

A Work Project, presented as part of the requirements for the Award of a Master Degree in Finance from the NOVA – School of Business and Economics.

D.R. HORTON RIDES THE HOUSING BOOM

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Abstract

This work project "Equity Research - Valuation of D.R. Horton's (DHI)" depicts DHI's business within the US homebuilding industry. Given a current 5.3 million shortage of homes in the US market (driven by the emergence of the Millennials demographic group in the housing market and the rapid growth of US "Sun Belt" region where DHI has a strong position), we expect homebuilding revenues to have an average annual growth rate of 8% until 2030. However, an uncertain mortgage rates environment and the possibility of additional inflationary pressure of house prices can pose some risks to DHI. Our DCF valuation yields a price target of \$139.30 for FY22, resulting in a 31% total shareholder return, considering a \$0.9 dividend and hence, a *BUY* recommendation.

Keywords

D. R. Horton; US Homebuilding Industry; Equity Research; Valuation

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This report is part of the “*The US largest homebuilder as a Covid winner*” report (annexed) and should be read as an integral part of it.

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Company Overview

D.R. Horton, Inc. (DHI) was founded in 1978 in Texas. Since 2002 the company became the largest home builder by volume in the US, with 65,388 homes closed in 2020. Today, the company constructs and sells single-family homes designed primarily for the entry-level and move-up markets. Entry-level home is a subset of the “first-time buyer” that refers to a price range at the low to mid end of the home price spectrum. Entry-level homes are characterized by a smaller size (averaging 2000 square feet), and are targeted to first time home buyers, mainly in the age range of 35-45 years old. Move-up markets target homeowners that want to move from a smaller home into a bigger and more expensive one. DHI operates in 98 markets (includes sub-regions within each state) and 31 states in the US regions: Southeast (30% of sales), South Central (25%), West (20%), East (15%), and lastly the Midwest and Southwest regions (10%). *Figure 1* represents all states in which the company is present, and to be in accordance with the Bureau regions data, these areas are divided in South (Southeast and Southcentral), East, Midwest, and West (West and Southwest).

Fig. 1: DHI Geographical Presence



Source: Company's Data

Segments

DHI's single-family homes sell for an average price of \$300,000 (as of 2020) under the brand names: D.R. Horton, Emerald Homes, Express Homes and Freedom Homes (*Fig. 2*). Homes marketed under the D.R. Horton brand is focused on first-time move-up buyers, constituting 66% of total home sales revenue, with an average selling price (ASP) of \$339k. This brand is present in all 98 markets. Express Homes brand represents 30% of home sales, targeting entry-level buyers concerned with affordability. It holds an ASP of \$282k (lowest ASP among all brands) and is present in 64 markets. At an ASP of \$322k, Freedom Homes is present in 22 markets, representing 3% of revenues. It is a brand that offers homes at affordable prices. Finally, Emerald Homes brand courts higher-end and luxury homes, with an ASP of \$556k. It only represents 1% of the revenues and is present in 17 markets, mainly focused on the West part of the country.

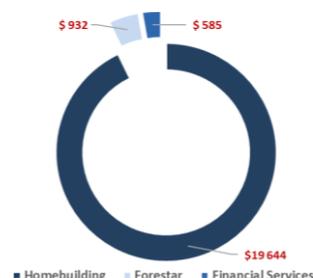
Fig. 2: D.R. Horton's brand names as of 2021

	D.R. HORTON	Express	FREEDOM	EMERALD
Homes Sold	66%	30%	3%	1%
Homes Closed	65%	31%	3%	1%
Homes Sales Revenue	68%	27%	3%	2%
ASP	\$339k	\$282k	\$322k	\$556k
# of markets	98	64	22	17
# of states	31	20	10	6

Source: Company's Data

In 2017, D.R. Horton acquired 75% of Forestar (FOR), a publicly traded American residential lot developer. As of Q4 2021, DHI owns 63% of FOR. The merger provides a platform for DHI to accelerate its long-term strategy of developing strong relationships with land developers across the US and grow the portion of land and lot position, enhancing operational efficiencies. In 2020 Forestar's owned and controlled lots increased 58% totalling 60,500. Of these lots, 30,400 were under contract to sell to or subject to a right of first offer with D.R. Horton, an increase of 30% comparing to 2019. It is expected this percentage to increase throughout time as the merger consolidates synergies.

Fig. 3: Revenue per Segment (2020) (millions)

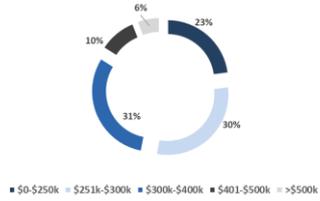


Source: Company's Data

Business Model

The company's primary activity is acquiring land, developing infrastructure on the land (utilities, roads), and building residential homes. Therefore, DHI's homebuilding operations are its core business, generating more than 97% of total revenues (*Fig. 3*), mainly from the sale of completed homes. Land and lot sales provide less than 1% of the division's revenues, not being part of the company's focal strategy. Single-family detached homes represent more than 90% of home revenues, with the remainder being from the sale of attached homes, including townhomes, duplexes, and triplexes. The company markets and sells homes through commissioned

Fig. 4: D.R. Horton houses sold per price segment

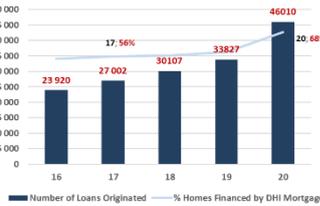


Source: Company's Data

employees, independent real estate brokers, and other platforms such as digital media. With an ASP of \$300k recorded in 2020, the company focuses on low-medium cost houses, as opposed to competitors such as Toll Brothers that focuses on high-end luxury homes (Fig. 4).

Financial services represent less than 3% of the company's revenues (Fig.5). DHI Mortgage subsidiary provides mortgage financing to homebuyers (68% of total homes sold were financed by the subsidiary in 2020), selling a substantial percentage of loans originated to third party purchasers (94% in 2020), such as financial institutions (Fannie Mae, Ginnie Mae, and two others).

Fig. 5: Mortgage Loans Provided



Source: Company Data

Ownership Structure

D.R. Horton completed its IPO in 1992 on the New York Stock Exchange. As of 15th December 2021, D.R. Horton registered a market capitalization of \$39.276 billion with 365.8 million shares outstanding. Of this value, 84% are held by institutional investors (Fig. 6), such as Investment Advisors (71%), Hedge Fund managers (7%), and other banks (6%). The top 3 holders are BlackRock Inc. (10.1%), the Vanguard Group Inc (9.7%), and Donald Horton (9.24%). D.R. Horton is the second largest position in Soro's Fund Management (6.7% of his "13F" portfolio). At the end of Q3 2021, 51 hedge funds held long positions in the stock, up 13% from the last quarter (Yahoo Finance, 2021). Regionally, 78.3% of all investors are placed in the US, followed by UK (4.2%) and Canada (2%). Overall, DHI's shareholder ownership does not possess a high concentration on a specific investor.

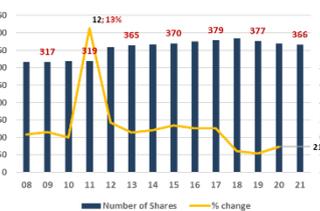
Fig. 6: Ownership Structure



Source: Yahoo Finance

Until 2018, number of shares experienced a 2% average annual increase, and from 2019 to the present the evolution has been negative (-2%), indicating new share repurchases (Fig. 7). The company has been paying dividends since 2005, albeit in a smaller magnitude during the financial crisis (\$0.15 per share). As of now the value has been rising since 2016, where it registered \$0.32, comparing with \$0.70 per share in 2020. In the beginning of 2021, the Chairman of the Board mentioned a commitment to increase return to shareholders through dividends on a consistent basis.

Fig. 7: D.R. Horton Shares Outstanding 2009-2021 (millions)



Source: Company's Data

Over the last 6 months, insiders have been net buyers, collectively buying more than 5.4 million shares. Overall, insiders hold 36.77 million shares, corresponding to a percentage of 10.3%.

DHI's management team has a high level of experience, with city managers having an average tenure of 10 years, division presidents of 15 years, and executive team and region presidents of 27 years. There is a separation between the Chairman and the CEO. Currently, the Chairman of the Board is Donald Horton (holding 9.23% of ownership and a tenure of 30 years), while the CEO is David Auld, holding 0.20% of the company with a tenure of 7 years.

Macroeconomic Outlook

Population growth trends

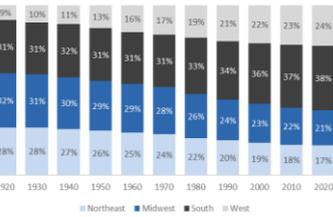
Demand for new homes is greatly driven by population growth. Results from 2020 census reveal that there is an unprecedented stagnation in **population growth**, from July 2019 to July 2020, the population grew only by 0,35%. For the past decade, US population grew only by 7,3%, the second-smallest decade-long growth rate since the first census in 1790 (Fig. 8). Due to an aging population, low natural growing levels will likely continue regardless of federal policy, suggesting that only increased immigration rate could foster population growth. From 2010 to 2020, three

Fig. 8: US annual population growth: 1900 to 2020



Source: World Bank Data

Fig. 9: Share of population across 4 US regions from 1920-2020



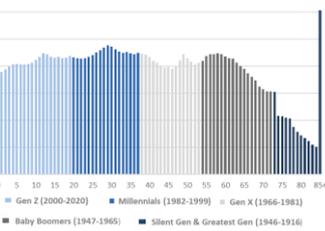
Source: US Census Bureau

states decreased the number of residents, including two in which D.R. Horton is present, Mississippi (South) and Illinois (Midwest). This is the highest number of population-losing states since the 1980s.

Between 1970 and 2020, the Northeast and West populations switched positions: the West’s percentage decreased from 28% to 17% while the Northeast’s share increased from 9% to 24% (Fig. 9). D.R. Horton has a significant presence in the West region (18% of total homes closed as of 2020), opposed to the Northeast where it is only present in 2 states (New Jersey and Pennsylvania). Besides the Northeast region being associated with high house prices in the US, the company has not made any statement regarding increasing exposure to this region. DHI’s geographic presence has been relatively stable since 2015, except the opening to two major markets in Ohio and Iowa in 2019.

Key Demographic Age Groups

Fig. 10: Total US population by age in 2020 (millions)



Source: US Census Bureau

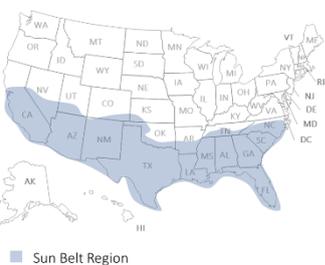
The current underbuilding of the homebuilding industry comes ahead a decade in which the largest generation in American history, the **millennials** (Fig.10), is entering the housing market in full force, peaking around 2028. Now millennials make up the largest share of homebuyers in the US at 38% (Bloomberg, 2021). 86% of the younger millennials and 52% of the older range ones are buying their first homes. This has driven the share of first-time buyers in the market, which has been increasing and accounted for 31% of total house sales in June 2021 (National Association of Realtors, 2021). The D.R. Horton brand (63% of total homes sold) and Express Homes (32% of total homes sold), focus on targeting this type of customers.

According to data from the Fed Board, millennials have lower real incomes than earlier generations at the same age and appear to have stored fewer assets. This results in a decreased purchasing power, and a higher emphasis on lower to medium-cost housing which is precisely D.R. Horton’s target. This was already reflected in D.R. Horton’s data, with 35% of total houses sold being directed to millennials in 2019. The ratio increased to 42% in 2020.

This will subsequently increase demand for single-family housing, with US household growth projections implying baseline demand of 15.1 million units in 2018-2028 (Harvard University, 2018). However, the housing market has not been able to keep up with this evolution, since according to the US Census, there is a US shortage of 5.3 million of homes, as of June 2021. With the pandemic widening this gap, CNBC believes that this issue will require decades to be solved. As such, throughout the next years, home shortage will gradually decrease, despite remaining at high levels for the medium-term, implying a strong demand for the coming years. D.R. Horton is well positioned to benefit from this trend, due to an increasing market share in the past, a spread geographical presence with an emphasis in higher growth markets, and an high revenue percentage from affordable homes.

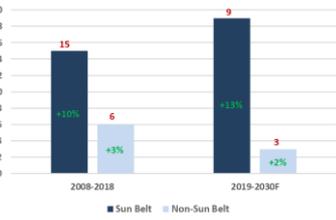
“Sun Belt” area

Fig. 11: Sun Belt Region



A positive trend in the US population is the rapid growth in the US “**Sun Belt**” region (Fig. 11). The area comprises almost all South states considered in Figure 1, and three Western states (New Mexico, Arizona, and California). The region encompasses 18 states, including 7 of the 10 largest US cities (Los Angeles, Dallas, Houston, Atlanta, among others), and large mid-size metropolitan areas. DHI is present in 16 out of the 18 states. Over the past decade, the Sun Belt accounted for 75% of total US population growth. The region now holds about 50% of the national population, which is expected to rise to about 55% by 2030. Over the next decade non-Sun Belt

Fig. 12: Sun Belt Region and Non-Sun Belt Region



Source: Clarion Partners

states are projected to grow by 2% population wise, whereas Sunbelt states by 13% (Fig. 12). Improvements in the quality of life, GDP, and wage growth (in the past decade, employment in the region grew 20% versus 12% in the non-Sun Belt area), lower cost of living driven by lower taxes (Texas, Florida, California), and mild climate, provide a high attractiveness for this part of the country (Clarion Partners, 2019). As such, the Sun Belt growth is driven by a large in-migration, a decline in out-migration, and a higher birth rate comparing with the other regions (ArborCrowd, 2020).

Fig. 13: Median House Prices per state (2021)



Source: World Population Review

Millennials are expected to represent 75% of the total workforce by 2030, and currently 50% of total Millennials live in the area (Clarion Partners, 2019). Young adults have exited large metropolis, due to a high-cost and low quality of life. Sun Belt markets will continue to capture more jobs and increasing attraction in younger age groups. As such, entry-level type of homes, the focus of D.R. Horton, should thrive in coming years, especially in these states.

Fig. 14: Monthly inflation rate in the US from September 2020 to November 2021 (CPI)



Source: Statista

Currently, major Sun Belt cities, on average, have lower median single family home prices when comparing to the other regions (West, and Northeast mainly) (Fig. 13), even though both have risen in recent years. Cities in the Sun Belt still have a lower homeownership rate than the national level which indicates that there is still a scalable investment opportunity. Yet, the low cost of housing in the area will be at risk, as increasing demand for housing and population overcrowding, may push cost of living up. D.R. Horton is exposed to this risk, as it may jeopardize young adults purchasing power for the long-term.

Inflation

Inflation has been increasing, affecting homes' prices. The monthly CPI has topped 5% for the first time since 1990, reaching 6.8% in November 2021 (Fig. 14). Adding to the inflationary pressure on housing, the limited supply of homes for sale is driving prices up rapidly. Even though the housing inventory was low before the pandemic, the homebuilding market has faced hurdles that were intensified by people delaying selling off their homes and by pandemic related supply chain disruptions, which have caused a spike of **building materials prices** like drywall, steel, and wood. This spring **lumber prices** reached 300% above its pre-pandemic level. The lumber bubble was created by the mixture of two conflicts on both the demand side (a housing and DIY boom) and the supply side (sawmills slowing productions during lockdowns). Nevertheless, in Q4 2021 prices started to return to normal (Fig.15). Homebuilders should get relief from lower commodity costs, despite only affecting less than one-third of the cost of a new home.

Fig. 15: Producer Price Index by Commodity: Lumber and Wood Products



Source: St. Louis Federal Reserve

High home prices are also affected by the rising price of land above the rate of inflation for the past decade. Tight land availability will persist, which should continue to constrain volume growth while pressuring costs. According to the Census Bureau, lot values for single-family detached homes started in 2020 increased by 18% and median lot price reached a new record high of \$53,000. The West region has the most prevalent high prices, a region where DHI registers 24% of homebuilding revenues (as of 2020) (Fig. 16). States in the South region (68% of total revenues) register higher land prices in the Western side (Arizona, New Mexico), and lower in the Eastern side (Florida, Georgia, and others). The Eastern region registers high homes sold prices, and high land prices. D.R. Horton does not hold operations in the area, as big metro regions with high housing costs are not the most attractive factors for the customer segment of the company.

Fig. 16: Land Median Prices (2021)



Source: NAHB Estimates

This creates an upward pricing pressure for the homebuilding industry, even though D.R. Horton has kept its price relatively stable over time, with an average annual growth of 0.5% since 2016,

comparing with an average economic inflation growth for the US of 1.9%, and a new US single family house price of 2%.

Cyclicality with the US economy

At the aggregate level, housing represents a relevant portion of all economic activity, and so, changes in the housing market can significantly impact the broader economy, as it was showed in the 2007-2009 recession. For instance, rising home prices increases the value of home equity of homeowners. This allows homeowners to borrow more money against the equity in their residence, increasing consumption. Personal consumption represents 70% of the US economy, and so an increased consumption leads to a stronger US economy.

On the other hand, a decline in homebuilding sales leads to a decline in homes' prices, which decreases the market value of all homes. Subsequently, by having a decreased value of home equity, homeowners have less equity available to borrow against, which decreases personal consumption. As the US economy is tied to this metric, this will cause a downward spiral in the economy by subsequently decreasing employment, income, and GDP growth (Bureau of Economic Analysis, 2020). Overall, the homebuilding industry serves as a barometer of the direction of the economy and business cycle. As such, the industry is highly cyclical, prospering in economic upswings. Equity betas from homebuilding companies will tend to be higher than one. Currently, construction indicators are at expansion levels.

Fig. 17: New Privately Owned Housing Units Authorized by Building Permits in Permit-Issuing Places (thousands)



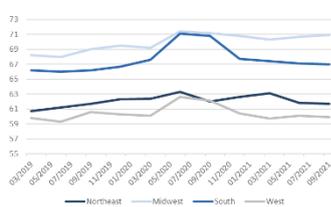
Source: US Census Bureau

Fig. 18: Monthly Supply of Houses in the US



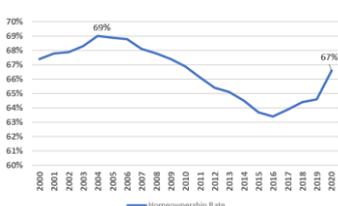
Source: St. Louis Federal Reserve

Fig. 19: Quarterly homeownership rates (US regions)



Source: US Census Bureau

Fig. 20: Annual US homeownership rate



Source: US Census Bureau

Homebuilding indicators

Since the subprime crisis, **new home construction has seen a dramatic decrease** which has recovered but not yet returned to pre-recession levels. This can be illustrated with Building Permits (*Figure 17*), an indicator that helps tracking the health of the homebuilding industry. *Figure 18* reinforces that the US has been significantly underbuilding homes leading to record-low **housing inventory** levels of new and existing homes. Since the beginning of 2021, housing inventory is up by 30%, still at pre subprime crisis lows.

Annual homeownership rates (proportion of households that is owner-occupied) **have been increasing** (*Fig. 19, 20*), having a more pronounced rise in the South region (1.5% in 2020). The US homeownership rate was 67% in 2020. The value decreased sharply during and after the subprime crisis (63% in 2016), while the Covid crisis accelerated the recovery of the rate (67% in 2020). An increasing high demand for homes in America has also been driven **by changing trends**. Americans' desire to move from urban to suburban areas. In an era marked by a pandemic, proximity to the workplace becomes less important. More than 20% of the workforce can work remotely three to five days a week, as effectively as they could from the office. If remote work continues to persist, it will translate to 3x-4x more people working at home than before the pandemic, which drives a greater need for additional home office space (McKinsey, 2020).

Unemployment Rate

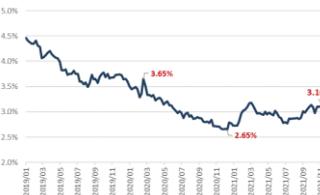
Aging workforce and challenging immigration policies have led to a shortage of construction workers driving labour prices higher. As of March 2021, residential construction employment has already surpassed its pre pandemic levels (\$839.8k as of February 2020 vs \$885.0k as of October 2021) (*Fig. 21*). Nevertheless, a significant number of construction workers abandoned the industry amidst the subprime crisis, with a slow recovery thereafter. This has driven labour costs higher, with builders competing for skilled workers. According to the Home Builder Institute, the

Fig. 21: Residential Building Employees (thousands):



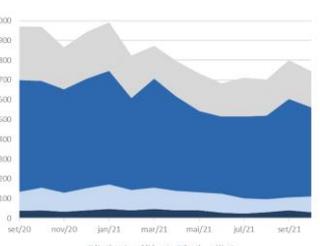
Source: St. Louis Federal Reserve

Fig. 22: 30-Year Fixed Rate Mortgage Average in the US since 2019, not seasonally adjusted



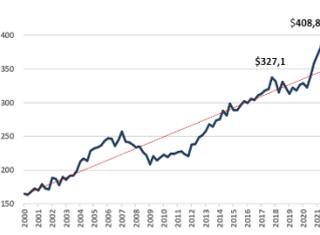
Source: St. Louis Federal Reserve

Fig. 23: New Privately-Owned Houses Sold (thousands)



Source: US Census Bureau

Fig. 24: Median Sales Price of Houses Sold for the US (thousands)



Source: St. Louis Federal Reserve

Fig. 25: Average Sales Price growth for new houses sold

	2010-2021	2016-2021
US	59,90%	20,85%
East	59,10%	26,1%
MidWest	57,27%	17,7%
South	59,56%	20,8%
West	73,48%	25,5%

Source: US Census Bureau

construction industry needs over 2 million more workers over the next three months to keep up with housing demand.

Mortgage Rates

The Federal Reserve indirectly affects the housing market through the cost of financing a home purchase, the mortgage rates. In fact, 70% of all household debt represents mortgage debt (New York Fed, 2021). During the pandemic, the Fed lowered the federal funds rate and increased purchases of mortgage-backed securities, leading to a historical low mortgage rate of 2,65% in December 2020, contributing to boost the homebuilding market by providing cheaper financing. Recently they started to gradually increase due to an economic slowdown, and higher expectation of inflation (Fig. 22). Overall, Fed monetary policy decisions have the most impact on builders that cater to the entry-level and first-time, move-up markets, which represent 96% of DHI’s sales. As it is expected an increase in interest rates in 2022 (indirectly affects mortgage rates) there can be a “cool down” in the housing boom experienced in 2021, with D.R. Horton being exposed to that.

Sector Evolution

According to the National Association of Homebuilders, it takes between 6.5 and 10.5 months to build a house, depending on climate conditions. Spec homes or move-in ready homes are the type of houses that D.R. Horton usually focuses, allowing for a faster completion. According to Zillow, in 2020, homes spent an average of 25 days on the market compared to 30 days in 2019. As of 2021, that time is reduced to a week (7 days), the lowest value since the 1990’s. Normally, the average time it takes to sell a house is 55-70 days in the US. Thus, the return on core invested capital is considered to be around 1 year for the industry.

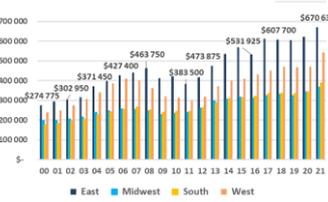
New residential home sales in the US value has peaked in 2020 but has not yet returned to its pre subprime crisis levels. Home sales in 2021 remain below their value in 2020 since high prices are weighing on buyers’ affordability, with supply disruptions not allowing a desired increase in supply (Fig. 23).

Price evolution

As of 2021, homebuilding is marked by both the shortage of homes available for sale and high homebuilding demand, leading to **double-digit growth in median house prices** (Fig. 24). Home prices are outpacing income growth by a 4-to-1 ratio (Fortune, 2021). In 2021, the US home industry witnessed the highest annual price growth rate since 2005 of 19.9%. Onto forecasting 2022 price growth, Fannie Mae, and Goldman Sachs both project an increase of 7.9% and 16%, respectively, showing that increasing price trend will persist in 2022.

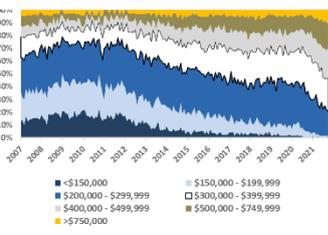
The average US house price has appreciated around 60% since the sub-prime crisis, from \$271,000 in 2010 to \$408,000 in 2021. The percentage change is similar across the 4 regions considered, except for the West, where the appreciation registered is 73.5% (Fig. 25). It is ranked as the second most expensive housing price region (Fig. 26), with Hawaii being the most expensive state in the country, with a 2021 median house price of \$615,000. Followed by California with \$505,000, and Colorado with \$343,000, all three in the Western region where DHI is present. However, the Eastern region has a larger concentration of high-cost states, with New York, Massachusetts, New Jersey, and Maryland, being DHI present in the latter two. The region has experienced the largest average home price appreciation in the US since 2000 (144% as of

Fig. 26: Median Sales Price of Houses Sold for the US regions



Source: St. Louis Federal Reserve

Fig. 27: Median Sales Price of Houses Sold for the US regions



Source: St. Louis Federal Reserve

Fig. 28: Price-to-rent ratio as a share of purchased homes bought by investors in Q2-2021



Source: Forbes

2021), with a lower emphasis in the last 10 years (Fig. 26).

The middle housing price segment (from \$200k to \$500k) of the housing market is by far the largest and accounts for 75% of all homes sold (Forbes, 2021). Under \$200,000 price range accounts for only 2% of transactions. Over the years, it has been registered a decline in sales in the lowest price segment and a subsequent increase in the higher price segments (Fig. 27). For DHI this can be seen as a risk if this trend aggravates reducing the share of homes sold in the mid-price segment. It is important to remember that the company does not possess a higher focus on below \$150,000 homes, as the average selling price is \$300,000.

■ Homebuilding vs Rental Market

Even though homeownership rates and household formation have been increasing, there is also a rising trend to those that do not want to commit for a down payment which are the single-family rentals. Even though this was already surging before the pandemic, Covid boosted the trend and the number of built-to-rent homes soared by 30% from 2019 to 2020 (New York Times, 2021).

Yet, it is important to account for the price-to-rent ratio (division of the median home price by the median yearly rent) across different regions, as it allows to analyse if it is more financially viable to rent or buy a home. It is observed (Fig. 28) that in the states where home prices are higher such as New York or California, it is more viable to rent than to buy a home. On the other hand, states located more in the Southern part such as Virginia and Florida (where D.R. Horton is present) rather benefit the purchase of a home.

Competitive Landscape

Small versus Large Homebuilders

From a strategic standpoint, generally all the homebuilders use a similar operating model that focus primarily on land purchases and construction activity. Homebuilders predominantly operate in 6 US regions: the Sun Belt, Central, Southeast, mid-Atlantic, Midwest and West. The Northeast is densely populated and so small privately financed homebuilders dominate.

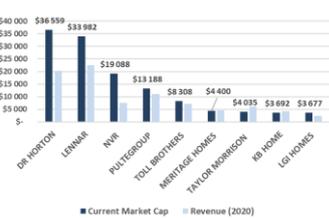
This industry is highly fragmented. In 2019, the top 10 homebuilders only had a share of 30.4% (NAHB, 2021), the remainder is composed by small and privately financed builders that operate solely at the regional level. Large homebuilders have the significant advantage of an easier access to finance large land purchases and construction projects with a lower cost of capital. Yet, small builders can better address growth in the custom home building market, pursuing niche opportunities, being able to establish loyal relationships with the customer and supplier.

Large homebuilders tend to expand their operations by acquiring small regional homebuilders. This constitutes a relatively inexpensive way for them to penetrate new markets. However, these M&A deals are not material in large homebuilders' balance sheets, a large deal between two major players rarely happens. D.R. Horton often incurs in these transactions, the most recent was in October 2020, with the acquisition of Braselton Homes in Texas for \$23 million in cash (DHI registered a total cash balance of \$3,000 million at the end of 2020).

Competitors

The largest homebuilders tend to focus on certain price and housing categories. Some on providing luxury homes characterized by high average selling prices (ASP), others on entry-level

Fig. 29: Current Market Cap and 2020 Revenue values (millions)



Source: Bloomberg

category in which buyers base their purchase decision on their ability to secure affordable financing.

Lennar is a large-scale homebuilder focusing on entry-level homes (40% of the total). It ranks second in terms of current market cap (\$33,982 million) (Fig. 29) and holds the highest revenue value as of 2020 (\$22,489 million). Lennar operates in 20 states, mainly located in the South region and Eastern states, focusing on fast-growing markets. Its ASP was \$420k in 2020.

PulteGroup primarily constructs and sells single-family homes in the US and supports its homebuilding operations through mortgage financing and land development/sales operations. In 2020, the company ranked as the fourth largest homebuilder by market cap (\$13,188 million), and third by revenues (\$11,036 million). Pulte Group is diversified across the nation with operations in over 22 states, concentrated in the Southeast, Midwest, as well as the West/Pacific region (Washington, California, Nevada). It registered an ASP of \$430k in 2020.

NVR, Inc primarily constructs and sells single-family detached homes, townhomes, and condominium buildings under three brand names. One of the brands, markets first-time move-up buyers, and the other two target luxury buyers. The company focuses only on the East side of the US (15 states from Illinois to New York). The ASP was \$371k in 2020. The company registered the fourth highest revenues value (\$7,536 million) and is currently ranked third in terms of market capitalization (\$19,088 million).

Toll Brothers constructs and sells single-family and multi-family homes, together with land development/sales, and single and multi-family rental operations. Currently, the company ranks as the fifth largest homebuilder by market cap (\$8,308 million), and by 2020 revenue value (\$7,078 million). With operations across 24 states, it focuses on higher home price states, located in the most Western part of the country (California, Oregon Washington), Texas, and the Eastern/South-eastern regions (New York, New Jersey, Florida). Due to this, it possesses the highest ASP amongst the peers considered, \$800k as of 2020.

LGI Homes also has a significant presence in the Sun Belt region and their target customers are current renters and first-time homebuyers, similar to D.R. Horton's. Geographically, Southeast region (North and South Carolina, Georgia among others), Florida and Texas, are the main locations for the company, with a higher focus on states with lower median house prices. Despite a rapid growth in the last 6 years (26.2% annual compound growth rate of houses sold), it still ranks ninth in the list considered in terms of market cap (\$3,677 million), and revenues (\$2,367 million). As for customer segment and pricing point, LGI is the closest peer to D.R. Horton, however it is a much smaller company with high growth prospects, and still does not possess the scalability level of DHI, which may affect the comparability level between both companies.

Geographic allocation

D.R. Horton operates in 31 states (Fig. 1), possessing a larger geography diversity when comparing to direct competitors, such as Lennar with 20 states, NVR with 15, Pulte Group with 22, and Toll Brothers with 24, all values as of 2020. Despite companies not reporting data per state as segments are divided in regions, Texas has a high share revenue in certain companies', being reported as a separate segment. Lennar relies on 13% of total revenues coming from this state, and Pulte 14%. A decade ago, the capital of Texas was among the most affordable places to live, yet now it is among the least affordable major metro region for homebuyers outside of California, surpassing hot markets like Boston or New York City. For homebuilding companies

Fig. 13: Median House Prices per state



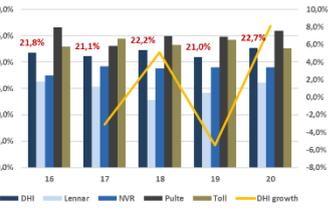
Source: World Population Review

that are more dependent on “hot” states like Texas, risks arise on higher competition, and increasing demand pushing selling prices upwards, decreasing housing affordability of buyers.

In 6 out of the total 31 states in which D.R. Horton operates, none of the competitors considered are present. These are located in the South (four), West and Midwest (both with one), being it Alabama, Iowa, Louisiana, Oklahoma, Mississippi, and Hawaii. Hawaii is the only not registering a median home price below \$170,000 (Fig. 13). It is a high home cost estate (>\$500,000 average home price), where D.R. Horton positions its “Emerald Brand”. In 9 out of the total 31 states, only one of the competitors has operations in that location (mainly Lennar), and in 7 all four competitors considered register home sales in the region. Despite the US homebuilding industry having a larger number of players, these are the largest in terms of revenues and market share, probably representing the biggest threat for DHI as of today.

Even though these companies can easily access new states, in some cases it is not consistent with the business model. Toll Brothers focuses on high-end homebuilding with ASP of \$800,000, reflecting this on its geographic presence, with no to low presence in the South/Central/North region, such as Arizona, Mississippi, Illinois, Iowa, and Oklahoma (Sunbelt states), coinciding with the states with lowest median home prices (Fig. 13). For D.R. Horton, having the widest geographic range, implies that the company operates in states both with high and low median home prices, positioning its brands accordingly.

Fig. 30: Annual Homebuilding Gross Margin among Competitors

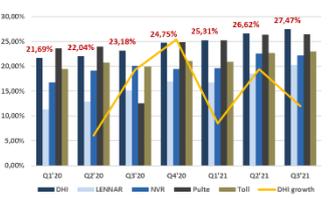


Source: Companies' Data

Profitability

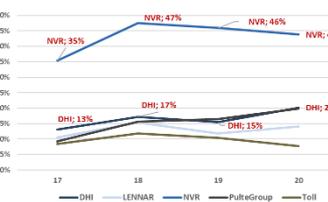
Since 2016, D.R. Horton has maintained a sustained growth in its homebuilding gross margin (Fig. 30), reaching 22.7% in 2020. The value is only below the 25.9% registered by Pulte, although this competitor has seen a decrease of the value since 2016, opposite to D.R. Horton with a 4.1% growth. Lennar is the most similar competitor comparing with D.R. Horton, considering ASP and geographical presence, and revenue values, yet its gross margin is well below the latter, recording 16.1% in 2020. Since the pandemic started, the increase in gross margin has been transversal to the industry, albeit with different magnitudes amongst the competitors (Fig. 31). Lennar and D.R. Horton express a constant growth throughout the quarters, both with an increase of 30% in gross margin value since the first quarter of 2020. In the industry, increasing labour and raw material costs have been fully offset by increasing demand and higher home prices. DHI has surpassed PulteGroup in Gross Margin value in Q3 2021.

Fig. 31: Quarterly Homebuilding Gross Margin among Competitors



Source: Companies' Data

Fig. 32: Annual ROIC among Competitors



Source: Company's Data

For the Return on Invested Capital, D.R. Horton’s value has evolved from 13% in 2016 to 20% in 2020, already projected to grow to 30% in 2021 (Fig. 32). D.R. Horton’s values are in accordance with PulteGroup, and above Lennar’s (14%). Both in gross margin and ROIC, Lennar demonstrates a lower operating efficiency and cost control. Toll Brothers (luxury builder) has experienced a decrease in the value since 2019, as since the pandemic started luxury homebuilders have performed worse than its peers.

NVR ROIC values are an outlier, not only in the set of peers considered here but also in the industry in general. The company is “asset light” among its competitors. In terms of cash, it is the only company with a net cash value, yielding \$1.3 billion in 2020. Overall, NVR benefits from a higher Altman z-score (credit-strength test) than its peers. The business model is different from the norm, as companies like D.R. Horton operate in almost all US regions and aim to gain market share in the areas operating in, NVR focuses on specific markets (15 states as of 2020), benefiting from a higher operating efficiency. Nevertheless, the annual revenue growth rate of the

Fig. 33: Competitive Performance

Gross margin	2017	2018	2019	2020
D.R.Horton	23.1%	24.0%	23.1%	25.3%
Lennar	12.8%	10.6%	12.6%	15.4%
NVR	21.4%	21.2%	21.5%	21.9%
Pulte Group	23.4%	25.0%	25.2%	26.8%
Toll Brothers	24.5%	23.3%	24.2%	22.6%
ROA				
D.R.Horton	9%	10%	10%	13%
Lennar	4%	5.9%	6.3%	8.2%
NVR	18%	25.2%	23.1%	15.6%
Pulte Group	5%	9.9%	9.3%	11.3%
Toll Brothers	6%	7.3%	5.4%	4.0%
ROIC				
D.R.Horton	13%	16%	16%	20%
Lennar	10%	12%	12%	14%
NVR	33%	44%	38%	29%
Pulte Group	11%	21%	19%	21%
Toll Brothers	12%	16%	12%	9%
Cash Conversion Cycle				
D.R.Horton	302	327	328	321
Lennar	339	344	320	319
NVR	105	111	97	101
Pulte Group	482	430	370	391
Toll Brothers	737	657	553	578

Source: Companies' Data

company is lower than the industry since 2016: 67% growth for D.R. Horton and 28% growth for NVR. NVR does not benefit from strong housing markets as much as the other peers, yet in economic downturns it is able to maintain higher profit levels when comparing to the industry. In fact, it was the only homebuilding company considered here, that during the subprime crisis maintained a positive profit every year.

It is true that the vast presence spread of D.R. Horton across the US, with a more "asset heavy" business model, implies a much lower ROIC value when comparing to NVR, however, when comparing with the other peers DHI is above Lennar and in accordance with Pulte.

Lastly, when it comes to the Cash Conversion Cycle (CCC), NVR's operating efficiency allows them to take the least amount of time to convert its invested capital into cash flows from sales. With similar CCC, D. R. Horton and Lennar take almost 3x more days to complete its net operating cycle than NVR, but still with an appropriate cash cycle for the industry. Toll Brothers lacks effectiveness and comes in the last place, taking almost 1.58 years to complete its cash cycle (Fig. 33).

Intrinsic Valuation

The key revenue drivers are the number of houses sold and the ASP per house. As D.R. Horton competitors are often present in the same US regions (analysis in "Competitive Landscape"), the total houses sold in each state/region, market share per player, and population growth, are the determinant factors to calculate the number of units sold for D.R. Horton. For the ASP, demand-supply relationships and the overall state of the economy are the key drivers.

The population evolution has empirically, a strong correlation with houses sold, and average family income, land prices, and the demand versus supply relationships are the principal trends affecting prices (Freddie Mac, 2021). Housing trends change regionally in the US, and as D.R. Horton is exposed to different areas, revenues behave differently in the four US regions considered for the company.

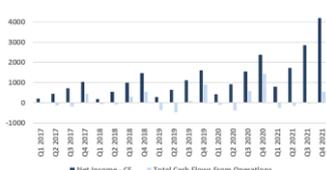
The company's assessment is divided in West, Midwest, and South regions (Fig. 1), despite D.R. Horton reporting data on 6 sub-regions, as mentioned in the company overview, this is in accordance with the extracted data from Census Bureau and FRED (Census Bureau). The East considered by D.R. Horton is fully interpreted as belonging to the South per the Census data, except for New Jersey and Pennsylvania which are considered Northeast in the Bureau. As such, the data belonging to these two states for the US in general (total population, and single-family houses sold), is added (with the required adjustments in single-family houses sold) in our model to the South data retrieved from the Bureau.

Operating Cash

When accounting for the cash that D.R. Horton uses for its operations versus the cash that it has available to pay out its debt, it is important to consider homebuilding seasonality. D.R. Horton obtains greater revenues and operating income in the Q3 and Q4 of the fiscal year (July and September) (Fig. 34), and so reflecting the period from the Q2 and Q3 of normal calendarization.

This business seasonality originates fluctuations throughout the year in the net working capital. Thus, cash reported in the annual report is usually not representative of the whole year balance. Considering a range between 2%-5% for operating cash, we selected 2% of total cash for the operating part of the business, and the remaining cash to be excess cash. This because DHI

Fig. 34: Cash Cycle (in USD millions) from DHI's FY



Source: Company's Data

reports in September, which coincides with a high cash period, and so results are usually inflated from the rest of the year.

D.R. HORTON

HOMEBUILDING INDUSTRY

STUDENTS: JOÃO SILVA | TERESA ALMEIDA

COMPANY REPORT

17 DECEMBER 2021

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The US Largest Homebuilder as a C-19 winner

D.R. Horton's Market Momentum

- A current **5.3M shortage of US homes** and historically low inventory levels have caused supply-demand imbalances, generating a record **19.9% YoY increase in median house prices**.
- South and West regions will prosper in terms of population growth, attracting **young adults to the Sun-Belt region**. D.R. Horton is well positioned to capture this trend (**68% of total revenues originated in the South**), focusing on low-medium cost houses (**average selling price of \$271k** in the region in 2020), and having a past sustained increase in market share.
- With homebuilding gross margin reaching a record high in 2021 (26%), we expect a gradual reduction of this value, as **average home price growth for DHI decreases** (6.1% appreciation in 2021 is not sustainable for D.R. Horton's customer segment), and demand "boom" stabilizes.
- As DHI aims to maintain a capital structure below 35% of D/Total Capital, a DCF model derived a **\$139.30 price target for FY22**, meaning a **shareholder return of 31%**, considering a **\$0.9 dividend**, resulting in a **BUY** recommendation.

Company description

D.R. Horton, Inc. is the largest homebuilder by volume in the US since 2002 (60.4 million homes closed in 2020). Founded in 1978 in Texas, it operates in 31 states across the US, being engaged in the construction and sale of quality homes through its diverse brand portfolio. It also provides mortgage financing, title services and insurance agency services through its subsidiaries.

Recommendation: BUY

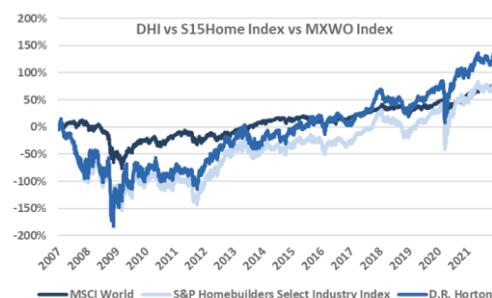
Price Target FY22: 139.30 \$

Price (as of 15-Dec-2021) 107.37 \$

Source: Bloomberg

52-week range (\$)	64.32-110.45
Market Cap (\$m)	39,275.946
Outstanding Shares (m)	365.8

Source: Bloomberg



Source: Bloomberg, Analysts' estimates

(Values in \$ millions)	2020	2021E	2022F
Revenues	20,311	27,285	30,686
Homebuilding revenues	19,644	26,239	29,460
Gross margin	25.3%	28.6%	27.4%
Homebuilding Gross margin	22.7%	26.1%	24.8%
EBITDA	3,189	5,188	5,254
EBITDA margin	15.7%	19.0%	17.1%
Net Income	2,374	3,863	3,873
Net margin	11.7%	14.2%	12.6%
Earnings/Share (in \$)	6.41	10.56	10.72
Dividend/Share (in \$)	0.70	0.80	0.90
P/E	10.94	10.17	9.99

Source: Company Data, Analysts' estimates

THIS REPORT WAS PREPARED EXCLUSIVELY FOR ACADEMIC PURPOSES BY JOÃO SILVA AND TERESA ALMEIDA, MASTER IN FINANCE STUDENTS OF THE NOVA SCHOOL OF BUSINESS AND ECONOMICS. THE REPORT WAS SUPERVISED BY A NOVA SBE FACULTY MEMBER, ACTING IN A MERE ACADEMIC CAPACITY, WHO REVIEWED THE VALUATION METHODOLOGY AND THE FINANCIAL MODEL. (PLEASE REFER TO THE DISCLOSURES AND DISCLAIMERS AT END OF THE DOCUMENT)

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Company Overview

D.R. Horton, Inc. (DHI) was founded in 1978 in Texas. Since 2002 the company became the largest home builder by volume in the US, with 65,388 homes closed in 2020. Today, the company constructs and sells single-family homes designed primarily for the entry-level and move-up markets. Entry-level home is a subset of the “first-time buyer” that refers to a price range at the low to mid end of the home price spectrum. Entry-level homes are characterized by a smaller size (averaging 2000 square feet), and are targeted to first time home buyers, mainly in the age range of 35-45 years old. Move-up markets target homeowners that want to move into a bigger and more expensive home. DHI operates in 98 markets (includes sub-regions within each state) and 31 states in the US regions: Southeast (30% of sales), South Central (25%), West (20%), East (15%), and lastly the Midwest and Southwest regions (10%). *Figure 1* represents all states in which the company is present, and to be in accordance with the Bureau regions data, these areas are divided in South (Southeast and Southcentral), East, Midwest, and West (West and Southwest).

Fig. 1: DHI Geographical Presence



Source: Company's Data

Segments

DHI's single-family homes sell for an average price of \$300,000 (as of 2020) under the brand names: D.R. Horton, Emerald Homes, Express Homes and Freedom Homes (*Fig. 2*). D.R. Horton brand is focused on first-time move-up buyers, constituting 66% of total home sales revenue, with an average selling price (ASP) of \$339k. This brand is present in all 98 markets. Express Homes brand represents 30% of home sales, targeting entry-level buyers concerned with affordability. It holds an ASP of \$282k (lowest ASP among all brands) and is present in 64 markets. At an ASP of \$322k, Freedom Homes is present in 22 markets, representing 3% of revenues. It is a brand that offers homes at affordable prices. Finally, Emerald Homes brand courts higher-end and luxury homes, with an ASP of \$556k. It only represents 1% of the revenues and is present in 17 markets, mainly focused on the West part of the country.

Fig. 2: D.R. Horton's brand names as of 2021

	D.R. HORTON <i>America's Builder</i>	Express HOMES	FREEDOM HOMES	EMERALD HOMES
Homes Sold	66%	30%	3%	1%
Homes Closed	65%	31%	3%	1%
Homes Sales Revenue	68%	27%	3%	2%
ASP	\$339k	\$282k	\$322k	\$556k
# of markets	98	64	22	17
# of states	31	20	10	6

Source: Company's Data

In 2017, D.R. Horton acquired 75% of Forestar (FOR), a publicly traded American residential lot developer. As of Q4 2021, DHI owns 63% of FOR. The merger provides a platform for DHI to accelerate its long-term strategy of developing strong relationships with land developers across the US and grow the portion of land and lot position, enhancing operational efficiencies. In 2020 Forestar's owned and controlled lots increased 58% totalling 60,500. Of these lots, 30,400 were under contract to sell to or subject to a right of first offer with

D.R. Horton, an increase of 30% comparing to 2019. It is expected this percentage to increase throughout time as the merger consolidates synergies.

Business Model

The company's primary activity is acquiring land, developing infrastructure on the land (utilities, roads), and building residential homes. Therefore, DHI's homebuilding operations are its core business, generating more than 97% of total revenues (Fig. 3), mainly from the sale of completed homes. Land and lot sales provide less than 1% of the division's revenues, not being part of the company's focal strategy. Single-family detached homes represent more than 90% of home revenues, with the remainder being from the sale of attached homes, including townhomes, duplexes, and triplexes. The company markets and sells homes through commissioned employees, independent real estate brokers, and other platforms such as digital media. With an ASP of \$300k recorded in 2020, the company focuses on low-medium cost houses, as opposed to competitors such as Toll Brothers that focuses on high-end luxury homes (Fig. 4).

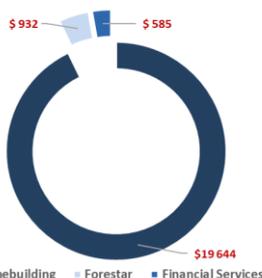
Financial services represent less than 3% of the company's revenues (Fig.5). DHI Mortgage subsidiary provides mortgage financing to homebuyers (68% of total homes sold were financed by the subsidiary in 2020), selling a substantial percentage of loans originated to third party purchasers (94% in 2020), such as financial institutions (Fannie Mae, Ginnie Mae, and two others).

Ownership Structure

D.R. Horton completed its IPO in 1992 on the New York Stock Exchange. As of 15th December 2021, D.R. Horton registered a market capitalization of \$39.276 billion with 365.8 million shares outstanding. Of this value, 84% are held by institutional investors (Fig. 6), such as Investment Advisors (71%), Hedge Fund managers (7%), and other banks (6%). The top 3 holders are BlackRock Inc. (10.1%), the Vanguard Group Inc (9.7%), and Donald Horton (9.24%). D.R. Horton is the second largest position in Soro's Fund Management (6.7% of his "13F" portfolio). At the end of Q3 2021, 51 hedge funds held long positions in the stock, up 13% from the previous quarter (Yahoo Finance, 2021). Regionally, 78.3% of all investors are placed in the US, followed by UK (4.2%) and Canada (2%). Overall, DHI's shareholder ownership does not possess a high concentration on a specific investor.

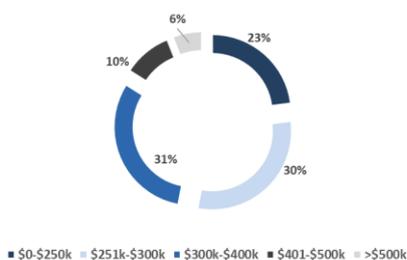
Until 2018, number of shares experienced a 2% average annual increase, and from 2019 to the present the evolution has been negative (-2%), indicating new share repurchases (Fig. 7). The company has been paying dividends since 2005, albeit in a smaller magnitude during the financial crisis (\$0.15 per share).

Fig. 3: Revenue per Segment (2020) (millions)



Source: Company's Data

Fig. 4: D.R. Horton houses sold per price segment



Source: Company's Data

Fig. 5: Mortgage Loans Provided



Source: Company Data

Fig. 6: Ownership Structure



Source: Yahoo Finance

As of now the value has been rising since 2016, where it registered \$0.32, comparing with \$0.70 per share in 2020. In the beginning of 2021, the Chairman of the Board mentioned a commitment to increase return to shareholders through dividends on a consistent basis.

Over the last 6 months, insiders have been net buyers, collectively buying more than 5.4 million shares. Overall, insiders hold 36.77 million shares, corresponding to a percentage of 10.3%.

DHI's management team has a high level of experience, with city managers having an average tenure of 10 years, division presidents of 15 years, and executive team and region presidents of 27 years. There is a separation between the Chairman and the CEO. Currently, the Chairman of the Board is Donald Horton (holding 9.23% of ownership and a tenure of 30 years), while the CEO is David Auld, holding 0.20% of the company with a tenure of 7 years.

Fig. 7: D.R. Horton Shares Outstanding 2009-2021 (millions)



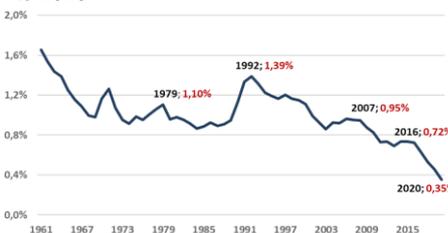
Source: Company's Data

Macroeconomic Outlook

Population growth trends

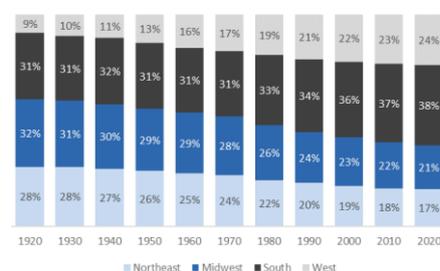
Demand for new homes is greatly driven by population growth. Results from 2020 census reveal that there is an unprecedented stagnation in **population growth**, from July 2019 to July 2020, the population grew only by 0,35%. For the past decade, US population grew 7,3%, the second-smallest decade-long growth rate since the first census in 1790 (Fig. 8). Due to an aging population, low natural growing levels will likely continue regardless of federal policy, suggesting that only increased immigration rate could foster population growth. From 2010 to 2020, three states decreased the number of residents, including two in which D.R. Horton is present, Mississippi (South) and Illinois (Midwest). This is the highest number of population-losing states since the 1980s.

Fig. 8: US annual population growth: 1900 to 2020



Source: World Bank Data

Fig. 9: Share of population across 4 US regions from 1920-2020

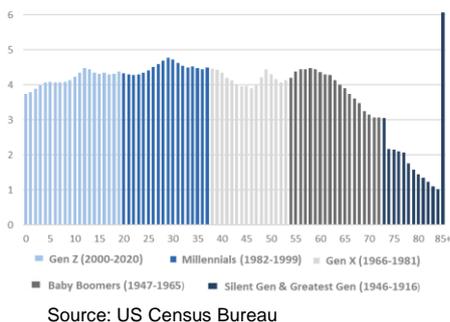


Source: US Census Bureau

Between 1970 and 2020, the Northeast and West populations switched positions: the West's percentage decreased from 28% to 17% while the Northeast's share increased from 9% to 24% (Fig. 9). D.R. Horton has a significant presence in the West region (18% of total homes closed as of 2020), opposed to the Northeast where it is only present in 2 states (New Jersey and Pennsylvania). Besides the Northeast region being associated with high house prices in the US, the company has not made any statement regarding increasing exposure to this region. DHI's geographic presence has been relatively stable since 2015, except the opening to two major markets in Ohio and Iowa in 2019.

Key Demographic Age Groups

Fig. 10: Total US population by age in 2020 (millions)



The current underbuilding of the homebuilding industry comes ahead a decade in which the largest generation in American history, the **millennials** (Fig.10), is entering the housing market in full force, peaking around 2028. Now millennials make up the largest share of homebuyers in the US at 38% (Bloomberg, 2021). Further, 86% of the younger millennials and 52% of the older range ones are buying their first homes. This has driven the share of first-time buyers in the market, which has been increasing and accounted for 31% of total house sales in June 2021 (National Association of Realtors, 2021). The D.R. Horton brand (63% of total homes sold) and Express Homes (32% of total homes sold), focus on targeting this type of customers.

According to data from the Fed Board, millennials have lower real incomes than earlier generations at the same age and appear to have stored fewer assets. This results in a decreased purchasing power, and a higher emphasis on lower to medium-cost housing which is precisely D.R. Horton’s target. This was already reflected in D.R. Horton’s data, with 35% of total houses sold being directed to millennials in 2019. The ratio increased to 42% in 2020.

This will subsequently increase demand for single-family housing, with US household growth projections implying baseline demand of 15.1 million units in 2018-2028 (Harvard University, 2018). However, the housing market has not been able to keep up with this evolution, since according to the US Census, there is a US shortage of 5.3 million of homes, as of June 2021. With the pandemic widening this gap, CNBC believes that this issue will require decades to be solved. As such, throughout the next years, home shortage will gradually decrease, despite remaining at high levels for the medium-term, implying a strong demand. D.R. Horton is well positioned to benefit from this trend, due to an increasing market share in the past, a spread geographical presence with an emphasis in higher growth markets, and an high revenue percentage from affordable homes.

“Sun Belt” area

Fig. 11: Sun Belt Region



A positive trend in the US population is the rapid growth in the US “**Sun Belt**” region (Fig. 11). The area comprises almost all South states considered in Figure 1, and three Western states (New Mexico, Arizona, and California). The region encompasses 18 states, including 7 of the 10 largest US cities (Los Angeles, Dallas, Houston, Atlanta, among others), and large mid-size metropolitan areas. DHI is present in 16 out of the 18 states. Over the past decade, the Sun Belt accounted for 75% of total US population growth. The region now holds about 50% of the national population, which is expected to rise to about 55% by 2030. Over the next decade non-Sun Belt states are projected

Fig. 16: Land Median Prices (2021)



Source: NAHB Estimates

High home prices were also affected by the rising price of land above the rate of inflation for the past decade. Tight land availability will persist, which should continue to constrain volume growth while pressuring costs. According to the Census Bureau, lot values for single-family detached homes started in 2020 increased by 18% and median lot price reached a new record high of \$53,000. The West region has the most prevalent high prices, a region where DHI registers 24% of homebuilding revenues (as of 2020) (Fig. 16). States in the South region (68% of total revenues) register higher land prices in the Western side (Arizona, New Mexico), and lower in the Eastern side (Florida, Georgia, and others). The Northeastern region registers high homes sold prices, and high land prices. D.R. Horton is only present in 2 states in the area, as big metro regions with high housing costs are not the most attractive factors for the customer segment of the company.

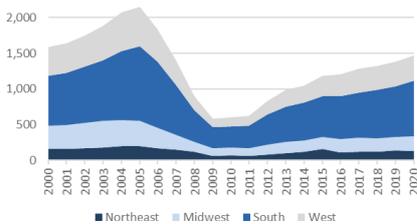
This creates an upward pricing pressure for the homebuilding industry, even though D.R. Horton has kept its price relatively stable over time, with an average annual growth of 0.5% since 2016, comparing with an average economic inflation growth for the US of 1.9%, and a new US single family house price of 2%.

Cyclicality with the US economy

At the aggregate level, housing represents a relevant portion of all economic activity, and so, changes in the housing market can significantly impact the broader economy, as it was showed in the 2007-2009 recession. For instance, rising home prices increases the value of home equity of homeowners. This allows homeowners to borrow more money against the equity in their residence, increasing consumption. Personal consumption represents 70% of the US economy, and so an increased consumption leads to a stronger US economy.

On the other hand, a decline in homebuilding sales leads to a decline in homes' prices, which decreases the market value of all homes. Subsequently, by having a decreased value of home equity, homeowners have less equity available to borrow against, which decreases personal consumption. As the US economy is tied to this metric, this will cause a downward spiral in the economy by subsequently decreasing employment, income, and GDP growth (Bureau of Economic Analysis, 2020). Overall, the homebuilding industry serves as a barometer of the direction of the economy and business cycle. As such, the industry is highly cyclical, prospering in economic upswings. Equity betas from homebuilding companies will tend to be higher than one. Currently, construction indicators are at expansion levels.

Fig. 17: New Privately Owned Housing Units Authorized by Building Permits in Permit-Issuing Places (thousands)



Source: US Census Bureau

Homebuilding indicators

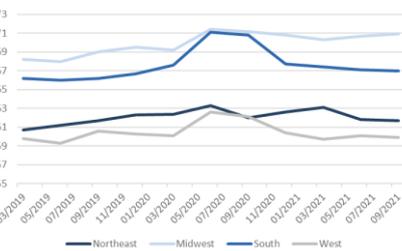
Fig. 18: Monthly Supply of Houses in the US



Source: St. Louis Federal Reserve

Since the subprime crisis, **new home construction has seen a dramatic decrease** which has recovered but not yet returned to pre-recession levels. This can be illustrated with Building Permits (*Figure 17*), an indicator that helps tracking the health of the homebuilding industry. *Figure 18* reinforces that the US has been significantly underbuilding homes leading to record-low **housing inventory** levels of new and existing homes. Since the beginning of 2021, housing inventory is up by 30%, still at pre subprime crisis lows.

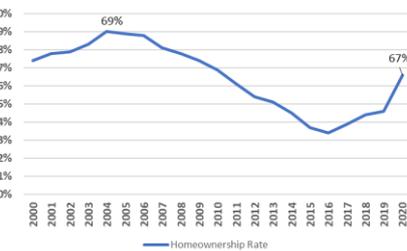
Fig. 19: Quarterly homeownership rates (US regions)



Source: US Census Bureau

Annual homeownership rates (proportion of households that is owner-occupied) **have been increasing** (*Fig. 19, 20*), having a more pronounced rise in the South region (1.5% in 2020). The US homeownership rate was 67% in 2020. The value decreased sharply during and after the subprime crisis (63% in 2016), while the Covid crisis accelerated the recovery of the rate. An increasing high demand for homes in America has also been driven **by changing trends**. Americans' desire to move from urban to suburban areas. In an era marked by a pandemic, proximity to the workplace becomes less important. More than 20% of the workforce can work remotely three to five days a week, as effectively as they could from the office. If remote work continues to persist, it will translate to 3x-4x more people working at home than before the pandemic, which drives a greater need for additional home office space (McKinsey, 2020).

Fig. 20: Annual US homeownership rate

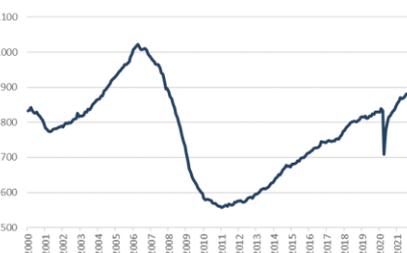


Source: US Census Bureau

Unemployment Rate

Aging workforce and challenging immigration policies have led to a shortage of construction workers driving labour prices higher. As of March 2021, residential construction employment has already surpassed its pre pandemic levels (\$839.8k as of February 2020 vs \$885.0k as of October 2021) (*Fig. 21*). Nevertheless, a significant number of construction workers abandoned the industry amidst the subprime crisis, with a slow recovery thereafter. This has driven labour costs higher, with builders competing for skilled workers. According to the Home Builder Institute, the construction industry needs over 2 million more workers over the next three months to keep up with housing demand.

Fig. 21: Residential Building Employees (thousands):

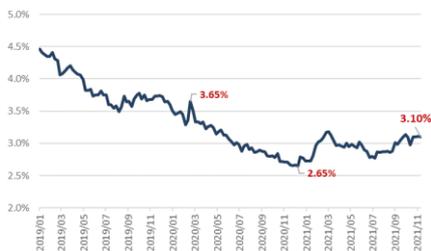


Source: St. Louis Federal Reserve

Mortgage Rates

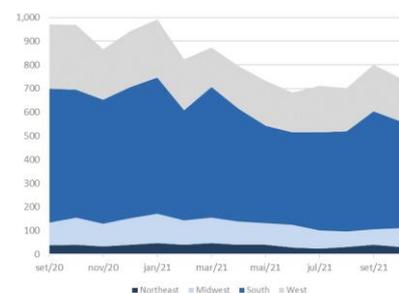
The Federal Reserve indirectly affects the housing market through the cost of financing a home purchase, the mortgage rates. In fact, 70% of all household debt represents mortgage debt (New York Fed, 2021). During the pandemic, the Fed lowered the federal funds rate and increased purchases of mortgage-backed securities, leading to a historical low mortgage rate of 2,65% in December 2020, contributing to boost the homebuilding market by providing cheaper financing. Recently rates started to gradually increase due to an economic slowdown, and

Fig. 22: 30-Year Fixed Rate Mortgage Average in the US since 2019, not seasonally adjusted



Source: St. Louis Federal Reserve

Fig. 23: New Privately-Owned Houses Sold (thousands)



Source: US Census Bureau

Fig. 24: Median Sales Price of Houses Sold for the US (thousands)



Source: St. Louis Federal Reserve

Fig. 25: Average Sales Price growth for new houses sold

	2010-2021	2016-2021
US	59,90%	20,85%
East	59,10%	26,1%
MidWest	57,27%	17,7%
South	59,56%	20,8%
West	73,48%	25,5%

Source: US Census Bureau

higher expectation of inflation (Fig. 22). Overall, Fed monetary policy decisions have the most impact on builders that cater to the entry-level and first-time, move-up markets, which represent 96% of DHI’s sales. As it is expected an increase in interest rates in 2022 (indirectly affects mortgage rates) there can be a “cool down” in the housing boom experienced in 2021, with D.R. Horton being exposed to that.

Sector Evolution

According to the National Association of Homebuilders, it takes between 6.5 and 10.5 months to build a house, depending on climate conditions. Spec homes or move-in ready homes are the type of houses that D.R. Horton usually focuses, allowing for a faster completion. According to Zillow, in 2020, homes spent an average of 25 days on the market compared to 30 days in 2019. As of 2021, that time is reduced to a week (7 days), the lowest value since the 1990’s. Normally, the average time it takes to sell a house is 55-70 days in the US. Thus, the return on core invested capital is 1 year for the industry.

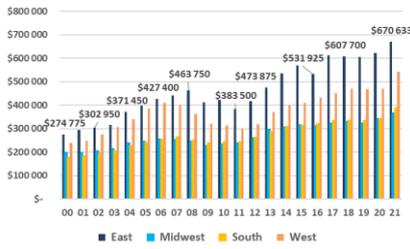
New residential home sales in the US has peaked in 2020 but has not yet returned to its pre subprime crisis levels. Home sales in 2021 remain below their value in 2020 since high prices are weighing on buyers’ affordability, with supply disruptions not allowing a desired increase in supply (Fig. 23).

Price evolution

As of 2021, homebuilding is experiencing both a shortage of homes available for sale, and a high homebuilding demand, leading to **double-digit growth in median house prices** (Fig. 24). Home prices are outpacing income growth by a 4-to-1 ratio (Fortune, 2021). In 2021, the US home industry witnessed the highest annual price growth rate since 2005, 19.9%. Onto forecasting 2022 price growth, Fannie Mae, and Goldman Sachs both project an increase of 7.9% and 16%, respectively, showing that increasing price trend will persist in 2022.

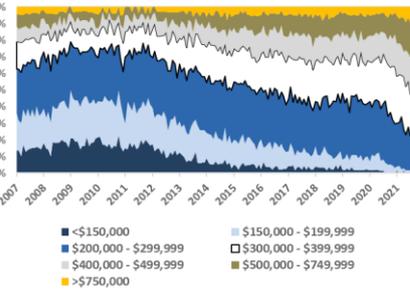
The average US house price has appreciated around 60% since the sub-prime crisis, from \$271,000 in 2010 to \$408,000 in 2021. The percentage change is similar across the 4 regions considered, except for the West, where the appreciation registered is 73.5% (Fig. 25). It is ranked as the second most expensive housing price region (Fig. 26), with Hawaii being the most expensive state in the country, with a 2021 median house price of \$615,000. Followed by California with \$505,000, and Colorado with \$343,000, all three in the Western region where DHI is present. However, the Eastern region has a larger concentration of high-cost states, with New York, Massachusetts, New Jersey,

Fig. 26: Median Sales Price of Houses Sold for the US regions



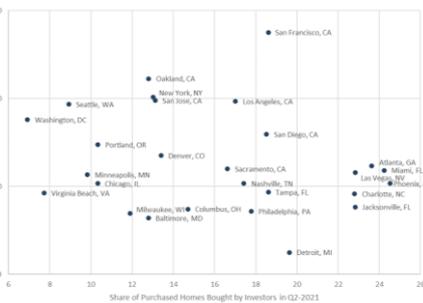
Source: St. Louis Federal Reserve

Fig. 27: Median Sales Price of Houses Sold for the US regions



Source: St. Louis Federal Reserve

Fig. 28: Price-to-rent ratio as a share of purchased homes bought by investors in Q2-2021



Source: Forbes

and Maryland, being DHI present in the latter two. The region has experienced the largest average home price appreciation in the US since 2000 (144% as of 2021), with a lower emphasis in the last 10 years (Fig. 26).

The middle housing price segment (from \$200k to \$500k) of the housing market is the largest, and accounts for 75% of all homes sold (Forbes, 2021). Under \$200,000 price range accounts for only 2% of transactions. Over the years, it has been registered a decline in sales in the lowest price segment and a subsequent increase in the higher price segments (Fig. 27). For DHI this can be seen as a risk if this trend aggravates reducing the share of homes sold in the mid-price segment. It is important to remember that the company does not possess a higher focus on below \$150,000 homes, as the average selling price is \$300,000.

▪ Homebuilding vs Rental Market

Even though homeownership rates and household formation have been increasing, there is also a rising trend to those that do not want to commit for a down payment, which are the single-family rentals. Even though this was already surging before the pandemic, Covid boosted the trend and the number of built-to-rent homes soared by 30% from 2019 to 2020 (New York Times, 2021).

Yet, it is important to account for the price-to-rent ratio (division of the median home price by the median yearly rent) across different regions, as it allows to analyse if it is more financially viable to rent or buy a home. It is observed (Fig 28) that in the states where home prices are higher such as New York or California, it is more viable to rent than to buy a home. On the other hand, states located more in the Southern part such as Virginia and Florida (where D.R. Horton a higher percentage of revenues) rather benefit the purchase of a home.

Competitive Landscape

Small versus Large Homebuilders

From a strategic standpoint, generally all the homebuilders use a similar operating model that focuses primarily on land purchases and construction activity. Homebuilders predominantly operate in 6 US regions: the Sun Belt, Central, Southeast, mid-Atlantic, Midwest and West. The Northeast is densely populated and so small privately financed homebuilders dominate.

This industry is highly fragmented. In 2019, the top 10 homebuilders only had a share of 30.4% (NAHB, 2021), the remainder is composed by small and privately financed builders that operate solely at the regional level. Large homebuilders have the significant advantage of an easier access to finance large land

purchases and construction projects with a lower cost of capital. Yet, small builders can better address growth in the custom home building market, pursuing niche opportunities, being able to establish loyal relationships with the customer and supplier.

Large homebuilders tend to expand their operations by acquiring small regional players. This constitutes a relatively inexpensive way for them to penetrate new markets. However, these M&A deals are not material in large homebuilders' balance sheets, a substantial deal between two major players rarely happens. D.R. Horton often incurs in these transactions, the most recent was in October 2020, with the acquisition of Braselton Homes in Texas for \$23 million in cash (DHI registered a total cash balance of \$3,000 million at the end of 2020).

Competitors

The largest homebuilders tend to focus on certain price and housing categories. Some on providing luxury homes characterized by high average selling prices (ASP), others on entry-level category in which buyers base their purchase decision on their ability to secure affordable financing.

Lennar is a large-scale homebuilder focusing on entry-level homes (40% of the total). It ranks second in terms of current market cap (\$33,982 million) (Fig. 29) and holds the highest revenue value as of 2020 (\$22,489 million). Lennar operates in 20 states, mainly located in the South region and Eastern states, focusing on fast-growing markets. Its ASP was \$420k in 2020.

PulteGroup primarily constructs and sells single-family homes in the US and supports its homebuilding operations through mortgage financing and land development/sales operations. In 2020, the company ranked as the fourth largest homebuilder by market cap (\$13,188 million), and third by revenues (\$11,036 million). Pulte Group is diversified across the nation with operations in over 22 states, concentrated in the Southeast, Midwest, as well as the West/Pacific region (Washington, California, Nevada). It registered an ASP of \$430k in 2020.

NVR, Inc primarily constructs and sells single-family detached homes, townhomes, and condominium buildings under three brand names. One of the brands, markets first-time move-up buyers, and the other two target luxury buyers. The company focuses only on the East side of the US (15 states from Illinois to New York). The ASP was \$371k in 2020. The company registered the fourth highest revenues value (\$7,536 million) and is currently ranked third in terms of market capitalization (\$19,088 million).

Toll Brothers constructs and sells single-family and multi-family homes, together with land development/sales, and single and multi-family rental operations.

Fig. 29: Current Market Cap and 2020 Revenue values (millions)



Source: Bloomberg

Currently, the company ranks as the fifth largest homebuilder by market cap (\$8,308 million), and by 2020 revenue value (\$7,078 million). With operations across 24 states, it focuses on higher home price states, located in the most Western part of the country (California, Oregon Washington), Texas, and the Eastern/South-eastern regions (New York, New Jersey, Florida). Due to this, it possesses the highest ASP amongst the peers considered, \$800k as of 2020.

LGI Homes also has a significant presence in the Sun Belt region and their target customers are current renters and first-time homebuyers, similar to D.R. Horton’s. Geographically, Southeast region (North and South Carolina, Georgia among others), Florida and Texas, are the main locations for the company, with a higher focus on states with lower median house prices. Despite a rapid growth in the last 6 years (26.2% annual compound growth rate of houses sold), it still ranks ninth in the list considered in terms of market cap (\$3,677 million), and revenues (\$2,367 million). As for customer segment and pricing point, LGI is the closest peer to D.R. Horton, however it is a much smaller company with high growth prospects, and still does not possess the scalability level of DHI, which may affect the comparability level between both companies.

Geographic allocation

D.R. Horton operates in 31 states (Fig. 1), possessing a larger geography diversity when comparing to direct competitors, such as Lennar with 20 states, NVR with 15, Pulte Group with 22, and Toll Brothers with 24, all values as of 2020. Despite companies not reporting data per state as segments are divided in regions, Texas has a high share revenue in certain companies’, being reported as a separate segment. Lennar relies on 13% of total revenues coming from this state, and Pulte 14%. A decade ago, the capital of Texas was among the most affordable places to live, yet now it is among the least affordable major metro regions for homebuyers outside of California, surpassing “hot” markets like Boston or New York City. For homebuilding companies that are more dependent on states with these characteristics, risks arise on higher competition and increasing demand, pushing selling prices upwards, decreasing housing affordability of buyers.

In 6 out of the total 31 states in which D.R. Horton operates, none of the competitors considered are present. These are located in the South (four), West and Midwest (both with one), being it Alabama, Iowa, Louisiana, Oklahoma, Mississippi, and Hawaii. Hawaii is the only not registering a median home price below \$170,000 (Fig. 13). It is a high home cost state (>\$500,000 average home price), where D.R. Horton positions its “Emerald Brand”. In 9 out of the total 31 states, only one of the competitors has operations in that location (mainly

Fig. 13: Median House Prices per state

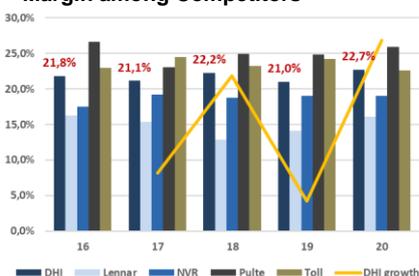


Source: World Population Review

Lennar), and in 7 all four competitors considered register home sales in the region. Despite the US homebuilding industry having a larger number of players, these are the largest in terms of revenues and market share, probably representing the biggest threat for DHI as of today.

Even though these companies can easily access new states, in some cases it is not consistent with the business model. Toll Brothers focuses on high-end homebuilding with ASP of \$800,000, reflecting this on its geographic allocation, with no to low presence in the South/Central/North region, such as Arizona, Mississippi, Illinois, Iowa, and Oklahoma (Sunbelt states), coinciding with the states with lowest median home prices (Fig. 13). For D.R. Horton, having the widest geographic range, implies that the company operates in states both with high and low median home prices, positioning its brands accordingly.

Fig. 30: Annual Homebuilding Gross Margin among Competitors

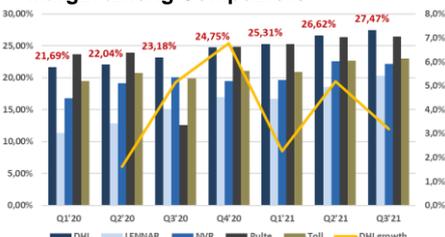


Source: Companies' Data

Profitability

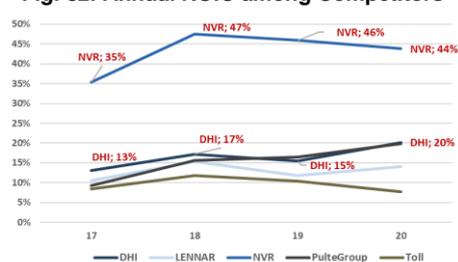
Since 2016, D.R. Horton has maintained a sustained growth in its homebuilding gross margin (Fig. 30), reaching 22.7% in 2020. The value is only below the 25.9% registered by Pulte, although this competitor has seen a decrease of the value since 2016, opposite to D.R. Horton with a 4.1% growth. Lennar is the most similar competitor comparing with D.R. Horton, considering ASP, geographical presence, and revenue values, yet its gross margin is well below the latter, recording 16.1% in 2020. Since the pandemic started, the increase in gross margin has been transversal to the industry, albeit with different magnitudes amongst the competitors (Fig. 31). Lennar and D.R. Horton express a constant growth throughout the quarters, both with an increase of 30% in gross margin value since the first quarter of 2020. In the industry, increasing labour and raw material costs have been fully offset by increasing demand and higher home prices. DHI has surpassed PulteGroup in Gross Margin value in Q3 2021.

Fig. 31: Quarterly Homebuilding Gross Margin among Competitors



Source: Companies' Data

Fig. 32: Annual ROIC among Competitors



Source: Company's Data

For the Return on Invested Capital, D.R. Horton's value has evolved from 13% in 2016 to 20% in 2020, already projected to grow to 30% in 2021 (Fig. 32). D.R. Horton's values are in accordance with PulteGroup's, and above Lennar's (14%). Both in gross margin and ROIC, Lennar demonstrates a lower operating efficiency and cost control. Toll Brothers (luxury builder) has experienced a decrease in the value since 2019, as since the pandemic started luxury homebuilders have performed worse than its peers.

NVR ROIC values are an outlier, not only in the set of peers considered here but also in the industry in general. The company is "asset light" among its competitors. In terms of cash, it is the only company with a net cash value, yielding \$1.3 billion in 2020. Overall, NVR benefits from a higher Altman z-score

Fig. 33: Competitive Performance

Gross margin	2017	2018	2019	2020
D.R.Horton	23.1%	24.0%	23.1%	25.3%
Lennar	12.8%	10.6%	12.6%	15.4%
NVR	21.4%	21.2%	21.5%	21.9%
Pulte Group	23.4%	25.0%	25.2%	26.8%
Toll Brothers	24.5%	23.3%	24.2%	22.6%
ROA				
D.R.Horton	9%	10%	10%	13%
Lennar	4%	5.9%	6.3%	8.2%
NVR	18%	25.2%	23.1%	15.6%
Pulte Group	5%	9.9%	9.3%	11.3%
Toll Brothers	6%	7.3%	5.4%	4.0%
ROE				
D.R.Horton	13%	16%	16%	20%
Lennar	10%	12%	12%	14%
NVR	33%	44%	38%	29%
Pulte Group	11%	21%	19%	21%
Toll Brothers	12%	16%	12%	9%
ROIC				
D.R.Horton	13%	17%	15%	20%
Lennar	11%	15%	12%	14%
NVR	35%	47%	46%	44%
Pulte Group	9%	16%	16%	20%
Toll Brothers	8%	12%	10%	8%
Cash Conversion Cycle				
D.R.Horton	302	327	328	321
Lennar	339	344	320	319
NVR	105	111	97	101
Pulte Group	482	430	370	391
Toll Brothers	737	657	553	578

Source: Companies' Data

(credit-strength test) than its peers. The business model is different from the norm, as companies like D.R. Horton operate in almost all US regions and aim to gain market share in the areas operating in. NVR focuses on specific markets (15 states as of 2020), benefiting from a higher operating efficiency. Nevertheless, the annual revenue growth rate of the company is lower than the industry since 2016: 67% growth for D.R. Horton and 28% growth for NVR. NVR does not benefit from strong housing markets as much as the other peers, yet in economic downturns it is able to maintain higher profit levels when comparing to the industry. In fact, it was the only homebuilding company considered here, that during the subprime crisis maintained a positive profit every year.

It is true that the vast presence spread of D.R. Horton across the US, with a more “asset heavy” business model, implies a much lower ROIC value when comparing to NVR, however, when comparing with the other peers DHI is above Lennar and in accordance with Pulte.

Lastly, when it comes to the Cash Conversion Cycle (CCC), NVR's operating efficiency allows them to take the least amount of time to convert its invested capital into cash flows from sales. With similar CCC, D. R. Horton and Lennar take almost 3x more days to complete its net operating cycle than NVR, but still with an appropriate cash cycle for the industry. Toll Brothers lacks effectiveness and comes in last place, taking almost 1.58 years to complete its cash cycle (*Fig. 33*).

Intrinsic Valuation

The key revenue drivers are the number of houses sold and the ASP per house. As D.R. Horton competitors are often present in the same US regions (analysis in “Competitive Landscape”), the total houses sold in each state/region, market share per player, and population growth, are the determinant factors to calculate the number of units sold for D.R. Horton. For the ASP, demand-supply relationships and the overall state of the economy are the key drivers.

The population evolution has empirically a strong correlation with houses sold, and average family income, land prices, and the demand versus supply relationships are the principal trends affecting prices (Freddie Mac, 2021). Housing trends change regionally in the US, and as D.R. Horton is exposed to different areas, revenues behave differently in the four US regions considered for the company.

The company's assessment is divided in West, Midwest, and South regions (*Fig. 1*), despite D.R. Horton reporting data on 6 sub-regions, as mentioned in the company overview. This is in accordance with the extracted data from Census

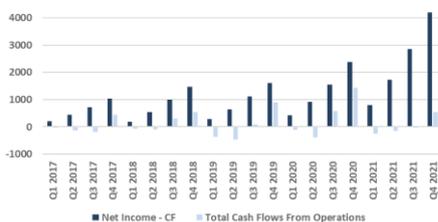
Bureau and FRED (Census Bureau). The East considered by D.R. Horton is fully interpreted as belonging to the South per the Census data, except for New Jersey and Pennsylvania which are considered Northeast in the Bureau. As such, the data belonging to these two states for the US in general (total population, and single-family houses sold), is added (with the required adjustments in single-family houses sold) in our model to the South data retrieved from the Bureau.

Operating Cash

When accounting for the cash that D.R. Horton uses for its operations versus the cash that it has available to pay out its debt, it is important to consider homebuilding seasonality. D.R. Horton obtains greater revenues and operating income in Q3 and Q4 of the fiscal year (July and September) (Fig. 34), and so reflecting the period from the Q2 and Q3 of normal calendarization.

This business seasonality originates fluctuations throughout the year in the net working capital. Thus, cash reported in the annual report is usually not representative of the whole year balance. Considering a range between 2%-5% for operating cash, we selected 2% of total cash for the operating part of the business, and the remaining to be excess cash. This because DHI reports in September, which coincides with a high cash period, therefore results are usually inflated from the rest of the year.

Fig. 34: Cash Cycle (in USD millions) from DHI's FY



Source: Company's Data

Houses Sold

- Population

The rate of population growth is slowing. Since 2010, the population has grown at an average of 2.3 million people per year, and it is projected to continue growing by a similar annual rate until 2030, averaging between 2-2.3 million population increment annually. However, it is expected to fall to 1.5-2 million per year between 2030 and 2040 and continue with a downtrend until 2060. These numbers imply a growth of 5.8-6.5% between 2020 and 2030, and of 5.2-5.8% until 2040, as net international migration is expected to overtake natural population increase in the United States. This is driven by a declining birth rate and aging population, especially amongst non-Hispanic white people (US Census Bureau, 2020).

In 2020, the North-eastern region experienced annual negative growth for the second consecutive year (-0.27% in 2020), as the Midwest also registered a negative growth but more marginal and for the first time since 2000 (-0.034%).

Fig. 35: Population Growth per region

	2000-2010	2010-2020	2020-2030	2030-2040
US	9,63%	13,72%	6,028%	5,74%
Northeast	3,19%	0,85%	-0,070%	-0,20%
Midwest	3,85%	2,00%	0,160%	0,10%
South	14,22%	10,27%	10,570%	9,37%
West	13,65%	9,09%	6,853%	7,17%

Source: US Census Bureau; Analyst Estimates

The other two regions are outpacing US population growth for every year since 2000, as it is seen in *Figure 35*.

The South and West will continue outgrowing the US until 2040, driving population growth in the country. The South region will register the highest growth for the next 10 years, when comparing with its peers. The Sun Belt region dynamics, with increasing domestic and international immigration gravitating towards this area, are the main factors to consider.

For the Midwest region, the decreasing population growth evolution of the last twenty years will persist, with special emphasis from 2030 to 2040, as given the factors mentioned, these regions will experience a higher rate of domestic emigration, and lower international immigration (*Fig. 36*).

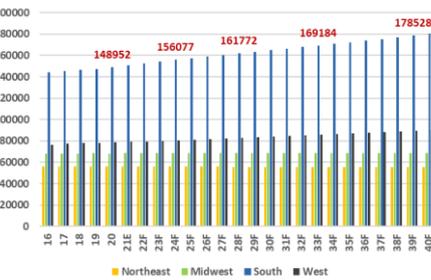
▪ Single Family Houses Sold per Population Number

Since 2000, the new single-family homes sold divided by the total population, has been of a larger magnitude in the South and the West (0.32% and 0.28% respectively in 2020), with the East having the lowest 5-year average of 0.06%. For the short term, supply constraints in labour markets are affecting homebuilding construction, creating a single-family house backlog (single-family houses authorized for construction but not yet started) of 152,000 in October (4.8% growth month-over-month), the highest since August 2006. As supply constraints ease from the second half of 2022, this imbalance will decrease, and homebuilders will benefit from the excess backlog experienced, as part of it was not transformed into product sold precisely due to these constraints. Adding this to the current, shortage of homes of 5.3 million in the US, the ratio of houses sold/population holds positive catalysts in the medium-term.

An important factor to differentiate forecasting between regions is the housing stock deficit, meaning the subtract of the estimated housing demand of Freddie Mac, from the Census estimate of housing supply (*Fig. 37*). In the Western region, South, and South-eastern part of the country the deficit is larger when comparing with the Midwest (Illinois, Indiana, Iowa, Ohio), and North. In the Northeast where D.R. Horton is not present (New York, Massachusetts, Connecticut, Rhode Island), mainly high-cost states, the deficit is also large. There is a clear positive correlation between the highest deficit states and high-cost states (*Fig. 13*). Western region suffers from a high stock deficit and high home prices. Households and millennials are struggling to afford homes in this area, as this is shown by the price to rent ratio (*Fig. 28*).

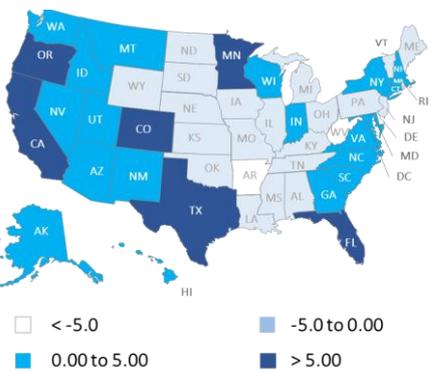
We forecast a persistency of this trend with young adults preferring renting in states such as California. D.R. Horton is affected by these factors, as total

Fig. 36: Population per region



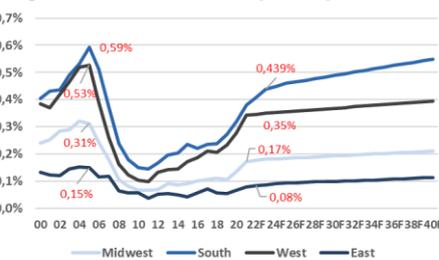
Source: US Census Bureau; Analyst Estimates

Fig. 37: Housing stock deficit as a proportion of state's housing stock (dynamic estimate considering interstate migration flows) (2020)



Source: Freddie Mac

Fig. 38: US Houses Sold per Population

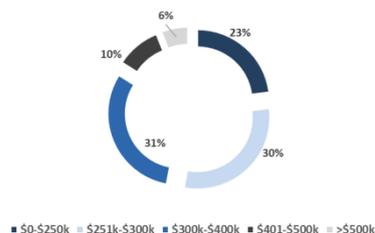


Source: Company Data; Analyst Estimates

houses sold in the region per population will plateau in the coming years, with growth being propelled by older generations and possibly higher cost homes. Furthermore, considering the population in-flow for the South, deficits are likely to follow an upward trend if supply does not increase accordingly, especially for the short term. Risks of sharp increase in housing prices due to high demand are evident, but as of now, trends are positive, and we assume a constant increase of houses sold per population. The Midwest holds a lower stock deficit and will register a lower long-term rate of houses sold per population number (Fig. 38). The population out-flow to be aggravated will not allow the deficit to increase.

Market Share

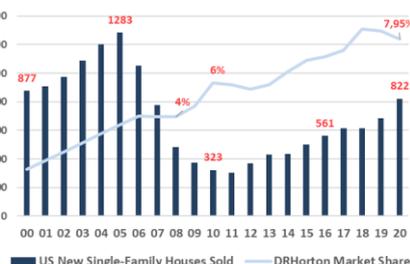
Fig. 4: D.R. Horton houses sold per price segment



Source: Company Data

The NAHB released a study inferring that 63 million households in the US, almost 50% of total households in the US, cannot afford a home that costs more than \$250,000. D.R. Horton is one of the few homebuilders (apart from LGI Homes) that focuses on building low-medium cost homes for entry level buyers. In the last quarter, 23% of D.R. Horton's sales were originated from houses selling for a maximum of \$250k, 30% from \$251k to \$300k, and 31% from \$301k to \$400k (Fig. 4). In 2020 the total ASP was \$301k. In comparison, Lennar's ASP was \$420k, Pulte's \$427k, and NVR's was \$442k.

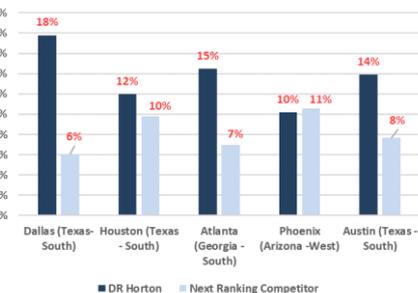
Fig. 39: Total Market Share and Total New Homes Sold



Source: US Census Bureau; Company Data

With the low segment prices accounting for 23% of total sales, and the middle segment (prices from \$250k to \$400k) accounting for 61% of total homes sold, D.R. Horton is well positioned to capture middle class homeowners, and millennials. Millennials (age 34 or less) already represent the largest generation in the population. Yet the homeownership rate is 42%, lower than Gen X numbers at the same age (around 50%). However, D.R. Horton reported 42% of revenues coming from this age group in 2020, and according to CEO statements' the ratio will increase further in the next years (Bloomberg, 2021).

Fig. 40: Market Share position in US states



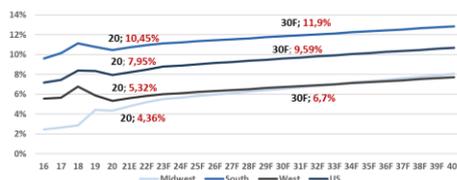
Source: Company Data

The past data of D.R. Horton's market share is supported by Fig. 39. The evolution of market share in the recent years for the US is strongly positive, with a sustained growth since 2000 with low volatility. Even during the sub-prime crisis, D.R. Horton's market share was only marginally negatively affected, resuming growth, thereafter, reaching approximately 8% in 2020. Despite the recent decrease in 2019 and 2020, the company has mentioned a return to positive market share growth in 2021, and we forecast it to be 8.2%. The dominance is also evident in the state's statistics, especially in the South (Fig. 40). In the top 5 markets ranked by market share, the next best competitor only surpasses the company in Phoenix by 1% difference. According to company data released in the last quarter earnings, out of the 44 markets operating in (including

districts), in 15 (35%) D.R. Horton is the leader in terms of market share, and in 35 (80%) it is in the top 5.

In the three regions considered for the company, since 2016, growth has been negative only in the West, with a sharp decrease in 2019 and 2020, from 6.76% in 2018 to 5.32% in 2020. In the forecast (*Fig. 41*), this region will hold the lowest market share growth over time. The high-cost housing/lot area is a negative catalyst for the company. The Midwest share has shown a strong appreciation (2.38% in 2018 to 4.36% in 2020), and it is forecasted to persist in the long-term, surpassing the West in 2030, reaching 6.7% market share comparing with 4.36% in 2020. The South experienced a strong appreciation since 2016, from 8% to 10.45% in 2020. With a stock deficit in some states, and low lot prices as of today (*Fig. 37*), we forecast an increase in the long term for this value. However, increasing competition amongst homebuilders in these states will be a negative catalyst for D.R. Horton. For that reason, although we believe the company has resources and knowledge to be a key player in the market, and will maintain market share growth, the forecast is conservative when considering these dynamics. In 2020 the market share value for the South region was 10.45%, and in 2030 it is forecasted to be 11.9%.

Fig. 41: Market Share per region



Source: US Census Bureau; Company Data; Analyst Estimates

The single-family homes shortage comes as builders, after the housing market crisis, were focused only on the move-up buyers. Young buyers were affected by weak employment, weak wage growth, and weak pricing power. Only now homebuilders are introducing product lines at lower price points, but still not matching the full needs of young adults (CNBC, 2017). Only D.R. Horton, mainly with “Express Homes” line launched in 2014, and LGI Homes, have substantial entry-level product. NVR, MDC, and Tri Point also introduced lower priced products, but not entry-level priced homes. Even luxury brands such as Toll Brothers have tried to enter this market (CNBC, 2017). Despite large homebuilders having a substantial amount of resources available, entering entry level home market comes with a cost to the bottom lines, as efficiency needs to be higher to maintain margins. We assess a medium risk regarding large homebuilders shifting their strategy to enter this type of market, as we believe that such a strong business model change will require a large period of time to be successful, plus D.R. Horton is already established in these type of markets, giving competitive advantage for the company.

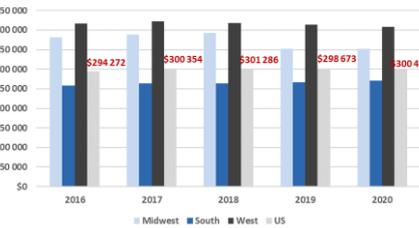
A large scalability level, strong regional position, past track record of market share growth, being the largest US homebuilder for more than two decades, an experienced management that was able to propel the company for growth after the financial crisis, and a positive market positioning in terms of pricing point with

Fig. 42: US Market Share



Source: US Census Bureau; Company Data; Analyst Estimates

Fig. 43: D.R. Horton's Annual ASP



Source: Company Data

Fig. 44: D.R. Horton's Quarterly ASP (thousands)



Source: Company Data

Fig. 45: US and D.R. Horton's ASP growth

	2016-2020	
	US	DR Horton
US	7,2%	2,1%
Northeast	16,9%	-
Midwest	9,7%	-7,7%
South	6,5%	5,2%
West	8,6%	-2,2%

Source: Company Data

favourable demographic trends, provide confidence of a bright future for the company's market share (Fig. 42).

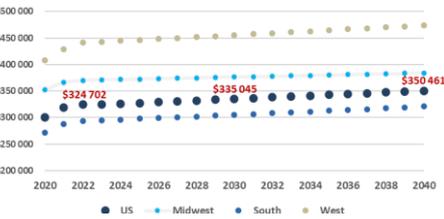
Average Selling Price (ASP)

Since 2016 to 2020, the overall ASP for the company has grown by 2%, demonstrating an average price stability (from \$294,272 to \$300,421, Fig. 43). However, recent price pressure trends are affecting D.R. Horton. In quarterly data, since the end of 2019, house prices for DHI have increased 15%, standing at \$345,000 (Fig. 44). This compares with an 18% growth of the US overall market values. Despite the larger recent increment in prices for the company, and positive correlation with the market price change, the trends are not proportional and move in different directions (Fig. 45). Since 2016, the evolution in ASP in the Midwest for the company is the opposite when comparing with the data for the region in general (9.7% versus -7.7%, respectively). The same happens in the West, with an appreciation of 8.6% in the region, and a depreciation of 2.2% in D.R. Horton's terms. The increasing demand and population growth in the South has caused this region to surpass the Midwest in terms of average house price in 2016, for the first time since 2000 for the overall US homebuilding industry. This dynamic has been exacerbated until 2021 (\$388,000 in the South and \$367,000 in the Midwest, without taking into account the last quarter of the year). For D.R. Horton that does not happen yet, as Midwest's ASP is higher than the South's (\$352,000 versus \$271,000, respectively), despite the growth in the last in contrast with the negative evolution in the former. For the West, ASP growth is also opposite between D.R. Horton and the market, however the West has the highest ASP in company's terms (2nd highest in the market behind Northeast).

There can be 3 reasons for the disparity, firstly D.R. Horton aims to maintain the \$0-\$350,000 as the highest percentage of homes sold, and the value for the regions in general consider homes from all price points. Even if the share of total houses in low-medium cost range in the market decreases, D.R. Horton will aim to always remain in that range. For the US data, if the appreciation in prices is more notable in luxury and high-cost homes, that will not be reflected in D.R. Horton's terms, for example. Secondly, the geographical presence within the regions may also affect the analysis. For example, in the Midwest D.R. Horton's presence is limited, not operating in 6 out of the 12 total markets. Thirdly, Forestar's merger has allowed the company to acquire land at "below market prices", improving cost efficiency of homebuilding.

Notwithstanding, it is forecasted a higher growth rate for the average selling price of D.R. Horton's houses in the next 2 years when comparing it with the recent

Fig. 46: D.R. Horton's average selling price per region forecast

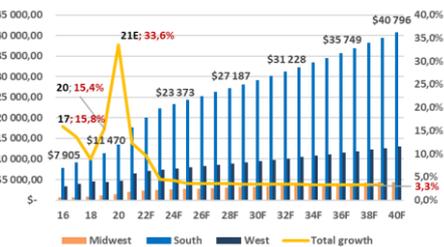


Source: Company Data

past, across the three regions (total ASP growth of 8% from 2020 to 2022 versus 2% from 2016 to 2020). Despite the “underbuilding” of single-family homes being exacerbated since 2020, the shortage of homes has been gaining relevance since 2010 (12.3 million US households were formed from 2012 to 2021 but 7 million new single-family homes were built) and may remain in the market for the next decade. This adds to increasing land prices powered by the pandemic, and labour and materials shortages, with a forecasted strong demand in the next years. These factors cause a higher inflation than expected. However, we assume the inflation value to converge back to 2% growth annually for the long term, as the FED mentions this to be “transitory”. Overall, the model incorporates these trends with a growth on the company’s US ASP over time but keeping the value within the \$300k-\$350k range (Fig. 46). Considering an average inflation rate of 1.9% since 2016 to 2020, the average growth of ASP for the company was 0.5%. The model considers, for the long term, an inflation rate of 2%, and a 0.5% price growth for D.R. Horton, similar relationship that the company has experienced in the past.

Homebuilding Revenues

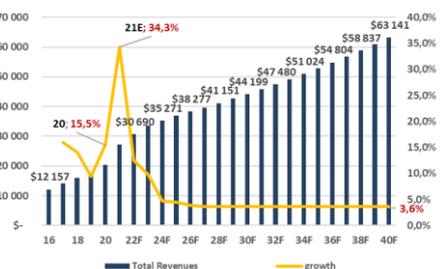
Fig. 47: Homebuilding Revenues per region (millions)



Source: Company Data; Analyst Estimates

Considering the drivers mentioned (Homes Closed p/region = total population × houses sold per population number × market share), the model predicts a maintenance of the share of total homebuilding revenues originated in the Southern region, from 69% in 2020 to 70% in 2030. The West is the only region with a decrease from 24% to 23% in 2030, continuing the trend experienced since 2016 where the value was 28% and strongly decreased to 24%. Overall, this reflects the increasing focus on entry-level homes, and as the region is characterized as high cost in terms of both houses and land, we consider better opportunities in the South.

Fig. 48: Total Revenues (millions)



Source: Company Data; Analyst Estimates

Overall, homebuilding revenues increase from \$19,644 million in 2020 to \$41,883 in 2030, an average growth rate of 8%, with a large increase in 2021 of 34%, approximately (Fig. 47). In the long term the growth rate for homebuilding revenues averages 3.3%, and the total revenue value for the company stabilizes at around 3.6%. In accordance with the expectation of our model for the US GDP growth rate, with a 2% inflation target to be continued by the FED, and a 1.6-1.7% real GDP growth predicted by the Congressional Budget Office (CBO, 2021) (Fig. 48).

Cost of Sales and Gross Margin

Cost of sales for the homebuilding segment includes home sales, and land/lot sales. For the home sales, it includes the construction costs and all applicable

Fig. 49: Quarterly Gross Margin

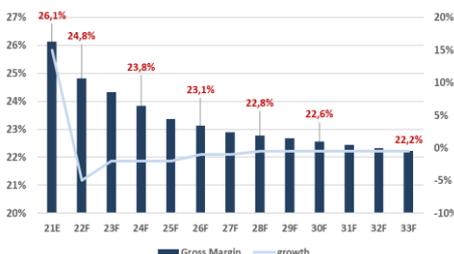


Source: Company Data

land acquisition and development, whether its incurred or estimated to be incurred. The same applies for land/lots sold, although resale of land is not a recurring operation for D.R. Horton (representing less than 1% of total revenues). Homebuilding cost of sales in 2020 was above the total value of cost of sales due to intercompany eliminations with Forestar.

For 2021 and 2022, D.R. Horton predicts higher cost of sales (no specific growth value mentioned) when comparing with the past data, due to labour shortages, increasing labour prices, inflationary environment on raw material prices, and increasing land prices. However, the outlook for gross margin is positive, as currently the factors mentioned are not translating in cost overruns. Its national scalability, and cost efficiency are maintaining margin's positive trend (analysis on competitive landscape). Since the last quarter of 2020, the homebuilding gross margin has grown from 24.1% to 26.9% in September of 2021 (highest quarterly value recorded), a 11.6% growth (Fig. 49). For total 2021, we consider a value of 26%, below the value recorded in the third quarter.

Fig. 50: Annual Gross Margin



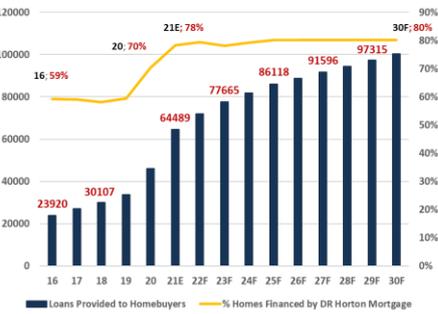
Source: Company Data; Analyst Estimates

We consider, in our model, a strong demand being sustainable for the foreseeable future, which supports strong margins as volumes increase. However, we find the margin expected in 2021, and registered in the last quarter, as not sustainable in the long-term, at least at the current value. We expect gross margins to moderate as current D.R. Horton's home ASP appreciation decreases, especially through a greater supply that will enter the market, mainly in Southern states. Besides, this growth value in a long term perspective is not coherent with the company's strategy in capturing low-to-mid price range segments. However, we are confident in a solid value above the average recorded since 2016 (21.8%). Adding to the volume support, D.R. Horton has been a gross margin leader amongst competitors (as shown before), with a higher emphasis since the pandemic started, demonstrating the high level of operational efficiency with national scalability and a strong supply chain. For the long term, margin reaches 22.6% in 2030 (Fig. 50).

Financial Services

Financial Services represented, as of 2020, 2.9% of total D.R. Horton revenues. It is important to consider the indirect effect of this segment to the homebuilding market. If mortgage loans conditions deteriorate, homebuyers are less prone to choose D.R. Horton as their seller, when buying a home built by the company, customers benefit from the simplicity of incurring in a loan from the same institution. In 2020, 98% of total loans provided, derived from the homebuilding segment clients.

Fig. 51: D.R. Horton's percentage of homes financed by D.R. Horton Mortgage



Source: Company Data

The services depend on the ability of the company to provide competitive interest rates versus other homebuilding companies or credit agencies, and the viability of third-party purchasers, since approximately 66% of mortgage loans provided in 2020 were sold directly to Fannie Mae or Ginnie Mae, and 28% were sold to two other major financial entities (total of 94%). As mentioned in the annual report, for the future, the company aims to establish loan purchase arrangements with additional financial entities as the dependency on Fannie Mae/Ginnie Mae is high. The company will continue to be affected by the liquidity provided by these agencies, with any significant change regarding the viability of these institutions being a major risk for D.R. Horton and other homebuilders. These can have an impact on interest and mortgage rates, which consequently affects demand for new homes.

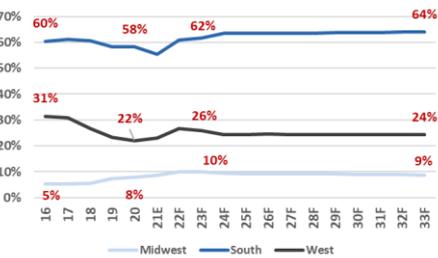
Fig. 52: Total Financial Services Revenues (\$millions)



Source: Company Data

Since 2016 the percentage of D.R. Horton homebuyers that received financing from DHI Mortgage subsidiary suffered a sharp increase, after reaching 68% in 2020, comparing with 55% in 2016. D.R. Horton has provided a program to offer below market interest rates to homebuyers by occasionally entering forward sales of mortgage-backed securities in the process, expanding coverage in certain markets, and increasing efficiencies resulting from technology advances. Moreover, in 2020 the approval of the CARES act, a stimulus containing provisions directly related to housing, with economic support to families and small businesses caused a lower percentage rate of loan default, improving confidence in the mortgage market. The percentage of homes financed by DHI will increase gradually, reaching 80% in 2030 (Fig. 51), as one must consider customers without the intention of incurring in loans and others preferring loans in other financial entities. Overall total revenues hold a stable evolution for the long term, reaching \$1,730 million in 2030 (Fig. 52).

Fig. 53: Inventory Share per region

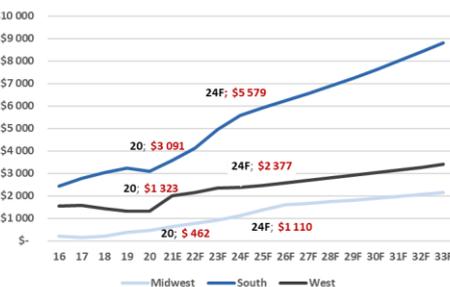


Source: Company Data; Analyst Estimates

Inventory and ROI

For inventory, the company considers finished homes and homes in construction in progress. In terms of land there are three categories: land developed/under development, land held for development, and land held for sale. In 2020, the land developed/underdevelopment accounted for 98% of total land value, with the other two metrics registering the remaining 2% (land sale is not a recurrent operation). Overall, homes in inventory accounted for 48% of total inventory, with land possessing 39% share, and Forestar the remaining percentage (13%). Regionally (Fig. 53), the South holds the highest percentage value of total inventory (58%), the same happening with homes closed (76% in 2020).

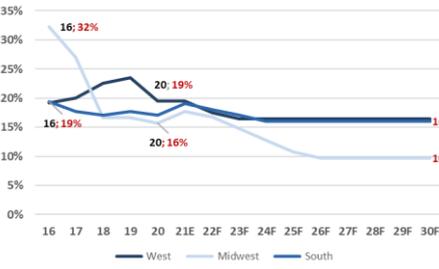
Fig. 54: Land Total Value per region (millions)



Source: Company Data, Analyst Estimates

For the total value of land (Fig. 54), in the short term, price growth will be more evident transversally across all regions. The high demand is the main catalyst,

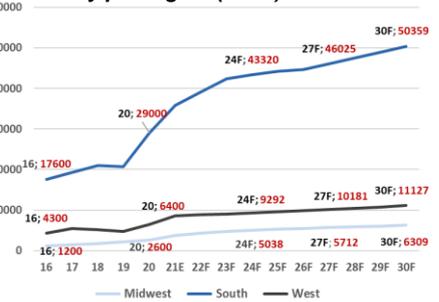
Fig. 55: Number of Land in Inventory as a percentage of Homes Closed



Source: Company Data; Analyst Estimates

especially for the South, where the population per acre available will increase when comparing with the other regions. The higher total value for land in the South segment, also reflects the increasing percentage of homebuilding revenues expected to come from this area, from 68.6% in 2020 to 70% over the long term. An important analysis in terms of land is Forestar's acquisition in 2018. It is notable the increasing efficiency in terms of total land in inventory as a percentage of homes closed, as the ratio decreases since 2016, for example, from 32% to 16% in 2020 in the Midwest region. It is forecasted to decrease to 10% in the long term, as the decreasing population, lower demand in comparison with other areas, and decreasing competition, will allow for a better land efficiency. For the South this decrease is less evident, from 19% in 2020 to 16% in 2030 (Fig. 55).

Fig. 56: Number of Homes in Inventory per region (units)



Source: Company Data; Analyst Estimates

Forestar allows for the acquisition of land below market prices, enhancing operational efficiencies by expanding relationships with land developers, as this is an established company present in 21 US states. We believe the synergies created are not yet fully incorporated, as the acquisition was recent. D.R. Horton will continue to take advantage of the robust land supply chain, and regional diversity of land positioning in Forestar.

Fig. 57: Houses in Inventory and Homes Closed growth



Source: Company Data; Analyst Estimates

Houses in inventory for D.R. Horton increased considerably in 2020 in all regions (Fig. 56). In the Midwest the increase was of 18%, South 44%, and West 33%. So far, in 2021, inventory value has recorded a 26% increase comparing with the first 9 months of 2020. For final 2021, houses in inventory reach 48,000, approximately, a 27% increase YoY. In Figure 57 it is noticeable the large growth in inventories in 2020 and 2021 when comparing to the growth in homes closed. However, in the long term, these values are predicted to converge and maintain the positive correlation experienced so far, with an increase of around 3% for the future.

Fig. 58: Total Inventory Value (million) and ROI



Source: Company Data; Analyst Estimates

Return on inventory (pre-tax core result for the year divided by homebuilding inventory), has seen an increase in 2020 to 2%. In 2021, the value is expected to reach all-time highs, projected by our model a value of 29%. The factors propelled by the pandemic that have defined the 2021 industry are atypical such as the reduced period in which homes remain in the market for sale. Homes across the US are selling faster than in the past years. The decrease in this value positively affects the ROI across competitors as company's generate revenues at a faster pace. With these types of factors not being sustainable in the long term, the ROI at these levels will also not be sustainable in the long term (Fig. 58). However, we are confident that the return will hold in the future at similar levels than the one experienced in 2020 (25%), reaching 24.2% in 2030. Excluding

NVR, this value is in accordance with PulteGroup’s (25% in 2020), and above Lennar’s (20%).

Overall, inventory value growth has a strong increase in 2021 (\$17,298 million), and stabilizes in the following years, reaching \$27,629 million in 2030.

FCFF, ROIC, and Long-term growth rate

Since 2016 until 2020, return on invested capital (ROIC) holds an average of 16.4%, with an increase of 54%. In 2020 the value reached 20%, a record high for the company. Despite the inventory buildup experienced throughout the 2021 FY with higher core invest capital comparing with the past (\$17 million in 2021 versus \$13.3 million in 2020), the industry has also benefited from a reduced period in which homes remain in the market for sale, as previously mentioned. In 2021, the time window is 7 days, which affects positively the ratio, as company’s generate revenues from each home built in a faster pace. Plus, the ROIC computation was lagged for one year, and so 2021 core result considers 2020 core invested capital, inflating the value. DHI mentioned an expected strong demand for the next years, and the inventory buildup in 2021 is justified precisely due to that. Nevertheless, these factors will normalize in the future, due to supply disruptions easing, allowing for a higher number of houses in the market. As such, we expect the ROIC value to peak in 2021 (30%) stabilizing further to more normal levels (17%) (Fig. 59). The value is sensibly 1% above the average recorded in the last four years (16%), and still above competitors’ values (excluding NVR).

For the Free Cash Flow to the Firm (FCFF), 2021 was a negative outlier, mainly caused by the 30% increase in inventory level, propelled by increasing homes in inventory (48,000 in 2021, versus 38,000 in 2020), both finished homes and construction in progress homes, as building delays affected D.R. Horton’s ability to capitalize all its backlog. As inventory value growth normalizes FCFF values remain stable after 2023, reaching \$4,450 million in 2033.

As mentioned in the revenues long term growth rate, assuming an inflation rate of 2% for the future, we consider a nominal GDP growth rate around 3.6%, as the CBO projects a real GDP growth rate in the long term of 1.6% to 1.7%. The Core result growth of the company will register a similar value to the nominal GDP evolution (around 3.4%), implying a company growth rate similar to the one experienced by the economy (Fig. 60).

Cost of Capital

Fig. 59: FCFF and ROIC



Source: Company Data, Analyst Estimates

Fig. 60: Core Result and Growth Rate



Source: Company Data, Analyst Estimates

For discounting the company’s core and non-core cashflows, the cost of capital has been computed. Although the company operates in two distinct business segments, namely homebuilding and financial services, only one WACC was used for both. Financial Services represents only 3% of total revenues, and for the long term, 98% of loans originated are attributable to D.R. Horton’s home sales, both segments are extremely positively correlated, and share similar risks.

The CAPM was applied to compute the cost equity. US 10-Year treasury yield was used as risk-free rate, as it is considered indicator of investor confidence, protected by the U.S. government. Due to its high liquidity, it is viewed as one of the safest investments in the market. Given the current abnormal low values of treasury yields, the value considered is an average of the past ten years. For Market Risk Premium, it was used the Damodaran recommendation for 2020, yielding a value of 5.5%, falling between the market interval recommendation of 5% and 7%.

For the equity beta computation, three years of weekly returns from D.R. Horton were regressed against the market portfolio, MSCI World index, through a Rolling Beta method of 4-weeks. The world index was chosen instead of the S&P 500 because what is relevant for investors with globally diversified portfolios, is the correlation of the stock with the rest of its assets. Therefore, the World Index is a better representative of the investor’s portfolio than the S&P 500.

A β_e was obtained, for the median (0.23), 10th (-0.71) and 90th percentile (1.35). This beta was not unlevered as DHI has stated that it aimed to maintain the capital structure constant. Additionally, the same procedure to calculate the β_e of its peers (Lennar Class A shares, NVR, and Pulte) was applied but afterwards all the betas were unlevered and then averaged, arriving at an industry β_u . The β_u was relevered with DHI’s capital structure (D/E of 5%), obtaining a β_e for the industry (DHI’s peers considered), bounded by the median (0.26), 10th (-0.73) and 90th percentiles (1.56). Lastly, we calculated a confidence interval (C.I.) for DHI and its competitors’ beta, arriving at a 95% C.I. between 1.25 and 1.72.

D. R. Horton’s equity betas (-0.71; 0.23; 1.35) values were relatively lower than the industry average ones (-0.73; 0.26; 1.56) (Fig. 61). It would not make sense to choose a beta that was negative neither a beta that was less than 1, given the cyclicity of the business. Therefore, we opted for the equity beta in the upper bound, choosing the one from D.R. Horton (1.35) rather than the industry one (1.56) to better reflect our vision of the company. Firstly, there are always significant differences among peers, such as different capital structures, different scalability levels, and different business models. Secondly, even though there is a vast number of homebuilders in the US, only these three are comparable in

Fig. 61: Lower and Upper bounds of β_u and β_e for DHI and its peers

	Lower Bound	Median	Upper Bound
β_u D.R Horton	-0.71	0.23	1.28
β_e D.R Horton	-0.77	0.23	1.35
β_u Industry Average	-0.70	0.25	1.48
β_e Industry Average	-0.73	0.26	1.56

Source: Analyst Estimates

Fig. 62: R_d and β_d calculations

	D.R. Horton	Lennar	NVR	Pulte
Cost of Debt (R_d)	3.96%	3.81%	3.06%	4.19%
Credit rating	BBB+	BBB	BBB+	BBB
Method 1				
Cost of Debt (R_d)	4.89%	4.09%	2.83%	4.83%
YTM Corporate Bond	4.90%	4.10%	2.83%	4.84%
Loss Given Default	0.6	0.6	0.6	0.6
Probability of Default	0.0105%	0.02%	0.0007%	0.0084%
Implied β_d	0.327	0.299	0.162	0.368
Method 2				
Cost of Debt (R_d)	3.03%	3.53%	3.28%	3.54%
Risk free rate	2.16%	2.16%	2.16%	2.16%
Credit spread	0.87%	1.37%	1.12%	1.38%
Implied β_d	0.157	0.249	0.203	0.251

Source: Analyst Estimates

Fig. 63: WACC

10Y Treasury Bond	2.16%
MRP	5.50%
D/E (Market Cap)	6.33%
Re	9.60%
Rd	3.96%
βd	0.24
βe	1.35
WACC	9.18%

Source: Analyst Estimates

terms of market cap, and stock market liquidity. Yet, at the same time this limited set of peers, constraints our analysis, leading us to choose the β_e derived from DHI's rolling beta regression.

The cost of equity that we obtained, through the 1.35 rolling beta, was 9.60%. Finally, the cost of debt, was computed with the yield to maturity of a 10-Year bond issued by the company (4.9%), probability of default, and loss given default through the formula ($r_d = YTM - PD \times LGD$) (Fig. 62). The value considered was 4.89%. Additionally, we also computed the cost of debt based on D.R. Horton's credit spread, obtained through the spread of a 10-Year credit default swap of the company (Bloomberg). By adding the credit spread to the risk-free rate, we obtained a cost of debt of 3.03%. The country risk premium was not incorporated in the formula as the US is considered to have a 0% risk premium. Both values obtained for the cost of debt were averaged, deriving a 3.96% cost of debt. Overall, the WACC value was obtained by combining DHI's capital structure, cost of debt and equity, as well as its tax shields, resulting in a value of 9.18% (Fig. 63).

Multiples Valuation

For the peer group, companies in the homebuilding industry only selling in the US, with similar regional distributions, and with similar capital structures are considered. Companies selected are Lennar, NVR, PulteGroup, and Toll Brothers, with market caps ranging from \$8 billion to \$39 billion. D.R. Horton's end of fiscal year (30th September) is close to Toll Brothers' one (31st October), corresponding approximately to the conventional Q3 of a calendar year. Nevertheless, Lennar (November 30th), NVR (December 31st) and PulteGroup (December 31st) have a distinct fiscal year end, only reporting roughly at the end of the year, relating to the conventional Q4. To make companies comparable, the financial data used for the multiples was adjusted based on the conventional Q3. As such, data from Lennar, NVR and PulteGroup comes from a combination of Q4 of 2020, plus the first three quarters of 2021. As for D.R. Horton data used was our 2021 estimations. Toll Brothers values were based on the release of its latest annual report. Two methods were considered, the first one is the multiples of the competitors mentioned above, and an analysis of the historical values of the P/E ratio of D.R. Horton.

For the competitor's analysis, the metrics considered are current P/E Ratio, EV/EBITDA (TTM), P/Sales (TTM), P/Book (TTM), and EV/Sales (TTM) (expressed in Figure 64). In Fig. 65 the first and third quartile values are represented, as well as the price target obtained from the DCF model (\$139). Toll

Fig. 64: Competitors' Multiples

	DR Horton	Lennar	NVR	Pulte	Toll Brothers
Mkt Cap (USD) (millions)	\$ 39,276	\$ 35,926	\$ 21,137	\$ 14,513	\$ 7,847
Price (as of 15/12)	\$ 107	\$ 117	\$ 5,936	\$ 56	\$ 60
P/E	10.17	8.71	17.57	8.43	10.97
EV/EBITDA	8.57	8.85	12.64	6.72	9.91
P/S	1.44	1.41	2.33	1.16	1.05
EV/SALES	1.57	1.54	2.21	1.21	1.28
P/B	2.56	1.73	7.02	2.03	1.74

Source: Companies' Data; Analyst Estimates

Fig. 65: Multiples Valuation-Competitors



Source: Analyst Estimates; Companies' data

Brothers and NVR hold a higher value in almost all multiples considered. Toll Brothers is a “premium company” due to its customer target, which may justify that multiple. However, it is not seen in ROIC values, gross margins, or other profitability ratios (Fig. 33), when comparing against competitors. NVR’s premium ROIC and higher operational efficiency are also mirrored on the multiples, especially on the P/Book ratio, as the company is “asset light”, as mentioned in the competitive landscape. Overall, the median second quartile price implied by the multiples (\$96) is lower than the one implied by the DCF valuation, which is closer to the third quartile median of \$133.

We normalized EBITDA, earnings, and book value of equity for extraordinary events that occurred during 2021. NVR accounted for a major contract land deposit recoveries that was significantly higher when compared to previous years and when compared to the proportionate increase in contract land deposit for that year. Additionally, Toll Brothers registered a one-off event of expenses related to early retirement of debt. These values were normalized, considering pre- and post-tax adjustments.

As for the analysis of the P/E ratio historical of the company (Fig. 66), the current value is 10.17. The average recorded since 2014 is 12.6, with the standard deviations being 17.2 and 8.1. The current value is below the average, and in the graph, it is notable that when the ratio is well above or below 12.6, it tends to converge to that value. With current EPS of \$10.56, assuming a P/E ratio equal to the average, the implied share price would be \$133, closer to the \$139 in our DCF model.

Finally, with core result estimate of \$3.979 billion in 2022 by the analysts’ model, company trades at an implied forward P/E ratio of 9.99x, similar to the one experienced today (Fig. 67). For the following years, the discount of the implied P/E ratio comparing with today’s value increases, reaching 13% in 2025, with a P/E ratio of 8.86.

Sensitivity Analysis

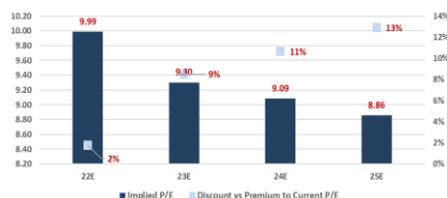
A sensitivity analysis is applied to the respective terminal growth rate derived from the model, and the weighted average cost of capital value (Fig. 68). To perform the analysis, a delta of 0.5% for the terminal growth rate, and to the WACC value was applied. With exceptions in both metrics to include the terminal growth rate and WACC obtained from our model, 3.4% and 9.2%, respectively. It is evident that if the US nominal GDP growth rate is higher than what our model incorporates, and consequently so is the long-term growth rate of the company, the share price increases, reaching \$158. The opposite happens to a decrease in

Fig. 66: D.R. Horton Historical Daily P/E



Source: Bloomberg; Analyst Estimates

Fig. 67: D.R. Horton Implied P/E ratio



Source: Analyst Estimates

Fig. 68: Price Target

		Growth rate				
		2.50%	3.00%	3.4%	4.00%	4.50%
W A C C	9.2%	\$ 128.01	\$ 133.76	\$ 139.37	\$ 148.58	\$ 158.36
	9.7%	\$ 120.06	\$ 124.76	\$ 129.31	\$ 136.65	\$ 144.32
	10.2%	\$ 113.32	\$ 117.21	\$ 120.93	\$ 126.88	\$ 132.99
	10.7%	\$ 107.56	\$ 110.81	\$ 113.89	\$ 118.77	\$ 123.71
	11.2%	\$ 102.60	\$ 105.34	\$ 107.92	\$ 111.95	\$ 116.00
	11.7%	\$ 98.30	\$ 100.63	\$ 102.80	\$ 106.18	\$ 109.53
	12.2%	\$ 94.56	\$ 96.54	\$ 98.39	\$ 101.23	\$ 104.04
	12.7%	\$ 91.29	\$ 92.99	\$ 94.56	\$ 96.98	\$ 99.34
	13.2%	\$ 88.41	\$ 89.87	\$ 91.23	\$ 93.29	\$ 95.30

Source: Analyst Estimates

Fig. 69: Total Shareholder Return

		Growth rate				
		2.50%	3.00%	3.4%	4.00%	4.50%
W A C C	9.2%	20%	26%	31%	39%	48%
	9.7%	13%	17%	21%	28%	35%
	10.2%	7%	10%	14%	19%	25%
	10.7%	1%	4%	7%	12%	16%
	11.2%	-3%	-1%	1%	5%	9%
	11.7%	-7%	-5%	-3%	0%	3%
	12.2%	-11%	-9%	-7%	-5%	-2%
	12.7%	-14%	-12%	-11%	-9%	-6%
	13.2%	-17%	-15%	-14%	-12%	-10%

Source: Analyst Estimates

the evolution of the US economy. The WACC also affects the share price, in this case we assume the lowest value in the analysis as being the one obtained from our model (9.2%) for a conservative approach, as the industry is cyclical and riskier than the overall economy evolution. With a WACC of 10.7% (assuming constant growth rate), the price decreases to \$113.89, still above the market price. In *Figure 69* the total shareholder return sensitivity to the variation in WACC and growth rate is registered.

Fig. 70: Risk of Occurrence

	Risk of Occurrence
Bear case 1	High
Bear case 2	Low
Bear case 3	Medium
Bear case 4	Medium
Bear case 5	Low
Bull case 1	Low
Bull case 2	Low
Bull case 3	Medium
Bull case 4	Medium
Bull case 5	Medium

Source: Analyst Estimates

Scenario Analysis

We divided the scenarios into 3 main possibilities, the base, bull, and bear case. Both bear and bull cases are composed of situations in which we believe there are different probabilities of occurrence (*Fig. 70*). The effects on the share price and shareholder's return are shown on *Figure 71*.

Fig. 71: Scenario Analysis

	Share Price	% growth from the base case	Shareholders' Return	% growth from the base case
Bear case 1	\$ 136.2	-2.21%	27.85%	-9.33%
Bear case 2	\$ 104.8	-24.75%	-1.41%	-104.59%
Bear case 3	\$ 103.8	-25.48%	-2.34%	-107.62%
Bear case 4	\$ 115.1	-17.39%	8.16%	-73.44%
Bear case 5	\$ 135.3	-2.90%	26.96%	-12.23%
Base case	\$ 139.3	0.00%	30.72%	0.00%
Bull case 1	\$ 140.6	0.90%	31.89%	3.82%
Bull case 2	\$ 154.3	10.80%	44.74%	45.66%
Bull case 3	\$ 147.1	5.60%	37.98%	23.65%
Bull case 4	\$ 168.8	21.16%	58.17%	89.38%
Bull case 5	\$ 156.8	12.59%	47.06%	53.19%

Source: Analyst Estimates

The **first hypothetical situation** was focused on the population evolution. As it is mentioned in the report, CBO projections reflect a growth decrease in the next 2 decades. If birth rates do not increase in a larger magnitude than expected (more likely scenario than the opposite), and immigration is lower than expected in the base case, population growth will decrease in a larger magnitude than forecasted. Growth values for the three scenarios are represented in *Figure 72*, with the Midwest continuing its negative population evolution experienced in 2020. On the other hand, a scenario was performed to predict an increased migration to the Sun Belt states. Both bear and bull cases have a marginal impact on the share price.

Fig. 72: Case 1 – Population growth

	2020-2030		
	Base	Bear	Bull
Midwest	0.16%	-0.11%	0.26%
South	10.10%	8.10%	11.05%
West	6.65%	4.75%	8.39%

Source: Analyst Estimates

In the **second hypothetical situation**, we analyzed the impact of market share fluctuations. If more players enter in the homebuilding market or if the already existing ones start to cater to the low-mid price range, DHI could lose its market share. We assess a low risk, as to offer lower price ranges homebuilders need a complete change in their business model (likely to take years) with negative impact on their margins, plus D.R. Horton benefits from already established brands. Conversely, the increase in homeownership rates in the Millennials generation could be higher than anticipated in the base case, and since Millennial's housing demand is focused on the price range of D.R. Horton's products, it could result in higher market share for them (bull case). The market share growth variations are expressed in *Figure 73*. The target share price lowers 25% in the bear case and rises by 11% in the bull case.

Fig. 73: Case 2 – Market Share growth

	2020-2030		
	Base	Bear	Bull
Midwest	2,20%	1,02%	6,00%
South	1,40%	-1,40%	2,10%
West	1,40%	-1,00%	2,65%

Source: Analyst Estimates

In the **third hypothetical situation**, we considered a positive and negative effect in the demand for homes. Regarding the bear case, if inflation turns out not to be transitory and be above predicted for the next 3-5 years, this will hurt American's

Fig. 74: Case 3 – Houses Sold per Population (growth)

	2020-2030		
	Base	Bear	Bull
Midwest	41,69%	12,73%	56,38%
South	53,22%	3,13%	59,48%
West	32,91%	12,87%	42,66%

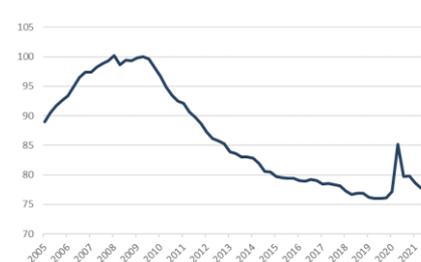
purchasing power, especially the middle-class (customer target). Subsequently, this can create incentives for turning into rental markets, decreasing homeownership rates (houses sold per population number) and so, decreasing demand for homes and DHI’s revenues. In *Figure 74* the bear case is characterized by a sharper growth decrease in the South until 2030. In the Midwest, with a positive housing affordability and future population outflow, we do not see the growth to reach negative levels in any scenario.

We consider the resurgence of a housing market crash similar to the one experienced in the subprime crisis very unlikely. Covid led the housing market to positive growth, in the opposite direction of what one would expect from a recession, as median home prices increased. The financial system is better capitalised comparing with 2008 data, and most households are not overly indebted (*Fig. 75*). With home equity at an all-time high (\$9.1 trillion as of October 2021), this allows the most distressed assets to be sold before foreclosure action.

On the contrary, if the US economy grows strongly and inflation returns to normal levels in 2023-2024, American’s purchasing power will improve, with housing affordability increasing, which can foster an even higher growth for DHI’s sales. The ratio converges to the levels in 2008 (*Fig. 74*). Both cases have a medium risk assessment, depending on how purchasing power evolves after the pandemic.

The **fourth scenario** accounts for fluctuations on its Homebuilding gross margin. On the bear case, both the surge in raw material prices, and higher levels of unemployment in the homebuilding industry (that leads to an increase in salary costs to attract workers), are present in the market for longer than expected, which could impact DHI gross margin as home prices and the demand boom in 2021 stabilize. In the bull case investment in technology is considered, increasing bandwidth, compatibility, and efficiency in this industry. Homebuilding, along with other industries, is entering a digital revolution by already having implemented several solutions from cloud-based software to improve workflow to the use of drones for more precise and efficient site visits or even robotic constructors to provide extra manpower (Forbes, 2021). In fact, DHI in 2018 acquired a 3D printing company that prints homes in less than 24 hours. If this technology is implemented and proves to be efficient and scalable, it could allow D.R. Horton to save on personnel and raw materials costs, increasing its inventory turnover with less time needed to build a home. In this scenario, higher gross margins than the base case was the focus of the analysis. Gross margin growth is registered in *Figure 76*. Both are assessed with a medium risk, as it all depends on future outcomes that are hard to predict, however, we are confident on DHI’s ability to maintain strong gross margins.

Fig. 75: Household Debt to GDP for US (ratio)



Source: St. Louis Federal Reserve

Fig. 76: Case 4 – Homebuilding Gross Margin growth

	2020-2030		
	Base	Bear	Bull
Total Growth	0.20%	-7.60%	6.50%

Source: Analyst Estimates

Lastly, the **fifth scenario** accounts for a base and bull case for the entrance on the rental market. D.R. Horton recently revealed in its 2021 quarterly reports that it is already entering in the rental market segment. This could fill a market gap for DHI by catering to individuals that do not have sufficient purchasing power to buy a home. Currently, this market constitutes around 6% of all new homes being built in the US and is forecasted to double in the next 10 years. The high demand for rental houses has led prices to grow as much as 13% nationwide since 2020, and it is expected that this trend persists for the next year (Business Insider, 2021). As such, the impact of the recent segment inclusion was added to our bull scenario estimation forecast. We accounted for the possibility of the rental market to prosper, driving the rental property revenues growth to similar values as revenues growth of the home sales segment. To account for the increase in inventories, our value driver was the homebuilding inventories. Conversely, we projected a bear scenario in which the increase in invested capital to penetrate this new market business would outpace the return DHI would get from its revenues, affecting cash flow generated for the next years. The risk assessed for the bull case is medium, and for the bear case low. The impact on share price is high in the bull case, but low for the bear case.

Final Recommendation

A strong market performance for homebuilding companies is being driven by low mortgage rates and a strong supply-demand imbalance. DHI is well positioned to capture this momentum as it targets a low-to-mid price range segment that faces lower competition and caters the need for affordable housing that is surging, especially from Millennials. The demographic trend on the US Sun Belt region is being captured through DHI's strategic geographical positioning. D.R. Horton's ability to constantly increase market share since 2000 even amid the subprime and Covid crisis, proves its resilience, together with an experienced management team that has led the company in a sustainable growth for the past years.

We believe the key strategy for DHI is to continue to position itself and its brands in a geographically efficient way, be able to maintain/increase market share in the Southern region, and forcing higher synergies on Forestar's acquisition that will allow the company to develop a better land management efficiency and maintain ROIC at high values.

Nevertheless, increasing inflation can pose a risk by continuing impacting raw material, land, and house prices, which subsequently hurts middle class's purchasing power. Plus, gross margins across the industry may be affected if this inflationary environment persists for longer, especially companies that rely on

house prices in low-mid levels. The uncertain mortgage rates environment can also impact homebuyers' ability to sustain their mortgages, which is partially dependent on FED's policies of the funds rate.

According to our DCF valuation as we believe to be the most accurate method to evaluate the company, we arrive at a target price of \$139.30 for FY2022 (September 2022). This yields a shareholder return of 31%, that includes a constant payout ratio of 10%, considering a dividend per share of \$0.9 in 2022, and its predicted constant share buyback purchases. As such, when comparing to the company's current price (\$107.37), our analysis indicates a BUY recommendation, as the shareholder return is above 10%.

References

- ArborCrowd. (2020). Retrieved from <https://www.arborcrowd.com/articles/sun-belt-population-growth/>
- Bloomberg. (2021). Retrieved from <https://www.bloomberg.com/opinion/articles/2021-04-15/home-ownership-for-millennials-may-finally-be-within-reach>
- Bloomberg. (2021, November). *Americans cashing out home equity after record gains in value*. Retrieved from <https://www.forbes.com/sites/kathleenhowley/2021/11/08/americans-cashing-out-home-equity-after-record-gains-in-value/?sh=5665d2082005>
- Bloomberg. (2021, February). *Millennials are changing the luxury real estate market*. Retrieved from <https://www.bloomberg.com/news/articles/2021-02-01/millennials-are-changing-the-luxury-real-estate-market#:~:text=At%2038%25%2C%20millennials%E2%80%9494adults,interested%20in%20owning%20a%20home.>
- Bureau of Economic Analysis. (2020). *National Data*. Retrieved from <https://apps.bea.gov/iTable/iTable.cfm?reqid=19&step=2#reqid=19&step=2&isuri=1&1921=survey>
- Business Insider. (2021, September). Retrieved from <https://www.businessinsider.com/rent-prices-increasing-us-cities-zumper-data-2021-9>
- Business Insider. (2021). Retrieved from <https://www.businessinsider.com/construction-industry-needs-staggering-22m-more-workers-2021-11>
- CBO. (2021). *An Overview of the Economic Outlook: 2021 to 2031*. CBO.
- CDC. (2021, April). *Provisional Mortality Data*. Retrieved from <https://www.cdc.gov/mmwr/volumes/70/wr/mm7014e1.htm>
- Census Bureau. (n.d.). *Census Regions and Divisions of the United States*. US Census Bureau.
- Clarion Partners. (2019, April). *The rise of the Sun Belt*. Retrieved from https://www.clarionpartners.com/News/CPNewsLibrary/Clarion%20Partners-Thought%20Leadership-The%20Rise%20of%20the%20Sun%20Belt_April_2019.pdf
- CNBC. (2017). Retrieved from <https://www.cnbc.com/2017/05/16/home-builders-target-millennials-and-it-will-hit-their-margins.html>
- CNBC. (2021, September). *The fed holds rates near zero for now*. Retrieved from <https://www.cnbc.com/2021/09/22/as-the-fed-holds-rates-near-zero-for-now-what-that-means-for-you.html>
- Congressional Research Service. (2021, May). Retrieved from <https://sgp.fas.org/crs/misc/IF11327.pdf>
- Deloitte. (2020, February). Retrieved from <https://www2.deloitte.com/us/en/insights/economy/spotlight/economics-insights-analysis-02-2020.html>
- Financial Times. (2021). Retrieved from <https://www.ft.com/content/662d3839-2c58-4b88-8df8-71d8f0af85d5>
- First American. (2021, September). *Will Housing Market Seasonality Return to Normal?* Retrieved from <https://blog.firstam.com/economics/will-housing-market-seasonality-return-to-normal>
- Forbes. (2021, July). Retrieved from <https://www.forbes.com/sites/elenabotella/2021/07/22/is-it-really-better-to-rent-these-days-than-buy-price-to-rent-ratios-tell-the-story/?sh=531428ba1986>

- Forbes. (2021, April). *2021: Building Momentum In The Construction Industry Post-COVID-19*. Retrieved from <https://www.forbes.com/sites/franksorrentino/2021/04/22/2021-building-momentum-in-the-construction-industry-post-covid-19/?sh=4294a0c7533e>
- Forbes. (2021, April). *D.R. Horton: Built To Profit from Long-term Tailwinds*. Retrieved from <https://www.forbes.com/sites/greatspeculations/2021/04/13/dr-horton-built-to-profit-from-long-term-tailwinds/?sh=389ae0b66bfd>
- Fortune. (2021, November). Retrieved from https://fortune.com/2021/11/08/home-prices-drop-late-2022-mortgage-brokers-association-fed-inflation-interest-rates/?queryly=related_article
- Freddie Mac. (2021, May). *Housing Supply*. Retrieved from http://www.freddiemac.com/fmac-resources/research/pdf/202105-Note-Housing_Supply-08.pdf
- Freddie Mac. (2021, January). *U.S. Population Growth: Where is housing demand strongest?* Retrieved from http://www.freddiemac.com/research/insight/20210128_population_growing.page
- Harvard University. (2018, December). *JCHS Updated Household Growth Projections*. Retrieved from Joint Center for Housing Studies: https://www.jchs.harvard.edu/sites/default/files/Harvard_JCHS_McCue_Household_Projections_Rev010319.pdf
- Harvard University. (2021). *Single-family zoning: can history be reversed?* Retrieved from <https://www.jchs.harvard.edu/blog/single-family-zoning-can-history-be-reversed>
- McKinsey. (2020, November). *What's next for remote work: An analysis of 2,000 tasks, 800 jobs, and nine countries*. Retrieved from <https://www.mckinsey.com/featured-insights/future-of-work/whats-next-for-remote-work-an-analysis-of-2000-tasks-800-jobs-and-nine-countries>
- NAHB. (2021). Retrieved from <https://eyeonhousing.org/2021/01/top-ten-builder-share-tops-30-percent-in-2019-for-second-year-in-a-row/>
- National Association of Realtors. (2021). *Housing Statistics*. Retrieved from <https://www.nar.realtor/research-and-statistics/housing-statistics>
- New York Fed. (2021, August). Retrieved from <https://www.newyorkfed.org/newsevents/news/research/2021/20210803>
- New York Times. (2021, October). Retrieved from <https://www.nytimes.com/2021/10/22/realestate/single-family-rentals.html?>
- New York Times. (2021, August). *Real estate prices*. Retrieved from <https://www.nytimes.com/2021/08/13/realestate/real-estate-prices.html>
- NPR. (2021, September). Retrieved from <https://www.npr.org/2021/09/04/1033585422/the-housing-shortage-is-significant-its-acute-for-small-entry-level-homes?t=1636554923252>
- Quartz. (2019). Retrieved from <https://qz.com/1748561/%E2%80%A8reducing-cements-carbon-footprint-is-critical-to-climate-fight/>
- Realtor. (2020, November). Retrieved from <https://www.nar.realtor/newsroom/pandemic-caused-buyers-to-seek-multi-generational-homes-sellers-to-sell-faster>
- Realtor. (2021, September). Retrieved from <https://www.realtor.com/research/september-2021-data/>
- Reuters. (2021, April). *Biden seeks to ease housing shortage with \$5 billion 'carrot, no stick' approach*. Retrieved from <https://www.reuters.com/article/us-usa-biden-infrastructure-zoning-idUSKBN2BV1CX>
- Reuters. (2021, July). *U.S. housing starts accelerate, building permits skid to eight-month low*. Retrieved from <https://www.reuters.com/business/us-housing-starts-rise-june-building-permits-fall-sharply-2021-07-20/>
- Reuters. (2021, October). *US New Home sales hit six month high. Median price stays above \$400,000*. Retrieved from <https://www.reuters.com/business/us-new-home-sales-hit-six-month-high-median-price-stays-above-400000-2021-10-26/>

- Urban Institute. (2021, January). *The Future of Headship and Homeownership*. Retrieved from <https://www.urban.org/research/publication/future-headship-and-homeownership>
- Urban Land Institute. (2020, October). Retrieved from <https://americas.uli.org/ulis-latest-real-estate-economic-forecast-sees-continued-slump-for-real-estate-throughout-2020-with-a-rebound-expected-in-2021-2022/>
- Urban Wire. (2021, January). Retrieved from <https://www.urban.org/urban-wire/2040-us-will-experience-modest-homeownership-declines-black-households-impact-will-be-dramatic>
- US Census Bureau. (2019). *American Community Survey*. Retrieved from <https://www.census.gov/programs-surveys/acs>
- US Census Bureau. (2020). Retrieved from <https://www.census.gov/construction/chars/>
- US Census Bureau. (2020, February). *Demographic Turning Points*.
- US Census Bureau. (2020). *Population*. Retrieved from <https://www.census.gov/topics/population.html>
- Yahoo Finance. (2021). *Yahoo Finance*. Retrieved from <https://finance.yahoo.com/news/hedge-funds-buying-d-r-011706799.html>
- Zillow. (2021, February). *2020 Urban/Suburban Report: How Housing in Cities and Suburbs Both Thrived in an Extraordinary Year*. Retrieved from <https://www.zillow.com/research/2020-urban-suburban-report-28802/>
- Zonda. (2021, August). *New Home LSI: New home lot inventory dropped to cycle lows*. Retrieved from <https://zondahome.com/new-home-lsi-new-home-lot-inventory-dropped-to-cycle-lows/>

Appendix

Financial Statements

Income Statement

\$(in millions)	19	20	21E	22F	23F	24F	25F	26F	27F	28F	29F	30F	31F	32F
Revenues	17,593	20,311	27,285	30,686	33,656	35,235	36,826	38,234	39,648	41,103	42,601	44,144	45,732	47,416
Cost of Sales	13,526	15,167	19,479	22,270	24,576	25,860	27,156	28,245	29,345	30,461	31,582	32,735	33,921	35,141
Gross Profit	4,067	5,144	7,805	8,416	9,079	9,375	9,671	9,990	10,302	10,642	11,019	11,409	11,811	12,275
Selling, general and administrative expense	1,833	2,048	2,792	3,366	3,687	3,852	4,017	4,163	4,312	4,466	4,623	4,785	4,951	5,189
Goodwill impairment	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other (income) expense	-31	-33	-93	-113	-132	-148	-165	-181	-190	-198	-208	-217	-227	-240
Equity in earnings of unconsolidated entities	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
Gain on sale of assets	-54	-60	-80	-90	-99	-103	-108	-112	-116	-120	-125	-129	-134	-139
EBITDA	2,320	3,189	5,188	5,254	5,624	5,775	5,927	6,121	6,297	6,496	6,730	6,971	7,222	7,466
Depreciation and amortization	72	80	92	103	113	118	124	128	133	138	143	148	154	159
Notes payable - Interest	123	126	191	224	262	317	359	405	457	505	556	610	664	720
Net Income before Taxes	2,125	2,983	4,905	4,927	5,249	5,339	5,445	5,587	5,707	5,853	6,030	6,213	6,404	6,586
Taxes	507	603	1,040	1,053	1,103	1,132	1,153	1,181	1,208	1,239	1,276	1,315	1,355	1,394
Minority Interests	0	7	3	3	4	4	4	4	4	4	4	4	4	4
Net Income	1,619	2,374	3,863	3,873	4,144	4,208	4,293	4,408	4,502	4,619	4,760	4,905	5,057	5,202

Balance Sheet

\$(in millions)	19	20	21E	22F	23F	24F	25F	26F	27F	28F	29F	30F	31F	32F
Cash	1,494	3,019	4,093	5,217	6,395	7,047	7,365	7,647	7,930	8,221	8,520	8,829	9,146	9,483
Restricted cash	20	22	41	117	143	157	164	171	177	184	190	197	204	212
Inventories	11,282	12,237	17,298	18,509	20,288	21,355	22,493	23,466	24,454	25,476	26,534	27,629	28,762	29,935
Mortgage loans held for sale	1,072	1,529	2,007	2,429	2,813	3,200	3,649	3,896	4,158	4,436	4,732	5,046	5,380	5,877
Property and equipment, net	499	684	659	741	813	851	889	923	957	992	1,029	1,066	1,104	1,145
Other assets	913	1,114	1,496	1,897	2,317	2,672	3,050	3,435	3,839	4,268	4,423	4,584	4,748	4,923
Deferred income taxes	163	145	146	148	149	150	152	153	155	156	158	159	161	162
Investment in unconsolidated entities	0	0	0	11	0	0	0	11	0	0	0	11	0	0
Goodwill	164	164	164	196	216	216	216	259	285	285	285	342	376	376
Total Assets	15,607	18,912	25,903	29,265	33,133	35,648	37,979	39,961	41,955	44,018	45,871	47,863	49,882	52,113
Accounts payable	-634	-901	-1,346	-1,667	-1,997	-2,267	-2,369	-2,460	-2,551	-2,644	-2,741	-2,840	-2,942	-3,051
Accrued expenses and other liabilities	-1,278	-1,570	-1,685	-1,813	-1,956	-2,111	-2,278	-2,458	-2,653	-2,862	-3,089	-3,333	-3,597	-3,881
Notes payable	-3,399	-4,283	-5,405	-6,650	-7,983	-9,337	-10,718	-12,137	-13,587	-15,074	-16,607	-18,186	-19,815	-21,490
Total Liabilities	-5,312	-6,754	-8,436	-10,130	-11,936	-13,714	-15,366	-17,055	-18,790	-20,581	-22,436	-24,359	-26,353	-28,421
Minority Interests	-274	-282	-2,107	-216	1,530	4,662	7,931	11,693	15,577	19,555	23,936	28,381	33,009	37,631
Total Shareholders Equity	10,021	11,877	15,360	18,918	22,727	26,596	30,544	34,599	38,741	42,991	47,371	51,884	56,537	61,323

Cash Flow Map

\$(in millions)	19	20	21E	22F	23F	24F	25F	26F	27F	28F	29F	30F	31F	32F
Core Result	1,494	3,019	4,093	5,217	6,395	7,047	7,365	7,647	7,930	8,221	8,520	8,829	9,146	9,483
Depreciation and Amortization	20	22	41	117	143	157	164	171	177	184	190	197	204	212
Gross Cash Flow	11,282	12,237	17,298	18,509	20,288	21,355	22,493	23,466	24,454	25,476	26,534	27,629	28,762	29,935
Change in NWC needs	1,072	1,529	2,007	2,429	2,813	3,200	3,649	3,896	4,158	4,436	4,732	5,046	5,380	5,877
Change in PP&E	499	684	659	741	813	851	889	923	957	992	1,029	1,066	1,104	1,145
Change in Deferred Income Taxes	913	1,114	1,496	1,897	2,317	2,672	3,050	3,435	3,839	4,268	4,423	4,584	4,748	4,923
Change in Other Assets	163	145	146	148	149	150	152	153	155	156	158	159	161	162
Change in Other Liabilities and Accrued Expenses	0	0	0	11	0	0	0	11	0	0	0	11	0	0
Operating Cash Flows	164	164	164	196	216	216	216	259	285	285	285	342	376	376
Non Core Result	15,607	18,912	25,903	29,265	33,133	35,648	37,979	39,961	41,955	44,018	45,871	47,863	49,882	52,113
Change in Investment in Unconsolidated Entities	-634	-901	-1,346	-1,667	-1,997	-2,267	-2,369	-2,460	-2,551	-2,644	-2,741	-2,840	-2,942	-3,051
Change in Goodwill	-1,278	-1,570	-1,685	-1,813	-1,956	-2,111	-2,278	-2,458	-2,653	-2,862	-3,089	-3,333	-3,597	-3,881
Non Core Cash Flows	-3,399	-4,283	-5,405	-6,650	-7,983	-9,337	-10,718	-12,137	-13,587	-15,074	-16,607	-18,186	-19,815	-21,490
FCF Unlevered available to investors	-5,312	-6,754	-8,436	-10,130	-11,936	-13,714	-15,366	-17,055	-18,790	-20,581	-22,436	-24,359	-26,353	-28,421

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Buy	Expected total return (including expected capital gains and expected dividend yield) of more than 10% over a 12-month period.
Hold	Expected total return (including expected capital gains and expected dividend yield) between 0% and 10% over a 12-month period.
Sell	Expected negative total return (including expected capital gains and expected dividend yield) over a 12-month period.

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