Equity REITs: Industry Overview and Valuation Methodologies

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Abstract

An investor willing to obtain exposure in real estate must understand the multitude of factors that influence real estate prices. These will inherently include the relationship between cap rates and long-term real interest rates, but also the specificities of demographics and government policies. He should also comprehend the various types of investment vehicles available. This paper's, main objective was to clarify the main aspects an investor must consider, with an emphasis in defining REITs as an asset class. Due to their minimal investment requirement and highly liquid nature, we argue that REITs provide the most democratic investment vehicle currently available. We also provide a REIT-specific layout to implement various types of valuation methodologies, including: Public Comparables, Precedent Transactions, Net Asset Value, Discounted Cash Flow analysis, Dividend Discount Model and Replacement Value. We find, through a case study of Equity Residential (a U.S. based Equity REIT), that all methods possess their merits and drawbacks, but that the Net Asset Value can be considered the most prominent valuation tool available.

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Chapter I.

Introduction

Real estate is undoubtedly one of the most important sectors of the economy. In 2017, global real estate value has reached an all-time high of over USD 280 trillion (tn), being the largest portion of that (USD 220 tn) attributable to residential real estate (Savills, 2019). While ownership remains mainly driven by occupational needs, rather than as an investment, the professionally managed global real estate investment market has been expanding. From 2016 to 2017, it grew from USD 7.4 tn to USD 8.5 tn, almost a 15% increase (MSCI, 2018).

An investor willing to allocate part of his capital into real estate has a wide variety of investment types and vehicles to consider. Perhaps the one that gained the most prominence in recent years, and that will be the focus of this paper, is the figure of Real Estate Investment Trusts (REITs). These were originally implemented in 1960, by President Eisenhower in the U.S. Since then, REITs have already expanded to 37 other countries, each with its own variant of REIT legislation, and today possess a global market capitalization of USD 1.7 tn. (EY, 2018).

In hopes of bringing more clarity to this rapidly changing environment, this paper will explore the main aspects surrounding REITs as an asset class. We will overview how the real estate industry is structured and segmented, and how REITs have evolved since its inception. We will also describe the main factors that can affect prices, as well as layout what we believe to be the most appropriate approach to their valuation.

While the literature available for corporate valuation is extensive, REITs have unique structures that will greatly influence the validity and usefulness of each valuation methodology. Certain academics and practitioners have proposed specific valuation approaches for REITs, but they are often contradictory. While Nussbaum advocates the use of the Discounted Cash Flow (DCF) analysis, practitioners, such as the highly regarded Green Street Advisors, focus almost exclusively on the Net Asset Value model. In addition, relative valuation tools, such as the use of Public Comparables or Precedent Transactions, have their own merits that should also be considered.

In this light, we will compare and contrast these diverse methodologies by applying them to the valuation of Equity Residential, the 7th largest Equity REIT in the U.S. and the largest Residential REIT in the world. Finally, we will conclude by taking a step back to discuss the main aspects an investor should consider when allocating their capital in REITs, including the practical difficulties encountered in the valuation process.

Chapter II.

Real Estate Industry Overview

Real estate is real, tangible property that consists of land and improvements, which include buildings, fixtures, roads, structures, utility systems, etc. The term "real estate" itself comes from the Latin root "res", which means "things". Others claim it derives from the Latin word "rex", meaning "royal," since kings used to own all land in their kingdoms, a testament to how traditional this asset class is.

The motivation for owning real estate can be split into two categories:

- Occupation, as one might seek a store to open a business, or a house to live in; and
- Investment, as a means of generating steady cash flows, or by expecting capital appreciation.

As an investment, real estate can be closely compared to fixed income since a primary concern is the risk of default of a tenant. Nonetheless, it also possesses equity-like characteristics, with a major source of return being the potential for capital appreciation. It is, therefore, widely regarded as a total return investment.

Historically, real estate has generated attractive returns to its investors, as noted in Table 1, below. This performance has meant a very active environment. In 2018 alone, the global real estate market saw the transaction volume exceed USD 1 trillion, 6% above 2017's volume (CBRE, 2019). There is also ample capital ready for investments in 2019, with a total "dry powder", or funds allocated for real estate but not yet deployed, of USD 295 billion, also 6% higher than 2017's year-end record (CBRE, 2019).

Table 1. Real Estate Annualized Performance

Index	3-Year	5-Year	10-Year	20-Year
MSCI US REIT (RMZ)	9.5%	12.0%	6.8%	N/A
NCREIF Property	11.9%	12.5%	8.0%	9.8%
S&P 500	12.4%	13.3%	6.1%	8.1%
Barclays Capital U.S. Aggregate	1.7%	3.1%	4.6%	5.6%

Source: Oaktree Capital (2016)

In this chapter, we will overview how the real estate market is structured. We will also describe the main methods available for investors to gain exposure to real estate, be it through direct investments or various types of investment vehicles. Finally, we will go over the main factors affecting real estate prices and valuation, such as interest rates, demographics and other relevant considerations.

Segmentation

Each property is different, and its intrinsic value is derived from fundamental factors including property use, location, size and shape, amenities, and specification. It is possible to classify real estate investments mainly within two different groups: residential and commercial.

Residential

Residential real estate refers to residential lots or dwelling units usually comprising single-family homes and condominiums that are mainly owned for personal use (Oaktree, 2016). It is quite a significant market, with an approximate size of USD 22 trillion in the U.S. alone, as of 2016 (Oaktree, 2016). It's personal ownership nature, however, means that it is not the central focus of real estate investment companies or vehicles.

Commercial

Commercial real estate, on the other hand, refers to income-producing properties that, unlike residential properties, are usually not occupied by its owners. Property owners lease the space and its amenities to tenants, who pay rent. This segment of the market, although smaller with an approximate size of USD 15 trillion in the U.S. (Nareit, 2018), is the principal focus of professional real estate investments. Commercial real estate typically includes (Oaktree, 2016):

- Office;
- Retail;
- Industrial/warehouse;
- Hotel;
- Multifamily rental apartment properties; and
- Sub-segments of the market like self-storage, manufactured housing and healthcare.

Key Players

Several stakeholders have significant and well-defined roles within the real estate industry.

Property Developers

Developers key roles include assembling sites, sourcing the financing required to execute the construction, and organizing the role of specialists. Pure commercial property developers are a rarity today, with the majority of the listed commercial property

companies now predominantly property investment companies with development sidelines to deliver asset value growth (Credit Suisse, 2010).

Most real estate developments can be split into three different categories, based on certain characteristics:

Speculative Development

This occurs when the project is developed without having a tenant in place to occupy the building on completion. Due to the uncertainties surrounding its commercialization, it is considered the riskiest form of development, but is also the one that has the greatest upside potential.

Pre-Let

'Pre-letting' is an agreement between a potential tenant and a developer to lease a building whose construction has not yet started (GVA Grimley, 2007). Benefits typically flow to both parties as occupiers can negotiate particularities in the space to suit their needs, as well as lower rents. The developer, on the other hand, benefits from the reduced uncertainty of finding a tenant and the corresponding lower financing costs that can be obtained.

Refurbishment and Redevelopment

This occurs when a building is already in place, but there is room for improvements that are expected to generate a corresponding gain in value derived from the potential of increasing rents. This might involve refurbishing the premise or redeveloping a property for new use (Credit Suisse, 2010).

Financiers/Bankers

Financiers and bankers assist developers and investors by providing development finance, as well as property investment finance (Credit Suisse, 2010). Seeking to magnify returns, as well as to increase their purchasing power, developers and investors alike leverage their equity with an amount of debt. Asset-backed industries traditionally present high leverage ratios and real estate is no different. By the end of Q2 2018, the LTV (Loan to Value) ratio for commercial real estate in the U.S. stood at approximately 62%, while the total debt outstanding was approximately USD 3.27 trillion (Deloitte, 2019).

Occupiers

The occupiers are those that effectively utilize the property's space and amenities. In exchange for this, they provide steady cash-flows to the property owners in the form of rent. Considering that the property's value should be the present value of future cash generation, a creditworthy occupier with a long lease can make all the difference to a property's value. They will not only lower the risk of holding the property, therefore reducing the discounting factor applied to future cash flows, but may also help attract other tenants, as is the case of anchor tenants in major retail centers. It is, therefore, possible to raise the value of a property simply by re-leasing the space to better tenants or by improving the lease covenants, such as extending the lease length. A metric commonly used to measure this is the weighted average lease term (WALT). A strong commercial team is, therefore, a critical factor in real estate investing.

Property Consultancy

The array of services provided by property consultancies is vast. These may include (Credit Suisse, 2010):

- Marketing properties available to lease, identifying suitable occupiers and negotiating leases for clients;
- Marketing properties available for sale, identifying suitable buyers (investors);
- Negotiating the purchase and sale of properties;
- Surveying properties and reporting on their condition and structural soundness;
- Managing property for investors; and
- Valuing a property.

Investment Type

According to the risk and return properties of a real estate investment, we can classify them into core, core plus, value-add and opportunistic. These range respectively from conservative to aggressive and are so defined based on the magnitude of the capital expenditures employed and the amount of debt used to finance the project (Episcope, 2018).

Relevant attributes of the assets include, but are not limited to, the length and term of the in-place leases, the credit worthiness of the tenants, and the physical condition and location of the building. The amount of debt used to capitalize a project is an equally important consideration because it impacts the risk profile of the investment. For example, a property with a credible tenant and long-term lease in place may be attractive to a

conservative investor at first but, if a considerable portion of the purchase price is financed with debt, the initially small risk can be significantly magnified (Episcope, 2018).

Core

Core properties are the most liquid, the least vacant, and the better located properties in real estate portfolios. Although these properties have the greatest liquidity when compared to other real estate assets, they still are not sold as quickly as traditional investments, such as bonds and equity. Core properties also tend to be held for a longer period of time, since they are generally acquired because of their income generating properties, rather than value appreciation. These investments are the ones intended to generate stable income with very low risk and are a good substitute, or complement, to investing in investment-grade bonds. A core property requires very little asset management and is typically occupied with creditworthy tenants on long-term leases. This is the most similar type of investment to passive investing that one can obtain when acquiring properties directly (Episcope, 2018).

Core Plus

This investment type is associated with a low to moderate risk profile. Core plus property owners typically aim at increasing cash flows through light property improvements, management efficiencies or by increasing the quality of the tenants. Like core properties, these tend to be well-occupied, high-quality assets. These investments, however, possesses a slightly higher degree of risk. The main downside is that the cash flow is less predictable than in a core investment, and these properties require some degree of active management to materialize the improvements in cash generation. A 15-year-old

apartment building that is well-occupied but in need of light upgrades is an example of a core plus investment opportunity. Although it may vary from country to country, or even city to city, a common scenario in a major city of a developed country for this type of investments is to use between 40%-60% leverage and to generate annual returns of around 9%-13% (Episcope, 2018).

Value-Add

Value-add investments usually target properties with little to no income generation at acquisition but that have the potential to produce a significant amount of cash once the value, in the form of improvements and by attracting new tenants, has been added (Episcope, 2018). Once this has been achieved, value-add investors typically dispose their assets by selling it to more conservative (core or core plus investors) at a significant premium to their initial acquisition price and capital expenditure.

Properties suitable for this type of investment can include new ones that might otherwise be considered core except that they are not yet fully leased, such as a new apartment complex or shopping center. In addition, it is not uncommon for these properties to have occupancy issues, management problems, deferred maintenance or a combination of all three. These investments are more complex than the previous ones and, thus, require a deeper knowledge of the local real estate industry and the market dynamics. Although conditions may vary, a common scenario for this type of investments is to use between 60%-75% leverage and to generate annual returns of 13%-18% (Episcope, 2018).

Opportunistic

Opportunistic real estate investments are those with the greatest amount of risk, but also the greatest upside potential. Like value-add investments, these usually target properties with little to no income generation at acquisition but that have the potential to produce a significant amount of cash. In these, however, investors take on the most complicated projects and may not see returns for as long as three years or even longer. This investment strategy requires years of experience and a team to execute it in an optimal way. Opportunistic real estate investments tend to pursue some event that will result in the property being quickly and dramatically revalued. This could include the development of raw property, redevelopment of property, or purchase in an area of renewal.

After completing the business plan, investors will typically dispose their assets by selling them to more conservative investors, therefore realizing their gains and maximizing the internal rate of return. Although conditions may vary, a common scenario for this type of investment is to use (if possible) >70% leverage and to generate annual returns higher than 20% (Episcope, 2018).

Investment Vehicles

Having exposure to real estate ought to be a concern for any investor. As mentioned previously, real estate should be a part of any well-balanced and diversified portfolio. Investors seeking to allocate capital into real estate have a myriad of options to choose from. These offer a range of benefits, risks and return profiles to suit any investor's needs. In this section of the paper, we will explore the main strategies through which equity investments can be made. These will range both public and private markets, either through direct investment, or through various forms of indirect investment structures. Although the

particularities of each structure vary from country to country, the underlying concepts remain the same. Certain emphasis will be given to the structures currently found in the U.S. since they possess the largest and most mature real estate market today.

Direct Investment

Direct investment means to invest directly into a specific property. For equity investments, this means acquiring, through private markets, an ownership interest in an entity that directly owns an asset, such as an apartment complex, shopping center or office building. This requires established and often costly infrastructure with on-the-ground personnel in target markets, and an in-depth understanding of the local market and regulations. Investments require day-to-day active management which includes leasing, property management and various other capabilities (Oaktree, 2016).

On top of the greater resources required, investing in real estate directly also involves a higher degree of risk. Not only do investments tend to be relatively concentrated in fewer assets, but also the private real estate market is much less liquid than public markets.

Direct real estate investment grants, however, greater flexibility to investors who have expert resources, know-how and convictions about specific markets and investment opportunities. With greater control over the assets and operations, direct real estate investment allows these investors the ability to seek solutions that they believe will add value to the properties and generate exceptional returns.

Partnerships

In partnerships, more than one person or legal entity can share ownership in one or more properties. Partnerships are considered pass-through tax entities. Therefore, they are exempted from corporate level taxation and all income, gains and losses from operations are reported on the individual partners' tax return. (Brueggeman & Fisher, 2011). There are three main types: general partnerships, limited partnerships and limited liability partnerships.

General Partnerships

In General Partnerships (GPs), each member is a general partner and share equal rights and responsibilities, unless previously defined in a partnership agreement. These agreements can address issues such as profit and loss sharing, management responsibilities and partnership termination. A significant drawback of this structure is that partners do not enjoy limited liability regarding legal or financial obligations of the partnership. Therefore, this structure is most commonly used by companies undertaking joint ventures, as these already possess limited liability, such as Limited Liability Companies (LLCs), Limited Liability Partnerships (LLPs), and corporations (Brueggeman & Fisher, 2011).

Limited Partnerships

What differentiates Limited Partnerships (LPs) from GPs is the existence of two different classes of partners. In a GP everyone is equal. In a LP, however, there exists at least one general partner while the others are registered as limited partners. The general partner, typically an investment manager, is the one responsible for the active management of the partnership's portfolio. The investment manager is usually paid a management fee

and has the ability to receive an incentive fee (also called "carried interest") if returns generated by the LP exceeds a specified minimum rate of return (or "hurdle rate") (Oaktree, 2016). The limited partner, however, behaves mainly as a passive investor, much like a minority shareholder in a company. Not only do limited partners not participate in the day-to-day management of the partnership, but they also enjoy limited liability regarding any legal or financial obligation.

Limited Liability Partnerships

A Limited Liability Partnership (LLP) is a relatively new structure when compared to GPs or LPs. Unlike the previous two, they do not require a general partner. In a LLP, each partner is responsible for the management of the partnership and the extent of the limited liability they enjoy may vary. However, typically each partner is only liable for its own investment (Brueggeman & Fisher, 2011). Due to the limited liability of all members, an LLP provides an efficient ownership structure which can be very attractive to groups of real estate investors. Partnerships, however, can still be quite costly to structure and the average ticket size to participate in one is often too high for the average investor.

Limited Liability Companies

A Limited Liability Company (LLC) is the U.S.-specific form of a Private Limited Company. It is a relatively new legal form that shares many of the advantages of an LLP, particularly with respects to the limited liability of partners and by being able to qualify as a pass-through entity. LLCs also have the added management flexibility of allowing some members to be passive investors (Brueggeman & Fisher, 2011).

LLCs can be either member-managed or manager-managed. In a member-managed structure, LLCs function as an LLP, where all members have an equal participation in the business. As for a manager-managed structure, LLCs can be more closely compared to Corporations, where managers are appointed to take care of the day-to-day activities.

The flexibility of pass-through taxation, limited liability, and management structure have made the LLC an increasingly popular choice of ownership entity, especially for the ownership of commercial investment real estate (Brueggeman & Fisher, 2011). It has generally replaced the LLP structure. The exception is when a GP or LP is already in place since the conversion to an LLP may be more tax efficient.

Corporations

A corporation is a legal and taxable entity that is owned by one or more shareholders and managed by directors (Brueggeman & Fisher, 2011). Although it offers shareholders limited liability, the most traditional form of corporation has the disadvantage of not being able to qualify as a pass-through entity. Therefore, the corporation is required to pay taxes on its income, and shareholders are subsequently required to pay taxes on dividends received. In the U.S. there is an alternative structure, called S Corporation, that provides the possibility of it being recognized as a pass-through entity, albeit under certain conditions.

Real Estate Investment Trusts

The label ‘real estate investment trusts’, or REITs, applies to several different property investment vehicles in various countries (Credit Suisse, 2010). They, however, share common features, the main of which is the tax treatment. In the U.S., a REIT is

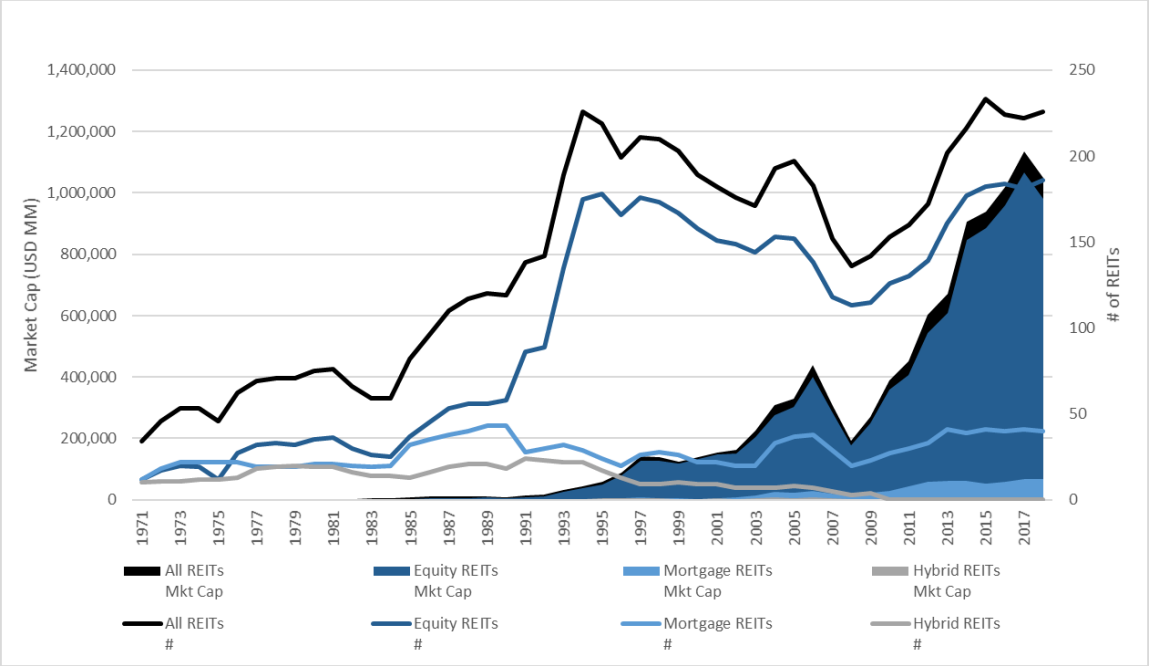
defined as a company, trust or association, that has elected to qualify under a specific tax treatment in which it is regarded as a pass-through entity (Brueggeman & Fisher, 2011). For that to be possible, REITs need to adhere to strict rules that will be further explored in the next chapter.

There exists both publicly traded and private REITs, but the vast majority is public. In publicly traded REITs, the minimum capital required to invest is as low as the price of one share that is being traded. This means that REITs are a much more accessible and liquid form of investment than a direct investment. They also provide an easy way for the average investor to obtain exposure to a professionally managed and diversified real estate portfolio (i.e. for them to obtain an interest in multiple properties with a minimum investment). In addition, investors also possess limited liability for the REIT's debt. REITs, however, may charge high management and transaction fees, minimizing potential returns. Furthermore, investors also forego their control of all the operational decisions that they would otherwise possess if a property was acquired by them directly. Investing in REITs, therefore, should be the result of a careful consideration with regards to its advantages and disadvantages and with respects to the investor's personal objectives.

REITs can be classified as equity, mortgage or hybrid REITs, depending on the type of investment that they target. Equity REITs acquire and operate income-generating property. They are the most prominent type of REIT, as can be seen in Figure 1 below, and will be the focus of the following chapters in this paper. Mortgage REITs, on the other hand, target solely real estate related debt. They can do this either directly, by providing loans (mortgages) or indirectly, by acquiring mortgage-backed securities. A hybrid REIT

is a combination of both. They acquire equity interest in properties as well as real estate related debt.

Figure 1. Evolution of the REIT industry in the US



Source: Nareit (2019)

Main Factors Affecting Real Estate Prices

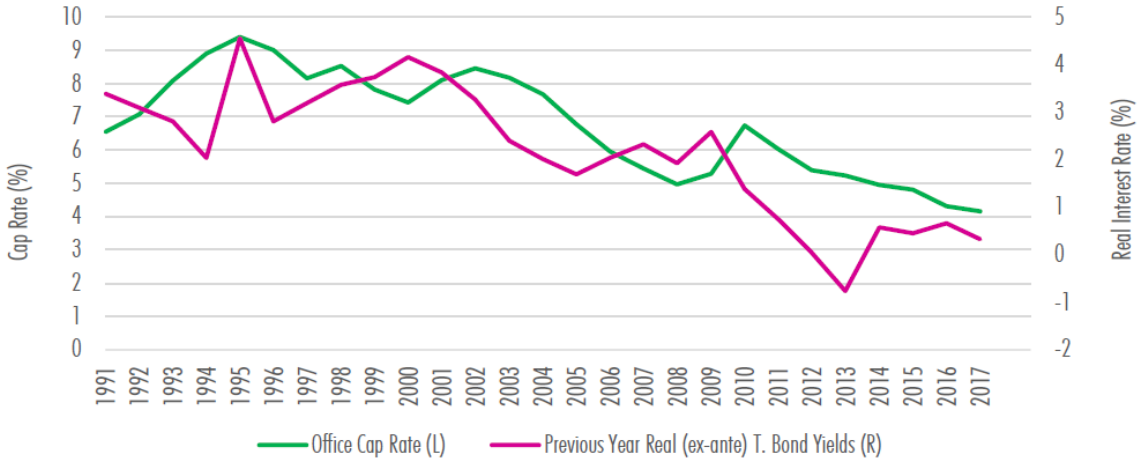
Investing in real estate, like any other asset class, is first and foremost an exercise in evaluating market dynamics by stipulating the interactions between various factors to determine whether the investment thesis is sound. Changes in interest rates, local demographics, etc., have significant impacts on the pricing of real estate assets and, therefore, its future return potential. Below we analyze what we consider to be the most determinant factors.

Interest Rates

A change in interest rate is arguably the most critical factor impacting real estate valuation. Prices, often measured as cap rates (or yields), have a very close statistical relationship with interest rates. Cap rates are defined as the Net Operating Income (NOI) of a property divided by its market value. Since leases are usually indexed to inflation, a property's NOI will tend to move accordingly. Therefore, all else being equal, cap rates will have a closer relationship to real interest rates, rather than nominal rates. Due to the long-term nature of real estate investments, it is also correct to assume that the relationship will be the strongest with long-term rates.

Figure 2, below, shows us the evolution, since 1991, of office cap rates in the U.S. and the previous year's real (ex-ante) T Bond yields. The correlation might not be perfect, but it is undoubtedly strong and significant.

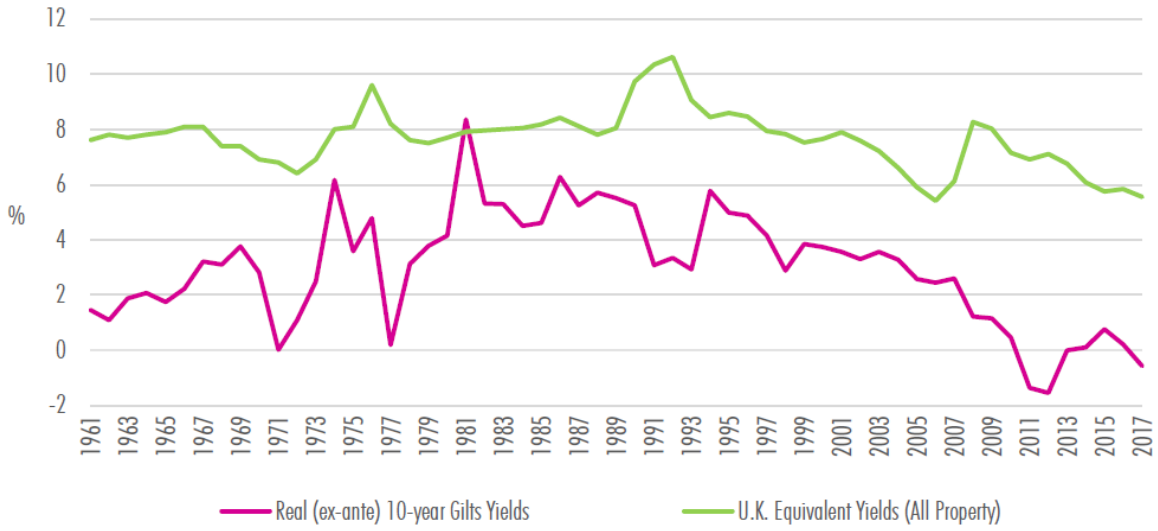
Figure 2. U.S. Cap Rates and Interest Rates



Source: CBRE (2018)

Figure 3, below, also shows us a similar comparison, but in the U.K. Although the relationship seems a bit weaker, particularly in the 1970s when there was significant turbulence primarily driven by a strong recession, there is ample statistical evidence to support a close to 1 to 1 relationship between long-term real interest rates and property cap rates.

Figure 3. U.K. Property Yields and Real Interest Rates



Source: CBRE (2018)

Cap rates are also consistently above government bond yields. This spread reflects the additional risks associated with investing in real estate when compared to the government bonds. We can, therefore, assume the following formula to be a good predictor for cap rates:

Cap rate = Long-term Real Interest Rate + Spread

To see how changes in interest rates impact property prices, let's use take as an example a prime office building located at the business center of a major city and that

generates an annual NOI of EUR 160 thousand. Let us also assume that the current long-term real interest rate stands at 2%, and that the risk spread associated with this particular asset is also 2%. This means that the corresponding cap rate for this asset will be 4% and, therefore, it is currently valued at EUR 4.0 million (Mn). Now, if the yield curve shifts upwards by 100 basis points and all else is equal, our cap rate has just increase by the same amount and stands at 5%. The new valuation for this asset has just decreased to EUR 3.2 Mn, a 20% reduction. Although this as an overly simplistic example, we can see how commercial real estate investments can have very similar considerations to traditional fixed income investments.

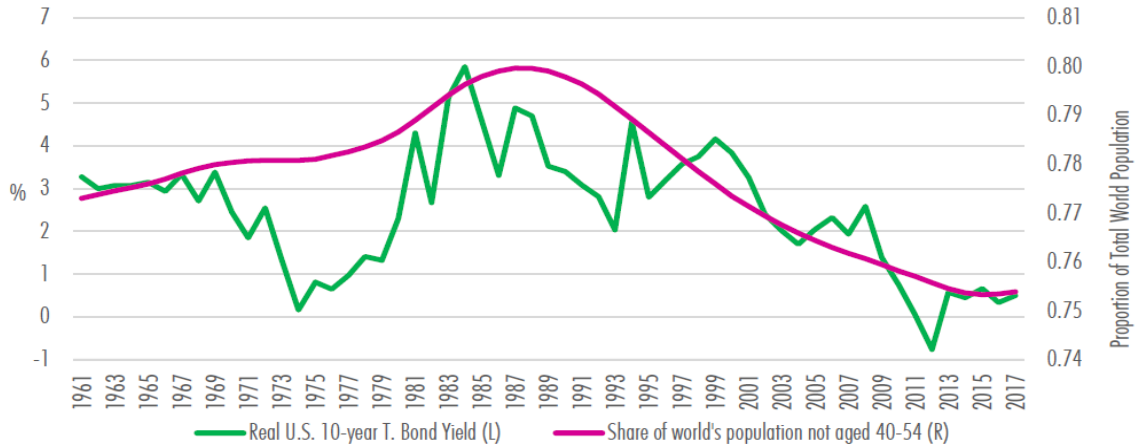
Demographics

Another major factor affecting real estate assets' pricing is local demographics. Real estate markets are widely regarded as being regional. While in one city demand for multifamily residences might be surging, in another one it might be declining, even if both are in the same country. Demographic indicators are often used as predictors for these changes. These indicators describe the composition of a population. A non-exhaustive list includes age, race, gender, population growth, and income. Major shifts in these will undoubtedly impact the local demand for certain types of real estate. While the supply might tend to accommodate these shifts in the long run, any delay will have a direct impact in property prices.

Global demographic trends are also a major driver of long-term real interest rates. The life-cycle hypothesis argues that people tend to adjust their savings and borrowings over their lifetimes to match their spending ambitions with their earnings potential (CBRE, 2018). While children and the elderly/retired tend not to save or borrow, young adults are

more likely to borrow, and middle-aged adults are usually the biggest savers. Changes in demographics, therefore, will have a direct impact in the proportion of savings and borrowings, both domestically and abroad. This will, in turn, impact the availability of capital and, consequently, the long-term real interest rates. In Figure 4, below, we see that the surge in the world's population aged 40 to 54 could be a major factor behind the fall in long-term real interest rates since the mid-1980s (CBRE, 2018). This provides us strong evidence that the amount of savings generated by this increasing portion of the global population has significantly contributed to drive down interest rates. CBRE's research, however, suggests that this demographic's impact on the savings-investment balance is global rather than national. The indicator, for example, does not correlate well with interest rates in the U.S. during recent years, although it still holds true globally. Another factor that helps explain the dynamics of real interest rates is income. Growing incomes in emerging economies tend to increase the impact of demographic trends on the savings/investment balance (CBRE, 2018).

Figure 4. Real 10-Year U.S. Treasure Bond Yields and Demographics



Source: (CBRE, 2018)

Other Macroeconomic Indicators

While real estate markets are definitely regional, they are also undoubtedly cyclical and tend to follow the overall health of the economy. Major economic aggregates, such as unemployment and GDP help predict the supply and demand dynamics of the overall real estate market. It is also important, however, to consider the fact that certain sectors of the economy might move independently from others and, even when moving together, the sensitivity to cycles vary. Long-term leases, such as the ones usually encountered in most office buildings, often helps mitigate the impacts of economic cycles. The retail sector, whose rents are commonly dependent on each tenant's individual performance, on the other hand, will tend to be more impacted by an economic downturn.

Government Policies and Subsidies

A final factor that can also have a sizeable impact on the supply and demand dynamics of the real estate market is legislation and any changes that may occur to it. Subsidies, tax credit and deductions are some of the ways a government might have a direct impact on property prices. By granting tax incentives to new home buyers, for example, a government might temporarily boost the demand of the residential sector. This change is usually discrete and might take place too fast for changes in supply to help offset the increase in prices.

For example, the U.S. implemented between 2008 and 2010 a first-time homebuyer tax credit that, according to the National Association of Realtors (NAR), contributed to the acquisition of 900,000 new homes. The most recent Tax Cuts and Jobs Act, however, is likely to diminish many of the tax benefits of homeownership. As a result, NAR is projecting slower growth in home prices of 1-3% in 2019 (NAR, 2019).

To actively anticipate relevant changes in legislation, as well as to forecast the impacts of the aforementioned factors influencing property prices, is among the main benefits of seeking professional investment management in real estate. Experienced professionals are able to capitalize on the ever-evolving economy by seeking the most suitable sectors and geographies to invest in. Although this might not always be an exact science, the value of correctly positioning your investments is unquestionable. It is, therefore, not uncommon to see collective investment vehicles, such as REITs, trading at a premium or discount to the aggregate value of its assets and liabilities (or Net Asset Value, NAV). These discrepancies are often attributable to the management's superior capabilities (or lack of) to generate value.

Chapter III.

U.S. Equity REITs Overview

As of mid-2018, the Global REIT market capitalization stands at approximately USD 1.7 trillion (EY, 2018). Being the forerunner in implementing modern REIT legislation, the U.S. has the largest REIT market, with 2018's closing market cap standing at USD 1.0 trillion, of which 94% are Equity REITs (Nareit, 2019). According to Ernest & Young, there are currently 38 nations who have adopted some variant of REIT legislation, the youngest of which is Oman. Although each jurisdiction will have its own particularities, the U.S. is widely regarded as being the most mature and the *de facto* leader when it comes to the REIT industry[1]. This is why we chose to dedicate the following chapter of this paper to describe and analyze the origins and current situation of U.S. REITs.

Origins

Although the current REIT framework is relatively new and has originated in the 1960s, the concept of Real Estate Investment Trusts can be dated back to the 19th century. Investors initially struggled to find the ideal investment vehicle to hold real estate. While the legislation for corporations granted limited liability to shareholders, as a matter of corporate law they were still not allowed to own real estate (Levy, Gianou, & Jones, 2016). Alternatively, GPs, who could own real estate, did not protect its general partners from the liabilities of the partnership. (Levy, Gianou, & Jones, 2016). It was only in 1854 that the

[1] In Appendix Figure 1, despite the particularities of each jurisdiction, EY attempts to classify each country based on its stage of REIT regime maturity, from "Nascent" to "Mature". Only the U.S. is currently classified as possessing a mature regime.

State of Massachusetts first recognized the limited liability of business trusts and paved the way for the first REITs.

The introduction of the Corporate Tax Act of 1909, however, initiated what Levy et al. describe as a game of regulatory "whack-a-mole", where the Internal Revenue Services (IRS) attempted to distinguish between a narrow set of trusts that would continue to be taxed as trusts, and a broadly defined set of trusts that would be taxed as corporations. Successive regulatory changes throughout the 1920s and 1930s eventually led the Supreme Court, in the case of *Morrissey v. Commissioner (1935),* to create the controversial corporate resemblance test. This test resulted in the taxation of REITs and Regulated Investment Companies (RICs)[2] as corporations.

Although RICs managed to effectively revert most of the negative consequences of the corporate resemblance test through the Revenue Act of 1936, it took REITs nearly three decades to do the same. In the meantime, investments were mainly structured through LPs. The general partner – usually a corporation with limited liability – issued limited-partner interest to individual investors (Chinloy, 1988). While the limited partner held limited liability, the general partner did not. As this was one of the key characteristics in the corporate resemblance test, the entity was able to secure pass-through taxation[3] (Levy, Gianou, & Jones, 2016).

In the long run this structure proved insufficient. Not only did it restrict income-generating real estate investments to those private investors with enough financial means

[2] Examples of RICs include: mutual funds, unit trusts, exchange-traded funds, etc.
[3] A couple of other measures were also necessary to secure pass-through taxation: the non-transferability of limited-partner interest and a predetermined end-date for the liquidation of the partnership in a not-so-distant future (Levy, Gianou, & Jones, 2016).

to participate in a LP, but it was also not capable of providing developers and sponsors with the amount of capital that they required (Levy, Gianou, & Jones, 2016).

Only in 1960, when President Dwight Eisenhower signed Public Law 86-779, did REITs revive. The reasoning behind the change was exactly the same as the one used in 1936's Revenue Act: the notion that collective investment vehicles should be exempt from corporate-level taxation (Levy, Gianou, & Jones, 2016). This move was foremost a push towards a more democratic investment environment, where the average investor was now allowed access to a professionally managed real estate portfolio, without having to incur double taxation or partake in a costly partnership structure.

Following 1960's REIT legislation, a series of further adaptations were implemented with the objective of increasing REITs' competitiveness. Initially REITs were not allowed to provide any service to its tenants without having to outsource it to an external contractor (Levy, Gianou, & Jones, 2016). It was only through changes in 1986[4] and finally in 1999, when Congress created the concept of Taxable REIT Subsidiaries (TRS), that REITs gained the level of autonomy that they currently enjoy.

Industry Structure

As Equity REITs grow to become even more popular among investors, the industry has gained considerable attention over the recent years. This is true both in the U.S. and globally. In recognition of its importance and particularities, as of September 2016, the

[4] In 1986, the Tax Reform Act relaxed the management restriction of REITs, allowing them to render normal and customary services for tenants, eliminating the need of an outside contractor (Brueggeman & Fisher, 2011). For non-costumery services, however, an independent contractor was still required until the 1999 reform (Levy, Gianou, & Jones, 2016).

Global Industry Classification System (GICS) has begun to recognize Real Estate as its 11th standalone sector. It is comprised of Equity REITs and Real Estate Management & Development companies[5]. With 27 S&P 500 constituents at the time (26 of which were Equity REITs[6]) and a market capitalization of nearly USD 520Bn, the new sector instantly became the 9th largest S&P 500 sector (RBC Capital Markets, 2016).

Since then, the industry has continued to expand and develop. Therefore, in the following section, we are going to breakout the industry in order to better understand how it is currently structured.

Public vs. Private REITs

In the U.S., REITs can either be publicly or privately held. Public REITs are the most common and are usually traded on stock exchanges with its financial information disclosed to the public. There also exists Public non-listed REITs (PNLRs), that register with the Securities and Exchange Commission (SEC), but that do not trade on major securities exchange. Because they are not listed, PNLRs do not offer the same level of liquidity as exchange-traded REITs. Redemption programs for PNLR shares exist, but vary from company to company and, generally, there is a minimum holding period for investment (Nareit, 2019).

Private REITs, on the other hand, do not share the same disclosure requirements as stock-exchanged REITs or PNLRs. These exemptions include rules that only permits an issuer to sell securities to "accredited investors" and, which exempts securities issued to qualified institutional buyers (QIBs) (Nareit, 2019). Therefore, Private REITs are typically

[5] It is worth noting that Mortgage REITs will remain within the Financials sector as a sub-industry.
[6] Today this number has grown to 31.

only sold to institutional investors. They usually do so via financial intermediaries at a fixed price. After deducting the brokerage fees of the financial intermediaries, Private REITs use the proceeds to acquire real estate assets.

Internally Managed vs. Externally Managed

REITs can either have their own internal management teams, that are responsible for overseeing the portfolio and taking care of the day-to-day operations of the company, or utilize an external manager. Most large publicly traded REITs are internally managed, while PNLRs and Private REITs tend to be externally managed (Nareit, 2019). When a REIT outsources its management, they typically pay a flat fee to the external manager. This fee is usually based on the total assets under management (AUM) and it is also standard to find additional incentive fees that are proportional to the REITs performance.

It is most common to see external management in REITs that are relatively young and have not yet grown enough for an internal management team to be economically feasible. Once the REIT has a stable portfolio and profit base, the company can begin to set a path for internalization of the management team, though, in practice, management internalization of a mature company rarely occurs (RBC Capital Markets, 2016).

While external management might make economic sense if the REIT has a relatively small portfolio, most investors tend to favor internally managed REITs due to potential conflicts of interest. Since most external managers are paid a flat fee proportional to the size of a REITs portfolio, they possess a strong incentive to grow the size of the REIT without much regard to asset quality and performance. This is often magnified by the fact that most management contracts encompass a broad range of services that grants the manager considerable discretion (RBC Capital Markets, 2016).

Sector Breakout

In the U.S., the National Association of Real Estate Investment Trusts (Nareit) subdivides REITs into 12 sectors, based on the type of real estate in which the REIT invests. These are described below.

Office REITs

These own and manage office real estate and rent space in those properties to tenants. Some office REITs focus on specific types of markets, such as central business districts or suburban areas. Some emphasize specific classes of tenants, such as government agencies or biotech firms (Nareit, 2019).

Industrial REITs

These own and manage industrial facilities and rent space in those properties to tenants. Some industrial REITs focus on specific types of properties, such as warehouses and distribution centers (Nareit, 2019).

Retail REITs

These own and manage retail real estate and rent spaces in those properties to tenants. Retail REITs include REITs that focus on large regional malls, outlet centers, grocery-anchored shopping centers and power centers that feature big box retailers. Net lease REITs own freestanding properties and structure their leases so that tenants pay both rent and most operating expenses of a property (Nareit, 2019).

Lodging REITs

These own and manage hotels and resorts and rent space in those properties to guests. Lodging REITs own different classes of hotels based on features such as the hotels' level of service and amenities. Their properties service a wide spectrum of customers, from business travelers to vacationers (Nareit, 2019).

Residential REITs

These own and manage various forms of residences and rent space in those properties to tenants. Residential REITs include REITs that specialize in apartment buildings, student housing, manufactured homes and single-family homes. Within those market segments, some residential REITs also focus on specific geographical markets or classes of properties (Nareit, 2019).

Timberland REITs

These own and manage various types of timberland real estate. Timberland REITs specialize in harvesting and selling timber (Nareit, 2019).

Healthcare REITs

These own and manage a variety of healthcare-related real estate and collect rent from tenants. Healthcare REITs' property types include senior living facilities, hospitals, medical office buildings and skilled nursing facilities (Nareit, 2019).

Self-Storage REITs

These own and manage storage facilities and collect rent from customers. Self-storage REITs rent space to both individuals and businesses (Nareit, 2019).

Infrastructure REITs

These own and manage infrastructure real estate and collect rent from tenants that occupy the real estate. Infrastructure REITs' property types include fiber cables, wireless infrastructure, telecommunications towers and energy pipelines (Nareit, 2019).

Data Center REITs

These own and manage facilities that customers use to safely store data. Data center REITs offer a range of products and services to help keep servers and data safe, including providing uninterruptable power supplies, air-cooled chillers and physical security (Nareit, 2019).

Diversified REITs

These own and manage a mix of property types and collect rent from tenants. Diversified REITs can, for example, own a portfolio comprising both office and industrial properties (Nareit, 2019).

Specialty REITs

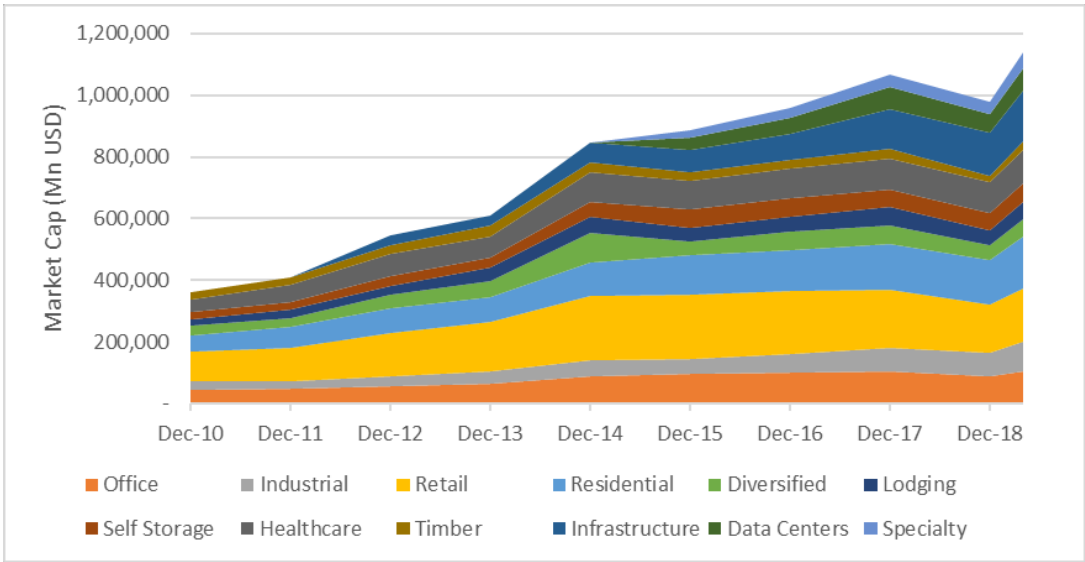
These own and manage a unique mix of property types and collect rent from tenants. Specialty REITs own properties that don't fit within the other REIT sectors. Examples include movie theaters, casinos, farmland and outdoor advertising sites (Nareit, 2019).

Evolution and Historical Performance

As of April 2019, Retail REITs are the largest REIT sector, accounting for 15.0% of all U.S. Equity REITs. They are closely followed by Residential and Infrastructure

REITs at 14.8% and 14.5% respectively. All other REIT sectors account for less than 10% of the total market capitalization, the smallest of which is Timberland at 2.4%. Figure 5, below, shows us the market capitalization evolution for each REIT sector since 2010 (Nareit, 2019).

Figure 5. Equity REITs Market Capitalization Evolution by Sector

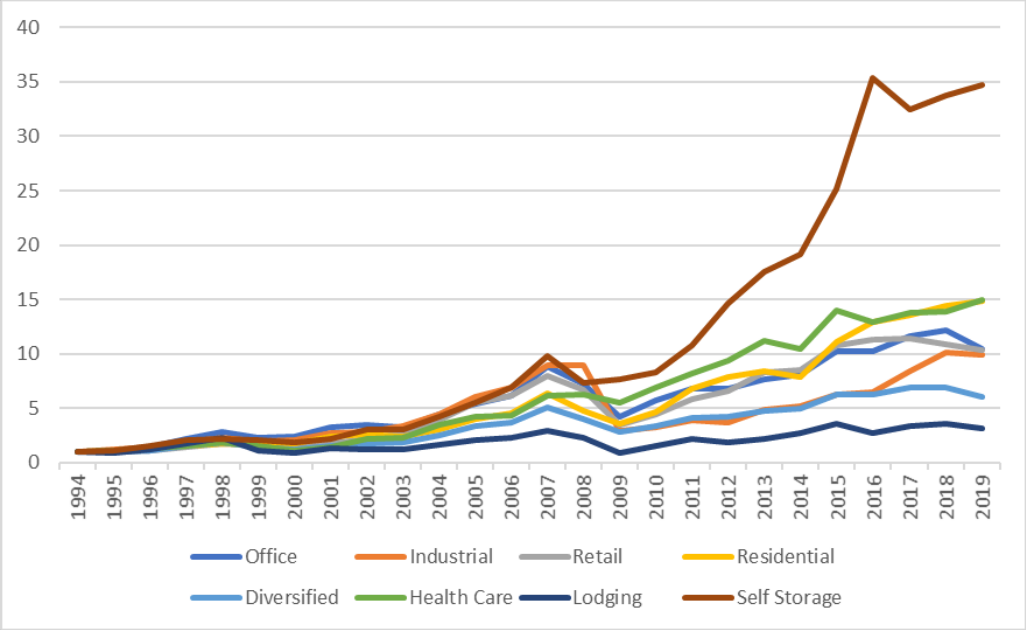


Source: Nareit (2019)

Historically, REITs have produced a track record of strong performance. The current trailing 25-year annualized total return of the FTSE Nareit All Equity REITs Index stands at 9.9%. It also has a dividend yield of 4.3%, almost double than that of the S&P 500 (2.2%). The sector that produced the strongest annualized total return over the last 25 years was Self-storage at 15.2%, while the one with the poorest performance was Lodging at 4.7%. Timber, Infrastructure, Data Centers and Specialty were not considered as they are relatively new sectors and were only implemented this decade. Figure 6, below, shows

us a comparison of the performance for each REIT sector over the last 25 years (Nareit, 2019).

Figure 6. Value of one dollar invested since January 1994 in each of the REIT sectors



Total Return. Source: Nareit (2019)

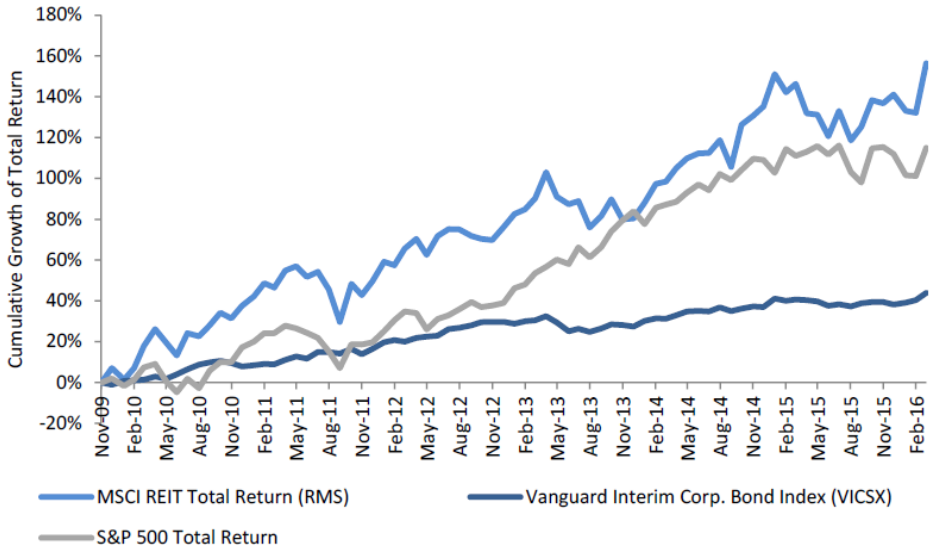
In the previous chapter, we claimed that commercial real estate valuation would tend to move closely to bond prices during changes in real interest rates. For REITs this continues to be the case, although a few nuances do exist. In a study performed by the Royal Bank of Canada where they examined historical REIT performance during five periods of rising rates, five periods of falling rates, and four periods of flat interest rates, sharp changes in interest rates have shown to elicit immediate price corrections from the

REIT sector[7]. This immediate change, however, was followed by a gradual return to a long-term view of REIT fundamentals[8] (RBC Capital Markets, 2016). Furthermore, the study found consistently that sectors with the greatest lease duration, such as healthcare and offices, were the most impacted by rate changes, while sectors with the shortest lease duration, typically hotels, were the least affected. In addition, although REITs do show considerable similarity to fixed income securities, their growth and performance typically correlates more closely to equity securities. Figure 7, also taken from the research made by the Royal Bank of Canada, shows that the MSCI REIT total return Index (RMS), moves considerably more closely to the S&P 500 total return index than the Vanguard Intermediate Bond Index (VICSX). It is worth remembering, however, that the RMS and the S&P 500 share common components.

[7] Appendix Figure 2 shows us how REITs tend to underperform the broader market in the first three months of rising rates.

[8] Appendix Figure 3 shows us how REITs tend to gradually recover throughout the year following a sudden rise in rates

Figure 7. REITs total returns against Equity and Fixed Income



Source: RBC (2016)

Current Legislation

Legislation is ever-evolving, oftentimes for the best of society. As the oldest and most mature REIT market, the U.S. has arguably the most comprehensive framework for REITs at the moment. Below we explore the most significant aspects of current U.S. regulation with regards to how REITs are defined, and to what are their key advantages and requirements.

Legal Form and Tax Treatment

As previously mentioned, a Real Estate Investment Trust is a company, trust or association, that has elected to qualify under a specific tax treatment in which it is regarded as a pass-through entity (Brueggeman & Fisher, 2011). It is, therefore, a creation of tax law, rather than corporate law.

Such pass-through entities are exempt from taxation at the corporate level. The form in which this is achieved is by allowing REITs to deduct from its taxable income any dividend paid out to shareholders. Corporate level tax is, therefore, applicable to any income that is not distributed. Furthermore, an excise tax of 4% applies to the extent that the REIT fails to distribute at least 85% of its ordinary income (PWC, 2015). Although most states follow the federal tax treatment for REITs, states have the prerogative to impose a variety of none-income taxes on REITs and their operations, as well as being able to restrict the ability to make deductions from dividends paid under certain circumstances (PWC, 2015).

At the investor level, distribution from REITs, other than capital gains distributions, are taxable as ordinary income to individuals at a rate of up to 39.6%, as well as an additional 3.8% Medicare Contribution Tax (PWC, 2015). If dividends have already been subject to corporate level taxation, the 39.6% tax threshold is lowered to 20%. Capital gains dividends are ordinarily taxed at a 20%[9] rate for individual investors (PWC, 2015). Furthermore, with regards to corporate investors, corporations are generally subject to a tax rate of up to 35% on dividends from REITs and these dividends are not eligible for the dividends received deduction (PWC, 2015).

Legal Requirements

In order to be qualified for such tax treatment, there are a series of requirements and obligations with which a REIT must comply. These can be split into ownership, asset, income, and distribution requirements. Below we explore the intricacies of each.

[9] 25% in the case of it being attributable to accumulated depreciation

Ownership Requirements

The current tax treatment for REITs was elaborated under the notion that collective investment vehicles should be exempt from corporate-level taxation. To be considered a collective investment vehicle, REITs are subject to the following requirements:

- have a minimum of 100 shareholders;
- five or fewer individuals must not hold more than 50% of the value of the REIT's stock and;
- shares must be fully transferable.

Distribution Requirements

The taxation of corporations, through the Corporate Tax Act of 1909, was implemented with the intent of limiting the accumulation of retained earnings, which could be used to pursue monopolistic or unfair trade policies (Levy, Gianou, & Jones, 2016). A pass-through entity is granted a special tax treatment specifically because they are not created with the intent of withholding earnings. REITs are, therefore, required to distribute at least 90% of each year's ordinary taxable income[10].

Asset Requirements

To ensure that a REIT's main activity is, in fact, real estate related, they are obliged to comply with the following restrictions (at any given quarter):

[10] Distributions made after year-end with the intent to meet this threshold are allowed under certain conditions (PWC, 2015).

- at least 75% of the value of a REIT's gross assets must consist of real estate assets, cash, and U.S. government securities;
- a REIT may not hold over 10% of the voting rights to any one issuer, and these securities cannot exceed 5% of the value of the REIT's gross assets (100% owned subsidiaries, TRSs and shares in other REITs are not subject to these restrictions) and;
- the value of all TRS securities owned by a REIT cannot exceed 25% of the value of the REIT's gross assets

Income Requirements

Following the same rational as above, a REIT must comply with the following restrictions (at the end of each year):

- at least 75% of a REIT's gross taxable income must be derived from its real estate activities (e.g.: dividends received from other REITs, interest on obligations secured by mortgages, rents from real property, etc.) and;
- at least 95% of a REIT's gross taxable income must be derived from its real estate activities, as described above, or interest income, dividend income, and gain from the sale or disposition of securities.

Comparison with other Countries

When U.S. legislation is compared to the other 37 countries who currently possess a variant of what can be considered a REIT, it is worth noting that there are countless differences. In Spain, for example, REITs must be listed in an organized stock market either domestically, or in any other country or economic region with an effective tax information

exchange with Spain (PWC, 2015). This listing requirement is entirely absent in U.S. Furthermore, the tax benefits enjoyed by REITs in Brazil, for example, are extended to the investor level for individuals[11]. Other characteristics, such as the absence of capital requirements, the lack of restriction on foreign investors, and the lack of restriction on foreign assets[12], are among the main points of divergence between REIT regulation in the U.S. and other countries.

Alternative Legal Structures

Traditionally, REITs own the real estate assets directly. There are alternative structures, however, that have been developed over time. These were created oftentimes to avoid, or at least to differ some form of taxation. The most widespread of these are the Umbrella Partnership REIT (UPREIT) and the Down-REIT structures, both of which are further explored below:

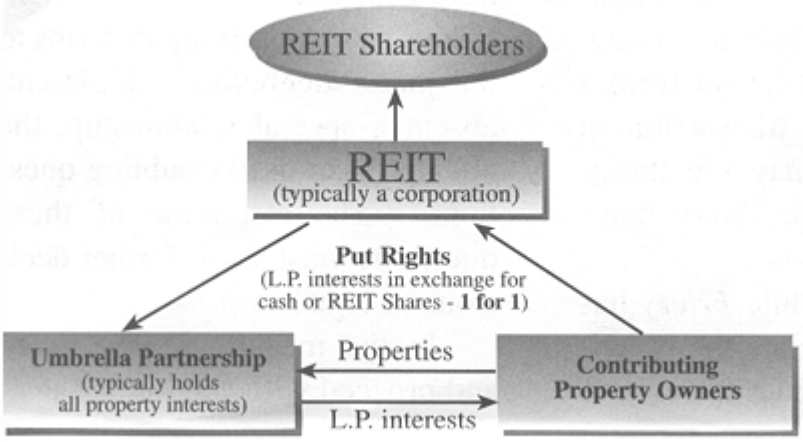
UPREIT

In this structure, illustrated in Figure 8, the REIT does not directly own any real estate assets. What it possesses, instead, is a controlling interest in a LP that, in turn, owns the real estate assets (Brueggeman & Fisher, 2011). As Brueggeman et al. elaborate, this structure was created in 1992 as a tax-deferring mechanism through which property owners (often developers) could contribute their real estate assets to the REIT without triggering a taxation event. In return, the property owners receive operating partnership units (OP

[11] This is true under certain conditions that include: (i) the REIT must be listed; (ii) there must be at least 50 unit holders, (iii) the individual's interest in the REIT must not exceed 10%.
[12] The income and assets tests described above with regards to currency gains might impose indirect restrictions on foreign assets.

Units) that are generally convertible into REIT shares and that grant them similar benefits, such as voting rights and dividend payments (Brueggeman & Fisher, 2011).

Figure 8. UPREIT Structure

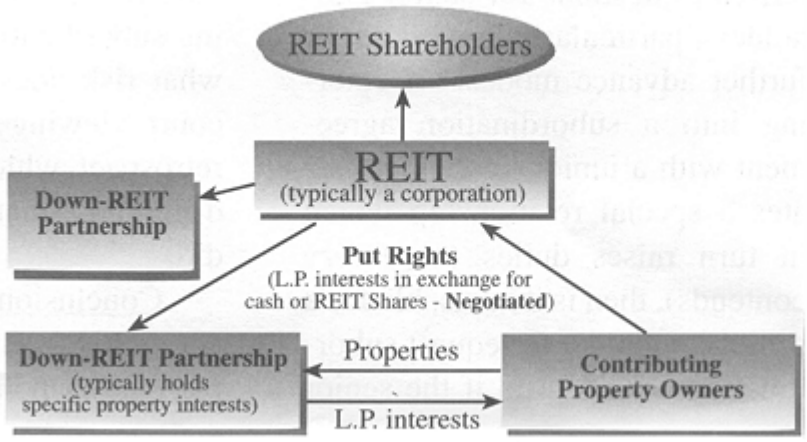


Source: Chilcote (1998)

Down-REIT

The main difference in this structure, illustrated in Figure 9, when compared to that of an UPREIT, is that it grants the REIT further structuring flexibility. In a typical Down-REIT structure, the property owner becomes partner in a LP with the REIT, the umbrella partnership of a REIT, or a wholly owned subsidiary of the REIT or UPREIT (Chilcote, 1998).

Figure 9. Down-Reit Structure



Source: Chilcote (1998)

Each structure has its own advantages and drawbacks[13]. In essence, however, determining the optimal investment vehicle involves more than just understanding the multitude of legal structures and tax considerations. It is also paramount to obtain a strong grasp of the business fundamentals. Notwithstanding, it is still important to fully comprehend the structure in which a REIT is set-up as this will factor into the valuation process. We will further explore these impacts in the following chapter.

[13] Appendix Figure 4 attempts to make a direct comparison between the two.

Chapter IV.

Equity REITs Valuation Methodologies

The valuation methodologies for Equity REITs are similar in several regards to those for standard companies. Among the tools available, we will still find both intrinsic and relative forms of valuation. There are, however, certain factors to consider that are particular to the REIT industry. In this chapter, we will explore the main methodologies available, giving special attention to the specificities of their application to REITs.

Public Comparables

One of the simplest and perhaps the most agile valuation tool available is the use of Public Comparables, also known as Comparable Companies, or Comp's. Despite its simplicity, it can capture current market sentiment, something that is not possible using more elaborate intrinsic valuation methods, such as the Discounted Cash Flow (DCF) analysis.

The Public Comparables methodology is built upon the law of one price; thus, it assumes that firms with similar attributes should have analogues values in the market (Welch, 2009). In other words, it predicts that comparable firms should generate similar future cash flows and hence should have the same proportional value (Berk & Demarzo, 2014). It is, therefore, a relative form of valuation, where the value of a company is derived from observing the value of its peers. In brief, there are three main assumptions in the Public Comparables methodology:

- That it is possible to identify firms/projects that are closely comparable;
- That it is possible to identify a measure that is value-relevant;

- And that the market values comparable firms/projects similarly (i.e. the law of one price)

Regarding these assumptions, it is worth noting that perfectly comparable companies do not exist. This entails an inherent imperfection of this valuation approach (Berk & Demarzo, 2014). To help mitigate this, it is important to find companies that are the most similar to the one in question. From a practitioner's standpoint, this means finding companies within the same business, with similar financial characteristics, risks and objectives. In addition to finding the right peer group, it is also important to consider an appropriate multiple and to calculate them consistently for each company (Koller, Goedhart, & Wessels, 2010). Below we will provide guidelines on how to tackle each of these issues separately.

Peer Selection

Selecting the right peer group is key to obtain a reliable valuation using comparable companies. Practitioners' common practice is to select a group of 8-15 peers. It is difficult, however, to provide a set of rules that can be applied in all circumstances. It is, therefore, important to analyze each case individually. A well-constructed valuation requires judgement about which companies and multiples are truly relevant (Koller, Goedhart, & Wessels, 2010). To obtain the optimal peer group, it is first important to ensure that the value driving attributes (e.g. Return on Invested Capital, expected growth, profitability, WACC, and pay-out ratio) are comparable across the companies selected (Welch, 2009). In addition, some researchers have concluded that selecting peer groups with similar past growth patters helps improve the valuation's precision (Boatsman & Baskin, 1981).

A common approach to identifying potential peers is to use the Standard Industrial Classification (SIC) codes[14] or the newer Global Industry Classification Standard (GICS) system developed by Standard & Poor's and Morgan Stanley (Koller, Goedhart, & Wessels, 2010). Another approach is to use peers provided by the company being valued. This last approach, however, may not be very precise, as it is common for companies to provide aspirational peers rather than companies that they truly compare with. If the number of potential peers is scarce, it is better to have a smaller peer-set that truly compete in the same market, with similar products and services, than including companies that do not compare so closely (Koller, Goedhart, & Wessels, 2010). This, however, will rely on the practitioner's best judgement.

Multiple Selection

When deciding which multiple is the most appropriate one to be used, it is traditionally possible to choose between Equity Value (EqV) or Enterprise Value (EV) based multiples. It is also necessary to match an appropriate metric to these values, such as Net Income (NI) or Earnings Before Interest Taxes and Depreciation (EBITDA). Accurately matching a metric to the appropriate measure of firm value is paramount for the multiple to be theoretically sound. To do this it is necessary to consider which metric relates to which capital holders. Net Income, for example, is a metric that has already been discounted for debt related factors, such as interest. It is, therefore, not a relevant metric for credit holders. Since EV includes the claim of all holders of a firm, including credit

[14] Beginning in 1997, SIC codes were replaced by a major revision called the North American Industry Classification System (NAICS). The NAICS six-digit code not only provides for newer industries but also reorganizes the categories on a production/process-oriented basis. The Securities and Exchange Commission (SEC), however, still lists companies by SIC code.

holders, Net Income should never be associated with EV. Therefore, the correct multiple would be EqV/NI. If you follow the same rationale, EBITDA will converse with EV, rather than EqV.

In addition to selecting related metrics, it is also important to consider which period to measure. This can involve measuring either the Last-Twelve-Months (LTM) figures or projecting forward values (i.e. multiples based on projected metrics). Although LTM multiples are the ones most readily available, Rosenbaum & Pearl give preference to forward multiples. They argue that these are more coherent with the valuation theory, as a company's value depends on future expected cash flows and not past performance (Rosenbaum & Pearl, 2009). In addition, special attention must also be given to the way these multiples are obtained. Both numerator and denominator should be calculated in a homogeneous way for all peers. This means that a strict definition should be given to both. This may prove particularly difficult if financial statements do not follow the same standard, since aggregate numbers might not reflect the same items. It is important, therefore, to pay detailed attention to a company's filings and to use the best judgement when interpreting them.

Now that the main guidelines have been set, we will explore a few of the most widely used multiples by practitioners when valuing REITs, including a few that are specific to the real estate industry.

Enterprise Value Multiples

Enterprise Value multiples assume that peer companies have similar future growth prospects, similar future performance (measured by the RONIC, i.e. Return on Newly Invested Capital), similar cost of capital (measured by the WACC, i.e. Weighted Average

Cost of Capital) and similar marginal tax rates. This relationship is captured by the Key Value Driver (KVD) formula, a variant of the Perpetual Growth method[15]. This formula is presented below:

$$V_t = EV_t = \frac{NOPLAT_{t+1} * \left(1 - \frac{g}{RONIC}\right)}{WACC - g}$$

NOPLAT is defined as the net operating profit, less adjusted taxes. If we define EBIT such that it reflects operating profit, we can infer the following:

$$NOPLAT = EBIT * (1 - T)$$

Therefore, we can rearrange the previous formula and obtain the EV/EBIT multiple:

$$\frac{EV_t}{EBIT_{t+1}} = \frac{(1 - T) * \left(1 - \frac{g}{RONIC}\right)}{WACC - g}$$

If we consider that the companies are from the same industry and present in the same geographies, the WACC and the tax rates can be assumed to be equal. This is because the operating assets of both companies should be comparable and, therefore, so should the underlying risks. Furthermore, being present in the same geographies means that the taxation should also be similar. To assume that RONIC and future growth will also be the same throughout the peer-set, on the other hand, is more questionable. That is why it is important to collect data from multiple companies and take averages. This will help mitigate the impact of any potential outliers.

The above considerations are also applicable to other EV multiples. Perhaps the most widely used one is EV/EBITDA. EBITDA is a slight variation of EBIT where

[15] The Perpetual Growth Method will be further detailed when we cover the DCF methodology further along this chapter.

depreciation and amortization (D&A) is not considered. Since depreciation and amortization are non-cash charges, it is used to reflect a company's true operating profit with respects to cash. EBITDA multiples are often preferred over EBIT multiples since the former is more susceptible to differences in accounting practices among corporations when determining D&A (e.g. IFRS vs local GAAP standards). Nevertheless, EBIT multiples can be particularly useful when D&A is not available or when a company is very capital intensive (if D&A is assumed to be equal to Capex). For REITs, EBITDA multiple are preferred. This is because the annual fair value adjustments of their real estate assets under IAS 40 make depreciation charges mostly irrelevant.

Equity Value Multiples

The most widely used Equity Value multiple is the price-to-earnings (P/E, or P/EPS) ratio. It can be derived from a simple, one-stage, Dividend Discount Model (DDM). This is given by:

$$P_t = \frac{Div_{t+1}}{r_e - g}$$

Where:

P is the price of one share;

Div is the dividend distributed per share;

g is the future growth rate of dividends;

And r_e is the required return on equity (i.e. the cost of equity)

If we divide both sides by earnings per share (EPS), we obtain the price-to-earnings ratio. This is shown below:

$$\frac{P_t}{EPS_{t+1}} = \frac{Div_{t+1}/EPS_{t+1}}{r_e - g} = \frac{\text{Dividend Pay-Out Ratio}}{r_e - g}$$

Therefore, the Price/Earnings ratio assumes that companies have similar dividend growth, risks (measured by the required return on equity) and pay-out ratios. Given these assumptions, Berk and Demarzo argue that firms and industries with high growth rates, and that generate cash well in excess of their investment needs, can maintain high pay-out ratios, which reflects in high P/E multiples (Berk & Demarzo, 2014). This is particularly relevant for REITs, given their need to maintain high pay-out ratios as a result of regulation.

Equity Value multiples, however, are highly dependent on capital structure and are also more prone to differences in accounting policies among firms. Unlike EV multiples, EqV multiples utilize earnings metrics that are affected by interest and other P&L items, such as Depreciation and Amortization (D&A). While differences in capital structure might not prove a significant issue for REITs, as the amount of leverage is uniformly high throughout the industry, the impact of accounting practices, on the other hand, can be quite significant. As Graham and Knight argue, earnings figures for REITs can be highly unreliable (Graham & Knight, 2000). This is mainly due to the several accounting particularities that afford REITs a lot of discretion, such as the use of fair value adjustment for real estate assets under IAS 40.

Multiples Specific for REITs

Although the above-mentioned multiples can be used to value REITs, they do present a few limitations. While we have already shown that REITs are particularly sensitive to depreciation expense, other factors, such as the high frequency of capital gains and losses due to the sale of properties, can also have an impact on the most common performance metrics. REIT managers generally claim that by excluding depreciation, amortization, and several one-time, non-recurring revenue and expenses, we can obtain a

metric that is more representative of a firms' operating performances. The industry, therefore, has widely adopted the concept of Funds from Operation (FFO). In general terms, it can be defined FFO as:

Table 2. Funds from Operations (FFO)

+ Net Income (NI)
+ Real Estate Related Depreciation
- Gain / (Loss) on Sale of Property
= Funds from Operations (FFO)

Since interest charges are factored into Net Income and are not removed from FFO, it is a metric that relates to common shareholders (i.e. it relates to EqV, not EV).

Although FFO is the most popular metric for REITs today, government regulators, such as the Securities and Exchange Commission (SEC), are concerned about the usefulness and reliability of the FFO measure. This is driven by the fact that it is unaudited, voluntarily reported and not prepared according to the Generally Accepted Accounting Principles (GAAP) (Ben-Shahar, Sulganik, & Tsang, 2011). In this light, several researches have attempted to determine the usefulness of the FFO metric over Net Income. While Fields et al. argue that Net Income still has a better predicting power for stock prices, most other academics, including Gore and Scott (1998) and Graham and Knight (2000), claim the contrary. The current consensus seems to point towards a greater usefulness and forecasting power of FFO over Net Income. Nevertheless, Stunda and Typpo (2004) claim that both provide incremental information in the presence of the other and, therefore, that NI and FFO should be used in conjunction.

While it may be argued that FFO is a better metric than Net Income for determining recurring earnings and estimating dividend pay-out, it is still not indicative of cash generation, since it does not include spending with acquisitions, debt repayments, etc. It also does not factor in Maintenance Capex, which can be quite substantial. To tackle these issues, practitioners sometimes adopt a variant of the FFO, the Adjusted Funds from Operations (AFFO). This can be defined as:

Table 3. Adjusted Funds from Operations (AFFO)

+ Funds from Operations (FFO)
- Maintenance Capex
+ Other relevant Non-Cash Charges
Adjusted Funds from Operations (AFFO)

While the SEC and other entities might question the reliability of the FFO measure, it can be considered fairly standardized throughout the industry. AFFO, on the other hand, varies dramatically. Although most practitioners are consistent in including maintenance (i.e. recurring) capex, the same cannot be said to the other non-cash adjustments. Even though these are made to increase the usefulness of the metric, the lack of standard means that FFO is still more popular among practitioners.

Implementation

Once the appropriate multiple has been selected (note that more than one can be used to make an even more comprehensive analysis), it must be calculated for all peers. The final step is to get the average and multiply it by the metric of the company being valued. There are different approaches to compute this average. These include performing

a simple mean, a harmonic mean, a weighted mean, or by using the median. Although there is no inherently correct approach, some researchers found that the harmonic mean provides the best minimum variance estimate within industry segments (Baker & Ruback, 1999).

Precedent Transactions

Precedent Transaction is similar in spirit to Public Comparable; it is also a relative form of valuation that employs a multiples-based approach to derive an implied price-range for a given company, division, business, or collection of assets. Instead of looking at current trading prices, however, it considers the sales price of comparable companies in previous M&A deals where there has been a Change of Control (CoC). Therefore, differently from Pubic Comparables, Precedent Transactions will capture a CoC premium (i.e. how much is required to pay per share if you want to acquire a controlling interest). In addition, transaction prices also typically reflect potential synergies that a buyer might expect to achieve by consolidating its business with that of the target. Therefore, the results obtained by this methodology will typically be higher than the ones using Public Comparables.

Precedent Transaction Selection

While finding comparable companies might already prove itself challenging, finding relevant past transactions will, most likely, be even more difficult. Here it is not only necessary to consider similarities between the company being sold and the one being valued, but the time and circumstances in which the transaction occurred is also crucial. While recent deals might be more likely to reflect current market sentiment, it is important to consider the context behind the sale (e.g. if it was a competitive bid vs. a fire sale), as

this will directly influence the transaction price. In addition, when searching for past transactions, if there has been no recent activity it can be interesting to analyze deals that occurred during similar points in the target's business cycle, or when macroeconomic conditions were comparable (Rosenbaum & Pearl, 2009).

In the case of REITs, if there is not enough information on relevant entire-REIT deals, it might be necessary to consider asset-only deals and make certain assumptions considering the REIT's portfolio. Even if it is possible to find relatively comparable transactions, it might still prove impossible to retrieve reliable data, since information won't necessarily be public. Furthermore, since these deals have occurred in the past, there is no guarantee that the current market sentiment has remained constant. It is important, therefore, to use your best judgement when determining the validity and reliability of the information obtained.

Multiple Selection and Implementation

The key multiples used for precedent transactions mirror those used for comparable companies (EV/EBITDA, P/E, etc.). Sector-specific multiples are also common, such as EqV/FFO for REITs. It is also important to note that multiples for precedent transactions are typically calculated on a Last-Twelve-Months (LTM) basis. This is mainly due to the limitations in obtaining reliable information, since it is not uncommon for targets to be private (i.e. not listed). Finally, implementation will follow the same rationale as the one using Public Comparables, where an average of the peer-set (in this case the average of the transactions) is taken and then applied to the target.

Net Asset Value (NAV)

Perhaps the most widely used valuation tool for REITs is the Net Asset Value (NAV) methodology. It is defined as the market value of all assets, minus that of all liabilities (including other claims on equity[16]). Fundamentally, this is true for any industry and, if the entity is listed and the market is complete (i.e. negligible transaction costs, perfect information and there is a price for every asset), it should perfectly reflect its market capitalization. The critical issue with the NAV calculation, however, is the ability to accurately infer the value of assets and liabilities in practice. This is particularly true in industries where intangible assets account for a substantial part of the total value. The phenomenon of 'undisclosed intangibles' have contributed to make matters even more obscure. These occur because accounting standards do not allow the recognition of intangible assets unless there has been a transaction to support its values in the balance sheet. Real estate is arguably the sector with the lowest proportion of intangibles relative to total assets[17]. As REITs are primarily comprised of tangible, real estate assets, the limitations of the NAV methodology are greatly diminished, although not completely.

NAV vs. Market Capitalization

In practice, REITs, as well as other listed entities, rarely trade precisely at their NAV[18]. These deviations (premium or discount to NAV) have been the subject of many scholarly papers. Although most of these have been developed by analyzing closed-end

[16] i.e. Preferred Shares, Non-Controlling Interest, Unfunded Pension Obligations and other debt-like items.
[17] Appendix Figure 5 provides us a breakdown of the industries by their proportion of intangibles relative to total assets.
[18] Green Street Advisors provides an interesting chart showing the average premium or discount to NAV of the REIT industry at https://www.greenstreetadvisors.com/insights/avgpremnav

funds, some explanations are still greatly applicable to REITs. Below we describe what we believe to be the most relevant findings.

Intangibles' Pricing and Corporate Overheads

As mentioned above, the real estate industry is the one with arguably the lowest portion of intangibles relative to the total value of assets. These, however, are still relevant and the difficulties to price them may influence certain investors to overvalue the REIT and others to undervalue it. Intangibles might include franchise value, corporate strategy, corporate governance, superior management capabilities, among others. These are often very hard to measure and will influence directly the REIT's future growth prospects. Quality managers, for example, might help the company to grow faster than its peers, both internally, through operational improvements to existing properties, and externally, through positive spread investing. All else equal, however, REITs should sell at a discount to NAV because of the added layer of management and resulting costs of running the REIT (Clayton & MacKinnon, 2002).

Biased Asset Appraisal

Another factor that is greatly relevant is the periodic appraisal requirement for properties measured at fair value (IAS 40). While this up-to-date appraisal is paramount for the NAV calculation, the appraisers are hired and paid for by the REIT and are, thus, prone to conflicts of interest. In addition, the lack of liquidity of individual properties might leave appraisers more prone to different cognitive biases, such as anchoring. Northcraft and Neale argue that anchoring is especially relevant to a bargaining setting such as the purchase of real estate, where (i) the fair market value of the piece of property is not

objectively determinable, and (ii) a bidding process is used to arrive at the property's actual selling price (Northcraft & Neale, 1987). Investors, therefore, have good reasons to doubt the accuracy of asset values in REIT filings.

Private Real Estate Cycle and the Value of Liquidity

Contrary to the underlying properties, REIT shares are highly liquid. This relative liquidity should be priced into a REIT's share price and, therefore, should translate itself into a premium to NAV. Liquidity is also a dynamic factor and should evolve in both private and public markets somewhat independently. Clayton and MacKinnon argue that this factor should help determine the fluctuations of premium to NAV over time at the sector level for REITs. They also claim that when private markets are showing strong activity (i.e. liquidity is high), investors place a relatively lower value on the public market liquidity benefit of REITs. Hence, the value of a REIT's liquidity is related to the liquidity of private real estate, which in turn varies over the private real estate cycle (Clayton & MacKinnon, 2002)

Agency Costs

The agency theory is a principle used to describe the issues arising behind potential mismatching interests between a principle and his agent. For a fund or REIT, this relationship is typically between shareholders and the executives (management) but can also arise if a major shareholder has a significant influence over decision-making (blockholder). An agency cost is defined as the expense resulting from the agent taking actions on behalf of the principle. These costs can either be seen directly, such as performance bonuses that are awarded to ensure an alignment of interest, or indirectly,

when the management does not act in the best interest of shareholders. Supporting evidence of this theory shows that blockholding in funds, for example, are strongly correlated with NAV discounts[19] (Barclay, Holderness, & Pontiff, 1993).

Certain measures, however, can be implemented in REITs which greatly help mitigate agency risks. These include: (i) having an internal management team; (ii) having statutory disclosure requirements and audits; and (iii) limiting any business between a REIT and shareholders or managers. The fact that REITs are required by legislation to limit ownership concentration in order to qualify for pass-through taxation already greatly reduces the risks of blockholding.

Investor Sentiment and Behavior

As a matter of pricing within behavioral finance theory, it is necessary to analyze the motives behind each class of REIT investors. Doing so provides us the framework to distinguish between rational and irrational behavior and, therefore, potential mismatches between the share price and its fundamental value (i.e. NAV per share). By construction, REIT ownership was initially highly fragmented and targeted more directly at retail investors. As REITs grew in size, however, they gradually became more attractive to institutional investors as well. By the time of the global financial crisis of 2008, individuals accounted for only 10% of total Equity REIT ownership, while insiders represented 14%, mutual funds 34% and institutions 42% (IPF Research Program, 2009). Although institutional investors (institutions and mutual funds) own most of REIT shares, it is important to note that a considerable portion of them do not possess real estate dedicated

[19] In their research, Braclay et al. showed that funds with block holders traded at a 14.2% discount to NAV, while those without were trading at only a 4.1% discount. This effect was also much more prominent in Equity funds rather than Bond funds.

capital. Clayton and MacKinnon argue that these are generally not long-term investors, but investors chasing growth or using REITs as a yield play until the next growth sector is identified. Therefore, the capital flows attributable to these investors represent more momentum-based strategies, rather than actual real estate fundamentals. Clayton and MacKinnon also show that the number of REIT IPOs tends to greatly increase in moments of widespread NAV premiums in the REIT sector. This provides additional evidence to support the claim that capital flows are greatly dependent on investor sentiment.

Changing Fundamentals

In an empirical study performed by Gentry et al., they found that NAV changes tended to supersede REIT prices movements. This mean-reversion to NAV suggests that the information incorporation for REITs is not immediate. There is also evidence of long-term mean reversion for stocks, albeit in horizons beyond one year. One possibility is that the fundamental value of REITs is easier to observe, so the mean reversion takes place more quickly (Gentry, Jones, & Mayer, 2004). Such claim suggests that the deviations from NAV cannot be entirely attributable to investor sentiment, nor other factors that would entail a constant premium (or discount), such as the presence of intangible assets and corporate overheads.

NAV Calculation

Although the issues presented above are certainly limitations of the NAV methodology, it is still arguably one of the most accurate forms of valuation available for REITs. It is important, however, to bear them in mind when calculating and interpreting

the results obtained. Below we will describe how to implement this methodology in practice.

Operating Real Estate Assets

It is possible to categorize REIT assets into two: real estate assets and other assets. Real estate assets are typically subdivided into operating real estate and non-operating real estate. You can obtain the operating real estate values either directly, by taking the reported balance sheet figures and making certain adjustments, or indirectly, by estimating income generation and assuming cap rates.

The simplest method is taking the balance sheet figures directly. There are many reasons, however, why the book value of the assets might differ from their actual market value. The most immediate reason is that investment properties are initially measured at cost (IAS 40). Although it is common for REITs to subsequently apply fair value accounting to their operating real estate assets, there is also the presence of biases and conflicts of interest in asset appraisals. Therefore, it is generally considered a more reliable approach to make an implicit calculation of asset values.

An indirect valuation of a REIT's operating real estate assets can be done either through a bottom-up approach, or a top-down one. In the bottom-up approach, the value of each property is calculated independently. For this to be possible, we rely heavily on the amount of information made available in a REIT's filings. Certain factors, such as the location of each property, their usable floor space and the individual lease terms are paramount for such valuation to be possible. Since REITs are not required to disclose such detailed information, this approach is, in most cases, not feasible.

We are, therefore, left with the top-down approach. The first step is to segment a REIT's real estate operating assets into different segments (if applicable). For each segment, you must take the Net Operating Income and divide it by an assumed cap rate. The sum of the results will be the implied value of a REIT's gross real estate operating assets. If there is not enough information to derive the NOI per segment, it is possible to weigh the cap rate based on each segment's book value (Capozza & Lee, 1996) and derive a blended cap rate that can be used in conjunction with the REIT's total NOI (Brueggeman & Fisher, 2011).

One major setback of the top-down approach is in assuming cap rates. When doing so, we are implying that the property stock is homogenous. This oversimplification is mitigated by segmenting the portfolio. Common segments include consolidated properties, unconsolidated properties, and management fees and other sources. Management fees and other sources typically receive a lower valuation (higher cap rate), because these are usually derived from contracts that are easily cancelable. Revenue from this segment is, therefore, less certain (more risky). If enough information is provided, it is also possible to segment the portfolio by geography, property quality and property type. This provides greater flexibility and accuracy when assigning cap rates to each segment.

By construction, the implied valuation will be very sensitive to the cap rate used. It is, therefore, very important to use the best judgement available when finding them. There are two main methods of finding property cap rates: using past transaction data, or through market reports. Since market reports try to reflect current market sentiment, they often present more accurate information than past transaction data.

Other Assets

Other assets include non-operating real estate assets and other balance sheet assets. Typical non-operating real estate assets are construction in progress, land held for development, and real estate assets held for sale. For construction in progress and land held for development, it is possible to assume that they will become operating properties in the future and calculate their Net Present Value (NPV). This, however, relies on certain information that might not be readily available in the REIT's filings. An alternative method, which is often used in equity research, is to assume certain premiums to the balance sheet values. These values are, in most cases, based on accrued development costs (IAS 16). Applying to them a premium, although arbitrary, provides better estimates of the market value as historical costs do not reflect the future cash generation potential. Real estate assets held for sale, on the other hand, can usually be taken at book value.

As for the other balance sheet assets, these should already reflect market values. Other assets include cash and equivalents, accounts receivable, inventories, prepaid expenses, etc. If unconsolidated properties (or unconsolidated joint ventures), were already accounted for in the operating real estate assets, this should be removed from this section in order to avoid double-counting.

Liabilities and Other Claims on Capital

Contrary to what is done for assets, liabilities and other claims on equity, such as preferred stock and NCI, are commonly accounted for simply at their book value, with little to no adjustment. It is important, however, to adjust the value of interest-bearing debt based on the REITs current cost of debt.

The book value of debt is accounted for at par value. Changes in the yield curve, however, will have an impact on the market value of any interest-bearing debt. These shifts, which can be quite significant, are not captured by the book value. It is, therefore, necessary to calculate the present value of future cash flow streams (interest payments + repayment of the principal), based on the current rate obtainable by the REIT (Widmann, 2007). To do so, one can infer the rate based on the company's Credit Rating. For each rating, it is possible to obtain a corresponding yield that is currently being priced by the market. REITs, however, can also source secured debt. Since the risks associated with these are not directly related to that of the company, the rate may vary considerably. It will depend on the quality of the asset posed as collateral and the amount of leverage relative to its market value. In order to obtain a reliable estimate for the REIT's cost of debt, the best method is to look at company guidance, or to calculate the average rate of the most recent loans issued.

NAV and NAV per share

After we have the values described above, to find the NAV we should perform the following calculation:

Table 4. Net Asset Value (NAV)

+ Operating Real Estate Assets
+ Other Assets
- Liabilities
- Other claims on capital
= Net Asset Value (NAV)

The calculation of the diluted share count will depend on what has been considered other claims on capital. Here we will consider the following calculation for diluted share count:

Table 5. Diluted Share Count

+ Common Shares
+ Restricted Share Units (RSUs)
+ dilution from warrants/options/convertibles
+ OP or DownREIT Units
= Diluted Share Count

After dividing the NAV by the diluted share count, we obtain the NAV per share. This number should be compared to the REIT's current share price. Any deviations can be either attributable to wrong inputs (i.e. inadequate cap rates) or to the various possible factors explained in the previous section. An evaluation of such factors and the comparison with different methodologies is, therefore, fundamental to determine the validity of the results obtained.

Discounted Cash Flow (DCF)

The DCF methodology is perhaps the most widely accepted and utilized intrinsic valuation tool in existence. Its major premise is the intuitive notion that a value of a business/project can be derived from the Free Cash Flows (FCFs) it generates. These FCFs are discounted using an appropriate cost of capital that should reflect the corresponding risks associated with the business/project. The most common variant of the DCF methodology is the two-stage model. The first stage projects FCF generation for a certain amount of years in which the business/project has yet to stabilize. After stabilization, the

business/project reaches the second stage, for which a Terminal Value (TV) can be inferred without the need for further FCF projection.

Although intuitive and theoretically sound, the valuation derived using the DCF methodology is highly dependent on the assumptions utilized. There are, therefore, four main aspects to which special attention must be given. The first one is in selecting the appropriate FCFs to consider. Our second concern is in making reasonable assumptions when projecting these FCF. Subsequently, we should determine an appropriate discount rate to be utilized. Finally, after stabilization has been reached and the discount rate has been decided, we still need to consider how the Terminal Value (TV) should be calculated. Below we will describe what we consider to be the most appropriate approach to the DCF methodology for REITs.

Appropriate Free Cash Flow (FCF)

There are two main types of FCFs that can be used in the DCF methodology: Free Cash Flow to Firm (FCFF) and Free Cash Flow to Equity (FCFE). When utilizing FCFF (also known as Unlevered FCF) we are considering the cash that is available to all holders of the firm – including bondholders, preferred shareholders and common shareholders. FCFE (also known as Levered FCF), on the other hand, measures the cash available only to equity holders. FCFE is, therefore, net of interest and preferred dividend expenses. Given an appropriate discount rate, the Present Value (PV) of all FCFFs plus that of the TV calculated using the stabilized FCFF, will be the firm's Enterprise Value (EV). If we use FCFE, however, we obtain the Equity Value (EqV) of the firm's operating assets. It is worth noting that for each case we should use a different discount rate. This will be further explored in a later section. After the EqV or the EV is obtained, to move from one to

another (and vice versa) we simply need to add back (or subtract) the various claims on capital. This will also be explored in a dedicated section further along this paper.

In theory, utilizing FCFE and FCFF should derive the same firm values (Nussbaum, 2006). The use of FCFF, however, indirectly assumes that the firm is entirely equity financed. Nussbaum argues that this is mostly useful for companies that have rapidly changing balance sheets, and periods of high growth. FCFE, on the other hand, assumes that all cash available to equity holders is distributed as dividends. This entails that the company does not accumulate excess cash, something particularly applicable for REITs since they have high distribution requirements. Furthermore, because REITs typically maintain a relatively stable amount of leverage, a more appropriate approach is to utilize FCFE (Nussbaum, 2006). In this paper, we will utilize FCFE as defined in table 5, below:

Table 6. Free Cash Flow to Equity (FCFE)

+ Cash Flow from Operations (CFO)
+ Cash Flow from Investing (CFI)
+ All Non-Debt-Related Cash Flow from Financing
+ New Debt Issuance
- Debt Repayments
= Free Cash Flow to Equity (FCFE)

Guidance on Financial Projections for REITs

In order to effectively extract each year's FCFE, it is first necessary to project the REIT's financials. This is done for the first stage of our two-stage DCF model, where the company is still progressing towards stabilization. The number of years that this might take depends on the level of maturity that they currently possess. It is customary, however, to project anywhere between 5 and 10 years, since otherwise we run the risk of the Terminal Value (TV) being too sizeable. Consequently, the valuation would be highly dependent on

the assumptions used to calculate this TV. On the other hand, extending the analysis by too long might also prove undesirable, as the visibility for projections gradually diminishes with time. Given that REITs are typically stable entities (unless they have been recently created), we recommend projecting only 5 years.

Now that a time span has been decided upon, we must extract historical data from the REIT's filings and make assumptions that allows us to forecast them during this period. It is important to note, however, that there is no inherently correct answer when making financial projections. Although there are some guidelines that should be followed, it will ultimately rely heavily on one's own judgement. While, there is ample literature providing methods of forecasting normal companies' financials, the same is not true for REITs. The main point of divergence between a regular company and a REIT is that the former generates most of its value from its real estate properties, instead of working capital. Therefore, it is essential to forecast asset values and income generated by the different property segments, i.e. Same Store properties, properties Under Development (if the REIT engages in development activities), Acquisitions & Dispositions and Non-Same Store properties. Below we will describe some guidelines to follow when projecting these property segments.

Same Store

Same Store properties are those that have already reached their full potential in terms vacancy and rent according to the REIT's management. They have, most likely, been part of the REIT's portfolio for some time and there is no imminent plan on disposing them. Three main factors are required for projecting gross asset value and income generation: rental growth rate, capex growth rate and NOI margin. These can be projected as follows:

- Rental growth can be obtained from equity research, management guidance, or assumed to be equal to expected inflation. It might also be interesting to use your best judgment in estimating rental growth by comparing and contrasting these three sources.
- Capex growth rate can be linked to the same figure used for rental growth. The rationale being that they are driven by similar considerations (i.e. inflation, or extra expenditure to increase property value and, therefore, rents).
- NOI margin can be assumed to be an average of historical data. To obtain a more representative figure, at least 3 years should be considered. This assumes that the cost structure of the properties will be maintained at the same level.

Properties Under Development

Most REITs have a development branch where they develop new properties or redevelop existing properties. In order to project gross asset values and income for this segment, we need to consider the following factors: rate of growth in development spending, and value of properties reclassified as Non-Same Store. These should be projected as follows:

- Rate of growth in development spending will depend on the REIT's business model. If they have a dedicated development branch, this should either stay constant or grow at a steady rate. The rate in which this happens can be projected by consulting equity research or management guidance. If neither provide sufficient information, we must rely on our own judgement based on historical figures and current market trends. On the other hand, if the REIT does not have a dedicated

development branch, we should assume that spending converges to zero by the time the REIT reaches stabilization.

- The value of property that should be reclassified each year as Non-Same Store should also be inferred from equity research or management guidance. If, again, not enough information is found, we can make and estimate of the average time it takes for developments to complete. If we assume that it takes one year, for example, the amount reclassified should be equal to that of last year's development spending.

Acquisitions & Dispositions

The projection of acquisitions and developments will depend, once again, on the REIT's business model. Some REITs, for example, have a develop-to-sell model, where disposals provide a recurring source of revenue. To forecast the impact acquisitions and dispositions will have on total assets and income generation, we need to consider the following factors: amount spent in acquisition each year, acquisition cap rate, amount disposed each year, and average gain or loss on dispositions.

- To forecast the amount of assets acquired and disposed each year, it is possible to consider company guidance on whether they intend to intensify this side of the business or not. It is also possible to derive average values from historical numbers.
- The acquisition cap rate should also be inferred from historical numbers or projected based on market reports of the cities in which the REIT has been acquiring.
- Finally, the average gain or loss on dispositions should also be inferred from historical values.

Non-Same Stores

Once we have projected the previous segments, we are now able to forecast the Non-Same Stores. These will increase in size with Capex and when assets are reclassified from being Under Development, but they will decrease in size with Dispositions. To infer the level of income generation, we are required to project the following factors: Capex growth rate, Trailing Cap Rate, and NOI margin. These are done as follows:

- Capex growth should follow the same rationale as for the Same Stores segment.
- The Trailing Cap Rate is used to determine the level of income generation given the amount of gross assets, which will be constantly changing with assets being reclassified or disposed. To estimate this, we should take an average of historical figures.
- Finally, the NOI margin will allow us to determine the amount of Revenue and Operating Expenses relative to the NOI being generated. This can also be taken as the average of historical figures for this segment.

Once the different property segments have been successfully forecasted, it is possible to link them back to the three main statements. Other non-operating items should also be forecasted. These will mostly follow a standard approach used for any corporate and that will be further explored when we undergo the valuation of Equity Residential in the next chapter.

Appropriate Discount Rate

After projecting the financials, we still need to determine the appropriate discount rate to utilize in our DCF analysis. To do so let's first consider how the Present Value of FCFs are calculated. For one FCF at time t (in years), the PV at time 0 is defined as follows:

$$PV_0 = \frac{FCF_t}{(1+r)^t}$$

In this calculation, "r" is the discount rate, which should reflect the required rate of return for one year of those entitled to the FCFs. Therefore, the choice of the appropriate discount rate first depends on the FCF selected. In our case, we have opted for a DCF using FCFE. Therefore, the discount rate should reflect the required rate of return of common shareholders (equity holders). We define this discount rate as r_e.

We now must determine which rate of return common shareholders require for investing their capital. This discussion is one which academics have debated extensively throughout the years and there still appears to be no definite consensus. One of the earliest methods and still the most popular one is the Capital Asset Pricing Model (CAPM). Alternative methodologies, such as the Arbitrage Pricing Theory (APT), the Fama-French Model, and other multi-factor models have since been developed. Deciding which is the most appropriate one is not a trivial matter and is still subject of discussions between academics. It falls, therefore, beyond the scope of this thesis. Thus, we will adhere to the de-facto standard: the CAPM.

The CAPM is defined as:

$$r_e = r_f + \beta * ERP$$

Where:

r_e is the expected return of the asset

r_f is the risk-free rate of return

β is the beta

ERP is the Equity Risk Premium

In this equation, the risk-free rate of return is defined as the expected return on a riskless asset. For an asset to be considered riskless, it should be free of both default and reinvestment risks. Therefore, it should represent a default-free zero-coupon bond rate whose maturity matches that of the cash flow being discounted (Damodaran, 2012). In practice, however, there are no completely default-free assets. The closest to one is a government bond. In addition, it is hardly possible to match cash flows precisely with government bonds. The best solution is to approximate the duration of the government bond to that of the cash flows being analyzed (Damodaran, 2012).

The next factor of the CAPM is the Equity Risk Premium (ERP). The ERP is the premium demanded by investors for investing in the market portfolio, which includes all risky assets in the market, instead of investing in the riskless asset (Damodaran, 2012). It is, therefore, the expected excess return of the market when compared to that of the risk-free rate. In practice, it is impossible to accurately measure the market portfolio. Therefore, it is acceptable to use an available index whose behavior would approximate the most to that of the market. In the U.S., the S&P 500 is the most widely used index for this purpose. Furthermore, it is common practice to assume that the average historical return of an index is a good estimator for its future returns. Although this is not necessarily true, it is arguably the most suitable method. In order to maximize the reliability of this estimate, it is paramount to use the longest time span available for the calculation (Damodaran, 2012).

Finally, the β in the CAPM measures the risk added by an investment to the market portfolio (Damodaran, 2012). It is defined as follows:

$$\beta = \frac{Cov(r_e, r_m)}{Var(r_m)}$$

Where:

r_e is the expected return of the asset

r_m is the expected return of the market portfolio

It reflects, therefore, the sensitivity of the asset's return to that of the market, given here by the return of an index. Thus, it is calculated by running a linear regression of the asset's returns against those of the market index. Here, however, there is a tradeoff between taking the longest possible time span and taking the most recent data. While a longer time span might help minimize the impact of anomalies, more recent data should be more representative of a company's current state (i.e. current business and current leverage ratios). Literature usually recommends using a period between two and five years. Since REITs typically follow stable business models and leverage, it is acceptable to consider a longer period.

Calculating Terminal Value

Once we have projected the financial statements and determined the appropriate discount rate, we now must calculate the TV. There are two main methods to do so: (i) by assuming that the FCFs grow at a constant rate forever; (i) by utilizing exit multiples. The intricacies of these two methodologies will be further explored below.

Perpetual Growth

Assuming a perpetual growth rate is a natural step of any DCF since it still derives value from future cash flow generation. The main assumption here is that the stabilized FCF, achieved at time T, will grow at a constant rate "g". This allows us to calculate the PV of cash generated to infinity. The formula through which the TV (given at time T) can be calculated is the following:

$$TV_T = \frac{FCFE_T * (1 + g)}{r_e - g}$$

By construction, the results obtained will be extremely sensitive to the growth rate chosen. It is, therefore, important to make a few considerations regarding its selection.

A first aspect to note is that "g" cannot be greater than the expected long-term growth rate of the economy. If this were true, we would be assuming that the REIT would eventually surpass the size of the economy, which is clearly not possible. Therefore, we can make the following restriction:

$$g \leq GDP\ growth$$

It is also worth noting that a lower bound does not necessarily exist. It may be assumed that the REIT might even have a negative growth rate. This would imply the discontinuation of the company's operations. In most cases, however, we are not faced with modelling a REIT that will be discontinuing soon. Therefore, we can also make the following restriction:

$$g \geq 0$$

Although anywhere between these two inequalities may be reasonable, it is still too wide of a range to make accurate predictions. Therefore, it is important to analyze what effectively drives the long-term growth rate in the real estate industry. Damodaran argues

that real assets, when compared to financial assets, show strong and positive correlation to inflation[20]. It is indeed a common factor in lease contracts for rents to be corrected for inflation. Even when this is not the case, property managers will be incentivized not to renew leases who's rent are below what is currently being practiced by the market. Real estate, therefore, acts as a natural inflation hedge and the expected long-term growth rate for stable markets should be close to the expected inflation rate (Damodaran, 2012)

Exit Multiples

An alternative method is to use an exit multiple. This is done in a similar way to when valuing REITs using public comparables. As was already discussed, there is a wide range of possible multiples to consider. Once one has been selected, the terminal value will be equal to the last forecasted year's metric (e.g. the LTM FFO if you place yourself at the time of the valuation of the terminal value) multiplied by an LTM multiple (e.g. EqV/FFO).

The LTM multiple used to calculate TV can be assumed to be what is currently being practiced in the industry. It is also possible, however, to correct it for the future growth prospects ("g"). This can be done by using today's LTM multiples for the REIT's peers and plotting it against future growth (e.g. if we are at the end of 2018, we will plot 2018's EqV/FFO vs. FFO CAGR 18-21). If we assume that there is a linear relationship between future growth and multiples, we can trace a straight line between the data points and infer the appropriate multiple to be used given the stable growth rate ("g") (Petra, 2018).

[20] The correlation between inflation and home prices for the period ranging from 1947-1982 was 0.77. The figures for T-Bonds and CREF were -0.17 and 0.35 respectively. (Damodaran, 2012)

Combination of both methods

By making the exit multiple a function of "g", we can compare the results obtained using both methods. If the TV found through the exit multiple approach is different from the one found through the perpetual growth methodology, we can adjust "g" to make the two values converge. The growth rate found can be interpreted as the long-term steady-state growth rate of the set of peers as viewed by the market today (Petra, 2018).

Equity Value / Enterprise Value Bridge

Once we have gone through all the preceding steps, we are now able to calculate the firm's EqV (of operating activities). This is done through the following formula:

$$\text{Equity Value (EqV) of operating activities} = \sum_{t=1}^{t=T} \frac{FCFE_t}{(1+r_e)^t} + \frac{TV_T}{(1+r_e)^T}$$

The EqV derived from the formula above does not capture, however, non-operating assets. To correct for this, we need to add back all non-operating assets. These include unconsolidated entities (i.e. Associate & Investments), Cash & Equivalents and other asset-like items (e.g. Tax Loss Carried Forward). Items that are particularly relevant for REITs include unconsolidated joint ventures, as well as land and properties held for sale. We calculate as follows:

Table 7. Equity Value from DFC analysis

+ Equity Value (EqV) of Operating Activities
+ Associate & Investments
+ Cash & Equivalents
+ Other Asset-Like Items
= Equity Value (EqV)

Now that we have obtained the EqV, we are able to cross the EqV/EV bridge and determine Enterprise Value (EV). EV is defined as the market value of 100% of all controlled subsidiaries' net operating assets, including the parent company. In other words, it is the market value of the Capital Employed (CE), i.e. Fixed Assets (FA) plus Working Capital (WC). To move from EqV to EV we must remove the non-operating assets that were just added and include all other holders that have a claim on a company's capital. These include Creditors, Non-Controlling Interest (NCI), Preferred Shareholders and other debt-like items (e.g. Underfunded Pension Deficits). The EqV/EV bridge can, therefore, be defined as follows (Petra, 2018).

Table 8. Equity Value vs. Enterprise Value bridge

= Equity Value (EqV)
- Associate & Investments
- Cash & Equivalents
- Other Asset-Like Items
+ Financial Debt
+ Non-Controlling Interest (NCI)
+ Preferred Shareholders
+ Other Debt-Like Items
= Enterprise Value (EV)

Dividend Discount Model (DDM)

If we decide to relax the assumption made in the DCF methodology that all cash available to shareholders is distributed as dividends, we are effectively utilizing the Dividend Discount Model (DDM). The DCF, therefore, is a sub-case of the DDM.

In the DDM, we still consider cost of equity as the appropriate discount rate and the financial projections still follow the same rationale. The main divergence, however, is that DDM assumes a dividend payout ratio that is used to calculate the dividends issued each year. For REITs the DDM normally looks at FFO and AFFO payout ratios, rather than FCFE (Breaking Into Wall Street, N.A.). Similar to what was done in the DCF, the TV might be based on a Terminal FFO or AFFO growth rate, or an FFO or AFFO multiple.

Since REITs have very high distribution requirements the results obtained from the DCF methodology and the DDM will be very similar. A practical comparison will be made once we apply the two methodologies for valuing Equity Residential in the next chapter.

Replacement Value

The final valuation method that it is going to be presented is the replacement value methodology. While it is most commonly used to value individual properties, such as offices and hotels, it can also be extended to entire portfolios and, therefore, REITs. This approach is quite different from the others that have already been covered (i.e. public comps, precedent transactions, DCF, etc.) as it doesn't look at very high-level metrics, like FFO, AFFO and FCFE. Instead, it calculates the costs that would be required to replace an entire property, i.e. the cost of buying the land and developing the property from scratch (soft costs, hard costs, FF&E, tenant improvements, the capitalized interest, the origination costs and taxes, the operating deficit, etc.) (Breaking Into Wall Street, N.A.) It is important to note that it cannot be used to value properties under construction, as the methodology only provides the value of the finished building.

To determine the replacement costs, estimates per square meter are obtained by referencing recently constructed comparable properties in the area. Since this is not public

information, it is paramount to have first-hand knowledge and experience or to consult local property developers. Considering that some REITs own hundreds of properties spread across different geographies, this, however, can be very time consuming and challenging. That is why the replacement cost methodology is not very popular for REITs. Even when sufficient information is available, practitioners often give preference to other forms of valuation. The replacement cost is effectively used as a sanity check for other methods.

It is also worth noting that asking prices per square meter for properties usually exceed the replacement costs per square meter. The reason being that the replacement cost does not accurately capture the risks associated with the construction. The finished property should, therefore, have an intrinsically higher value, since it is already rid of this risk. Like a liquidation valuation, replacement cost usually provides a minimum value for an individual property (Breaking Into Wall Street, N.A.).

Two further drawbacks of this methodology can be noticed. Firstly, not all assets are replaceable. A company's organizational capital, for example, can only be valued based on the cash flow it generates. Secondly, the replacement cost of certain assets may very well exceed its economic value. A machine or property, for example, can be generating positive cash flow, but the replacement cost may exceed the value of the business as an ongoing entity (Koller, Goedhart, & Wessels, 2010).

Chapter V.

Case Study: Equity Residential

Now that we have done an overview of the industry and that we have presented the main methodologies for REIT valuation, we will attempt a practical example where the American REIT Equity Residential (NYSE: EQR) will be analyzed. We will first go through a brief overview of the company and its business model, identifying the main aspects to consider in the valuation. Each methodology will then be applied using December 31st, 2018, as the valuation date, giving special attention to describing the main assumptions used. Finally, we will summarize and compare our findings, determining whether we believe Equity Residential to be over or undervalued by the market at the time.

Company Overview

Equity Residential (EQR) is a publicly traded Equity REIT founded in 1969 and listed in New York Stock Exchange. With a total market capitalization of approximately USD 28 Bn as of April 2019, it is the 7th largest Equity REIT in the U.S., the largest Residential REIT in the world and a member of the S&P 500. Its business mainly involves acquiring, developing and managing high-quality, rental apartment properties, located in high-density urban markets and attractive suburban areas of U.S cities.

Currently, it owns or has investments in 310 properties consisting of 80,061 apartment units located mainly in Boston, New York, Washington D.C., Seattle, San Francisco, Southern California and Denver. The company's corporate headquarters is in

Chicago, Illinois, and it has approximately 2,700 employees distributed among different divisions, including: operations, leasing, legal, financial, accounting, acquisition, disposition, development and other support functions.

Business Model & Geographical Location

EQR finances its acquisitions and developments using different sources of capital. These may include retained cash flow, issuance of additional equity, issuance of debt and/or sales of properties and joint venture arrangements. The corporate mission of the company is to provide to its stakeholders value stability, liquidity, predictability and accountability. EQR does this by investing in apartment communities located in strategically targeted markets with the goal of maximizing the risk adjusted total return (operating income plus capital appreciation) on invested capital.

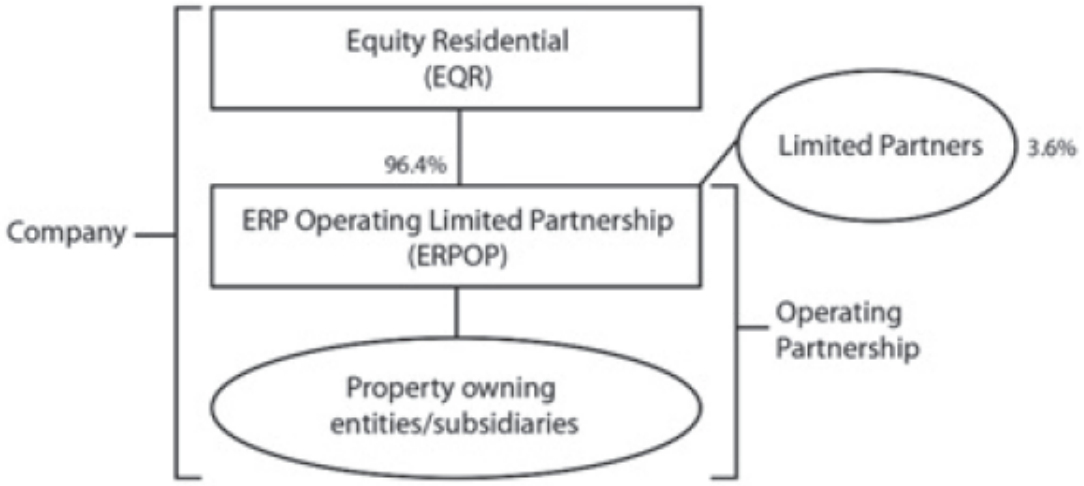
Over recent years, the company has conducted an extensive repositioning of its portfolio into urban and highly accessible, close-in suburban assets. Since 2005, Equity Residential has sold approximately 200,000 apartments located in markets and submarkets in which it believes that it will have less attractive long-term returns for an aggregate sales price of approximately USD 24.6 Bn. It also acquired approximately 71,000 apartment units for a total value of USD 21.2 Bn and began approximately USD 6.3 Bn of development projects primarily located in areas of interest.

Legal Structure

EQR is structured as an UPREIT, as shown in the Figure 10, below. All EQR's property ownership, development and related business operations are conducted through the Operating Partnership with ERP Operating Limited Partnership (ERPOP), of which

EQR owns an approximate interest of 96.4%. Other than its investment in ERPOP, EQR has no material assets.

Figure 10. Equity Residential – Legal Structure



Source: (Equity Residential, 2019)

EQR issues equity on occasion, the net proceeds of which it is obligated to contribute to ERPOP. In addition, EQR does not have any indebtedness, as all debt is incurred by the Operating Partnership. The Operating Partnership holds substantially all the assets of the company, including the company's ownership interests in its joint ventures. The Operating Partnership conducts the operations of the business and is structured as a partnership with no publicly traded equity.

Public Comparables

Peer Selection

In order to find suitable peers for our valuation, we have considered factors ranging from the business type conducted, the geographical presence and financials (i.e. size and income generation). Therefore, the peers selected were all Residential Equity REITs with a multi-family focus and a presence restricted to the U.S. (but also well spread throughout the nation). As Equity Residential is the largest U.S. based Residential Equity REIT, we restricted the selection to companies with over USD 8 Bn in gross real estate operating assets. The selected peers have been, therefore, UDR, AvalonBay Communities, Camden Property Trust and Apartment Investment and Management Co.

As of March 31, 2019, UDR has an ownership position in 49,795 apartments spread across the U.S. (United Dominion Realty, L.P., 2019). AvalonBay Communities (AVB) owns 291 apartment communities, containing 85,313 apartments spread across 12 states and the District of Columbia (AvalonBay Communities, 2019). Similarly, Camden Property Trust (CPT) owns and operates 165 properties, containing 56,271 apartments spread across the U.S. (Camden Property Trust, 2019). Finally, the portfolio of Apartment Investment and Management Co (AIV) currently consists of 134 apartment communities that account for a total of 37,228 apartments (AIMCO Properties, L.P., 2019).

Multiple Selection and Implementation

Two types of multiple have been considered: EqV/FFO and EqV/AFFO. These were selected due to their popularity and relevance in the real estate industry, especially for REITs.

The first step in the implementation was to determine the equity value for each peer based on the diluted share count and the share price at the time of the valuation. Table 9, below, summarizes the main figures for each company:

Table 9. Equity Residential – Public Comparables – Balance Sheet Data Summary

Equity Residential - Public Comparables - Balance Sheet Data Summary (USD in Mn except per share data)	AVB	UDR	CPT	AIV	EQR
Cash & Cash-Equivalents:	91.7	185.2	34.4	36.9	47.4
Investments in Unconsolidated Entities:	217.4	780.9	22.3	-	58.3
Total Assets Excluding Net RE Op. Assets:	2,557.3	1,169.7	588.2	466.5	778.8
Total Debt:	5,906.0	3,547.8	2,321.6	4,075.7	8,817.9
Redeemable Noncontrolling Interests:	3.2	972.7	-	101.3	379.1
Preferred Stock:	-	46.2	-	125.0	37.3
Noncontrolling Interests:	-	17.2	73.7	64.2	226.4
Total Liabilities:	7,744.4	3,816.2	2,781.8	4,325.1	20,394.2
Total Diluted Shares	138.5	305.8	95.6	158.7	386.2
Current Share Price	174.05	39.62	88.05	45.25	66.01
Equity Value:	**24,114.6**	**12,117.4**	**8,418.9**	**7,180.9**	**25,494.4**
Enterprise Value:	**29,711.5**	**14,762.4**	**10,757.6**	**11,409.0**	**34,470.3**

The next step included calculating TTM FFO & AFFO metrics for each peer, as per the definition presented in the last chapter[21]. For forward estimates of these metrics, we have referenced broker reports for the comparable companies, while for Equity Residential we have calculated them directly. Since the definition of AFFO can vary considerably, only forward FFO metrics were obtained from brokers. Table 10, below, provides a summary of the operating statistics considered, while Table 11 summarizes the valuation statistics obtained.

[21] Appendix 2 provides a breakdown of the TTM FFO & AFFO calculation for each peer.

Table 10. Equity Residential – Public Comparables – Operating Statistics

Equity Residential - Public Comparables Operating Statistics (USD in Mn except per share data)			FFO			AFFO	Gross RE Operating
Company Name	EqV	NOI	TTM	2019	2020	TTM	Assets
AvalonBay Communities	24,114.6	1,598.2	1,262.7	1,299.4	1,362.4	1,209.0	19,728.1
UDR, Inc.	12,117.4	732.1	574.1	632.0	660.0	541.5	10,196.2
Camden Property Trust	8,418.9	610.9	463.9	511.0	544.0	408.3	8,034.5
AIMCO	7,180.9	615.4	397.9	368.7	398.7	367.0	8,308.6
Minimum	7,180.9	610.9	397.9	368.7	398.7	367.0	8,034.5
25th Percentile	8,109.4	614.3	447.4	475.4	507.7	398.0	8,240.1
Median	**10,268.2**	**673.7**	**519.0**	**571.5**	**602.0**	**474.9**	**9,252.4**
75th Percentile	15,116.7	948.6	746.3	798.9	835.6	708.3	12,579.2
Maximum	24,114.6	1,598.2	1,262.7	1,299.4	1,362.4	1,209.0	19,728.1
Equity Residential	25,494.4	1,791.3	1,204.9	1,308.6	1,364.3	1,101.4	26,311.7

Table 11. Equity Residential – Public Comparables – Valuation Statistics

Equity Residential - Public Comparables Valuation Statistics (USD in Mn except per share data)			EqV / FFO			EqV / AFFO
Company Name	EqV	NOI	TTM	2019	2020	TTM
AvalonBay Communities	24,114.6	1,598.2	19.1 x	18.6 x	17.7 x	19.9 x
UDR, Inc.	12,117.4	732.1	21.1 x	19.2 x	18.4 x	22.4 x
Camden Property Trust	8,418.9	610.9	18.1 x	16.5 x	15.5 x	20.6 x
AIMCO	7,180.9	615.4	18.0 x	19.5 x	18.0 x	19.6 x
Minimum	7,180.9	610.9	18.0 x	16.5 x	15.5 x	19.6 x
25th Percentile	8,109.4	614.3	18.1 x	18.0 x	17.1 x	19.9 x
Median	**10,268.2**	**673.7**	**18.6 x**	**18.9 x**	**17.9 x**	**20.3 x**
75th Percentile	15,116.7	948.6	19.6 x	19.2 x	18.1 x	21.1 x
Maximum	24,114.6	1,598.2	21.1 x	19.5 x	18.4 x	22.4 x
Equity Residential	25,494.4	1,791.3	21.2 x	19.5 x	18.7 x	23.1 x

Precedent Transactions

Precedent Transaction Selection

Finding closely comparable transactions proved highly difficult. Ideally, we would have selected transactions that happened late in 2018 and involved similarly sized, U.S.

based, Residential Equity REITs. The REIT segment, however, is highly consolidated, limiting the number of transactions available. We, therefore, had to broaden our search criteria substantially. The transactions selected were all from 2018 and involved U.S. Equity REITs of varying sizes and sectors.

Of the transactions selected, two involved Diversified REITs. These were the acquisition of Gramercy Property Trust (GPT) by The Blackstone Group and the acquisition of Forest City Realty Trust (FCE) by Brookfield Asset Management. Another transaction considered was the acquisition of GGP, a Retail REIT, also by Brookfield Asset Management. Finally, we also included the acquisition of Education Realty Trust, a REIT specialized in Student Housing, by Greystar Real Estate Partners. All these transactions involved an implied total equity value of over USD 3 Bn.

Multiple Selection and Implementation

The same multiples and procedures adopted for the Public Comparables methodology were replicated here. In this case, however, we have restricted our valuation to the use of TTM metrics, as there was limited coverage of the target companies by brokers. Tables 12 and 13, below, summarize the data gathered and the results obtained[22].

[22] Appendix 2 provides a breakdown of the TTM FFO & AFFO calculation for each peer.

Table 12. Equity Residential – Precedent Transactions – Balance Sheet Data Summary

Equity Residential - Precedent Transactions - Balance Sheet Data Summary (USD in Mn except per share data)	GGP	FCE	GPT	EDR	EQR
Cash & Cash-Equivalents:	164.6	204.3	30.2	24.8	47.4
Investments in Equity Companies:	3,377.1	550.4	0.4	-	58.3
Total Assets Excluding Gross RE Op. Assets:	5,566.8	2,392.8	901.4	590.9	778.8
Total Debt:	12,832.5	3,332.0	2,865.6	933.5	8,817.9
Redeemable Noncontrolling Interests:	248.1	-	0.2	52.8	379.1
Preferred Stock:	242.0	-	84.4	-	37.3
Noncontrolling Interests:	104.7	416.3	113.5	1.2	226.4
Total Liabilities:	14,201.4	4,218.6	3,203.7	1,116.4	20,394.2
Total Diluted Shares	965.0	268.5	166.3	76.3	386.2
Offer Price Per Share	23.5	25.35	27.5	41.5	66.01
Equity Value:	**22,678.5**	**6,807.2**	**4,573.3**	**3,166.4**	**25,494.4**
Enterprise Value:	**32,316.0**	**9,800.9**	**7,606.2**	**4,076.4**	**34,470.3**

Table 13. Equity Residential – Precedent Transactions – Summary

Equity Residential - Precedent Transactions - Summary (USD in Mn except per share data)			Transaction Value		Operating Metrics			Multiples Equity Value /	
Acquirer Name	Target Name	Date	EqV	EV	NOI	FFO	AFFO	FFO	AFFO
Brookfield Asset Management	GGP, Inc	26-03-18	22,678.5	32,316.0	2,349.5	1,530.6	1,181.2	14.8 x	19.2 x
Brookfield Asset Management	Forest City Realty Trust	31-07-18	6,807.2	9,800.9	621.8	422.1	355.9	16.1 x	19.1 x
Blackstone Group	Gramercy Property Trust	07-05-18	4,573.3	7,606.2	374.0	300.4	226.1	15.2 x	20.2 x
Greystar Real Estate Partners	Education Realty Trust	25-06-18	3,166.4	4,076.4	185.4	142.8	132.2	22.2 x	23.9 x
	Minimum		3,166.4	4,076.4	185.4	142.8	132.2	14.8 x	19.1 x
	25th Percentile		4,221.6	6,723.7	326.8	261.0	202.6	15.1 x	19.2 x
	Median		**5,690.2**	**8,703.5**	**497.9**	**361.3**	**291.0**	**15.7 x**	**19.7 x**
	75th Percentile		10,775.0	15,429.7	1,053.7	699.2	562.2	17.6 x	21.2 x
	Maximum		22,678.5	32,316.0	2,349.5	1,530.6	1,181.2	22.2 x	23.9 x

Net Asset Value (NAV)

Operating Real Estate Assets

The first step in applying the NAV methodology was to derive a blended cap rate for Equity Residential's real estate portfolio. In their filings, EQR split their operating real estate assets into specific markets determined by their geographical location. By looking

at market reports that focus on residential buildings for each region, we were able to obtain an estimate for that location's going cap rates. Two segments, however, are not broken down by geography. These are the ones classified as Other Markets and Non-Same Store. For those we estimated a higher cap rate (i.e. a lower valuation) because they are not core or not yet stabilized.

EQR also provides us with the breakdown of the NOI for each segment. By performing a weighted average based on NOI, we could infer the blended capitalization rate for the entire portfolio as being 5.0%. This is shown in the table below:

Table 14. Equity Residential – Blended Cap Rate Calculation

Equity Residential - Blended Cap Rate Calculation (USD in Mn)			
Region	NOI	Cap Rate	Asset Value
Los Angeles	297.2	5.0%	5,944.3
San Francisco	337.1	5.0%	6,741.7
Washington D.C.	300.1	6.0%	5,002.0
New York	277.3	4.0%	6,933.2
Boston	165.7	5.0%	3,314.6
Seattle	141.3	4.5%	3,140.3
Orange County	69.6	4.5%	1,546.2
San Diego	67.9	5.0%	1,359.0
Other Markets	1.3	7.0%	18.3
Non-Same Store	132.9	7.0%	1,899.0
Portfolio total	**1,790.5**	**5.0%**	**35,898.6**

The market value of EQR's operating real estate assets is, therefore, around USD 35.9 Bn. Equity Residential also derives a part of revenue from Management Fees. This revenue is usually attributable to management contracts of relatively short lengths and that are easily cancelable. Therefore, we assume a cap rate of 20% to capitalize this income.

Other Assets

In addition to the income generating assets, we also should include the value of the non-operating assets. For the constructions in progress and land held for development, we considered their book value at 110% and 105%, respectively. This increase is supposed to capture the added value that is expected to be generated once these assets become operational. All other assets, including cash and unconsolidated joint ventures, are added at 100%. In addition, we decided to follow the procedure adopted by Barclays of including a benefit attributable to the portion of EQR's debt that is tax-exempt (i.e. a subsidy benefit of 1.5% is applied and then capitalized at 8.5%).

With these considerations, we calculated the total market value of EQR's assets as being USD 36.8 bn[23].

Liabilities and Other Claims on Capital

To estimate the value of liabilities and other claims on capital, we first determined EQR's current cost of debt. This was obtained from the latest loan issued by EQR, which was at an annual rate of 4.2%, slightly higher than the weighted average rate of their existing debt (4.1%). Because a detailed debt schedule was not provided in their filings, to calculate the market value of debt we assumed a zero-coupon bond with maturity at the weighted average maturity and calculated the present value by discounting at their current cost of debt. We then included other liabilities and other claims on capital at 100% of their book value. This resulted in a total value of around USD 9.7 bn[24].

[23] For a detailed presentation of the calculation, please refer to Appendix 2.
[24] For a detailed presentation of the calculation, please refer to Appendix 2.

NAV and NAV per share

Finally, we are able to calculate Equity Residential's Net Asset Value, as presented in the table below:

Table 15. Equity Residential – Net Asset Value Calculation – NAV

Equity Residential - Net Asset Value Calculation - NAV	
(USD in Mn except per share data)	
Plus: Value of Assets	36,783.7
Less: Value of Liabilities & Other Claims on Capital	(9,652.5)
Net Asset Value:	**27,131.2**
Share Count:	
Basic Shares Outstanding:	368.1
Options Dilution	1.8
OP Units Outstanding	13.9
Restricted Shares	0.3
Restricted Units	1.1
Diluted Shares Outstanding:	385.2
NAV Per Share:	70.43
Current Stock Price:	66.01
Premium / (Discount) to NAV Per Share:	(6.3%)

A sensitivity analysis varying the blended cap rate provides the following implied share prices in USD:

Table 16. Equity Residential – Net Asset Value Sensitivity

Equity Residential - Net Asset Value Sensitivity									
Baseline	**Assumed Blended Cap Rate:**								
NAV:	4.0%	4.2%	4.5%	4.7%	**5.0%**	5.2%	5.5%	5.7%	6.0%
70.43	93.48	86.70	80.67	75.28	**70.43**	66.04	62.05	58.41	55.08

Discounted Cash Flow (DCF)

Financial Projections

The first step in the DCF methodology is to make financial projections. For Equity Residential, we decided to forecast figures until 2023. To do so, we first had to split its real estate assets into different segments, as explained in chapter IV. These segments were namely Same Store, Properties Under Development, Acquisitions & Dispositions, and Non-Same Store.

Same Store

For the Same Store properties, we assumed a rental growth and Capex growth that ranged from 3.0% in 2019 to 2.0% in 2023. This was taken to reflect the US estimates for inflation over this period. Furthermore, we assumed a constant NOI margin derived from the historical average for that segment.

Properties Under Development

For the properties Under Development, we took 2018's development spending and assumed a constant increase in spending of 2%, to maintain the relative importance of development activities when compared to the other segments. We then assumed an average construction time of 2 years to be able to reclassify these assets under development as Non-Same Store.

Acquisitions & Dispositions

To determine the level of spending in acquisition, we took the average of the three preceding years. We also used the average acquisition cap rate to infer the NOI generation.

The split between Revenue and Operating Expenses was done by assuming an NOI margin of 70%, similar to the one found in Same Stores properties.

For dispositions we had to take the average asset sale net proceeds of the last two years, instead of three. This was because EQR sold over USD 5 Bn worth in assets in 2016 as part of their repositioning strategy. Since then they have not sold more than USD 1 Bn each year. To determine the book value of dispositions we assumed a constant percentage in the gain on net proceeds which was equal to the average of the last two years. It is important to note that EQR's filings do not provide us enough information on the level of depreciation of assets disposed. Therefore, we did not correct the accumulated depreciation for asset sales. Although net asset values and net income will, therefore, be underestimated, this, however, will not impact cash flow metrics, which are the basis for the DCF valuation.

Non-Same Store

To infer the gross asset value of non-same stores, we assumed the same Capex growth as done with Same Stores properties, we also included the assets reclassified from Properties Under Development and subtracted the assets disposed. The NOI was then determined by utilizing the average implied trailing cap rate for the three preceding years. The split between Revenue and Operating Expenses was determined by assuming a constant NOI margin equal to the average of the three preceding years.

Depreciation & Amortization

Once the gross asset values for all segments had been forecasted, we projected D&A by first allocating them, based on historical proportions, to each of the following categories: Building & Improvements, FF&E and Lease Intangibles. We then took an

estimate of the useful life for each from EQR's filings and applied it to last year's gross asset values. Although this is an oversimplification, it is a non-cash charge that will not impact significantly the results.

Other Assets & Liabilities

After projecting gross and net real estate asset values, and their respective income generation, we now had to forecast the other non-real estate assets and liabilities, including debt. To project debt we built a debt schedule that would maintain the total level of debt constant. As for the other items, these were either held constant or taken as a fixed percentage of a driving factor (e.g. Distributions Payable as a percentage of Total Distributions). For a more comprehensive overview of the projections, please refer to the Balance Sheet, Income Statement and Cash Flow Statement present in the Appendix 2. A summary of the FCFE generation (and their present value) is also provided in the Appendix 2.

Cost of Equity

The cost of equity was calculated by applying the CAPM. The following parameters were utilized: the risk free rate was taken as the daily 20-year US treasury rate, the market risk premium was assumed to be 4.50% (Implied Risk Premia - USA, 2019), and the Beta was taken as 0.78[25] from the data provider Thomson ONE. This resulted in a cost of equity equal to 6.34%. While we have used this cost of equity as the discount rate for the DCF

[25] The Beta is defined as the slope coefficient for the regression line formed by using the return on a security as the dependent variable and the return on the S&P 500 issues as the independent variable. The natural logarithm of the daily price ratio is used as an approximation of the return. Time period is 1300 weekdays (approximately 5 years of daily data).

and DDM analysis, this number can be considered rather low, particularly since the real estate industry is regarded as being highly cyclical. It reflects, however, the low Beta that can be attributable to the REIT industry today. While at the time of the global financial crisis of 2008 the industry Beta was considerably higher, at around 1.1 – 1.4 range, this number has greatly decrease since then. It can be argued, however, that the underlying risk associated with REITs in term of their business and leverage has not changed enough to support this decrease.

Terminal Value

For the Terminal Value calculation, we utilized the Perpetual Growth method. The terminal growth rate chosen was 1.5%, this was derived from the DDM model calculation, where we used a combination of the Perpetual Growth method and Exit Multiples to infer the long-term steady-state growth rate of the set of peers as viewed by the market today, as per the method described in Chapter IV. This will be further explained when we cover the DDM analysis in the following section of this chapter.

Equity Value

Following the methodology presented in Chapter IV, we derived the Equity Value as shown in the table below[26]:

[26] For a comprehensive overview of each year's FCFE, please refer to the Appendix 2.

Table 17. Equity Residential – DCF Assumptions & Share Price Calculations

DCF Assumptions & Share Price Calculations			
Discount Rate:			6.3%
Baseline Terminal Growth Rate:			1.5%
Terminal Value:			26,042.3
Present Value of Terminal Value:			19,749.0
Sum of PV of FCFE:			5,276.0
Sum of Non-RE Operating Assets/(Liabilities)			(130.9)
Implied Equity Value:			**24,894.1**
Diluted Shares Outstanding:			369.4
Implied Share Price:			**67.39**
Type:	**Number:**	**Exercise Price:**	**Dilution:**
Options	7.1	52.35	1.6
OP Units Outstanding	13.9		13.9
Restricted Shares	0.3		0.3
Restricted Units	1.1		1.1

A sensitivity analysis, varying both the discount rate and the terminal growth rate provides the following implied share prices in USD:

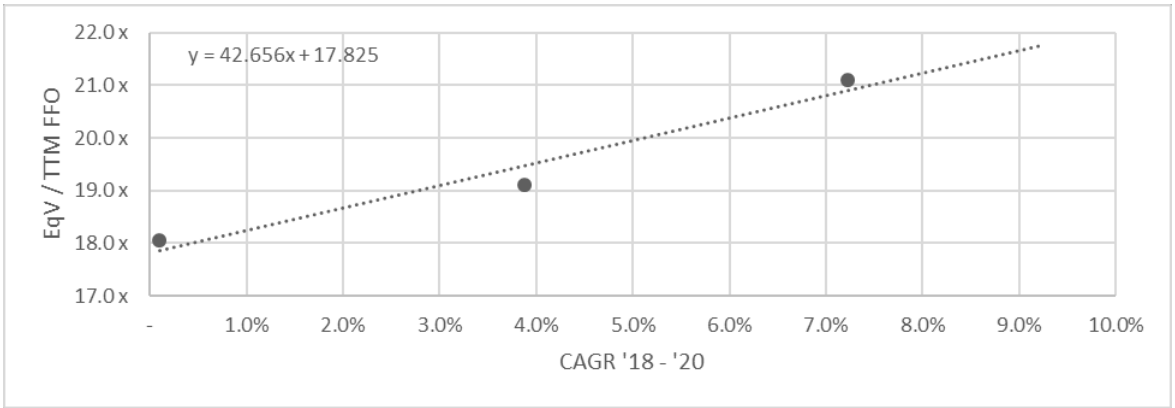
Table 18. Equity Residential – DCF Analysis Sensitivity

Equity Residential - Discounted Cash Flow Analysis - Sensitivity								
		Discount Rate						
		5.6%	5.8%	6.1%	**6.3%**	6.6%	6.8%	7.1%
Terminal FCFE Growth Rate	2.3%	94.92	88.38	82.70	**77.72**	73.31	69.39	65.87
	2.0%	89.08	83.35	78.32	**73.88**	69.92	66.37	63.17
	1.8%	84.00	78.93	74.45	**70.46**	66.88	63.65	60.73
	1.5%	**79.54**	**75.02**	**71.00**	**67.39**	**64.14**	**61.19**	**58.51**
	1.3%	75.61	71.55	67.91	**64.63**	61.65	58.95	56.48
	1.0%	72.10	68.43	65.12	**62.12**	59.39	56.90	54.61

Dividend Discount Model (DDM)

In our DDM analysis we specified an FFO payout ratio of 80%, consistent with what can be observed within the industry[27]. We also considered EqV/FFO multiples when determining the Terminal Value, as well as utilizing the Perpetual Growth method. To determine the appropriate exit multiple, we regressed the FFO CAGR 18'-20' of the Public Comparables peer-set against their currently trading EqV/TTM FFO multiples. We obtained the following result:

Figure 11. Equity Residential – Peers Growth Rate vs. Trading Multiples



By making the exit multiple a function of the terminal growth rate, the result for both methodologies converged when "g" was equal to 1.5% and EqV/TTM FFO was 18.5x.

As expected, the results were very similar to the ones obtained using the DCF methodology. A sensitivity analysis, varying both the discount rate and the terminal growth rate provides the following implied share prices in USD:

[27] For a comprehensive overview of each year's dividend, please refer to the Appendix 2.

Table 19. Equity Residential – DDM Analysis Sensitivity

Equity Residential - Net Present Value Sensitivity - Terminal FFO Growth Rates								
		Discount Rate						
		5.6%	5.8%	6.1%	6.3%	6.6%	6.8%	7.1%
Terminal FFO Growth Rate	2.3%	93.12	86.71	81.15	**76.27**	71.95	68.11	64.66
	2.0%	87.39	81.78	76.85	**72.50**	68.63	65.15	62.02
	1.8%	82.41	77.45	73.06	**69.15**	65.65	62.49	59.63
	1.5%	**78.05**	**73.62**	**69.68**	**66.14**	**62.96**	**60.07**	**57.45**
	1.3%	74.19	70.21	66.65	**63.44**	60.53	57.88	55.46
	1.0%	70.75	67.16	63.92	**60.98**	58.31	55.87	53.63

Replacement Value

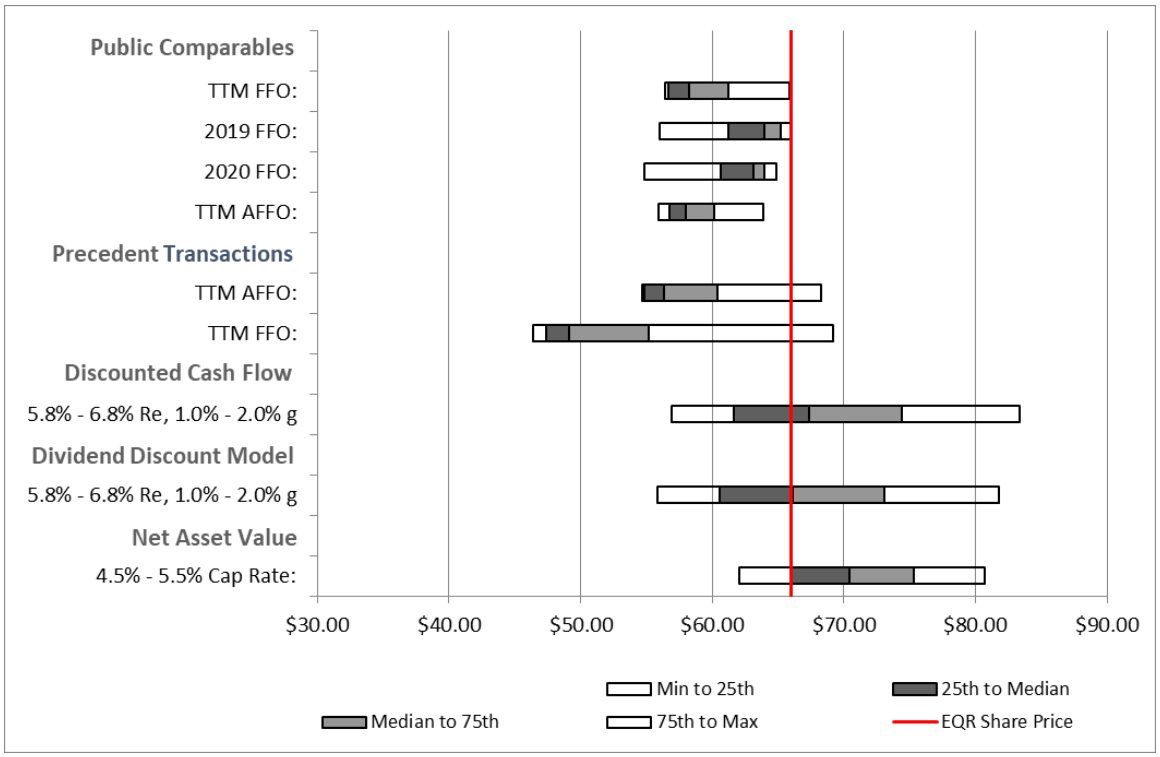
In Chapter IV, we presented the replacement value as one of the possible tools to value a REIT. As was discussed, however, it is a methodology that is much more applicable to individual properties than to entire portfolios. It is also highly dependent on the availability of information in the REITs filings. For Equity Residential, in particular, we were faced with the impossibility of applying such valuation tool.

Although EQR does provide a comprehensive list of each property, its location and the acquisition costs, it does not divulge each community's total gross area. This information is not even provided for the aggregate of all properties. Since we do not possess the size of each property, or the aggregate size of the properties in the portfolio, it is not possible to accurately infer a replacement cost for them.

Summary and Comparison

To summarize and compare the results obtained from each methodology, we have constructed the football field chart presented below.

Figure 12. Equity Residential – Valuation Results



Football field chart comparing the valuation results and EQR's share price at the time of the valuation.

As can be seen, the results all fall somewhere within the USD 50-80 range. The first set of results were obtained using the Public Comparables valuation methodology. The TTM figures for both FFO and AFFO multiples point towards an implied share price with a median below USD 60. Forward FFO figures, on the other hand, possess a slightly higher median, pointing towards a higher expected growth rate of some of the peers relative to others. Nonetheless, EQR's share price at the time of the valuation shows that EQR is currently trading at a higher multiple than all its peers. This means that markets believe EQR has a higher potential of showing above average growth. This might be a reflection

of higher quality assets, better positioning, superior management, easier access to cheaper financing due to the quality and size of its balance sheet, or a combination of all four.

The next set of results come from the Precedent Transactions valuation methodology. Here we can clearly see how the poor comparability of the transactions utilized will directly impact the results obtained. Not only are the results highly dispersed, but they also suggest a lower valuation than the one obtained using Public Comparables. This should not be the case, as this methodology should reflect a change of control premium. There are two main explanations for this. The first one, as already mentioned, is the lack of comparability of the transactions used. Out of the 4 transactions considered, two were Diversified REITs, one was a Retail REIT and the last one was a REIT specialized in student housing. This last one could potential be the most comparable, as student housing is a form of residence. In fact, if the individual multiples are analyzed, this transaction was the one that presented the highest multiples (22.2x FFO and 23.9x AFFO). Both are at a higher multiple than EQR was trading at the time of the valuation and could be a better reflection of the CoC premium that could be associated with an acquisition.

The second potential reason for such low results is the delay between the date of the transactions and the date of the valuation. All transactions occurred around mid-2018, while the valuation date was at the end of 2018. During that time, macroeconomic conditions shifted. While at the beginning of 2018 EQR's share price fell as low as USD 53, it greatly increased by the end of the year. Similar price movements were seen throughout the REIT industry and undoubtedly contributed to the low implied prices obtained in the valuation.

The third and fourth set of results were obtained using the Discounted Cash Flow methodology and the Dividend Discount Model respectively. As was expected, both presented very similar numbers. The base case of the DDM, in particular, resulted in an implied share price that was almost equal to the share price at the time of the valuation. We can see from the dispersion derived from the sensitivity analysis, however, that both methodologies are highly unstable. Results ranged from the high USD 50s to around USD 80. This is an inherent drawback of these methods and the only way to mitigate it is to have very sound assumptions.

The last set of results were obtained using the NAV methodology, the most widely used valuation tool for REITs and arguably the most accurate. Although the results were also considerably dispersed, varying almost USD 20 by changing the blended cap rate by only 1%, they were less so than the ones obtained in the DCF and DDM analysis. Furthermore, the base case of the NAV presented us with an implied share price of USD 70.43. Since the share price at the time of the valuation was USD 66.01, this represents a 6.3% discount to NAV per share.

If we were to take the median implied share price of the Public Comparables and Precedent Transactions methodologies as being true, we would claim that EQR was overvalued at the time of the valuation. If we were to take the median implied share prices of the DCF and DDM analysis, on the other hand, we would claim that EQR was fairly valued by the market. Finally, if we were to take the median implied share price of the NAV methodology as being true, we would claim that EQR was undervalued at the time. To determine which one is correct is not an easy task. In hindsight, however, we can see that EQR's share price did increase since the time of valuation and currently stands at USD

78.26 as of June 2019. This would suggest a movement that is in line with what was shown by Gentry et al, i.e. that NAV changes tend to supersede REIT prices movements. While it is convenient for us to make this assertion, given the results we obtained, it nonetheless supports the notion that the NAV methodology has great value when it comes to the pricing of Real Estate Investment Trusts.

Chapter VI.

Conclusion

While it is undeniable that any well diversified portfolio should inherently have an exposure to real estate, it is also true that there are several considerations an investor must contemplate before allocating their capital.

Firstly, investors should understand and be able to evaluate the different factors affecting real estate prices. As we have covered in detail, real estate valuations are driven by a variety of macroeconomic factors. Perhaps the most prominent of which is the relationship between cap rates and long-term real interest rates. An investor wishing to allocate their capital in real estate should, therefore, be aware that it is an investment with a very strong bond-like characteristic. In addition, investors must also contemplate the regionality of property prices, particularly with respects to changing demographics and shifting government policies.

The second consideration necessary is the selection of an appropriate investment vehicle. REITs, due to their minimal investment requirement and highly liquid nature, arguably provide the most democratic method of investment in real estate available today. Investors also benefit from a well-diversified and professionally managed portfolio. While the ownership requirements of REITs are evidence that they were original created for retail investors, this has since changed. Both retail and institutional investors alike have much to gain from allocating their capital in REITs. On top of the aforementioned reasons, they

also provide a tax efficient structure with limited liability, something that before was not easily accessible.

While the average investor might see REITs as being ideal for their specific needs, this may not be true for everyone. Investors with expert resources and know-how might find that direct real estate ownership provides them the flexibility they need to generate exceptional returns. The selection of the appropriate investment vehicle is, therefore, a private one. It will depend on the investor's personal objectives, knowledge, and resources. We believe, however, that REITs provide the most suitable investment vehicle for the majority of investors.

Finally, as a matter of determining the best candidate for investment, it is paramount to understand and apply the most widely used valuation methodologies. These should be tailored to incorporate the intricacies of REITs as opposed to common corporates. From both a theoretical and a practical perspective, we have presented how this should be addressed. We have also shown that each methodology possesses their own merits and drawbacks.

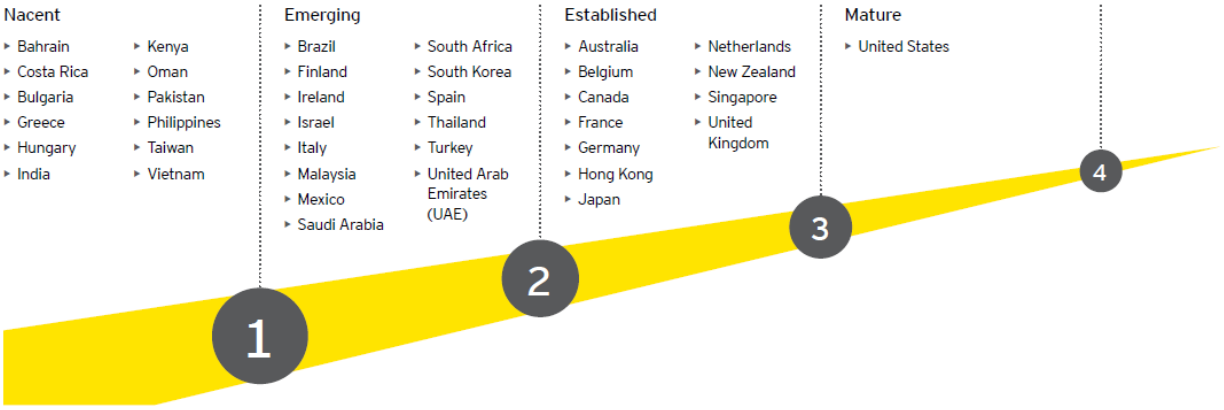
Relative valuation methodologies, such as the use of Public Comparables and Precedent Transaction, for example, might seem simple and objective at first, but the difficulties in finding suitable peers can greatly complicate matters. We have seen from the valuation of Equity Residential that the lack of comparable transactions significantly impacted the reliability of the results obtained. Nevertheless, Precedent Transactions is still arguably the only valuation methodology that can capture how the market is pricing a premium for change of control.

With regards to the intrinsic valuation methodologies presented, we have demonstrated that the Replacement Value method, although useful to set a minimum value for a REITs portfolio, might not always be doable, given the limitation of certain REITs filings. In addition, while the DCF analysis can be claimed to provide the most fundamentally sound tool, we have demonstrated that the results are highly unstable. The NAV method, on the other hand, provides a much less complicated approach, although results are also very sensitive to the blended cap rate utilized. Nevertheless, changes in NAV per share can even be said to anticipate future share price movements (Gentry, Jones, & Mayer, 2004). It is no surprise, therefore, that the NAV method is currently the most widely used by practitioners. The assertion that it can have predictive powers, however, is a strong one, and one that we believe should be grounds for further research.

Appendix 1.

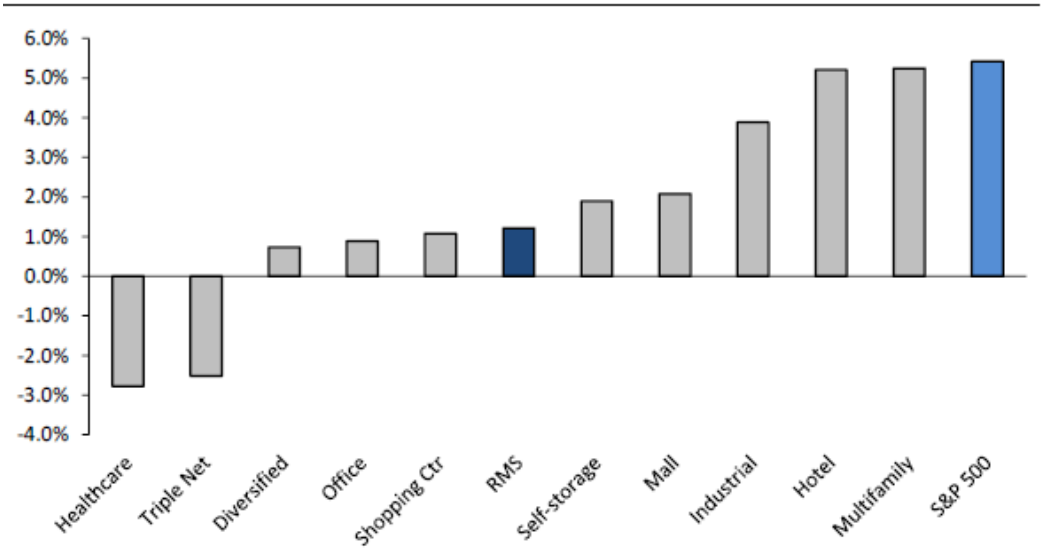
Industry Overview Supporting Figures & Tables

Appendix Figure 1. Stages of REIT regime maturity



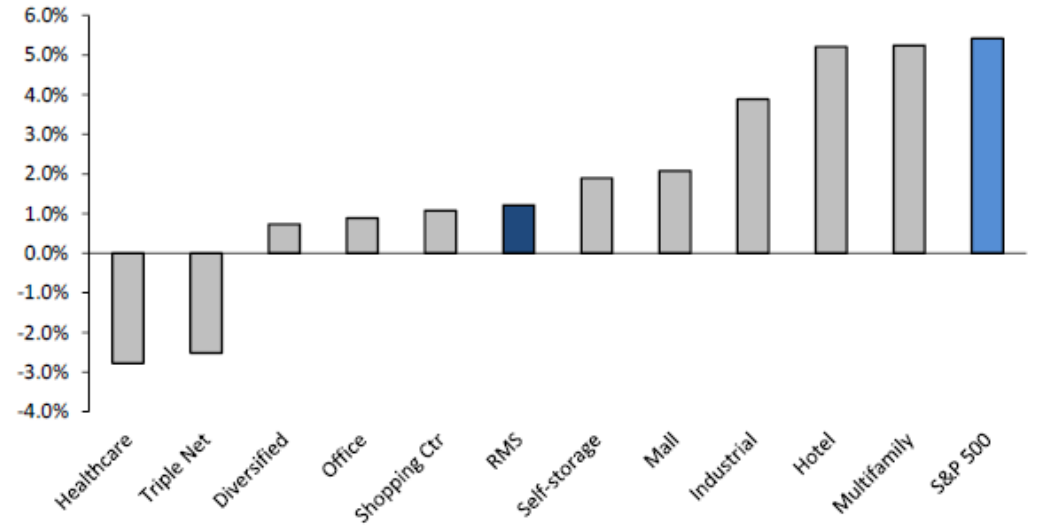
Source: EY (2018)

Appendix Figure 2. REITs performance in the first three months after rising rates



Source: RBC (2016)

Appendix Figure 3. REITs performance in the first 12 months after rising rates



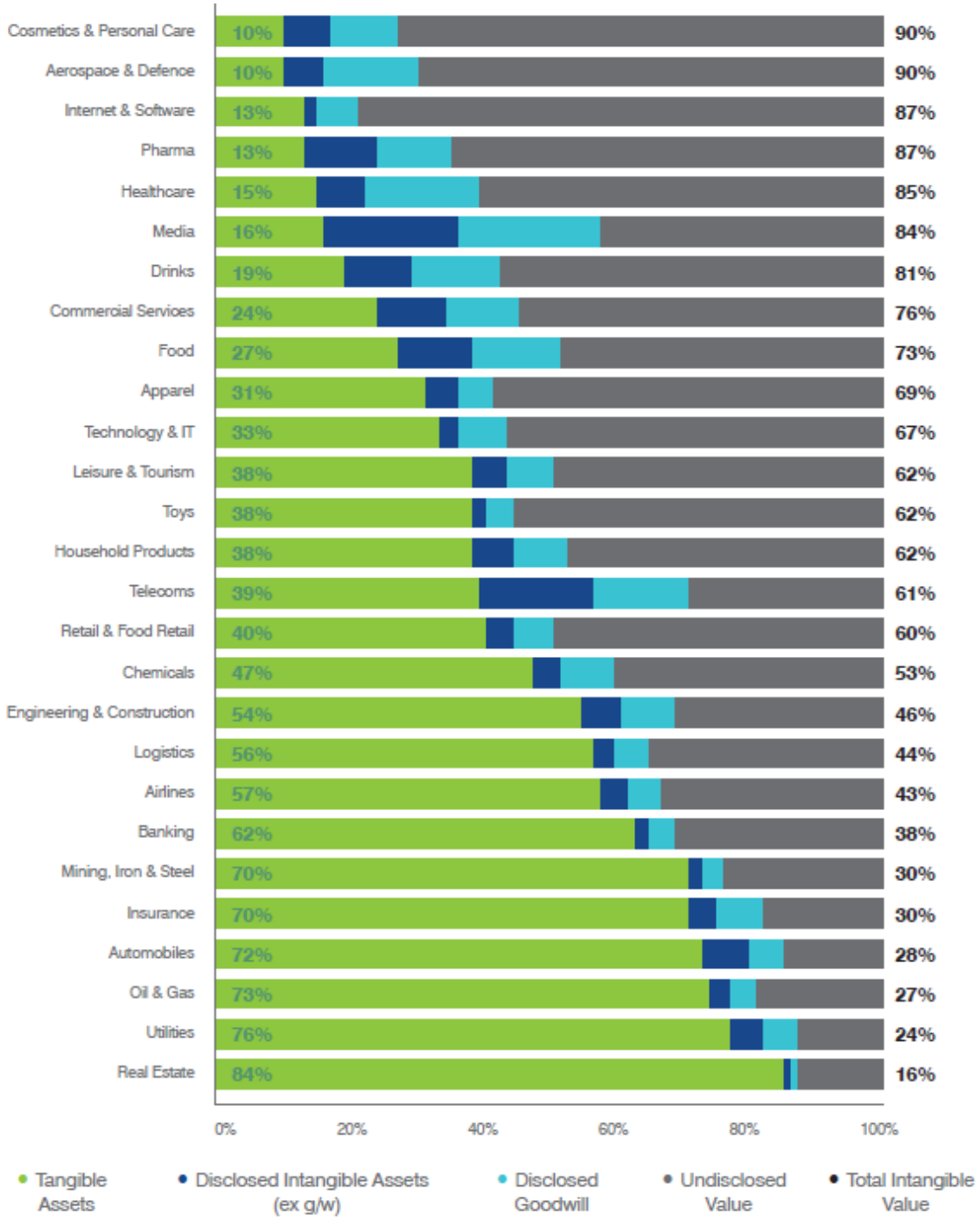
Source: RBC (2016)

Appendix Figure 4. REIT Legal Structures: UPREIT vs. Down-REIT

Item	UPREIT	Down-REIT
Rate of Return to Contributing Owner	Identical in amount to those received by REIT shareholders	First priority return equal to the return of the former owner at the time of contribution or a return that mimics REIT shareholder return
Diversification	Diverse larger pool of assets to generate cash flow	Single asset or non-diverse smaller pool of assets
Put Option	Units exchanged on a one for one basis with REIT shares	Negotiated exchange ratios
Sale of Contributed Property	Triggers taxable gain with more cash to other UPREIT partners but contributing owner will have remaining investment	Triggers taxable gain with more cash going to contributing owner but no remaining investment
Tax Differences	Disguised sale rules are not likely to apply Anti-abuse rules specifically sanction UPREITs	Disguised sale rules may apply Anti-abuse rules may apply

Source: RBC (2016)

Appendix Figure 5. Most Intangible Sectors - Relative Breakdown (%)



Source: GIFT (2018)

Appendix 2.

Equity Residential Valuation Outputs

Public Comparables

Appendix Table 1. Equity Residential – Public Comparables – TTM FFO & AFFO Calculation

Equity Residential - Public Comparables - TTM FFO & AFFO Calculation (USD in Mn)	AVB	UDR	CPT	AIV	EQR
Net Income to Common and Units	**974.5**	**199.2**	**156.1**	**656.6**	**679.4**
Adjustments for NCI	44.0	18.4	4.5	14.1	-
Real Estate Depreciation & Amortization	629.8	490.9	294.3	369.0	781.9
Net (Gain) / Loss on Sale of Unconsolidated Entities	(10.7)	-	9.0	-	-
Net (Gain) / Loss on Sale of Real Estate	(375.0)	(136.2)	-	(642.1)	(256.8)
Other / Misc. Adjustments	-	1.8	-	0.4	0.4
FFO to Common and Units	**1,262.7**	**574.1**	**463.9**	**397.9**	**1,204.9**
Maintenance CapEx	(83.6)	(46.9)	(72.3)	(48.5)	(188.5)
Stock-Based Compensation	-	-	16.7	8.6	27.1
Total Amortization	29.9	14.2	-	9.0	56.9
(Gain) / Loss on Sale of Land	-	-	-	-	1.0
AFFO to Common and Units	**1,209.0**	**541.5**	**408.3**	**367.0**	**1,101.4**

Precedent Transactions

Appendix Table 2. Equity Residential – Precedent Transactions – TTM FFO & AFFO Calculations

Equity Residential - Precedent Transactions - TTM FFO & AFFO Calculation (USD in Mn)	GGP	FCE	GPT	EDR	EQR
Net Income to Common and Units	**641.4**	**206.0**	**79.0**	**47.4**	**679.4**
Adjustments for NCI	(4.0)	-	0.8	(0.3)	-
Real Estate Depreciation & Amortization	974.4	310.6	263.7	96.3	781.9
Net (Gain) / Loss on Sale of Unconsolidated Entities	-	5.6	(33.4)	-	-
Net (Gain) / Loss on Sale of Real Estate	(81.3)	(155.0)	(46.8)	(0.7)	(256.8)
Other / Misc. Adjustments	-	54.9	37.1	-	0.4
FFO to Common and Units	**1,530.6**	**422.1**	**300.4**	**142.8**	**1,204.9**
Maintenance CapEx	(356.9)	(92.4)	(83.7)	(15.9)	(188.5)
Stock-Based Compensation	-	18.7	8.1	3.8	27.1
Total Amortization	7.5	7.5	1.4	1.6	56.9
(Gain) / Loss on Sale of Land	-	-	-	0.1	1.0
AFFO to Common and Units	**1,181.2**	**355.9**	**226.1**	**132.2**	**1,101.4**

Net Asset Value

Appendix Table 3. Equity Residential – Net Asset Value Calculation - Assets

Equity Residential - Net Asset Value Calculation - Assets	
(USD in Mn except per share data)	
December 31st 2018,	
Capitalized Income:	
Forward Property Net Operating Income:	1,790.5
Assumed Blended Cap Rate:	5.0%
Forward Management Fees NOI:	0.8
Assumed Cap Rate:	20.0%
Value of Capitalized Income:	**35,902.4**
Plus Market Value of Other Real Estate Assets:	
Construction in Progress, Including Land:	109.4
Adjustment for NPV of Construction:	110.0%
Market Value of Construction in Progress:	120.3
Land Held for Development:	89.9
Adjustment for NPV of Land:	105.0%
Market Value of Development Land:	94.4
Plus Non-Real Estate Assets:	
Cash and cash equivalents	47.4
Restricted deposits	68.9
Other Assets	404.8
Investments in Equity Interests:	58.3
Adjustment for Eq. Int. Capitalized Inc.:	100.0%
Market Value of Equity Interests:	58.3
Total Tax-Exempt Bonds:	493.7
Tax-Exempt Debt Subsidy %:	1.5%
Cap Rate:	8.5%
Benefit of Tax-Exempt Debt:	87.1
Market Value of Assets:	**36,783.7**

Appendix Table 4. Equity Residential – Net Asset Value Calculation - Liabilities

Equity Residential - Net Asset Value Calculation - Liabilities	
(USD in Mn except per share data)	
Less Total Liabilities (excl. debt):	
Accounts Payable and Accrued Expenses	102.5
Accrued interest payable	62.6
Other Liabilities	358.6
Security deposits	67.3
Distributions payable	206.6
Total Liabilities:	**797.5**
Less Market Value of Debt:	
Book Value of Total Debt	8,817.9
Weighted Average Maturity (years)	8.60
Weighted Average Rate	4.1%
Current Cost of Debt	4.2%
Estimated Market Value of Debt	**8,815.4**
Less Claims on Capital:	
Noncontrolling Interests (excl. OP Units):	2.3
Preferred Stock:	37.3
Total Claims on Capital:	**39.6**
Total Liabilities and Other Claims on Capital:	**9,652.5**

Discounted Cash Flow

Appendix Table 5. Equity Residential – Summary of Financial Statements

Equity Residential - Summary of Financial Statements								
(USD in Mn except per share data)								
	Historical			Projected				
December 31st,	2016	2017	**2018**	2019	2020	2021	2022	2023
Total Revenue:	**2,425.8**	**2,471.4**	**2,578.4**	**2,662.0**	**2,757.1**	**2,842.2**	**2,916.1**	**2,991.3**
Revenue Growth:		1.9%	4.3%	3.2%	3.6%	3.1%	2.6%	2.6%
Net Operating Income:	1,701.6	1,730.6	1,791.3	1,861.3	1,929.1	1,989.6	2,042.4	2,096.0
Net Operating Income Margin:		1.7%	3.5%	3.9%	3.6%	3.1%	2.7%	2.6%
Net Income to Common:	**4,289.1**	**600.4**	**654.4**	**514.4**	**551.6**	**587.5**	**611.5**	**642.9**
Earnings Per Diluted Share:	11.68	1.63	1.77	1.40	1.50	1.59	1.65	1.73
FFO Per Diluted Share:	2.94	3.15	3.14	3.41	3.55	3.68	3.79	3.91
AFFO Per Diluted Share:	2.72	2.83	2.87	3.01	3.13	3.25	3.35	3.46
Dividends Issued:	4,959.8	766.7	810.3	1,112.3	1,159.7	1,205.5	1,241.7	1,284.4
Total Gross Operating RE Assets	24,630.4	25,764.4	26,311.7	26,793.6	27,284.2	27,783.0	28,289.1	28,802.5
Total Real Estate Assets, Net:	20,026.0	19,986.5	19,814.7	19,224.2	18,722.2	18,210.1	17,686.9	17,152.4
Total Assets:	20,704.1	20,570.6	20,394.2	19,951.5	19,440.8	18,921.4	18,387.5	17,842.2
Total Debt + Preferred:	9,024.5	8,994.6	8,855.2	8,855.2	8,855.2	8,855.2	8,855.2	8,855.2
Cash & Cash-Equivalents:	60.1	50.6	47.4	174.8	167.1	160.9	152.0	142.7

Appendix Table 6. Equity Residential – Segments Summary

Equity Residential - Segments Summary								
(USD in Mn except per share data)								
	Historical			Projected				
December 31st,	2016	2017	**2018**	2019	2020	2021	2022	2023
Revenue by Segment:								
Same Store	2,200.1	2,311.2	**2,363.5**	2,434.4	2,507.4	2,570.1	2,621.5	2,673.9
Non-Same Store/Other	222.1	159.4	**214.2**	195.2	185.7	176.4	167.3	158.4
Acquisitions				31.7	63.3	95.0	126.6	158.3
Management, Development & Other Fees	3.6	0.7	**0.8**	0.7	0.7	0.7	0.7	0.7
Total Revenue:	**2,425.8**	**2,471.4**	**2,578.4**	**2,662.0**	**2,757.1**	**2,842.2**	**2,916.1**	**2,991.3**
Property-Level Expenses:								
Operating Expenses:	406.8	405.3	**429.3**	441.5	456.6	470.1	481.8	493.7
Property Taxes:	317.4	335.5	**357.8**	359.2	371.5	382.4	391.9	401.6
Total Expenses:	**724.2**	**740.8**	**787.1**	**800.7**	**828.1**	**852.5**	**873.7**	**895.3**
OpEx % Total:	56.2%	54.7%	**54.5%**	55.1%	55.1%	55.1%	55.1%	55.1%
Net Operating Income:	**1,701.6**	**1,730.6**	**1,791.3**	**1,861.3**	**1,929.1**	**1,989.6**	**2,042.4**	**2,096.0**
Gross Real Estate Operating Assets (from Balance Sheet):	24,630.4	25,764.4	**26,311.7**	26,793.6	27,284.2	27,783.0	28,289.1	28,802.5
Revenue Growth:		1.9%	**4.3%**	3.2%	3.6%	3.1%	2.6%	2.6%
Net Operating Income Margin:	70.1%	70.0%	**69.5%**	69.9%	70.0%	70.0%	70.0%	70.1%
NOI Growth Rate:		1.7%	**3.5%**	3.9%	3.6%	3.1%	2.7%	2.6%
Trailing Portfolio Cap Rate:	6.9%	6.7%	**6.8%**	6.9%	7.1%	7.2%	7.2%	7.3%

Appendix Table 7. Equity Residential – Balance Sheet

Equity Residential - Balance Sheet								
(USD in Mn except per share data)								
	Historical			Projected				
December 31st,	2016	2017	**2018**	2019	2020	2021	2022	2023
Assets								
Real Estate:								
Land	5,899.9	5,996.0	**5,875.8**	5,983.4	6,093.0	6,204.4	6,317.4	6,432.0
Buildings and Improvements	16,913.4	17,743.0	**18,232.6**	18,566.5	18,906.5	19,252.2	19,602.8	19,958.6
Furniture, Fixtures & Equipment	1,346.3	1,549.0	**1,722.2**	1,753.8	1,785.9	1,818.5	1,851.7	1,885.3
In-Place lease Intangibles	470.8	476.4	**481.0**	489.9	498.8	507.9	517.2	526.6
Gross Operating Real Estate Assets	**24,630.4**	**25,764.4**	**26,311.7**	**26,793.6**	**27,284.2**	**27,783.0**	**28,289.1**	**28,802.5**
Accumulated Depreciation	(5,360.4)	(6,040.4)	**(6,696.3)**	(7,677.0)	(8,675.7)	(9,692.6)	(10,728.1)	(11,782.4)
Net Operating Real Estate	**19,270.1**	**19,724.0**	**19,615.4**	**19,116.5**	**18,608.5**	**18,090.4**	**17,560.9**	**17,020.1**
Projects Under Development	637.2	163.5	**109.4**	17.7	23.7	29.8	36.0	42.4
Land Held for Development	118.8	99.0	**89.9**	89.9	89.9	89.9	89.9	89.9
Total Real Estate Assets, net	**20,026.0**	**19,986.5**	**19,814.7**	**19,224.2**	**18,722.2**	**18,210.1**	**17,686.9**	**17,152.4**
Investments in unconsolidated entities	77.2	58.3	**58.3**	58.1	57.9	57.7	57.5	57.2
Cash and cash equivalents	60.1	50.6	**47.4**	174.8	167.1	160.9	152.0	142.7
Restricted deposits	141.9	50.1	**68.9**	93.7	97.0	100.0	102.6	105.2
Other Assets	398.9	425.1	**404.8**	400.8	396.7	392.7	388.6	384.6
Total Assets	**20,704.1**	**20,570.6**	**20,394.2**	**19,951.5**	**19,440.8**	**18,921.4**	**18,387.5**	**17,842.2**
Liabilities and Shareholders' Equity								
Total Debt	8,987.3	8,957.3	**8,817.9**	8,817.9	8,817.9	8,817.9	8,817.9	8,817.9
Accounts Payable and Accrued Expenses	147.5	114.8	**102.5**	128.2	130.4	134.9	138.9	142.3
Accrued interest payable	60.9	58.0	**62.6**	53.1	54.1	54.3	55.1	55.0
Other Liabilities	350.5	341.9	**358.6**	350.3	350.3	350.3	350.3	350.3
Security deposits	62.6	65.0	**67.3**	69.4	71.9	74.1	76.1	78.0
Distributions payable	192.3	192.8	**206.6**	270.4	282.2	293.6	302.6	313.3
Total Liabilities	**9,801.1**	**9,729.8**	**9,615.5**	**9,689.4**	**9,706.8**	**9,725.2**	**9,740.9**	**9,756.8**
Redeemable Noncontrolling Interests - Operating Partnership	442.1	367.0	**379.1**	379.1	379.1	379.1	379.1	379.1
Shareholders' Equity								
Operating Partnership	221.3	226.7	**228.7**	224.8	221.3	217.7	214.1	210.5
Partially Owned Properties	10.6	4.7	**(2.3)**	(8.8)	(15.2)	(21.6)	(28.1)	(34.5)
Total Noncontrolling Interests	**231.9**	**231.4**	**226.4**	**216.0**	**206.2**	**196.0**	**186.0**	**176.0**
Preferred Shares	37.3	37.3	**37.3**	37.3	37.3	37.3	37.3	37.3
Common Shares of Beneficial Interest	3.7	3.7	**3.7**	3.7	3.7	3.7	3.7	3.7
Paid in Capital	8,758.4	8,886.6	**8,935.5**	8,999.5	9,061.5	9,124.0	9,186.9	9,249.4
Retained Earnings	1,543.6	1,403.5	**1,261.8**	691.6	111.3	(478.9)	(1,081.4)	(1,695.1)
Accumulated Other Comprehensive Income (loss)	(113.9)	(88.6)	**(65.0)**	(65.0)	(65.0)	(65.0)	(65.0)	(65.0)
Total Shareholders' Equity	**10,461.0**	**10,473.9**	**10,399.6**	**9,883.0**	**9,354.9**	**8,817.1**	**8,267.5**	**7,706.2**
Total Liabilities & SE	**20,704.1**	**20,570.6**	**20,394.2**	**19,951.5**	**19,440.8**	**18,921.4**	**18,387.5**	**17,842.2**
Balance Check	-	-	**-**	-	-	-	-	-

Appendix Table 8. Equity Residential – Income Statement

Equity Residential - Income Statement								
(USD in Mn except per share data)								
	Historical			Projected				
December 31st,	2016	2017	**2018**	2019	2020	2021	2022	2023
Revenue								
Rental Income	2,422.2	2,470.7	2,577.7	2,661.2	2,756.4	2,841.4	2,915.4	2,990.6
Management, Development & Other Fees	3.6	0.7	0.8	0.7	0.7	0.7	0.7	0.7
Total Revenue	**2,425.8**	**2,471.4**	**2,578.4**	**2,662.0**	**2,757.1**	**2,842.2**	**2,916.1**	**2,991.3**
Expenses								
Property and maintenance	406.8	405.3	**429.3**	441.5	456.6	470.1	481.8	493.7
Real estate taxes and insurance	317.4	335.5	**357.8**	359.2	371.5	382.4	391.9	401.6
Property management	82.0	85.5	**92.5**	92.5	95.8	98.8	101.4	104.0
General & Administrative	57.8	52.2	**53.8**	58.4	60.5	62.4	64.0	65.7
Depreciation	705.6	743.7	**785.7**	980.7	998.7	1,016.9	1,035.5	1,054.3
Impairement	-	1.7	**0.7**	-	-	-	-	-
Total Expenses	**1,569.7**	**1,623.9**	**1,719.9**	**1,932.4**	**1,983.1**	**2,030.7**	**2,074.6**	**2,119.2**
Operating Income	**856.1**	**847.5**	**858.6**	**729.6**	**774.0**	**811.5**	**841.6**	**872.1**
Other expenses	(10.4)	(5.2)	**(17.3)**	(11.6)	(12.0)	(12.4)	(12.7)	(13.0)
Interest and other income	65.8	6.1	**15.3**	2.1	2.7	2.8	2.9	2.9
Interest expense incurred, net	(482.2)	(383.9)	**(413.4)**	(371.2)	(378.1)	(379.7)	(385.4)	(384.2)
Amortization of deferred financing costs	(12.6)	(8.5)	**(11.3)**	(10.8)	(10.8)	(10.8)	(10.8)	(10.8)
Income and other tax (expense) benefit	(1.6)	(0.5)	**(0.9)**	(1.0)	(1.0)	(1.0)	(1.0)	(1.0)
Income (loss) from investment in unconsolidated entities	4.8	(3.4)	**(3.7)**	(3.5)	(3.5)	(3.5)	(3.5)	(3.5)
Net gain (loss) on sale of real estate properties	4,044.1	157.1	**256.8**	210.3	210.3	210.3	210.3	210.3
Net gain (loss) on sales of land parcels	15.7	19.2	**1.0**	-	-	-	-	-
Income from continuing operations	**4,479.6**	**628.4**	**685.2**	**543.8**	**581.6**	**617.2**	**641.4**	**672.8**
Discontinued operations	0.5	-	-	-	-	-	-	-
Net Income	**4,480.1**	**628.4**	**685.2**	**543.8**	**581.6**	**617.2**	**641.4**	**672.8**
OP Units NCI (income) loss	(171.5)	(22.6)	**(24.9)**	(23.8)	(24.4)	(24.1)	(24.2)	(24.1)
Partially Owned Properties NCI (income) Loss	(16.4)	(2.3)	**(2.7)**	(2.5)	(2.6)	(2.6)	(2.6)	(2.6)
Net Income attributable to controlling interest	**4,292.2**	**603.5**	**657.5**	**517.5**	**554.7**	**590.6**	**614.6**	**646.0**
Preferred distributions	(3.1)	(3.1)	**(3.1)**	(3.1)	(3.1)	(3.1)	(3.1)	(3.1)
Net Income attributable to Common shares	**4,289.1**	**600.4**	**654.4**	**514.4**	**551.6**	**587.5**	**611.5**	**642.9**
Earnings Per Basic Share								
Continuing Ops. Income to Common	11.75	1.64	**1.78**	1.40	1.49	1.59	1.65	1.73
Discontinued Ops. Income to Common	0.00	-	**-**	-	-	-	-	-
Total Basic EPS to Commn	**11.75**	**1.64**	**1.78**	**1.40**	**1.49**	**1.59**	**1.65**	**1.73**
Earnings Per Diluted Share								
Continuing Ops. Income to Common	11.68	1.63	**1.77**	1.40	1.50	1.59	1.65	1.73
Discontinued Ops. Income to Common	0.00	-	**-**	-	-	-	-	-
Total Diluted EPS to Commn	**11.68**	**1.63**	**1.77**	**1.40**	**1.50**	**1.59**	**1.65**	**1.73**
Weighted Average Basic Shares:	365.0	367.0	**368.1**	368.6	369.1	369.7	370.2	370.8
Weighted Average Diluted Shares:	382.0	382.7	**383.7**	384.2	384.8	385.3	385.9	386.4

Appendix Table 9. Equity Residential – Cash Flow Statement

Equity Residential - Cash Flow Statement								
(USD in Mn except per share data)								
	Historical			Projected				
December 31st,	2016	2017	**2018**	2019	2020	2021	2022	2023
Operating Activities								
Net income	4,480.1	628.4	**685.2**	543.8	581.6	617.2	641.4	672.8
Adjustments to NI and Non-Cash Charges								
Depreciation	705.6	743.7	**785.7**	980.7	998.7	1,016.9	1,035.5	1,054.3
Amortization of deferred financing costs	12.6	8.5	**11.3**	10.8	10.8	10.8	10.8	10.8
Amortization of discounts and premiums on debt	(18.0)	3.5	**22.8**	2.8	2.8	2.8	2.8	2.8
Amortization of above/below market lease intangibles	3.4	3.8	**4.4**	-	-	-	-	-
Amortization of deferred settlements on derivative instruments	41.7	18.8	**18.4**	-	-	-	-	-
Impairment - land holdings	-	1.7	**0.7**	-	-	-	-	-
Write-off of pursuit costs	4.1	3.1	**4.5**	3.9	3.9	3.9	3.9	3.9
(Income) loss from investments in unconsolidated entities	(4.8)	3.4	**3.7**	3.5	3.5	3.5	3.5	3.5
Distributions from unconsolidated entities - return on capital	2.9	2.6	**2.5**	2.7	2.7	2.7	2.7	2.7
Net (gain) loss on sales of investment securities	(58.4)	-	**-**	-	-	-	-	-
Net (gain) loss on sales of real estate properties	(4,044.1)	(157.1)	**(256.8)**	(210.3)	(210.3)	(210.3)	(210.3)	(210.3)
Net (gain) loss on sales of land parcels	(15.7)	(19.2)	**(1.0)**	-	-	-	-	-
Net (gain) loss on sales of discontinued operations	(0.0)	-	**-**	-	-	-	-	-
Net (gain) loss on debt extinguishment	114.7	12.3	**22.1**	17.2	17.2	17.2	17.2	17.2
Realized/unrealized (gain) loss on derivative instruments	0.1	-	**0.1**	-	-	-	-	-
Compensation paid with Company Common Shares	30.5	25.0	**27.1**	27.6	26.6	27.1	27.1	26.9
Change in Working Capital	(40.6)	(12.9)	25.6	73.9	17.5	18.3	15.8	15.9
CFO	**1,214.1**	**1,265.8**	**1,356.3**	**1,456.6**	**1,454.9**	**1,510.1**	**1,550.2**	**1,600.4**
Investing Activities	-	-	**-**					
Investment in real estate - acquisitions	(205.9)	(466.4)	**(708.1)**	(474.8)	(474.8)	(474.8)	(474.8)	(474.8)
Investment in real estate - development/other	(566.8)	(276.4)	**(154.4)**	(151.2)	(154.2)	(157.3)	(160.5)	(163.7)
(Increase) / Decrease in Under Development	**(51.5)**	**(26.3)**	**(6.3)**	91.7	(6.0)	(6.1)	(6.2)	(6.4)
Capital expenditures to real estate	(172.2)	(202.6)	**(188.5)**	(194.2)	(200.0)	(205.0)	(209.1)	(213.3)
Non-real estate capital additions	(5.7)	(1.5)	**(4.5)**	(3.9)	(3.9)	(3.9)	(3.9)	(3.9)
Proceeds from disposition of real estate, net	6,824.7	384.6	**691.5**	548.6	548.6	548.6	548.6	548.6
Investments in unconsolidated entities	(5.3)	(6.0)	**(6.6)**	(6.0)	(6.0)	(6.0)	(6.0)	(6.0)
Distributions from unconsolidated entities - return of capital	13.8	0.3	**-**	-	-	-	-	-
Proceeds from sale of investment securities and other investments	72.8	-	**-**	-	-	-	-	-
CFI	**5,903.9**	**(594.3)**	**(376.8)**	**(189.7)**	**(296.3)**	**(304.5)**	**(311.8)**	**(319.3)**
Financing Activities								
Net gain (loss) on debt extinguishment	(114.7)	(12.3)	**(22.1)**	(17.2)	(17.2)	(17.2)	(17.2)	(17.2)
Proceeds from (payments on) settlement of derivative instruments	(4.7)	1.3	**18.1**	-	-	-	-	-
Debt financing costs	(13.3)	(6.3)	**(8.6)**	(9.4)	(9.4)	(9.4)	(9.4)	(9.4)
Payment of offering costs	(0.3)	(0.1)	**(0.0)**	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)
Other financing activities, net	(0.0)	0.1	**0.0**	-	-	-	-	-
Common Shares Issuance / Repurchase								
Issuance of Common Shares	39.5	35.3	34.5	36.5	35.4	35.5	35.8	35.6
Repurchase of Common Shares	-	-	**-**	-	-	-	-	-
Distributions								
Common Shares	(4,771.7)	(739.4)	**(782.1)**	(1,084.6)	(1,131.9)	(1,177.7)	(1,214.0)	(1,256.6)
Preferred Shares	(2.3)	(3.1)	**(3.9)**	(3.1)	(3.1)	(3.1)	(3.1)	(3.1)
Noncontrolling Interests - Operating Partnership	(188.1)	(27.3)	**(28.2)**	(27.8)	(27.8)	(27.8)	(27.8)	(27.8)
Noncontrolling Interests - Partially Owned Properties	(36.2)	(8.3)	**(9.8)**	(9.0)	(9.0)	(9.0)	(9.0)	(9.0)
CFF	**(5,091.9)**	**(759.9)**	**(802.0)**	**(1,114.7)**	**(1,163.0)**	**(1,208.8)**	**(1,244.8)**	**(1,287.6)**
Debt Issuances / Repayments								
Issuance of Line of Credit / Commercial Paper	1,760.2	5,066.5	**14,030.9**	-	-	-	-	-
Repayment of Line of Credit / Commercial paper	(2,127.5)	(4,786.8)	**(13,831.5)**	(324.2)	(175.0)	-	-	-
Issuance of Mortgage	-	-	**96.9**	-	-	-	-	-
Repayment of Mortgage	(591.7)	(504.1)	**(1,354.6)**	(249.3)	(289.0)	(237.6)	(68.3)	(341.9)
Issuance of Unsecured Notes	496.7	692.5	**896.3**	800.0	1,329.3	1,128.1	466.1	1,531.6
Repayment of Unsecured Notes	(1,500.0)	(498.0)	**-**	(226.5)	(865.3)	(890.6)	(397.9)	(1,189.7)
Cash Flow from Debt	**(1,962.2)**	**(29.9)**	**(161.9)**	**-**	**-**	**-**	**-**	**0.0**
Cash and cash equivalents and restricted deposits Increase / Decrease	**64.0**	**(118.3)**	**15.6**	**152.1**	**(4.4)**	**(3.1)**	**(6.4)**	**(6.6)**
Beginning Cash			**50.6**	47.4	174.8	167.1	160.9	152.0
Beginning Restricted Deposits			**50.1**	68.9	93.7	97.0	100.0	102.6
Less: Ending Restricted Deposits		(50.1)	**(68.9)**	(93.7)	(97.0)	(100.0)	(102.6)	(105.2)
Ending Cash		**50.6**	**47.4**	**174.8**	**167.1**	**160.9**	**152.0**	**142.7**

Appendix Table 10. Equity Residential – Discounted Cash Flow Analysis – Summary

Equity Residential - Discounted Cash Flow Analysis					
(USD in Mn except per share data)					
		Projected			
December 31st,	2019	2020	2021	2022	2023
CFO	1,456.6	1,454.9	1,510.1	1,550.2	1,600.4
CFI	(189.7)	(296.3)	(304.5)	(311.8)	(319.3)
CFF (excl. Distrib./Repur. and Debt)	(2.4)	(3.4)	(3.3)	(3.0)	(3.2)
Issuance of Line of Credit / Commercial Pa	-	-	-	-	-
Issuance of Mortgage	-	-	-	-	-
Issuance of Unsecured Notes	800.0	1,329.3	1,128.1	466.1	1,531.6
Total Debt Repayments	(800.0)	(1,329.3)	(1,128.1)	(466.1)	(1,531.6)
Free Cash Flow to Equity (FCFE):	**1,264.5**	**1,155.3**	**1,202.3**	**1,235.4**	**1,277.8**
Present Value of FCFE:	**1,226.2**	**1,053.5**	**1,031.1**	**996.2**	**969.0**
Normal Discount Period:	*1.000*	*2.000*	*3.000*	*4.000*	*5.000*
Mid-Year Discount:	*0.500*	*1.500*	*2.500*	*3.500*	*4.500*
Free Cash Flow to Equity (FCFE) Growth Rate:		(8.6%)	4.1%	2.7%	3.4%

Dividend Discount Model

Appendix Table 11. Equity Residential – Dividend Discount Model Analysis – Summary

Equity Residential - Dividend Discount Model Analysis					
(USD in Mn except per share data)					
			Projected		
December 31st,	2019	2020	2021	2022	2023
Revenue:	2,662.0	2,757.1	2,842.2	2,916.1	2,991.3
Net Operating Income:	1,861.3	1,929.1	1,989.6	2,042.4	2,096.0
Net Income to Company:	543.8	581.6	617.2	641.4	672.8
Less: Distributable to NCI	(2.5)	(2.6)	(2.6)	(2.6)	(2.6)
Less: Preferred Stock Dividends:	(3.1)	(3.1)	(3.1)	(3.1)	(3.1)
Plus: Total Depreciation of Operating RE	980.7	998.7	1,016.9	1,035.5	1,054.3
Less: Gain on sale of RE and uncons. entities	(210.3)	(210.3)	(210.3)	(210.3)	(210.3)
Plus: NCI gain (loss) on sale of RE	-	-	-	-	-
Plus: Impairment of Operating Assets	-	-	-	-	-
Funds from Operations (FFO):	**1,308.6**	**1,364.3**	**1,418.2**	**1,460.9**	**1,511.0**
Dividend Payout Ratio:	85.0%	85.0%	85.0%	85.0%	85.0%
Dividends Issued:	**1,112.3**	**1,159.7**	**1,205.5**	**1,241.7**	**1,284.4**
Present Value of Dividends:	**1,078.7**	**1,057.5**	**1,033.7**	**1,001.4**	**974.0**
Normal Discount Period:	*1.000*	*2.000*	*3.000*	*4.000*	*5.000*
Mid-Year Discount:	*0.500*	*1.500*	*2.500*	*3.500*	*4.500*
Dividend Growth Rate:		4.3%	3.9%	3.0%	3.4%

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