproduce and publicly distribute paper and electronic copies of this thesis document in whole or in part in any medium now known or hereafter created.

Signature of Author: _____
Department of Architecture
July 27, 2007

Certified by: _____
David Geltner
Professor of Real Estate Finance
Department of Urban Studies and Planning
Thesis Supervisor

Accepted by: _____
David M. Geltner
Chairman, Interdepartmental Degree Program in
Real Estate Development

Towards A New Real Estate: Innovative Financing for a Better Built Environment

By

Matthew J. Lister

Submitted to the Department of Architecture on July 27, 2007 in partial fulfillment of the requirements
for the degree of Master of Science in Real Estate Development

ABSTRACT

The real estate industry has evolved significantly over the last century. This evolution has enabled the rise of real estate to be one of the largest and most important asset classes in American investment. Yet this evolution has also produced a system of development that has grown to compromise rather than facilitate the creation of places of enduring value. First, this thesis explores how the evolution of the industry led to this system. Second, this thesis asserts that the real estate industry has continued to evolve, and is on the verge of adopting a new system of development, a *New Real Estate*, that will again facilitate the creation of places of enduring value.

Following the current paradigm shift in American city planning, the *New Real Estate* acknowledges the significant benefits of developing walkable mixed use urbanism. Despite the significant advances made in the industry to design and entitle walkable mixed use urbanism, there has been little effort made to facilitate it's development in the field of real estate finance. Key to the continued evolution of the *New Real Estate*, is the introduction and acceptance of several innovative financing concepts. This thesis examines the potential roles of Patient Equity, Real Options Analysis, and the emerging U.S. Real Estate Derivatives market in the evolving real estate industry.

Thesis Supervisor: David Geltner
Title: Professor of Real Estate Finance

Acknowledgments

This thesis would simply not exist without the thoughtful support of my advisor David Geltner. His passion for the world of real estate finance and his propensity to see and explain that world in the context of its impact on the physical world made it a true joy to work with him.

Most importantly, I am indebted to my wife Erika and to my family. Their understanding, endless patience, and constant encouragement made the completion of this year at MIT and this thesis possible.

TABLE OF CONTENTS

<u>Introduction</u>	<u>5</u>
<u>Chapter 1- The Real Estate Developer: From Pillar to Pariah</u>	<u>7</u>
The Real Estate Developer - Pillar	7
The Real Estate Developer - Pariah	9
<u>Chapter 2 - Developing Walkable Mixed Use Urbanism</u>	<u>11</u>
Why Walkable Mixed Use Urbanism?	11
The Evolution of City Planning	13
The Evolution of the Real Estate Industry	14
Development Process Benefits of Walkable Mixed Use Urbanism	16
Return Benefits of Walkable Mixed Use Urbanism	18
What Has Been Accomplished Already?	20
<u>Chapter 3 - Christopher Leinberger & Patient Equity</u>	<u>22</u>
A Voice in the Woods	22
Patient Equity	24
<u>Chapter 4 - The DCF Method: A Critical Analysis</u>	<u>27</u>
NPV Analysis	27
Predictions and Uncertainty	29
<u>Chapter 5 - Real Options for The New Real Estate</u>	<u>31</u>
Flexibility and Value	31
Evaluation of a Simple Deferral Option	33
What is a Real Option Really?	37
What Determines the Value of a Real Option?	38
Real Options: Categorized	41
Why does Real Options Analysis Matter?	43
<u>Chapter 6 - Derivatives and The New Real Estate</u>	<u>45</u>
The Two Faces of the Real Estate Business	45
Harvesting “Alpha”	46
<u>Conclusion - The New Real Estate</u>	<u>51</u>
<u>Bibliography</u>	<u>53</u>

Introduction

During the period of world history known as the Renaissance, human civilization emerged from the dark ages to embark upon a new era of human achievement and progress some consider to be unparalleled even today. Extraordinary advances in the arts, sciences, literature and politics were all driven by the underlying notion that human capability is limited only by the reach of the imagination. It was an age defined by names like Da Vinci, Michelangelo, Palladio, Medici, and Farnese. It is important to understand that perhaps their greatest asset was also their greatest achievement: The Renaissance City. The City was intrinsically linked to her citizens by mutually supportive bonds that promoted the betterment of both. As such, the Renaissance City was built simultaneously as the expression of the age and as the crucible from which sprang forth the achievements that defined the age. The wealthy merchant families of the time shaped the buildings and spaces that today, centuries later, are as inspirational and delightful as they were when they were built. These cities remain a living and breathing testament to the enduring value of great city building.

Today, in the United States, the Real Estate Industry has become the de-facto builder of our cities and suburbs. Over the span of the last half century, tremendous changes in the real estate market, the business of real estate development, and monumental shifts in American planning have produced a new system by which cities get built. No longer the purview of the wealthy elite, real estate investment has evolved to empower and expand a range of investors more broadly than has ever been seen before. The result of this has been the unmitigated rise of real estate to become one of the largest and most important asset classes in American investment.

Yet when we examine the state of the built environment that is produced by this system we must ask some tough questions. Do the buildings and spaces that have been produced under this system offer the same value as the beloved towns and cities that came before? Is the modern real estate industry capable of producing a built environment that is worthy of becoming the true expression of our age?

Despite the numerous benefits that the modern system of real estate development offers, its evolution is currently in a state that tends to compromise rather than facilitate the creation of places of enduring value. This thesis is about the continued evolution of that system, and asserts that the answer to the above questions will soon again be a resounding *Yes*. Recognizing that recent advances in city planning, financial analysis, and asset trading are now converging to create a new system of development, this thesis proposes that the modern real estate industry is on the verge of evolving yet again to create a *New Real Estate*.

Chapter 1- The Real Estate Developer: From Pillar to Pariah

The Real Estate Developer - Pillar

Up until the last several decades, real estate development in the United States was regarded as a visionary and noble process that yielded the cities, towns, and neighborhoods that people have grown to love and cherish. Since their establishment, many of these places have grown to be among the most valuable real estate in the country. Notably, the people behind the creation of these places were not usually called developers. Instead, they were considered builders, were more commonly described as visionary and imaginative, and were often revered as “town founders.” These civic artists subsequently enjoyed rich financial rewards and the recognition born of work that contributed to the greater good of society. They were the builders of the homes and the places of business, play, and culture for American citizens.¹

A well known example is George Merrick, who imagined, planned, and developed the City of Coral Gables. He is considered the town founder and to this day a bust of his likeness still resides prominently at the City Hall. The city has even preserved Merrick’s house in Coral Gables as a museum dedicated to his life’s work.² Coral Gables, now 70 yrs old, is still one of the most desirable places to live in South Florida. It should be noted that Coral Gables was a ground up, “green field” real estate development that evolved into a bona fide city. The fact that it has been improved upon and built upon continuously since its inception is a testament to Merrick, his plan, and the place making principles he adhered to. Furthermore, as a project that was built to last and be adaptable for the long term, Coral Gables should be considered a model in an age where sustainability is increasingly becoming a priority for the world.

J.C. Nichols, a founding member of the Urban Land Institute, achieved fantastic success developing timeless beautiful places in Kansas City. The pinnacle of his work there is the much

beloved Country Club Plaza, a retail and residential mixed use district in Kansas City. Now an icon of Kansas City, Country Club Plaza solidified Nichols' place in history as "one of the most influential entrepreneurs in land use during the first half of the 20th Century". Nichols left us a legacy that continues to teach the benefits of building places of enduring value through high quality, well connected design. Wayne Nichols, great grandson of J.C. Nichols speaks of the planning process that his great grandfather and colleagues engaged in: "Their goal was to create beautiful communities -not subdivisions, not shopping centers- but long-term, integrated planned communities. They saw themselves as building human environments. Their motto was 'land development is a responsibility, not a right.'" Like Merrick, Nichols has been memorialized in many forms. The wonderful fountain that stands at the center of Country Club Plaza in his honor is perhaps the most notable. The inscription on the fountain reads: *J.C. Nichols was one of those rare individuals, a dreamer with a capacity for making his dreams come true. He dreamed moreover in terms of great practical benefit to his city. Few men have so variously and profoundly influenced the development of American community.*³

The array of other like minded individuals is as broad and rich as the American landscape itself. From James Oglethorpe of Savannah, John Nolan of Mariemont, to John D Rockefeller, countless people whether in large or small cities, in towns, or neighborhoods have contributed in great measure to the wonderful places we all enjoy visiting and living in today.

As described in the introduction of this thesis, these stories are not limited to the relatively short history of the United States. Indeed, world history is full of individuals great and small that have built for the benefit of themselves and their fellow man. A brief look at antiquity unearths examples of builders that were often revered as heroes for their contributions. Ruling Rome from 98-138 A.D., the emperors Trajan and Hadrian built, among many other things, the Pantheon and Trajan's Forum. Nearly 2000 yrs later, these buildings are still considered to be two of the most

widely recognized monuments in western History. The historian Edward Gibbon recalls that Trajan and Hadrian were among the five consecutive Roman emperors known as the “Five Good Emperors” for their contributions to Roman civilization. ⁴

So what is the common thread among these civic artists? They all built timeless places that have consistently captured the imagination and enriched the lives of the people that lived in them. Many of these places continue to provide their inhabitants with enduring comfort, safety, pride and community. Were these practitioners operating out of altruism alone? Of course not. Each a shrewd businessperson in their own right, they simply understood what it took to provide a superior product and reaped the rewards of doing so. Each of them achieved great financial success from their endeavours and each of them were considered pillars of the community.

The Real Estate Developer - Pariah

Oh how times have changed! Once the Pillar, now the Pariah. Development practices within the last several decades have left the industry with a public image that is less than noble.

Unfortunately, the general perception is that developers are greedy, voracious consumers of scarce land, that will stop at nothing to make a quick buck. It is said that developers care only about the quality of a product in so far as it doesn't adversely affect their bottom line. Recently, as the negative effects of post-war suburban development patterns have become more thoroughly documented, developers have borne the unfortunate mantle as the perpetrators of the much maligned “suburban sprawl.” The net effect is that the general public has become leery and untrusting of our work. As such, the public process, which is vital for development of almost any scale has become a veritable minefield of “nimby”-ism, skepticism, cynicism and well meaning but sometimes misinformed ideology. People do not trust that what developers intend to build can be beneficial to them. Many would simply rather see nothing built at all.

Of course, this public antipathy is sometimes wide of the mark. As with any public controversy, there is usually a divide between reality and perception. In reality, the development process is a convergence of politics, regulations, money, the market, and the real potential to impact the quality of peoples lives. At the center of this convergence lies a gauntlet that is difficult to navigate under the best circumstances. Because of this, developers actually have real incentives to produce real estate projects that people do, in fact, like. A developer that does not meet the demands of the market will most likely suffer the consequences of ignorance and produce a project that simply can't be sold.

If developers are incentivized to produce real estate projects that people find value in and thus purchase, and developers have historically been successful at selling their projects, then why is there still this public antipathy? The answer may be found in one fundamental difference between yesterday's Merrick and today's pariah. It is not that developers have failed to produce projects that people have loved, but that they have failed to produce projects that people have *continued* to love. As such they have failed to produce projects that have enduring value. Coral Gables, on the other hand, has become a beloved city, whose citizens continue to enjoy and contribute to it's rich collection of amenities. This did not happen by accident, but rather because Merrick intentionally composed an underlying urban plan for Coral Gables to achieve this result. More specifically, Merrick imbued his plan with the components necessary to produce and sustain *Walkable Mixed Use Urbanism*. As a result, Coral Gables was endowed with "good bones" and therefore is structurally capable of allowing its citizens to continue to adapt and develop in the ways that continue to make their city an authentic place of character.

Chapter 2 - Developing Walkable Mixed Use Urbanism

Why Walkable Mixed Use Urbanism?

The key to creating authentic places of character begins by developing projects that have the potential to possess an inherent sense of “place.” For the last 50 years, the American landscape has been carpeted with a vast network of well engineered roadways generously designed to move the automobile from point A to point B with efficiency and comfort. Despite the virtues of this network, such single-minded efficiency has left in its wake large tracts of concrete no-mans land. It appears that the priority of transit has far outweighed the necessity of arrival. Planners have begun to realize that the resultant parking lots, massive asphalt intersections, and highway interchanges do not in their present configurations contribute meaningfully to the creation of “place.” Unfortunately, it appears that these current configurations are actually antithetical to the development approaches that yield places of authentic character.

It turns out that much of the charm and vitality of our great cities, towns, and neighborhoods, depends in large part, on the quality of the pedestrian experience. One need only spend an afternoon strolling through the neighborhoods of cities like Charleston S.C., Savannah GA, or Georgetown in Washington D.C. to understand the distinct pleasures that a rich pedestrian experience can offer. The quality of that experience depends on physical planning that does not subordinate the needs of the pedestrian completely to the needs of the automobile.

Neighborhoods like the ones mentioned above typically possess multiple uses arranged within reasonable and safe walking distances from places of dwelling. Additionally, to facilitate shorter walking distances and generate the foot traffic required to support a variety of commercial uses, the neighborhoods are built at a higher density than what is normally found in conventional development. People simply want places to go, and prefer safe, interesting, and well connected pedestrian routes to get there. When planned and built correctly, the end result is a composition

of pedestrian friendly *and* automobile friendly streets. Conventional development regards streets as simply “arterial roadways” designed to move the car as “efficiently” as possible, a simplified means to an end. However, in doing so, conventional development fails to realize the benefits of adequately accommodating pedestrians. Namely, the street can actually become a vibrant and valuable amenity in and of itself. Once a small critical mass of these pedestrian friendly streets and blocks are built the result is a place that can be generally characterized as walkable mixed use urbanism.

As luck would have it, American planning practice is currently in the midst of a paradigm shift. There has been a tremendous body of work produced by architects, planners, and progressive developers alike to identify what physical characteristics are necessary to define an authentic place. Generally, these efforts have been organized under several different names including, Traditional Neighborhood Development, Transit Oriented Development, Smart Growth, and New Urbanism. Despite the difference in their names, all of these practitioners and movements hold the value of walkable mixed use urbanism as a core principle. They all recognize that walkable mixed use urbanism provides the underlying framework from which places of enduring value are shaped.

So, why is it that developers have not been building new walkable mixed use urbanism? As mentioned above, market conditions have a great deal to say about what a developer does and does not build. As such, it would be easy to say that developers have simply been responding to a specific demand found in the space market to produce something other than walkable mixed use urbanism. However, the development process is not driven by the space market alone. In order to more completely understand the state of real estate development today, it is important to recognize the impacts of structural shifts that have occurred since the time of George Merrick

and J.C. Nichols. Arguably, the most monumental shifts have taken place within city planning practices and because of the evolution of the real estate investment industry.

The Evolution of City Planning

Despite what the neigh-sayers might opine, the general state of the built environment cannot entirely be blamed on developers. It is not within the scope of this thesis to discuss at great length the history of post war American city planning, but it is important to note that the evolution of municipal zoning codes had made it virtually illegal by the end of the 20th century to develop new walkable mixed use urbanism. For a variety of valid reasons, not the least of which were the detrimental impacts of the industrial revolution on city inhabitants, Euclidian zoning laws that codified the separation of land uses gained widespread acceptance in post-war America. In addition to restricting the mixing of land uses, these codes were designed to prohibit high density development and accommodate the widespread incorporation of the automobile into the American landscape. As the automobile became the dominant form of American transit, zoning codes were further manipulated at the expense of the pedestrian experience. Buildings were required to set far back from the street and sidewalk to better accommodate large parking lots. Streets were widened and redesigned with new geometrics to accommodate high speed automobile traffic. As the experience of the end-user was likely to occur at 35 mph or faster, the demand for higher quality building finishes was now substituted for large, visible sign-age. Additionally, zoning codes would only allow much lower densities for new development. Seen as a remedy to the ills of the highly dense industrial age city, new development patterns offered relief by spreading development out. With the automobile becoming ever more ubiquitous in American life, travel costs plummeted, and spreading out truly became an option that did not exist before. Developers responded quickly to these changes and proceeded to build out instead of up. At the time, these changes were widely regarded as progressive advances for a modern

American city. Unfortunately, many of these advances ended up annihilating the pedestrian experience and all but destroyed the possibility of creating new urban places of enduring character.

The Evolution of the Real Estate Industry

At the same time that aggressive city planning practices were changing the shape of the American landscape, large evolutionary leaps were being made in the real estate industry. During the time of J.C. Nichols and George Merrick, real estate was primarily a local business. Most assets were built, owned, and held by local developers. A significant amount of real estate was actually developed by the end-users themselves. For example, many banks and corporations built, occupied, and owned their own buildings. Easily identifiable by the names that were carved permanently into their elegant stone or brick facades, these buildings were symbols of permanence and quality. In most of these cases, the financial decision making was intimately tied to the underlying bricks & mortar. Contrast that with today where we find that a large portion of real estate debt and equity is traded in one form or another on Wall Street. That which is not traded publicly is held privately by professional investment or financial institutions such as private equity funds and pension funds. On the whole, this has been a good thing for the real estate industry. The introduction of REIT's, CMBS, and RMBS, among other real estate investment vehicles, has created a real estate industry that is far more efficient, transparent, and generally accessible to investors. As a result, real estate now enjoys an unprecedented amount of investment as it has evolved into an asset class that has become one of the most widely held and important forms of American investment.⁵ All of this new market efficiency has not come without a price though. Digging a little bit further, we can see that this structural shift in the real estate industry has had an effect on the quality and the form of our built environment.

With debt and equity now traded on Wall Street, the markets and the investment bankers are for all intents and purposes segregated from the underlying asset. As such, these investors are obligated to evaluate the underlying real estate for investment and financial performance only. These investors, being rational, are biased towards trading similar assets because they are more predictable and thus considered less risky. The more that a real estate asset can behave like a commodity, the less risky that asset is assumed to be. The end-result has been the formation of several “standard” real estate product types. These are building “products” that have evolved as a result of pressure from the asset market to standardize.⁶ While the asset market has driven the industry to standardize, the space market has responded by determining the physical parameters of each product type. As with any standardized product, these are very specifically defined both programatically and physically. Each type tends to have a narrow range of physical parameters, including floor plate dimensions, vertical circulation arrangements, parking arrangements etc. Understandably, this is helpful for the investment community as it more easily allows them to evaluate and invest in real estate. Unfortunately, what makes things efficient for the investment community does not always contribute to great place-making. As the industry has continued to evolve, it has produced a more homogenized and commoditized built environment.⁷ This is one reason that suburban office parks look more or less the same from one end of the country to the other. This is also the reason that retail shopping experiences have morphed from unique experiences like Miracle Mile in Coral Gables, or Country Club Plaza in Kansas City, to miles and miles of strip malls, punctuated with the ever present, standard regional shopping mall. Investors have traded more easily and confidently in real estate demanding the asset market to form a set of highly specialized “standard” product types. As such, the asset market has supported the creation of a rather banal and homogenized built environment. It appears that the new efficiency of the real estate market is a double edged sword. Conformity has reduced unpredictability and made it easier for investors to value an underlying asset. This has reduced

the risk of investing in these assets, which in turn has reduced the cost of capital. Ultimately this has increased the amount of capital available to real estate developers. Developer's need capital, so they are far more likely to develop a building or project that can fit into the market prescribed standard product types. This reality, coupled with the fact that American planning practices made it virtually illegal to develop anything other than single use buildings has made it exceedingly difficult to develop walkable mixed use urbanism.

In light of the structural realities that this brief history of real estate has exposed, it is prudent to ask why any developer would endeavour to develop walkable mixed use urbanism? Because, despite the changes outlined above, it is apparent that people still yearn for places of enduring character. More importantly, evidence suggests that they are also willing to pay for it. As the modern American suburb fails to live up to its promises of efficiency, cleanliness, safety and privacy, some of the American home buying public has turned to look for an alternative. While this thesis does not contend that walkable mixed use urbanism should be for everyone, there is clearly a market for this type of development. Progressive developers have already begun to plan and produce walkable mixed use developments of various scales all over the country. Most of them are still quite young, but preliminary studies of projects that have attempted to develop in this manner are generating return premiums over their conventional counterparts.⁸ Furthermore the advocacy of the residents that have made the decision to move into these communities has been so fervent as to border on religious extremism. In these communities the developer has become the Pillar again.

Development Process Benefits of Walkable Mixed Use Urbanism

In addition to the benefit of garnering the support of the community, the development of walkable urbanism has many other pragmatic benefits. First, the greater density and diversity of uses greatly increases the flexibility of the project. By providing a developer with a greater array

of options, mixed use urbanism can allow the developer to respond more effectively to changes in the market. Later in this thesis we will explore how this flexibility can be exploited to great effect by developers of walkable mixed use urbanism. Second, by concentrating density on a smaller amount of land, developers can optimize the value of their land by increasing the sale-able sq. ft per sq. ft of land. While higher density construction is usually more expensive per foot than lower density, this cost increase is more than offset by the creation of more sale-able sq. ft. Third, Walkable Urbanism can have a lower infrastructure cost per unit than conventional development. These projects can demand larger *up-front* infrastructure costs in order to create the sense of place that people are willing to pay a premium for. But again, the higher densities offset the up-front costs of the infrastructure.⁹ Fourth, walkable mixed use development projects can ease the entitlement process. A study conducted by the Zell/Lurie Real Estate Center at the Wharton School of the University of Pennsylvania revealed that developers are now finding that local jurisdictions have become increasingly interested in supporting the development of walkable mixed use urbanism.¹⁰ In fact, as zoning codes continue to be revamped and rewritten, developers will increasingly find incentives to produce walkable mixed use urbanism. The entitlement process can be an expensive and unpredictable process. Indeed, when one examines the development process, it is clear that the entitlement stage is one of the riskiest. As such, the opportunity cost of capital during this stage is exceedingly high. Anything a developer can do to ease the entitlement process is highly valuable.¹¹ Finally, walkable mixed use urbanism also allows a developer to more easily take advantage of locational group amenities like a park or waterfront. Later, we will examine an example of how this has already happened in a new community.

Return Benefits of Walkable Mixed Use Urbanism

In addition to the development process benefits outlined above, the most important benefits of walkable mixed use urbanism are the return premiums that these projects have the potential to generate. Many walkable mixed use projects that have been built in the last twenty years by New Urbanists are now yielding data that suggests there are financial benefits to development using the walkable urbanism model. Notable is the apparent premium on house and lot prices that these projects realize when compared to their local competitors. A study that explored house sales at Kentlands, a well known new urbanist town, found that there was a significant premium on the prices paid for homes. When compared to house prices in adjacent conventional developments, Kentlands exhibited a price premium of approximately 12-13% that was attributed to the developments walkable urbanism. The study identified a \$24,000 to \$30,000 price premium for houses built at Kentlands when compared to similar houses built in adjacent conventional developments.¹²

Seaside, located on the Florida panhandle and recognized by many as the first New Urbanist town has garnered both tremendous support for and criticism against the New Urbanism. It has been, for the architectural and planning community, a lightning rod for controversy as it's unabashedly traditional architecture has been the source of much consternation among the architectural cognoscenti. Developers, on the other hand, began to take notice for other, less ideological reasons. Seaside, with it's traditional architecture and strong sense of place, has done fantastically well, providing rich returns to its investors. A 1982-1997 comparison of Seaside re-sales with the adjacent conventionally planned property, Seagrove Beach, found that Seaside had an astounding annual appreciation rate of 40.4 percent, while the Seagrove Beach lots only showed a rate of 26.0 percent. The annual appreciation rate for Seaside houses was 20.5 percent while Seagrove Beach was 17.9 percent. Seaside buyers enjoyed similar rewards, with same

house re-sales showing a 20 percent annual appreciation and same lot re-sales appreciating at a 40 percent annual rate.¹³ What is most interesting about Seaside, and further proof of the value of good place-making principles is what has happened to the waterfront lots compared to the interior lots. Seaside is comprised of about 80 acres situated on the Gulf coast of north Florida. When planning began on the new town, it was clear that the pristine white sand beach was going to be the most valuable amenity for the towns inhabitants, and as such it was thought that the waterfront property would be the most valuable to home-buyers. Conventional planning, like that which was done all along the gulf coast up to that point would recognize this fact and build as many units with a direct view of the water as possible. The seemingly logical result of this was the emergence of condo towers all along the coast. The planners of Seaside realized that if they were to erect condo towers along the waterfront property, they would be effectively cutting off their most important locational amenity from the rest of the developable land. Instead they allowed the beach front to be accessible for the rest of the community and built a town around that concept. The houses on the interior would generally be able to get a view of the ocean. The developers of Seaside were able to gain much higher value from the entire acreage of the developable land this way. Instead of heavily loading the beach front and forsaking the rest of the land, Seaside became a dense, walkable town arranged around it's two most valuable assets, the beach and the vibrant town center. As the benefits of this planning began to be recognized by the market, Seaside saw price escalation of the various lot types that ranged from 9 percent for the waterfront lots, to 87 percent for the interior lots.¹⁴

The benefits of building new walkable mixed use urbanism are not only being discovered in the United States. A recent report commissioned by the Prince's Foundation for the Built Environment, found significant economic advantages to developing walkable mixed use urbanism in Britain. Produced by Savills Research, the report studied three unique market areas

in Britain; Aylesbury, Dorchester, and Glasgow. Within each area, they compared the return characteristics of conventional development and new walkable mixed use urbanism. In all three cases, the new walkable mixed use urbanism clearly generated the superior returns. In Aylesbury the margin was 46%, in Dorchester the margin was 18% and in Glasgow the margin was 30%¹⁵

What Has Been Accomplished Already?

Recognizing the benefits and challenges of developing walkable mixed use urbanism, it is important to explore the ways in which the real estate industry has recently evolved to make this type of development more viable. As mentioned briefly above, a great deal of effort has been made to define, design, and facilitate the construction of walkable mixed use urbanism. The New Urbanist movement has produced new generations of architects and planners that have become quite sophisticated in their understanding of the necessary physical characteristics that make up a walkable mixed use urban development. These individuals have made progress rewriting zoning regulations that until now have prohibited the development of walkable mixed use projects.¹⁶ The New Urbanists also recognized the divide between development and the general public and have advanced the public consensus building process with the introduction of the *Charrette*. As New Urbanist projects have been built and continued to mature, a growing body of economic research has supported the assertion that New Urbanist projects can deliver higher returns than conventional development over time.

New Urbanism and mixed use projects have enjoyed an increasing amount of industry exposure from the Urban Land Institute. Widely considered to be one of the more influential organizations in the real estate industry, the ULI continues to produce an ever growing body of case studies devoted to the study of mixed use development.¹⁷ This is clearly a signal that the development community at large has begun to embrace walkable mixed use urbanism. Finally, with the introduction of LEED-ND standards for green urban design, the environmental community has

also signaled its support for walkable mixed use urbanism.¹⁸ With higher densities, reduced auto-dependence, lower land use requirements, and increased opportunities for building and land re-use, walkable mixed use urbanism is an exceptional model for sustainable development. Instead of simply erecting green buildings as independent islands of sustainability within an unsustainable urban framework, entire sustainable communities are now being planned.

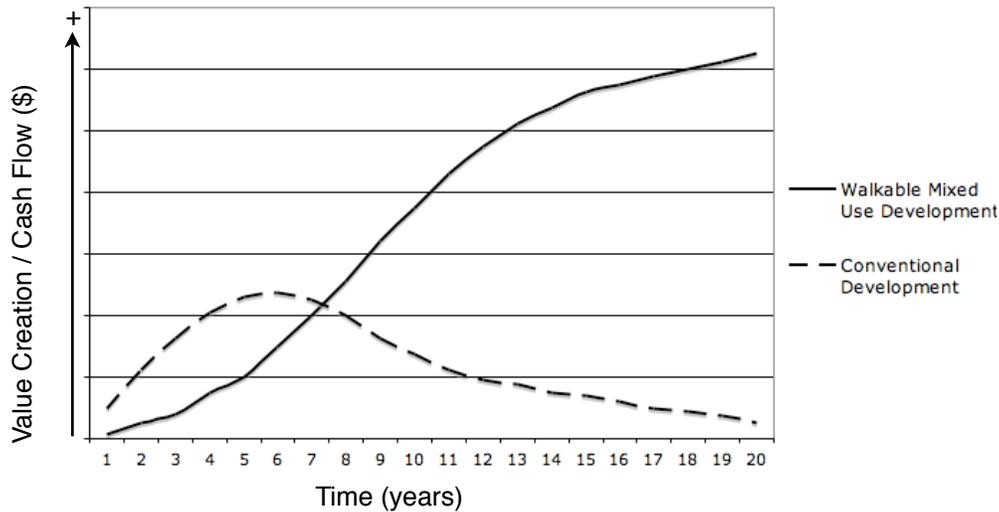
While there is a great amount of work to still be done, it seems that the tide is in the process of turning towards the development of walkable mixed use communities. But, because most of the work has centered around planning, design, and public policy, the challenges related to real estate finance largely still remain. As mentioned above, the real estate markets still promote the development of standardized, single use real estate products. This incentive exists because real estate markets can more easily assess the value of these products with relative accuracy. The complexity that is inherent in walkable mixed use projects defies standardization and thus makes these projects more difficult to accurately evaluate. The resultant higher risk premiums make capital more expensive for the mixed use developer. In order to overcome this obstacle, new ways of evaluating real estate must be considered. After all, if walkable mixed use urbanism does indeed provide greater returns over the long run as the evidence suggests, if the market can properly evaluate those returns, the market should respond to capture that value. As the New Urbanists formed to respond to the challenges posed by the shift in American Planning principles, a “New Real Estate” needs to be defined to meet the challenges posed by the evolution of the real estate finance industry. The “New Real Estate” must take advantage of new evaluation methodologies that can more accurately describe the value of mixed use real estate to investors and the industry at large. Ultimately, the “New Real Estate” contends that there is no need to compromise the quality of our built environment because today’s investment tools are incapable of accurately valuing it.

Chapter 3 - Christopher Leinberger & Patient Equity

A Voice in the Woods

Luckily, there has already been some work accomplished in the effort to produce a “New Real Estate.” One pioneer is Christopher Leinberger of the Brookings Institute. A committed urbanist and successful developer, Mr. Leinberger has written several articles clearly defining the need for innovative financing mechanisms for walkable mixed use urbanism. Mr. Leinberger asserts that walkable mixed use projects are shunned or penalized by the real estate financial markets despite achieving long term return premiums over their conventional counterparts. He bases his assertion on the belief that the larger returns on walkable mixed use projects actually occur too far in the future for industry standard Discounted Cash Flow (DCF) and Internal Rate of Return (IRR) based evaluation methodologies to accurately value.¹⁹ To illustrate the point he presents the two curves seen in Exhibit 1. The conventional development clearly realizes greater cash flows between the years 1-7 after which the development peaks and begins to depreciate. Contrast that with the walkable mixed use development, where cash flows are initially lower than the conventional development but rise considerably at years 7 and beyond. According to the graph, the long term cash flows far exceed any of the cash flows that the conventional development can produce. However, due to the compounding discount rate applied to these cash flows in a typical DCF model, the present values of these long term cash flows are very small.

Exhibit 1



Mr. Leinberger reasons that DCF analysis inherently undervalues these long term cash flows, and subsequently biases investors towards projects that generate short term rewards, regardless of their ability to generate returns in the long run. He suggests that developers respond to this pressure by building projects that “front-load” returns. They accomplish this in two ways. They first reduce their cost of capital by producing only projects that fit within the guidelines of the industry standard product types. As mentioned above, this more or less eliminates the possibility of developing mixed use products. Then developers reduce the construction budget as much as possible to further pump up returns.²⁰ Recognizing that the investment timeline is only a few years for these projects, the buildings are not required to last very long. This practice is reflected in the depreciation of the conventional asset after year 7 in Exhibit 1. Walkable mixed use urbanism on the other hand demands a larger construction budget and is susceptible to larger risk premiums on capital. This results in the return curve shown in Exhibit 1, where returns begin low and then climb as the project matures.

Patient Equity

Mr. Leinberger thus frames the dilemma facing the developers of mixed use urbanism as one of short term returns competing against long term returns. In order to build walkable mixed use developments, Mr. Leinberger suggests a novel approach to the short term vs long term problem. He notes that before DCF was widely accepted, developers had a tendency to put a larger share of their own capital into a development and hold it much longer than is currently the norm. These developers invested with what he calls “Patient Equity.” Put simply, Patient Equity is equity that does not have a defined timeframe for payback.²¹ In order to meet the increased budget demands, and relieve the pressure to produce large short term cash flows, an additive layer of Patient Equity can be applied to a conventional development budget. Leinberger asserts that many developers actually end up inadvertently providing Patient Equity for their projects when they find that they are undercapitalized at periods during the development process. In fact, many developers lose their projects due to these periods of undercapitalization, despite the fact that they turn out to be excellent income producing assets in the long run. The projects and their developers are simply unable to meet their short term cash flow demands. Leinberger suggests that these developers needed Patient Equity from the beginning. He believes that Patient Equity can be incorporated in an intentional way into the capital structure of a walkable mixed use development. By doing this the developer and the development itself can more effectively reap the benefits of the additional equity.²²

According to Mr. Leinberger, Patient Equity does three important things for a walkable mixed use project. First and foremost, it provides the additional capital needed to fund the budget demands of building a longer term project. If the project is designed and built well, it makes it more likely that the developer will be able to generate greater returns over the long run.²³

Second, by adding a layer of Patient Equity, the developer effectively moves the conventional equity to a capital position that more closely resembles a “preferred” equity or mezzanine position. Due to the reduction in risk that this position enjoys, the required expected return for this position should also be less. This effectively reduces the pressure on the development to produce such high returns for investors in the short term.²⁴

Finally, the additional layer of equity effectively decreases the loan to value ratio, giving the developer two potential advantages. First, by reducing the effects of leverage, the developer is less exposed to the possibility of losing the project to the debt holder when times are rough. Of course, the developer also surrenders the up-side effects of leverage as well. Second, the lowered LTV can potentially give the developer the power to negotiate either a fully non-recourse loan, or at least a loan with recourse that has more favorable “burn-off” provisions.²⁵

There is a catch of course, as all of this depends on the willingness of the Patient Equity provider to take a more exposed position in the project and to do so with no guarantee of when and how much their investment will return. Despite the benefits outlined above, this approach places more of the investment risk in a development project on the Patient Equity holder. In order for this type of investment to work in the market, that additional risk must be rewarded with larger returns. If it is found that this does not happen, that the rewards are not commensurate with the risk, the market will determine Patient Equity to effectively be a subsidy.

Considering this, Patient Equity as an investment strategy is probably best suited to a particular niche of “intramarginal” investors. These investors have an “investment value” for a given project that lies above what the market determines for the value of that project. In other words, they have circumstances specific to them that would allow them to pay more than the market demands in order to achieve a positive Net Present Value (NPV) investment. As such, these

investors are essentially willing to provide a subsidy if necessary. Indeed, Mr Leinberger suggests a variety of potential investors that could all be considered intramarginal.²⁶ An example of one of these investors might be a city municipality that is trying to encourage economic development in their downtown. The city could provide the Patient Equity necessary to build useful infrastructure like roads or parking decks. As the city is looking for returns on their investment in the form of economic development rather than strictly financial returns from the project, they would be considered “intramarginal” investors willing to provide a subsidy. Another example would be a landholder that has a personal interest in seeing the development of their land proceed in a specific way. By providing a Patient Equity land deal and maintaining some control over the project, the land owner would gain additional benefit beyond the financial returns. The real estate industry has also seen the emergence of special funds whose investment goals require what is called a “double bottom line.” These funds not only require a financial return, but as a matter of principle invest in projects that also generate extra-financial benefits. These benefits might include special re-investment in blighted downtowns, green development, or low-income housing. These entities are quite willing to provide subsidies to projects that meet the dual investment goals of financial returns *and* social returns. Finally, the developer might also be considered an intramarginal investor. If the developer has a personal interest in reducing the amount of leverage in the project or conceivably the need for a personal guarantee, or the developer simply wants to maintain more control over the project for professional reasons, it is possible that the developer would take on more than his market determined fair share of risk.

Chapter 4 - The DCF Method: A Critical Analysis

NPV Analysis

Patient Equity is a response to a need generated by the belief that DCF methods are inaccurate and that the widespread acceptance of these methods has made alternative forms of financing necessary in order to successfully develop walkable mixed use urbanism. As mentioned above, there is merit to this argument, however, it might be that the problem is not so much the DCF methods in and of themselves, but rather the misuse of those methods. First it is important to note that Discounted Cash Flows are employed to generate a Net Present Value (NPV) for a given project. Investment decisions are based on these NPV solutions. If a project realizes returns at a rate that is equal to the opportunity cost of capital (OCC) for the investor, the project will have an NPV that is equal to 0. If the project realizes returns that are lower than the OCC for the investor, the project will have an NPV that is negative. If this is the case the investor should not invest in the project. If the NPV is positive, the project is projected to produce returns that exceed the investor's OCC. Wealth maximization demands that investors choose projects that produce an NPV greater than or equal to zero. To further examine the implications of this analysis in the context of walkable mixed use urbanism, it is useful to do a simplified Net Present Value (NPV) DCF analysis on the two streams of cash flows implied by the curves in Exhibit 1. Hypothetical cash flow streams for both the conventional development and the walkable mixed use development are shown in Exhibit 2. Assuming that the conventional project would be undertaken only if it were to achieve an NPV of at least zero, a simplified development cost is extrapolated by accumulating the present values of all the future cash flows discounted at 8% and applying the total as the development cost in Year 0. These cash flows are discounted at the same 8% with a reversion assumed in the 10th year. The reversion is derived from dividing the

11th year cash flow by a going out cap rate of 9%. The walkable mixed use project applies the same development cost as the conventional one, but with a 30% cost premium to take into account any additional construction costs that this type of development requires. The cash flows of this project are discounted at the conventional rate but with an additional 4% risk premium to reach a total discount rate of 12%. As with the conventional project, a reversion is assumed in the 10th year. This reversion is derived by dividing the 11th year cash flow by a going out cap rate of 10%. This is a very conservative cap rate considering the implied growth in cash flows after year 10. To be consistent with industry standards, the analysis was based only on the first 10 years of the projected cash flows.

Exhibit 2

Conventional Project

Year	0	1	2	3	4	5	6	7	8	9	10	11
Cash Flows	(3,383)	100	225	325	410	460	475	450	400	325	275	225
Reversion											2500	
Total Cash Flows		100	225	325	410	460	475	450	400	325	2775	
NPV	\$0											

Walkable Mixed Use Project

Year	0	1	2	3	4	5	6	7	8	9	10	11
Cash Flows	(4,399)	15	50	80	150	200	300	400	510	640	750	860
Reversion											8600	
Total Cash Flows		15	50	80	150	200	300	400	510	640	9350	
NPV	\$1,219											

What is interesting is that DCF based NPV analysis of both projects under these assumptions clearly shows that the walkable mixed use project produces more NPV than the conventional project. This occurs even though the walkable mixed use project is significantly challenged with additional costs of construction, a very large risk premium, and a very conservative going-out cap rate. If this is the case, then why is it that developers and investors are not lining up to grab this additional NPV?

Predictions and Uncertainty

The market tends to rely upon precedent in order to provide the projections for the future cash flows in a given DCF analysis. It does this in order to form a “best guess” at something that is inherently uncertain. As mentioned above, standardization has helped to simplify this guesswork and reduce the potential risk in development. Walkable mixed use urbanism is complex, defies standardization, and has been unprecedented during the relatively recent evolution of the real estate industry. As such, the market has difficulty predicting future cash flows from these types of development.²⁷ It has been suggested that DCF fundamentally undervalues long term returns and thus biases investors towards projects that provide short term rewards. But as the example above suggests, the DCF based model is as good as the predicted cash flows that are installed into that model. Despite unfavorable discount rates, the project with the superior long term cash flows yielded a much larger NPV. In light of this, it would perhaps be more appropriate to say that DCF based NPV analysis actually biases investors away from projects that possess complexity and uncertainty. This thesis asserts that the reluctance on the part of investors to put their money in walkable mixed use urbanism has less to do with DCF itself, and more to do with the markets inability to accurately predict the future cash flows of walkable mixed use urbanism.

The DCF methodology in and of itself can not be blamed for the markets inability to make accurate predictions of the future. Targeting the way that DCF methods discount values over time, rather than targeting the actual accuracy of the predicted future cash flows, suggests that we need to address uncertainty by fundamentally changing the way that we invest for long term cash flows. Patient Equity addresses this need by requiring investors to invest patiently and in doing so to potentially suspend or modify their needs for a fair market determined risk adjusted return. As mentioned above, this is can be a useful strategy for investment entities that are willing to provide what the market would generally consider a subsidy. Alternatively, if we can address uncertainty by finding a way to more accurately value potential cash flows given that uncertainty, we no longer need to fundamentally change the way that people make investment decisions. If we can accomplish this, investors looking for a fair market determined risk adjusted reward, will be far more likely to invest.

Chapter 5 - Real Options for The New Real Estate

Flexibility and Value

Walkable mixed use urbanism realizes return premiums over conventional development in large part because of the richness of experience that it offers to its inhabitants. As previously noted, this experience depends on a degree of complexity that is not found in single use conventional development. We know that standard underwriting benchmarks manage uncertainty (risk) by limiting complexity and rewarding predictability and standardization. As such, it appears that well designed walkable mixed use urbanism can never fundamentally satisfy the demands of standard underwriting practices. Patient Equity attempts to deal with this conflict by asking investors to detach their return expectations from the market defined relationship between risk and reward. As mentioned above, this is an admirable and useful approach given the increased presence of real estate investment entities who possess “double bottom line” investment goals. Patient Equity clearly has a place within this niche of the real estate industry. There could be great value, however, in looking for an alternative approach that does not require investors to reconcile the paradoxical goals of walkable mixed use urbanism and standard underwriting practices.

One such alternative is to recognize that complexity in walkable mixed use urbanism can also be characterized as flexibility. Flexibility in real estate generates options that allow a developer to adjust as necessary to meet the demands and opportunities of a changing real estate market. The complexity (flexibility) found in walkable mixed use urbanism attracts consumers that are willing to pay a price premium for the richness of experience it generates. Developers can achieve a similar advantage with financial markets by exploiting the fact that walkable mixed use urbanism generates superior opportunities for flexibility, hence superior economic profit opportunities, albeit ones that conventional underwriting has trouble recognizing or quantifying.

At least until very recently, it has not been the practice of the real estate industry to explicitly analyze or quantify the value of flexibility or optionality. However, there has been a growing body of work that has borrowed from corporate finance and built upon the study of option theory. Researchers and practitioners within the fields of engineering, finance, and real estate have recently developed analytical tools that can be used to value the various forms of optionality found in real estate. This collection of tools and techniques comprise the analytical practice now known as Real Options Analysis. All of these tools are based on the simple notion that a future option to choose one path vs the other has inherent value.²⁸ Building upon this basic idea, Real Options Analysis can more accurately predict the future expected value of complex projects that possess flexibility. By accurately modeling the value of walkable mixed use urbanism without demanding that investors revise the market determined relationship between risk and reward, Real Options Analysis provides investors with not only the cake, but the means to eat it as well. As such, Real Options Analysis offers the promise to provide an underwriting tool that is up to the task of appreciating *The New Real Estate*.

In order to understand why Real Options Analysis is important, it is important to understand why financial markets would value flexibility in real estate development in the first place. Much of this thesis has described the ways in which the financial markets prefer predictability. However, conventional wisdom about the development process suggests a parallel, yet seemingly paradoxical reality. Despite the pressure to standardize, it is important for developers to maintain as much flexibility as possible. Any time that a developer is forced to define a course of action where they would otherwise wish to maintain flexibility should be considered to some degree a loss. This is because every time a developer is forced to define a single course of action, that developer forfeits the option to proceed on an alternate course of action. For example, once a developer irreversibly defines the first phase of a residential project as 200 single family

detached houses, the developer effectively loses the option to build some number of attached single family townhouses. However, in the event that market demand for townhouses exceeds the demand for detached single family houses, maintaining this option would obviously be very valuable indeed. Unfortunately, current DCF based NPV financial analysis can only account for and value these alternatives as mutually exclusive choices, ignoring the potential value of flexibility. The developer must choose one or the other in order to determine the value of the project. Intuitively though, a developer that can keep both options available has a better chance at being able to do the right thing at the right time. Put another way, by maintaining and quantifying both options, the developer is reducing the liability(risk) that uncertain and inflexible future predictions place on the subsequently realized value of the project. When a developer is able to do the right thing at the right time, that developer can clearly build more valuable real estate. Ultimately, financial markets seek value. Flexibility provides developers with greater opportunities to obtain value, thus the financial markets should seek to invest in developments that possess a high degree of flexibility.

Evaluation of a Simple Deferral Option

To make this point clearer, it is useful to examine a simple numerical example of how flexibility can increase project value. One simple option type is the deferral option, which refers to a developer's right to delay the start of a project.²⁹ The following example expresses how this option has value that can enhance the value of the underlying asset (the project to be built). It also illustrates how that value can be quantified and presented using NPV based return metrics that are widely accepted by the real estate industry.

Let us consider a hypothetical development of 300 residential units. The developer currently owns the land, the cost of construction for the development is \$88 million, and the value of the property if it were built out today is \$100 million. In this case, if the developer were to initiate

the project today, assuming immediate construction and sales, the project would generate a profit of \$12 million. Now, consider that the developer has an option to defer the project until next year. Let's assume that there is a 30% chance that the market will be down and the built value of the property, would in that case be only \$78 million. But on the up side there there is a 70% chance that the market will improve and the built value would then be \$113 million. Because construction would also occur one year later, the construction costs are projected to grow by 2% to \$89.76 million.³⁰

Exhibit 3

	Today	Next Year	
Probability	100%	30%	70%
Value of developed land	\$100.00	\$78.00	\$113.00
Construction Cost (excluding land cost)	\$88.00	\$89.76	\$89.76
NPV of exercise	\$12.00	-\$11.76	\$23.24
Future Values (actions)		0 (don't build)	\$23.24 (build)
Expected Value of built property	\$100.00	$(.3 \times \$78.00) + (.7 \times \$113.00) =$ \$102.50	
Expected Value of Option	\$12.00	$(.3 \times 0) + (.7 \times \$23.24) =$ \$16.27	
PV of alternatives discounted @ 20%	\$12.00	\$13.56	
Land Value Today (including Option Premium) = \$13.56			
Option Premium = \$13.56 - \$12.00 = \$1.56			

adapted from Geltner & Miller *et al* (2007)

It is now possible to determine the additional value of the developer's right to delay the construction of the project by one year. In other words, we can determine the value of the developer's ability to be flexible. Under these circumstances, if the market is down, the developer can simply choose not to develop again and generate a profit of 0. However, if the market is up, the developer can potentially develop a project that would generate a built value of \$113 million. This scenario would produce an profit of \$23.24 million. Given the probabilities of both outcomes, the expected profit of the built project one year from now is \$16.27 million. Because this expected value is one year in the future, and the future is uncertain, the value must be discounted back to the present using a market determined speculative discount rate. For the sake of this exercise that rate will be 20%, a rate that is typical of what the investment market requires for investment in highly risky development ventures. This yields a present value of \$13.56. Now the NPV of the built project a year from now can be compared directly to the NPV of the project built today. As the NPV of the project built in one year exceeds the NPV of the project built today by \$1.56 million, it is clear that the developer can maximize the value of the project in this case by exercising the deferral option.³¹

Given the fact that the developer owns the land, and possesses the option to defer the project one year, we can now determine that the economic value (aka "opportunity cost") of the land is \$13.56 million. As such, if the developer were to initiate the development today, and forgo the option to defer the project one year, the developer would essentially be investing in a negative NPV project. In other words, because the project would yield only \$12 million, the project would have an NPV of \$-1.56 million. The developer would be forfeiting the extra option value inherent in the project. It is important to recognize that this additional value is completely contingent on the existence of the deferral option. If this flexibility did not exist, and the developer was obligated to proceed with construction today, the opportunity cost of the land

would be \$12 million. For example, if the land entitlements included contingencies that did not allow for a delay in the project, the deferral option and the additional value would not exist.

The example above is a highly simplified analysis of a simple deferral option. This particular option type is only one of a vast array of options that are implicitly available to real estate developers. Not surprisingly, as the complexity and frequency of real options increase in a given project, the more option value is likely to be present (and also the more complicated the analysis becomes). The current array of Real Options analytical tools can include some very sophisticated mathematical modeling techniques to manage the complexities, but even relatively simple and transparent models can capture much of the essence of the added value. As it is not the intention of this thesis to be a Real Options Analysis how-to guide, these techniques will not be discussed at length. Fortunately there has been a significant body of work already completed on the various Real Options Analysis techniques.

This thesis does intend, however, to explain what Real Options are and how Real Options Analysis is particularly suited to accurately quantifying the value of the flexibility inherent in walkable mixed use urbanism. First, it is important to understand the differences between conventional DCF based NPV analysis and Real Options Analysis. From a technical standpoint, Real Options Analysis and NPV analysis are actually quite similar. Despite their differences both NPV analysis and Real Options Analysis are fundamentally DCF based approaches. Both consider cash flows over the life of a project. Both discount cash flows back to the present, and both use market opportunity costs of capital.³² This is important, because it means that Real Options Analysis in practice can be accomplished using the tools and nomenclature already accepted by the real estate industry.

NPV analysis is based on the comparison of a series of mutually exclusive development scenarios. Among these alternatives, the developer will choose as the single best scenario the one that presents the largest computed NPV. This process of elimination is referred to as a Highest and Best Use Analysis. It's accuracy depends entirely on the quality of the information that is gathered at the time of the analysis. However, because NPV analysis merely discounts only the one "best" series of expected cash flows it does not account for flexibility or uncertainty.³³

Of course, the future is uncertain. We know that many alternative outcomes can be realized in a development project between the start and the finish of the project. Real Options Analysis acknowledges this by modeling the options available to a developer given the flexibility inherent in that project. Real Options Analysis assumes that developers will make decisions in the future based on the acquisition of new information or circumstance. Fundamentally, Real Options Analysis is an expectation of maximums not a maximum of expectations.³⁴

What is a Real Option Really?

An option is *the right without obligation to obtain something of value upon the payment or giving up of something else of value*. The world of corporate finance traditionally categorizes options as either *Call options* or *Put options*. The classical common stock Call option gives the holder the right to purchase a specified number of shares of the common stock of a specified company at a stated price on or before a certain date. A Put option is essentially the opposite of the Call option, giving the holder the right to sell a specified amount of stock at a specified price within a specified time. A "Real" Option simply refers to an option where the underlying asset is

a “real” (physical) asset like a building or other capital asset instead of a purely financial asset like stocks or bonds.³⁵

It is also important to understand the key nomenclature associated with option theory. The *Holder* refers to an investor that maintains the right to exercise an option. *Exercising* a real option occurs when the holder actually buys or sells the underlying asset. The *Exercise Price* refers to the amount of money required to exercise an option. The exercise price for a real option in real estate could include any of the hard and soft costs of the development process. The decision to exercise or not exercise an option is dependent on the exercise price. As we will point out later, good pre-planning can reduce the exercise price and thus boost the value of real options found in real estate development.³⁶

Finally, one other concept that has been adopted from corporate finance is the *expiration date* of the option. Beyond the date of expiration an option no longer holds any value. In the case of real estate, an option either has an expiration date or is considered a *perpetual option*.³⁷ For example, suppose a developer acquires land entitled for 500 residential units, but those entitlements are contingent upon the start of construction within 3 years. The expiration date of the real option to build 500 residential units is three years from the date that entitlements were obtained. Past this date, the entitlements expire, and so does the real option. On the other hand, a land owner whose land is entitled “as-of-right” to build 50 residential units essentially holds a perpetual real option to build those 50 units. Real Estate developers frequently face scenarios where they hold both of these options and have to compare the relative value of each option against the other.

What Determines the Value of a Real Option?

Real Options by definition always possess some measure of positive value. There are a few key variables that determine the extent of this value. The first of these variables is the volatility of the

value of the underlying assets. As the volatility of the value of the underlying asset increases, the value of the option increases as well.³⁸ The value of an option, is a function of how much the value of the underlying asset may exceed the option's exercise price. As the volatility of the underlying asset increases, the magnitude of the upside range in the future possible values of the underlying asset increases. Since the option is a right *without obligation*, the additional downside exposure in the underlying asset that also comes along with greater volatility does not increase the option's downside exposure, which is truncated at zero.³⁹ One simply would not exercise the option when the underlying asset is worth less than the exercise price. To help to see this it is instructive to return to our simple deferral example.

Exhibit 4

	Today	Next Year	
Probability	100%	30%	70%
Value of developed land	\$100.00	67.00	\$118.00
Construction Cost (excluding land cost)	\$88.00	\$89.76	\$89.76
NPV of exercise	\$12.00	-\$22.76	\$28.24
Future Values (actions)		0 (don't build)	\$28.24 (build)
Expected Value of built property	\$100.00	(.3 x \$67.00) + (.7 x \$118.00) = \$102.70	
Expected Value of Option	\$12.00	(.3 x 0) + (.7 x \$28.24) = \$19.77	
PV of alternatives discounted @ 20%	\$12.00	\$16.47	
Land Value Today (including Option Premium) = \$16.47			
Option Premium = \$16.47 - \$12.00 = \$4.47			

adapted from Geltner & Miller *et al* (2007)

Note in Exhibit 4, that the range of possible built property values has expanded from our original assumption of \$78 million - \$113 million to a range of \$67 million to \$118 million. This reflects an increase in the volatility of the value of the built asset one year from today. The increase in volatility results in a larger option premium up to \$4.47 million from \$1.56 million.

The second variable is the value of the underlying asset. If the value of the underlying asset increases, then the value of the real option increases as well.⁴⁰ This makes intuitive sense if one considers a real world example. Let us assume a developer has a multi-phased walkable mixed use project and has built a first phase that includes a vibrant mix of retail, office and residential uses. The developer is now considering exercising his real option to develop the second and third phase. Let us also assume that the residential market is strong, and that the construction of the first phase has provided the amenities of walkable urbanism to the potential second and third phase. These amenities have added to the underlying value of the second and third phase, as such, the value of the developer's option to build the second and third phase has increased. Conversely, if the developer built the first phase, but the market weakened as he did so, the value of his option to build the second and third phase would decrease as the value of the land decreased.

The third variable that determines the value of an option is the exercise price. Generally if all other variables are held constant, as the exercise price of an option increases, the value of that option decreases.⁴¹ To illustrate this, we consider the same developer and the real option to build the second phase of our hypothetical development. In this case, the cost of construction would make up the majority of the exercise price. As the cost of construction increases, the value of the option to build the second phase decreases. If the cost of construction were to exceed the value of the option to build the second phase it would no longer make sense for the developer to exercise that option.

The fourth variable that determines the value of an option is the time to expiration.⁴² Generally, the shorter the timeframe the less valuable the option is. Again, this makes intuitive sense. The longer an option exists, the longer a developer has to exercise that option. Put another way, the further into the future we project, the more uncertain that future becomes, with that uncertainty comes more option value.

The fifth key variable that determines value of an option is the risk free interest rate over the life of the option. As the risk free rate goes up, holding all else constant, the value of the option also increases.⁴³

Real Options: Categorized

Real Estate Developments can possess a virtually limitless range of flexibility. Theoretically, if analytical methods and time were to allow it, Real Options Analysis could be applied to every single aspect of a development. Fortunately, within the practically countless range of options that a real estate development can offer, most of them can be classified within the following eight categories; Deferral, Abandonment, Contract, Expand, Extend, Switch, Compound, and Rainbow.⁴⁴

The Deferral option is one of the most common real options typically possessed by real estate developers. As illustrated by the simple example outlined above, this option simply gives the developer the right to delay the start of a project. The exercise price of this option is the amount of money required to initiate the project at a later date. As such, any carrying costs associated with waiting on development would also be considered part of the exercise price. A real estate developer would exercise a deferral option if the value of the underlying asset as built does not match or exceed the option value of deferring the project. In other words, if the market is weak, and the developer would gain more value by waiting for the market to strengthen, that developer

would exercise the option to delay exercising the option to build the project, retaining the option to build it later. It is important to note that many real estate developers consider this option, but not within the context of real options analysis. Because real options analysis can effectively quantify the value of the deferral option a developer can more easily determine the optimal time to commence with development.

As noted by its name, the abandonment option affords the holder the right to abandon a project. In real estate, the value of this option would be the market price of the undeveloped project, or the as-of-right land value.⁴⁵

The contract option affords the holder the right to scale a project down. Alternatively, the Expand option affords the holder the right to increase the scale of a project. The aptly named Extend option affords the holder the right to extend the life of a project.⁴⁶

A switch option affords the holder the right to switch between two modes of operation.⁴⁷ In the context of real estate, a switch option would grant the developer the right to respond to new market information and change plans to build one product offering for another. For example, consider the developer of our hypothetical three phase development. Having built the first phase with a majority of 1 bedroom units, and recognizing that there is actually significant market demand for 2 bedroom units, the developer could exercise his option to switch from 1 bedroom units to 2 bedroom units as he builds the second phase. The exercise price of this option would be the expenses incurred as a result of the re-design of the phase. These expenses would potentially include, but not be limited to, design fees, legal fees related to modified entitlements, and additional construction costs. If the developer found that the option value exceeded these costs it would be to his advantage to exercise this switch option. This option is particularly

valuable to the developers of walkable mixed use urbanism, as these projects offer a great deal more “switch”-ability than standardized conventional development.

A compound option is simply an option on an option. While a Rainbow Option refers to an option that has multiple sources of uncertainty. These options are applied to multi-phased projects, where each phase might include a variety of the previously described options. Most Real options are affected by uncertainty regarding price, quantity, and interest rates. As such, most real options are most accurately modeled as compound rainbow options.⁴⁸

Why does Real Options Analysis Matter?

What implications do Real Options, and the analytical methods by which we can evaluate those options have on the development of walkable mixed use urbanism? Walkable mixed use urbanism and standard underwriting practices appear to have an almost paradoxical relationship. The former gains value from it’s inherent complexity, while the latter demands that projects be simple and predictable. The latter demands this in order to limit investors liability of future uncertainty. By recognizing the value inherent in flexibility, Real Options can better balance and complete the investment decision analysis. While there may be greater uncertainty in more complex projects, there can also be greater flexibility and hence valuable optionality.

Introducing Real Options Analysis into the underwriting process allows that process embrace future possibilities rather than limit them. It does this in a manner that is consistent with rigorous economic valuation theory. As such, Real Options Analysis is a tool that can better value a real estate project without compromising the potential richness of the built environment, and this has great potential for The New Real Estate.

Walkable mixed use urbanism is intrinsically more flexible than conventional standardized real estate. As Real Options Analysis tells us, those projects that possess a high degree of flexibility

possess the greatest option value. This gives an obvious edge to the developer of walkable mixed use urbanism. By applying Real Options Analysis to a well designed walkable mixed use development, developers can find option value that exceeds that found in standardized development. If this is true, then it would stand to reason that developers of walkable mixed use urbanism would be well served by searching for as much flexibility as possible. Real Options Analysis not only provides a method for valuing existing Real Options, it can also be used to discover additional optionality. For example, a designer can use Real Options Analysis to help determine flexible and optimal phasing strategies. By doing this, a developer can avoid overbuilding or more quickly accommodate increases in demand. Having construction occur at optimal times and in optimal amounts can meaningfully reduce the present value cost of a project.⁴⁹ In addition to scale optionality, well planned design can provide switching flexibility. If, for example, a developer designs a project so that the lot widths are flexible, it will be all the easier for that developer to exercise a switch option later when the market determines the optimal residential unit size. Developers can apply this same logic to the design of buildings as well. In a mixed use project where the product mix is variable, the market might determine an optimal amount of ground floor retail space. If a developer can design buildings with easily convertible space, the developer can effectively reduce the exercise price of a switch option.

Ultimately, Real Options Analysis can help the cause of developing excellent real estate of enduring value in two fundamental ways. First, Real Options Analysis can free the financial markets to value walkable mixed use urbanism unencumbered by the constraints that define the conventional standardized real estate product types. Second, Real Options Analysis can provide developers of walkable mixed use urbanism with a powerful tool to maximize the flexibility that is already inherent in their projects.

Chapter 6 - Derivatives and The New Real Estate

The Two Faces of the Real Estate Business

As previously mentioned, in the last several decades the evolution of the real estate industry has, for better or worse, split the “money” from the “bricks & mortar.” The implications of this split on the built environment have already been discussed in this thesis. However, it is also important to discuss the ways in which this split has reshaped the business of Real Estate. In order to do so, it is useful to generalize a bit about the Real Estate Industry as a whole. Among the vast panoply of real estate related firms, one can understand the Real Estate business as having evolved into two general categories. One business revolves around the design, development, and sale of physical assets; the bricks & mortar of real estate. The other business revolves primarily around the trading of real estate equity and debt in the financial markets; the “money” of real estate. Both of these businesses are obviously related and dependent on one another. However, both businesses have developed increasingly specialized expertise in one area, generally, at the expense of the other. Ostensibly, this specialization has been a good thing for the industry. Increased expertise in both fields has led to, among other things, more efficient development and construction, more efficient and transparent financial markets, and greater opportunities for people to invest in Real Estate.

However, such specialization has naturally produced individuals and companies that are either very good at one business or the other, but not necessarily both. Highly capable real estate developers produce beautiful and valuable physical assets yet sometimes completely mistime the market. Conversely, sophisticated traders can make large amounts of money for themselves and their investors trading debt and equity, but couldn't possibly produce a physical asset. In fact, sophisticated traders that understand market trends, economics, and the risk and rewards of the

financial markets can make money no matter which direction the market is heading. They accomplish this by expertly managing risk and reward, going “long” or “short” on the market as necessary.

Real Options Analysis has given the “bricks & mortar” world better tools to communicate the value of walkable mixed use development more effectively to the “money” world. As a result, the “money” world stands to gain a great deal from the construction of these projects. However, this newly found value need not flow in only one direction. Currently in it’s infancy, the U.S. Real Estate Derivatives market is poised to give developers access to new investment opportunities in the “money” world that can help them to better control risk and enhance their ability realize returns.⁵⁰ In particular, derivative assets are uniquely beneficial to those in the “bricks & mortar” world who possess the expertise required to produce the walkable mixed use projects that achieve returns above the average returns of a given market. As such, derivatives assets are uniquely geared to play a major role in the further development of *The New Real Estate*.

Harvesting “Alpha”

In order to understand the ways in which derivatives assets can help developers more effectively access the “money” world, we must first understand what a derivative is. A derivative asset is one whose value depends completely on the value of another asset.⁵¹ The first derivative was created in the middle of the 19th Century. In 1851, at the Chicago Board of Trade, the first “Forward Contract” on corn futures was traded. Developed as a way to manage the risk associated with the corn market, Farmers were essentially able to sell their corn when they planted it, rather than when they harvested it. This allowed Farmers to take advantage of their unique ability to grow corn, and allowed them to hedge against future pricing risk in the corn

market.⁵² Since 1851, a variety of derivatives assets have been created and traded. It has not been until very recently however, that derivatives have traded in the Real Estate market.

The real estate derivative described in the most general terms is essentially two investors that make opposing long or short claims on a published index of a particular segment of the real estate market. These indexes value segments of the Real Estate market by tracking the return characteristics of those segments over time. A popular example in the United States is the NCREIF property index generated by the National Council of Real Estate Investment Fiduciaries.⁵³ Within the variety of Real Estate Derivative types perhaps the most simple one is called a Forward Contract. To illustrate the mechanics of a derivative, let us construct a simple example of a 1 year forward contract.

Let us assume that the real estate index today values the overall office market at \$100. One investor, the forward *buyer* assumes a *long* position, while the other investor, the forward *seller* assumes a *short* position. The two investors agree upon a contract price of \$105. The contract obligates the buyer to pay the seller \$105 in exchange for the value of the index one year from today. The seller has essentially sold a claim on the future value of the index to the buyer. No cash exchanges hands at this point. Suppose now, that the index one year later values the market at \$95. The forward buyer receives \$95, the value of the index, from the seller, but is contractually obligated to pay the seller the originally agreed price of \$105. The forward buyer nets a loss of -\$10. The seller receives \$105 for a net gain of \$10. If we assume that the market in one year actually goes up to \$107, the forward buyer receives the \$107 from the seller and only owes \$105. Therefore the buyer nets a gain of 2\$, while the seller nets a loss of -2\$⁵⁴

Now that the basic mechanics of the forward contract are clear, to illustrate how *New Real Estate* developers can gain benefit by *shorting* the index, it is useful to present a more specific example.

Let us now assume that a developer finds a property on the market for a price of \$100 million. As a practitioner of the *New Real Estate*, this developer happens to have particular expertise in developing walkable mixed use urbanism. The developer knows that walkable mixed use urbanism will generate residential return premiums that exceed the other conventional projects that are currently being built in the market. Recognizing this advantage, the developer buys the property for \$100 million. At the same time, the developer takes a 5 year \$100 million short position in a residential index forward contract. The buyer and seller agree to a contract price of \$106 million. The developer pays no cash out at this point and proceeds to build the project. At the end of the five years the developer has added \$10 million in profit to the land value bringing the total value to \$120 million. Now, let's assume that the overall residential market has generally risen 10 % as reflected in the residential index. In this case, the developer now owes \$110 million on the forward short, less the \$106 million price of the contract for a net of \$116 million. After the original cost of the land (\$100 million) the developer makes a \$16 million profit. That is, \$10 million due to the value added, plus \$10 million due to the residential market, less the \$4 million loss on the forward short. Now let's assume that the residential market falls by 10%. If this is the case, the land is worth \$90 million plus the \$10 million value add. The investor now owes only \$90 million on the forward short, less the \$106 million price of the contract for a net of \$116 million. Again, after the original cost of the land (\$100 million) the developer makes a profit of \$16 million. That is, \$10 million due to the value add plus \$10 million gain on the forward short, less \$10 million loss due to the residential market. No matter what happens in the broader residential market, the developer is able to realize a profit of \$16 million. ⁵⁵

\$16

In the example above, the ability to generate profit despite the conditions of the broader market depended entirely on the developer's ability to generate the \$10 million in additional value. As

the example points out, this additional value is derived from the return premiums that are associated with walkable mixed use urbanism. The developer essentially “beat” the broader market by a margin of \$10 million. In derivatives parlance, this margin of return over the average is called “Alpha.”⁵⁶By taking the short position in the forward contract, the developer was able to lay off the risk associated with the broader residential market, and “harvest” the alpha. To relate back to the corn farmer, the derivatives market allowed the developer to *sell* the project before it was built. The developer was able to use the derivatives market as an incredible risk mitigation tool. However, it is critical to understand that the benefits illustrated above are completely contingent on the developers ability to leverage development expertise and produce a superior project.

market exposure of the

The benefits of the Real Estate Derivatives market are two fold, applying first to the broad real estate market and second to the real estate development community. From the standpoint of the broader real estate market, derivatives allow investors with little prior market knowledge to invest in real estate without taking on an undesirable amount of risk. They can do this because derivatives assets allow them to simply invest in the value of the broader real estate market as tracked by a real estate index. More importantly, derivatives offer liquidity in an asset class that is typically understood as being highly illiquid. Real estate investments traditionally have high transaction costs and long transaction lead times. This makes sense, considering the development process timeline, and the due diligence required for real estate assets are almost always unique. By increasing liquidity and reducing potential risk for average investors, the trading of derivatives assets will further facilitate investment in the real estate industry.

More interesting are the benefits that derivatives offer to the development community, and in particular to developers of *The New Real Estate*. In short, real estate derivatives assets offer developers the ability to engage the “money” side of the real estate business. By doing so,

developers can mitigate the market risk of development and more easily harvest the additional value that they create based on their specific expertise. As the Real Estate Derivatives market takes off and becomes more ubiquitous in the industry, it will have the effect of weeding out developers producing marginal projects that deliver substandard returns. Conversely, those developers that are producing superior projects with superior returns, the developers of the New Real Estate, will naturally rise to the top.

Conclusion - The New Real Estate

Let us imagine that a knowledgeable developer of walkable mixed use urbanism has acquired 120 acres of developable land along 2000 linear feet of white sandy ocean coastline. Learning from the Seaside example mentioned above, this developer understands that the best way to maximize the value of the land is to develop walkable mixed use urbanism arrayed around a vibrant commercial center situated near the beach. The developer names the new development *Niku Beach*. Neighboring properties along the coastline are composed primarily of single use residential towers situated directly on the beach, in front of large asphalt parking lots. These developments offer excellent view amenities, but their arrangement along the beach forever negates the potential views and access from any property located on the land behind them. As such, these competing developers have forfeited the option value that could have been created by keeping the beach front open and accessible. *Niku Beach* on the other hand, has employed the latest in Real Options Analysis tools to generate a plan that offers the optimal amount of flexibility. The developer will be ready to respond quickly to market changes and adapt when necessary. *Niku Beach* is poised to become a smashing success, as the amenities provided by a vibrant town center and the rich atmosphere of the walkable urbanism all dramatically enhance the developers ability to leverage the value of the beach front. Understanding that *Niku Beach* will most likely beat the market and generate returns well above the average beach front development, this *New Real Estate* developer shorts the residential and commercial real estate indices and guarantees the harvest of the “alpha” that is created by the excellence of *Niku Beach*.

Granted, the example above is a rather simplified depiction of land development. What it presents though, is the potential of the *New Real Estate* in action. It is now possible for developers to create, accurately value, and mitigate the risk of new complex walkable mixed use urbanism. As such, real estate developers can now provide new places of authentic character and enduring value to a market that grows increasingly hungry for alternatives to standardized conventional development.

A new age of real estate is upon us, where the quality and richness of our built environment can again mirror the quality and richness of our society. Those developers that choose to adopt the new tools outlined in this thesis stand poised to become the builders and founders of new places of authentic character that can actually achieve enduring value. The benefits of Walkable Mixed Use Urbanism, Real Options Analysis, Patient Equity, and the Real Estate Derivatives Market are all available today. When applied together each one can more fully illuminate the path towards a *New Real Estate*.

Bibliography

Literature Cited

27

Bayster, Andrew P. Capital Structure in Mixed Use Development. Thesis Massachusetts Institute of Technology, 2005.

28

Cardin, Michel-Alexandre. Facing Reality: Design and Management of Flexible Engineering Systems. Thesis. Massachusetts Institute of Technology, 2007.

2

"City of Coral Gables Web Site." City of Coral Gables Website. 22 July 2007
<<http://www.citybeautiful.net/>>

32, 33, 34, 37, 38, 40, 41, 42, 43, 44, 45, 46, 47, 48

Copeland, Tom, and Vladimir Antikarov. Real Options: a Practitioner's Guide. New York City: Texere, 2003.

49

De Neufville, Richard, Stefan Scholtes, and Tao Wang. Real Options by Spreadsheet: Parking Garage Case Example. Massachusetts Institute of Technology. 2005.

1,16

Duany, Andres, Elizabeth Plater-Zyberk, and Jeff Speck. Suburban Nation: the Rise of Sprawl and the Decline of the American Dream. 1st ed. New York City: North Point P, 2000.

15

Dittmar, Hank, Gail Mayhew, James Hulme, and Christine Goupil. Valuing Sustainable Urbanism. The Prince's Foundation for the Built Environment. London: The Prince's Foundation, 2007.

29, 30, 31, 35, 36, 39, 56

Geltner, David M., Norman G. Miller, Jim Clayton, and Piet Eichholtz. Commercial Real Estate Analysis & Investments. 2nd ed. Thomson South-Western, 2007.

52, 54, 55

Geltner, David. "New Tools: Real Estate Equity Derivatives." MIT Center for Real Estate. Massachusetts Institute of Technology, Cambridge. 11 July 2007.

4

Gibbon, Edward. The Decline and Fall of the Roman Empire. Phoenix Press, 2005

10,11

Gyourko, Joseph E., and Witold Rybczynski. "Financing New Urbanism Projects: Obstacles and Solutions." Housing Policy Debate 11 (2000): 733-750.

18

"LEED for Neighborhood Development Pilot Launches." Congress for the New Urbanism. 20 July 2007 <<http://www.cnu.org/node/717>>.

19, 20, 21, 22, 23, 24, 25, 26

Leinberger, Christopher B. "Back to the Future: the Need for Patient Equity in Real Estate Development Finance." The Brookings Institute: Metropolitan Policy Program (2007).

5

Leinberger, Christopher B. "Financing Progressive Development." Capital Xchange May (2001).

6,7

Leinberger, Christopher B. "The Need for Alternatives to the Nineteen Standard Real Estate Product Types." Places 17 (2005): 24-29.

50, 51, 53, 57

Lim, Jong Yoon, and Yi Zhang. A Study on Real Estate Derivatives. Thesis. Massachusetts Institute of Technology, 2006.

3

"Nichols Prize: Legacy of JC Nichols." ULI Foundation. 2003. The Urban Land Institute. 25 July 2007 <http://www.uli.org/AM/Template.cfm?Section=The_Prize>.

17

"ULI - the Urban Land Institute: Research." Urban Land Institute. 22 July 2007 <www.uli.org>.

8,9, 12,13,14

Volk, Laurie, and Todd Zimmerman. "Development Dynamics." Wharton Real Estate Review II (1998).

Additional Readings

Greden, Lara V. Flexibility in Building Design: a Real Options Approach and Valuation Methodology to Address Risk. Diss. Massachusetts Institute of Technology, 2005.

Haughey, Richard M. Higher Density Development: Myth and Fact. Washington D.C.: ULI - the Urban Land Institute, 2005.

Hengels, Adam. Creating a Practical Model Using Real Options to Evaluate Large-Scale Real Estate Development Projects. Thesis. Massachusetts Institute of Technology, 2005.

Morrow-Jones, Hazel A., Elena G. Irwin, and Brian Row. "Consumer Preference for Neotraditional Neighborhood Characteristics." Housing Policy Debate 15 (2004): 171-202.

Song, Yan, and Gerrit-Jan Knaap. "New Urbanism and Housing Values: a Disaggregate Assessment." Journal of Urban Economics 54 (2003).

Volk, Laurie, and Todd Zimmerman. "Mass Markets, Housing, and the Illusion of Choice." On the Ground 2 (1996).