Report on “Factors Affecting Housing Prices in US in the next 10 years”, by Konark Pahuja, 06/04/21.

Problem Statement:

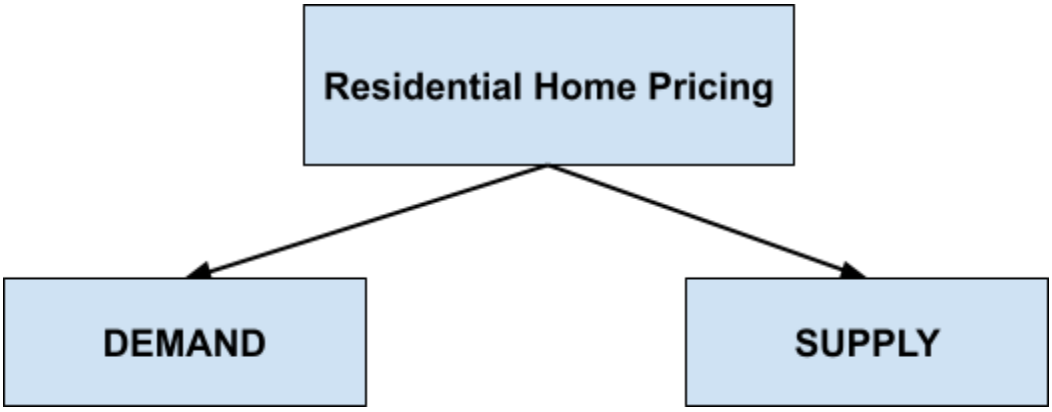
Describe and explain all the factors that could influence residential home prices across the United States over the next 10 years, and how.

Solution:

OVERVIEW

Foreseeable change in residential home prices (across the US in the next 10 years) can be covered by two root categories:

1. **Supply** of residential homes
2. **Demand** for residential homes



DEMAND

When there is a high demand for a good or service, its price rises. This holds true for the housing market.

Eg. : A weak economy or high interest rates may lead to low or no demand for housing, the prices of houses tend to fall.

Holding other factors fixed,
High Demand = High House Pricing

SUPPLY

When there is a high supply of a good or service but low demand for it, its price falls.

Eg. : A low supply of housing may drive prices up, leading to a bidding war. Multiple parties may try to outbid each other for a property, increasing their purchase price offer.

Holding other factors fixed,
High Supply = Low House Pricing

EQUILIBRIUM

The **quantity** and **price** of housing traded is determined by the **equilibrium** of the housing market.

Equilibrium in a market refers to an **equilibrium price** and an **equilibrium quantity** and has the following features:

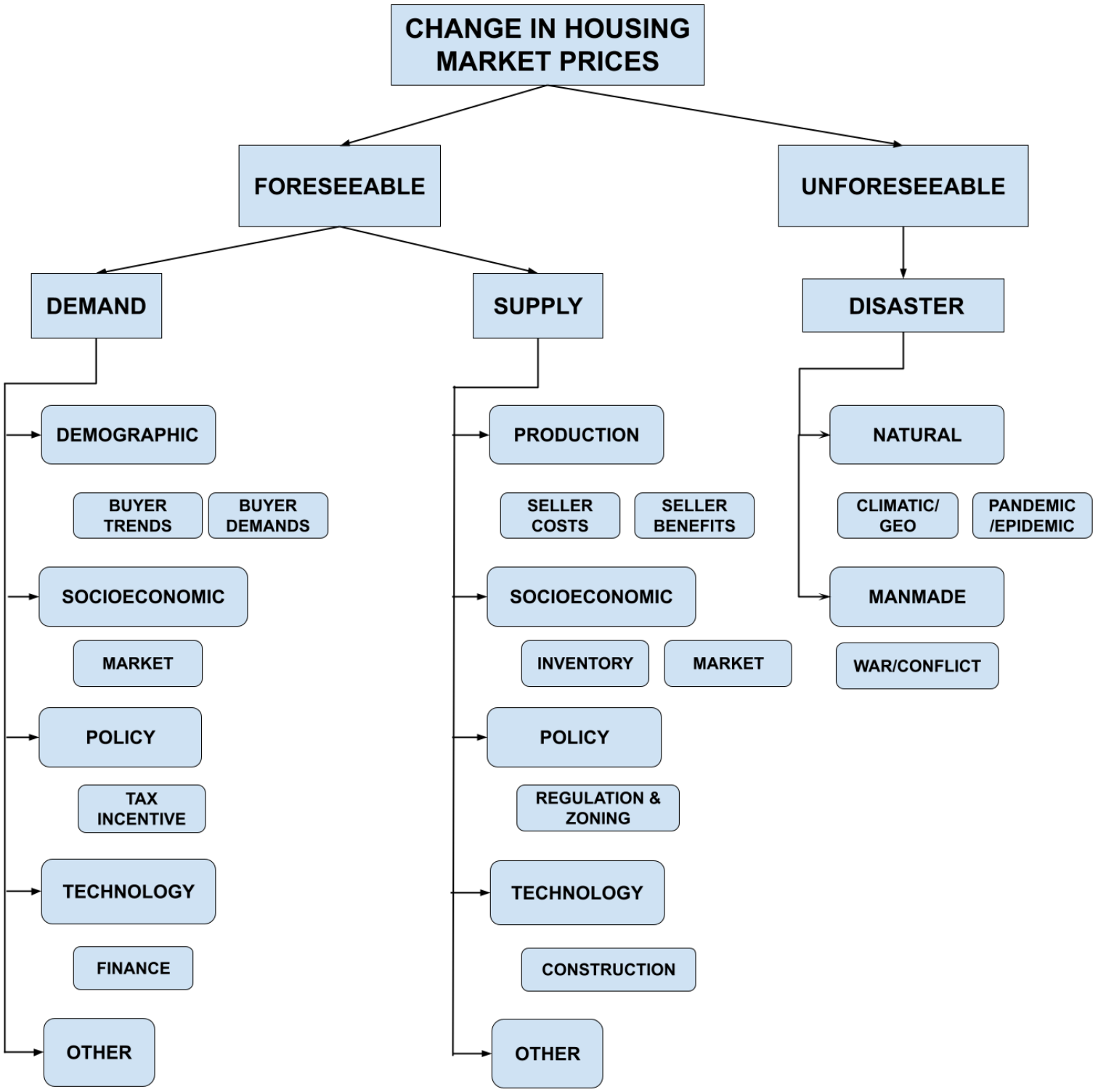
- Given the equilibrium price, sellers supply the equilibrium quantity.
- Given the equilibrium price, buyers demand the equilibrium quantity.

The point where supply and demand meet is the **equilibrium** in the market. At this point, there is a perfect match between the amount that buyers want to buy and the amount that sellers want to sell.

TAKEAWAY

Housing pricing is dictated by market equilibrium, controlled by supply and demand. Hence, supply and demand in the housing market generally provides reliable predictions about the movement of housing prices. Furthermore, we will proceed by adding unforeseeable factors to the predictable supply-demand context, and also break down the sub-factors affecting supply and demand of the housing market:

FACTORS AFFECTING HOUSING PRICES (US, next 10 years)



FACTORS AFFECTING HOUSING PRICES (US, next 10 years)

FORESEEABLE FACTORS:

DEMAND:

Factors affecting **Demand** for residential housing can be categorized into:

- **Buyer** – customer purchasing the house
- **Product (House)** – the residential house for sale
- **Market** – state of the market affecting housing & economic decisions
- **Other** – government policy and other factors (calamity, technology, etc.)

Let's examine these Demand categories one at a time:

1. **Demographics:**
   The buyer is the purchaser of a residential property. Demographics is the measure of population factors concerning the buyer that may influence Housing Prices. The Buyer Demographics are broadly categorized into:
   - **Buyer Trends** – factors about buyer affecting likelihood of buyer purchasing a residence.
   - **Buyer Demands** – factors about housing affecting likelihood of buyer purchasing a residence.

   1.1 Buyer Trends:

   1.1.1 Population: An increasing population leads to an increasing demand for housing. US population growth rates are declining. The decadal population growth rate has dropped from 18.5 % (1950-60) to 7.4% (2010-2020). In the next ten years, the decadal population growth rates are expected to be about 6.8 percent. Hence, a declining population indicates reducing housing demand nationwide. Region wise however, populations may increase or decrease across states and regions as people migrate.

   1.1.2 Education: Buyers with higher education (college degree) are likely to make higher incomes and afford homes more easily, driving up supply.

Usually college graduates are likely to be able to afford homes in the future. However, the number of Americans enrolling in colleges has been on a ten year decline. In the next ten years, alternative routes of education (online courses, peer-to-peer networks, etc.) may account for a higher slice of education outlets. If these non-collegiate methods of education translate into higher employment and salaries, the housing demand will increase, else decrease.

1.1.3 Family Size: Family size determines the type of housing requirement of a buyer. Projected increase in numbers of one-person US households (2000-2025): 35%. Projected increase in numbers of single-parent US households (2000-2030): 12%. Projected increase in numbers of US couples without children (2000-2030): 37%. In the next decade, it seems likely there will be a shift toward smaller families and more number of one-person households, leading to a shift in demand for more housing and smaller, cheaper housing.

1.1.4 Age: US has an aging population. By 2030, 20% of the U.S. population will be over 65. This generally implies that the US economy will suffer:
Declining labor-force participation
Lower economic growth
Decrease in savings and investment
However, this age group holds a very high median household net worth. Hence, an aging population with high wealth but low income will result in a slower economy but increased investment in real estate, and high housing demand in secondary cities, retirement homes, co-living facilities.

1.1.5 Income: The more the buyer's income, the greater the buyer's budget to afford a house. Hence, increase in income or wages leads to increase in housing demand.

1.1.6 Consumer Confidence: Optimism of a consumer toward the national economy in general and the ROI on the asset of a purchased home goes directs the willingness of a consumer to purchase a home. The health of the economy and events like pandemics, wars, calamities, etc. greatly impact consumer confidence and demand for housing.

1.1.7 Unemployment: Those who have lost their jobs are unlikely to buy a home any time soon. Even those who haven't been laid off are likely to

hold off on such a major purchase, fearing for the stability of their employment. High unemployment implies lower expected future income implying lower demand for housing.

1.1.8 Immigration: Studies suggest immigration affects house prices depending on the level of geographical aggregation and area size. In small local housing markets, immigration may increase house prices directly by increasing demand. Alternatively, house prices may fall through indirect local resident out-migration and the income effect that ensues. In small locales, negative attitudes towards immigrants can offset the demand effect on housing prices from increased population. This is consistent with outmigration as a result of immigration, or a reduction in the amenity value of a locale, leading to reduced willingness to pay higher house prices. In larger locales, usually the outmigration effect is muted as compared to the demand surge through immigration.

1.2 Buyer Demands:

1.2.1 House Construction:

1.2.1.1 Home Size & Usable Space: The value of a home is roughly estimated in price per square foot. Square footage directly drives up the value of a home. A home's usable space matters when determining its value. Garages, attics, and unfinished basements are generally not counted in usable square footage. Bedrooms and bathrooms are most highly valued.

1.2.1.2 Age and condition: Typically, homes that are newer appraise at a higher value. The fact that critical parts of the house, like plumbing, electrical, the roof, and appliances are newer and therefore less likely to break down, can generate savings for a buyer. Many buyers will pay top-dollar for a move-in-ready home. Buyers want to negotiate repairs to avoid any major expenses following the sale.

1.2.1.3 Upgrades and updates: The impact of a project or upgrade varies based on the market and you're existing home value. For example, a finished basement in Portland is 5x more valuable than finishing a basement in Atlanta, a roughly 13%

increase on the median home value versus 2.5% respectively. Additionally, some projects like adding a pool or wood floors tend to have bigger increases for more expensive homes, while projects like a kitchen remodel or adding a full bathroom tend to have a bigger increase for less expensive homes.

1.2.2 House Location:

1.2.2.1 Neighborhood comps: One of the indicators of a home's value is the sale prices of similar homes in the neighborhood that have sold recently. These comparable homes are often referred to as "comps". Most real estate experts will rely on comps to estimate a home's value.

1.2.2.2 Local Facilities: Proximity of a housing location to facilities like quality schools, parks, libraries, hospitals, etc. drive up the value of a house.

1.2.2.3 Crime rate: A lower crime rate in the geographic area equates to a more secure neighborhood and a higher value of homes therein.

2. Socioeconomic:

Market:

The market economy in general and the housing market in particular influence the demand for homes.

2.1 Price of Housing: As the price of housing decreases, the quantity demanded increases. This is an example of the law of demand, which derives from two effects:

- As the price of a good or service decreases, more individuals choose to buy a positive quantity rather than zero.
- As the price of a good or a service decreases, individuals choose to buy a larger quantity.

In the case of the market for housing, the first of these is more important. Most people own either zero houses or one house. As houses become cheaper, more people decide that they can afford a house, so the quantity demanded increases. A few people might decide to buy an additional house, but they would presumably be in the rich minority. Housing prices in the U.S. increased 48.55% over the past 10 years, according to RenoFi. When doing the projections, RenoFi assumed housing prices would again increase by the same amount over the next decade.

2.2 Economy: The overall economy plays a vital role in the demand for real estate. When the economy is good, the demand for real estate tends to be higher. However, when the economy is struggling, the supply of money tends to become more restrictive. As money becomes harder to borrow, fewer home buyers enter the housing market. With restrictive lending requirements making fewer buyers available, inventories of homes go up or take longer to sell. A greater supply of a product coupled with lower demand for it generally forces prices downward.

2.3 Interest Rates: The U.S. Federal Reserve sets a rate at which it lends money to banks and other financial institutions, which in turn affects the rate at which they lend to businesses and individuals, such as people seeking a mortgage. When mortgage rates are lower, this makes the purchasing of a home more affordable. Consequently, the sales of homes rise as more consumers are able to take out a low-cost loan. Consumers with existing mortgages may attempt to re-finance their mortgage, meaning they trade their current loan for another, cheaper one. In periods of low interest rates, more houses are often built as demand rises, and development companies are able to borrow money at a cheaper rate to finance the construction.

2.4 Rental Housing Princes: Rental prices of homes affect the demand for purchasing a home. If residencies are available cheaply at rent, potential buyers may choose to avoid the expensive decision of purchasing a home outright and instead live in a rented apartment. However, if rent prices are high, the inverse happens, and potential buyers may end up purchasing a home instead.

3. **Policy:**

Government policy on housing and economy can influence the housing market.

3.1 Tax & Incentive: Tax credits, deductions, and subsidies are some of the ways the government can temporarily boost demand for real estate for as long as they are in place. For example, in 2009, the U.S. government introduced a first-time homebuyer's tax credit to homeowners in an attempt to jump-start home sales in a sluggish economy (only those who purchased homes between 2008-2010 were eligible). According to the Government Accountability Office, 2.3 Million people took advantage of the tax incentive.

4. **Technology:**

Finance: Recent advances in financing tech have made it easier for potential buyers to acquire housing, hence driving up demand.

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4.1 Reduced Cost of Loan Administration: Blockchain technology can reduce the costs of loan administration by automating more of the process. Provenance offers an electronic mortgage application process that creates a fully electronic mortgage note recorded on blockchain, without the need to register the note with an analog registry platform. In addition, an internal token process allocates loan origination opportunities to improve the match between individual borrowers and the lenders and loan products most suited to their particular credit profile. This tech innovation holds promise for making housing and homeownership accessible to more people, driving housing demand.

4.2 Access to Capital: Companies like EasyKnock and NerdWallet make shopping for the best mortgage easier by taking on and automating most of a borrower’s work, even filling out the application, and delivering competitive options that fit a borrower’s unique situation. Divvy is helping renters turn their rental payments into down payments toward homeownership. Some are challenging the idea that credit is the only way to get into homeownership, with companies like Point using shared-equity financing to help borrowers buy a home. Instead of going to the bank for a loan, borrowers purchase a home with a financial technology partner who pays part of the down payment in exchange for an equity stake. If the home is sold for a profit, the borrower shares the earnings

with the partner, but the partner contribution isn't subject to monthly debt repayment like a traditional mortgage.

4.3 Improving Risk Prediction: Artificial intelligence (AI) and blockchain technology can help us better predict risk by allowing us to create more accurate models and by delivering more data to plug into these models. Current risk prediction is based on a handful of manually weighted factors, one of which is the borrower's credit score. Today, credit scores are based on only a few categories of payments, such as the borrower's history of paying mortgages, credit cards, and other consumer loans. Most recurring payments—cell phone bills, Netflix subscriptions, rent payments, utility bills, and the like—are not captured in the traditional credit bureau system. Blockchain entrepreneurs are now working to build networks of payment information that capture more categories of recurring payments, all of which may predict a borrower's future ability and willingness to repay. Although some traditional players in the credit score ecosystem are doing this to some extent, such as FICO with their XD product, which includes telecommunications payments, the current system does not holistically incorporate these other payments. A full-fledged system in the near future may boost housing demand.

SUPPLY:

Factors affecting **SUPPLY** for residential housing can be categorized into:

- **Seller** – seller selling the house
- **Product (House)** – the residential house for sale
- **Market** – state of the market affecting housing & economic decisions
- **Other** – government policy and other factors (calamity, technology, etc.)

Let's examine these Supply categories one at a time:

1. **Production:** The seller is the party offering a residential property for sale. The Seller bears the production of the property. Hence, factors affecting production of housing also directly affect the supply.

    1.1 Costs: Costs incurred in the construction of housing have to be borne by the builder/seller. Costs include raw material, labor wages, production costs, drawing plans, borrowing costs, etc. Costs are prone to vary depending on factors such as economy, availability of raw materials (eg.,

oil, lumber), topography (flat or hilly, plain or coastal), customized upgrades of specific houses, etc. Factors such as supply chain problems, labor shortages and surging material costs lead to higher costs and lower housing supply.

1.2 Benefits: Sellers may try to maximize profits. The price of the land is a fixed cost and sellers may be tempted to build as expensive houses as they can on the land and further sell them for as much as possible. This results in fewer, more expensive single-family houses thus tightening the supply for the median buyer.

2. **Socioeconomic:** Socioeconomic factors affecting the supply of a house can be categorized into Inventory and Market.

2.1 Inventory: The total unsold units of housing currently in the market.

Available Houses (Already built): Active listings play an important role in the supply of real estate. More active listings mean there's a greater supply of homes for homebuyers to choose from. When there are more homes available for sale than buyers to purchase them, buyers have more homes to choose from, which increases the odds that a buyer will find their perfect home. They'll have less competition for it, which could help them avoid a bidding war. This results in high supply or a buyer's market.

2.2 Market:

2.2.1 New Houses (Being built): When there's a mismatch between housing demand and supply, new homes can help fill the gap. However, there have to be enough new homes built to for supply to keep up with demand.

2.2.2 Price of Housing: As price increases, the quantity supplied to the market increases. As with demand, there are two underlying effects. As price increases, more firms decide to enter the market—that is, these firms produce some positive quantity rather than zero.
As price increases, firms increase the quantity that they wish to produce. Similarly with the housing market, when price of housing

decreases, sellers/builders construct more houses thereby increasing their supply.

3. **Policy:**

3.1 Regulation & Zoning: Modern land use regulation in the United States dates back at least to the 1910s, when the initial zoning laws were enacted. Today for instance, the median Boston suburb has a minimum lot size over one acre. Minimum lot size is strongly negatively correlated with new building across communities in greater Boston. Other instances of regulation and zoning include minimum acreage, maximum height, laws that prohibit multifamily dwellings, stop development near wetlands (which are often loosely defined), and make it difficult to build across large swaths of historic neighborhoods. The potential for a multiyear review process, which is not uncommon in many jurisdictions, is associated with higher project uncertainty, That risk also increases the expected costs to developers and deters new housing supply.

4. **Technology:**

Construction: Several advances in technology from construction techniques to building materials promise more streamline methods of house construction, thus driving up supply.

4.1 3D Printing: 3D printed homes can be created on site and can be constructed in complex shapes that are challenging to accomplish with timber and drywall. The process can save time, and reduce labor costs and environmental impacts. It can employ materials such as scrap concrete that would otherwise be considered waste. This reduces the cost and time of construction and decreases the amount of physical labor used. Lower costs of construction and faster construction times directly equate to higher housing supply.

4.2 Drone Inspections: Today, drones equipped with high-resolution cameras are increasingly making it possible to inspect buildings under construction without putting inspectors' safety at risk. Drones can also oversee subcontractors, and keep track of materials to reduce mistakes, fraud, and theft. Developers can use

drones to survey land faster and with less human error. All of these benefits help keep down construction costs and make the process safer and faster, helping supply.

4.3 Prefab Homes: Companies like Haus.me are selling autonomous self-sustainable intelligent houses constructed from 3-D polymer. It arrives fully constructed, furnished, and decorated. The home runs on solar power and includes a 550 gallon clean water tank, along with many other amenities, including remote management of all its systems, easy maintenance and low operating costs. At the company's Nevada facility, homes can be manufactured in seven weeks and be transported to their destination in another two to three weeks. These homes come in three sizes, starting at 400 square feet, so they can be used as accessory dwelling units, rental units, vacation homes, or primary residences. Prefab Homes greatly help housing supply.

4.4 Sustainable & Recycled Materials: the utilization of mass timber techniques, bamboo, recycled plastics, and recycled building materials. Mass timber techniques such as cross-laminated-timber (CLT) and glue-laminated timber (glulam) are increasingly being used more and more in place of concrete and steel. Fluid applied weather barriers and spray foam insulation both drastically improve thermal performance of buildings and ensure better quality and weather tightness and add to the projects longevity. These cheap and sustainable building materials help reduce building costs and boost housing supply.

UNFORESEEABLE FACTORS:

Unlike foreseeable factors affecting Housing Prices, unforeseeable factors are unique in that they don't always dictate a singular directional change in housing prices, i.e., depending on the disaster, it may lead to an increase or decrease or a mix of increase and decrease in housing pricing. The effects of this category of factors are complex to plot in a proportional sense but are interesting to study nonetheless.

DISASTER:

1. **Natural:** Natural disaster caused by forces of climate & earth.

1.1 Climatic & Geothermal: Floods, earthquakes, tsunamis, volcanic eruption, hurricanes, etc.

Concerning factors:

- **Extent of the Damage**
  The value of a home with extensive damage will naturally be more impacted by a natural disaster than a home with minimal damage. Even if the damage is repaired, if historical evidence of previous disasters remains, it can lower the value of a home.

- **Localization of the Damage**

  Natural disasters can easily affect nearly every home in a given neighborhood. Flooding, for example, only spares homes that are far enough from the water source or on high enough land. Other natural disasters destroy homes at random. Tornados are notorious for taking out one block and leaving the opposite side of the street untouched. If an entire area is affected, the values of all properties in the area will likely be driven down. Devastation on this scale likely disrupts local agriculture and supply chains, making the area less desirable in the immediate future. If the area is limited, the local housing market will probably not take such a hard hit.

- **Demand for the Location**

  In many parts of the country, locals are somewhat used to the natural disasters frequently experienced in the area. Homeowners are aware of the risks and choose to live there anyway. For decades, California real estate was in demand, despite the ever-present earthquake threat. Today, buyers are moving to Florida, which is known for difficult hurricane seasons, and to Texas, which is susceptible to floods, hurricanes, and tornados. Market more in-demand, experience less fallout from a natural disaster than less-desirable markets.

- **Insurance Policies and Practices**
  Insurance policies and practices have a profound impact on home values following a natural disaster. If insurance companies expect a recurrence of

the disaster, they could increase homeowner's insurance rates to mitigate the risk. This would increase the cost of homeownership in those areas and could cause lower demand. If the demand slips, home values are likely to slip as well.

1.2 Pandemic/Epidemic:

A disease outbreak can have unforeseen effects on the housing market. During the 2020 Covid-19 Pandemic, speculators expected housing prices in US to crash. However, the exact opposite happened.
An unemployment rate that quickly soared to the highest level since the Great Depression all but assured a real estate tailspin. Forecast models produced in spring 2020 by CoreLogic and Zillow agreed, with both real estate firms predicting that home prices would fall. But they were dead wrong: Not only did the housing market avoid a slump, it took off on one of the hottest stretches in U.S. history. Strong home buyer demand saw inventory plunge to a 40-year low, while bidding wars reached an all-time high. Since the beginning of 2020, U.S. median home list prices on realtor.com rose up 27%—adding $9.1 trillion to the total value of the U.S. housing market in 2021 alone.

2. **Manmade:** Manmade disasters are created by humans, usually arising from reasons of politics, military engagement, diplomacy, or catastrophe due to human error.

2.1 War:

Direct war with a nation or an attack/threat to national security can have direct effects on the US housing prices by disrupting the socioeconomic and political atmosphere of the country leading to unforeseeable reactions in the housing market such as a stall in demand or supply in specific regions or a rushed demand for special types of homes (bunkers).

However, for realistic purposes let's consider the current state of affairs i.e, the Russian-Ukrainian War. Although the war is far from US, it may still have indirect impacts on the US housing market, affecting buyer mentality and housing costs.

Aspiring home buyers in all price ranges may become more hesitant to make large purchases amid stock market uncertainty and fears of how a potential

full-blown war in Europe might affect U.S. inflation—which is already at a 40-year high.

The conflict could put more pressure on rising oil and food prices, which, in turn, could weigh more heavily on consumers' household budgets. Russia is the second-largest oil producer in the world, and although the U.S. imports little Russian oil, the conflict could roil global energy markets, raising global costs and hency inflation. Higher oil and gas prices likely will affect home heating costs and cause even more global supply-chain disruptions, which are being felt widely in the homebuilding industry. Inflation and supply chain problems likely will prompt even higher construction costs.

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