

Impacts of Drinking Water Quality on Housing Prices

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Abstract. Real estate and the housing market are vital for the U.S. economy, with factors such as economic growth, interest rates, government policies, and subsidies influencing housing prices. This paper will be focusing on the drinking water quality on housing prices by employing the existing researches of different methodologies. Hedonic property value analysis and production function have been used to assess the worth of environmental assets. One research has developed a household production function model that demonstrates that the economic value of system enhancements depends on the costs incurred by households in treating piped water, the availability of alternative options, and the feasibility of relocation. Another residential sorting model was adapted to identify variables influencing the relationship between piped water quality and house price. A natural experiment design found that land and property values increase in close proximity to unpolluted water bodies compared to polluted ones. The significance of this paper is to provide valuable insights for both homeowners and policymakers, as well as to help in making informed decisions regarding infrastructure development and urban planning to ensure access to safe and clean drinking water for all residents.

Keywords: Drinking water, property value, water quality.

1. Introduction

Real estate and the housing market are crucial components of the U.S. economy. Real estate serves as a substantial source of wealth for many individuals, particularly those residing in the United States. Understanding the various factors influencing housing prices is essential for policymakers, investors, and homeowners alike. The housing price can be influenced by macro and micro factors. In macro aspect, economic growth, interest rates, government policies and subsidies play crucial roles in affecting housing market. In micro aspect, property location, neighborhood comps, and environmental pollution can also be the contribute of changing housing housing price.

When purchasing a residence in a specific neighborhood, one must consider the quality of water provided to the property. Substandard water quality, an external attribute linked to the property's location, has the potential to decrease the property's market value. The extent of this impact may represent a significant portion of the economic repercussions associated with poor water quality. A modification in the standard of a home, as judged by both buyers and sellers in the market, ought to be reflected in the home's price[1]. Essentially, alterations in property values are indicative of shifts in the current value of the anticipated benefits derived from owning the property. Existing researches of water quality and housing prices are mostly concentrating on the impacts of surface water (such as rivers, lakes, reservoirs, ponds, and etc.) on property value. Despite uses of the hedonic property value method in assessing to surface water quality, there is a scarcity of comprehensive hedonic studies on the subject of gound water quality. The limited research in this area can be mainly attributed to the insufficient availability of suitable data and challenges in connecting indicators of ground water quality to specific households[2].

The primary objective of this paper is to investigate drinking water quality whether has impacts on housing price. This study offers a theoretical framework to explore the impact of drinking water quality on housing prices in an under-researched domain.

2. Factors that Affect Housing Prices

2.1. Economic Factors

The cost of housing and the factors that contribute to it are of great interest to economists, policymakers, and the general public. One of the primary drivers of housing prices is the balance between supply and demand. When demand for housing outstrips supply, prices tend to rise as buyers compete for limited available properties. Conversely, an oversupply of housing can lead to a decrease in prices as sellers compete to attract buyers. Additionally, interest rates play a significant role in housing prices, as lower interest rates can make mortgages more affordable, increasing demand for housing and driving up prices. Economic conditions, such as employment levels, income growth, and inflation, also impact housing prices. A strong economy with low unemployment and rising incomes can lead to increased demand for housing, putting upward pressure on prices. Understanding the complex interplay of these factors is crucial for analyzing housing price trends and developing effective policies to address housing affordability challenges.

2.2. Social Factors

Housing prices are influenced by a variety of social factors that play a significant role in determining the cost of real estate. One of the key social aspects that affect housing prices is the demographic composition of a particular area. Factors such as population growth, age distribution, and household size can all impact the demand for housing, which in turn affects prices. For example, areas with a rapidly growing population may experience increased demand for housing, leading to higher prices. Similarly, areas with a large proportion of young families may see higher demand for larger homes, driving up prices in those segments of the market. Cultural preferences and lifestyle trends can also play a role in shaping housing prices. Areas emphasizing urban living and amenities may see higher demand and prices for city-center properties. Similarly, cultural preferences for certain types of architecture or housing styles can impact prices in specific neighborhoods. Overall, social aspects such as demographics, income and wealth, and cultural preferences all contribute to the complex interplay of factors that determine housing prices in a given area.

2.3. Environmental Factors

Moving on to the environmental factors, include the proximity to natural resources, such as water bodies or forests, which can increase the desirability of a location and drive up prices. Additionally, environmental regulations and policies can impact the cost of housing, as developers may need to adhere to certain standards or mitigate environmental impacts, which can add to the overall cost of construction. Climate change is another environmental factor that can affect housing prices. Areas that are prone to natural disasters, such as hurricanes or wildfires, may see fluctuations in housing prices due to the increased risk associated with living in these locations. Additionally, rising sea levels and changing weather patterns can impact the value of coastal properties, as the risk of flooding or erosion increases over time. In addition to natural environmental factors, human activities can also play a role in determining housing prices. Pollution levels, access to green spaces, and urban development can all impact the desirability of a location and, consequently, the cost of housing in that area. As cities grow and expand, the demand for housing in certain areas may increase, leading to higher prices for properties in those locations. Overall, the relationship between housing prices and environmental factors is complex and multifaceted, with a range of influences shaping the cost of housing in different regions. The following section will focus on the examination of how drinking water quality affects housing prices.

3. Drinking Water and Housing Prices Analysis

3.1. The Role of Drinking Water Quality in Determining Housing Prices

Drinking water quality can reflect broader environmental and infrastructural conditions in a region, thus playing a crucial role in both residential satisfaction and property investment decisions. Homes in areas known for superior water quality often enjoy a competitive edge in the market, attracting more buyers and higher bids. Real estate agents and developers frequently highlight the quality of local water supplies in their marketing strategies to boost property appeal. Improvements or impairments in water quality could potentially have a substantial effect on the well-being of individuals selling their properties[3]. Governments and municipalities that invest in maintaining and improving water quality infrastructure can positively influence local housing markets. Upgraded water treatment facilities, robust filtration systems, and regular quality monitoring can reassure residents and prospective buyers about the safety of the water supply. Conversely, news of contamination incidents, such as lead in the water supply or industrial pollutants seeping into local aquifers, can deter buyers and devalue properties.

The development of drinking water infrastructure and treatment methods during the 20th and early 21st centuries led to enhancements in water dependability and purity in the United States as well as in various regions across the world[4]. Drinking water typically comes from two primary sources: surface water and groundwater. Surface water includes rivers, lakes, and reservoirs, which are often used by municipalities to supply large populations. Groundwater, on the other hand, is found in aquifers beneath the earth's surface and is accessed through wells. Both sources require extensive treatment processes to ensure the water is safe for consumption. Effective water management practices, from source protection to advanced purification techniques, are essential for ensuring high-quality drinking water.

Drinking water quality plays a vital role in determining housing prices and can significantly influence real estate markets. Clean and safe drinking water is a fundamental necessity for any household, and its availability can directly impact the desirability of a location. Homebuyers are often willing to pay a premium for properties that have access to high-quality water, knowing well that this ensures the health and well-being of their families. Conversely, areas with poor water quality can see a depreciation in property values as potential buyers might avoid such locations due to health concerns and potential financial burdens related to water treatment systems or bottled water costs. In addition to direct health implications, the perception of water quality can also affect the overall image of a community, influencing its attractiveness.

3.2. Factors Affecting Drinking Water Quality

There are various factors that may lead to the contamination of water sources on a property. Even water sourced from treatment facilities can become polluted under certain conditions. Firstly, deteriorating and damaged structural pipelines can allow harmful substances to infiltrate the water supply on its way to a residence. Certain regions may be more susceptible to this issue than others.

A residence situated near a body of water can be impacted by external factors beyond human control. Severe weather conditions like heavy rainfall and sudden floods tend to introduce more sediment into the water, resulting in murky waterfronts. Additionally, the presence of vegetation can contribute to decreased water clarity. This includes factors such as decaying leaves on the water's surface and the growth of algae blooms.

3.3. Existing Researches

Past hedonic literature has examined the effects of drinking water quality on the housing prices by employing wide range of water quality metrics and markers. One of the studies has developed a basic household production function model in which households are able to utilize materials, capital, and either piped or bottled water to generate water services that contribute to their overall utility. Through

the application of a domestic production framework and the establishment of a balanced sorting equilibrium, it is demonstrated that the economic value of system enhancements is contingent upon the expenses incurred by households in treating piped water, the presence of alternative options, and the feasibility of relocation. A residential sorting model was adapted to identify the variables that characterize the relationship between piped water quality and house price. While many studies have explored the impact of locational and structural attributes on house prices, very few have included piped water quality. In the model, households in a given community produce water services using piped water, materials, and capital, or purchase water from an alternate source. A housing rental price equilibrium emerges after households sort themselves among communities varying in piped water quality and alternate source water cost. The presence, direction, and size of the relationship between house price and community piped water quality depend on that piped water quality, the cost of treating it, and the quality and cost of substitutes[5]. Without accounting for these community-level characteristics, both measuring and interpreting a relationship between property prices and piped water quality will be questionable. The model results also suggest that if households know their piped water quality and can afford to invest in treatment or purchase of the substitute, they may adequately avert the impacts of poor quality piped water.

Another study used a natural experiment design. It used two rivers with significantly different water quality flowing through a specific geographic location to evaluate the impact of improved water quality on inland real estate prices. The findings indicate that land and property values experience a more significant rise in close proximity to unpolluted water bodies compared to polluted ones. By employing a bundle of sticks argument, which considers structural, neighborhood, and environmental factors, it can explain the varying willingness to pay for reduced distance to the nearby river as a reflection of the enhanced water quality's value. The calculations suggest that enhancing the environmental quality of the South (polluted) River to a level where the current fish consumption advisory is eliminated could result in a value ranging from \$7.3 to \$12 million[6]. This study adopts the more traditional method by integrating water quality parameters into econometric models to evaluate the economic value of these water quality attributes.

4. Suggestions and Perspectives

Future analysis of the relationship between drinking water quality and housing prices can be enhanced using advanced data analytics techniques. By employing sophisticated algorithms and models, Researchers can delve deeper into the intricate dynamics between water quality parameters and housing values. This approach will not only provide a more nuanced understanding of how water influences property prices but also offer insights into potential trends and patterns that may not have been apparent through traditional analytical methods.

Future studies can benefit from incorporating spatial analysis to account for regional variations in water quality and housing markets. By examining how different geographical factors interact with water quality indicators and housing prices, researchers can uncover localized impacts and disparities that may have been overlooked in previous research. This spatial perspective will enable a more comprehensive assessment of the relationship between drinking water quality and housing prices, leading to more targeted policy recommendations and interventions.

In addition, future research can explore the potential mediating factors that influence the relationship between drinking water quality and housing prices. Considering variables like demographic trends, infrastructure development, and environmental regulations helps researchers understand the complex interplay between water quality and property values.

This holistic approach will contribute to a more robust analysis of the impacts of drinking water quality on housing prices, allowing for a more informed discussion on the implications for policymakers and stakeholders in the real estate market.

Drinking water quality is a significant factor impacting housing prices, and it underscores the importance of sound environmental management and infrastructure investment in maintaining vibrant, desirable communities. When considering the consumption of water, the initial priority should be to confirm its safety for drinking purposes. To achieve this, the most effective approach involves the installation of a water purification system. A UV water purifier emerges as a compact and efficient solution for enhancing water quality and ensuring the potability of water. These systems are particularly adept at eliminating pathogenic elements, with an impressive average effectiveness rate of around 99%.

5. Conclusion

The objective of this paper has been to investigate whether drinking water quality has the impacts on the housing prices. From previous studies, hedonic property value analysis and production function, these two major method, have been used to examine the price of a residence based on its specific attributes. Both approaches have indicated substantial evidence of drinking water quality effects on the housing prices. Local inputs are used as water quality parameters in the models of each research, to compare and contrast findings with studies conducted in different geographical locations, thereby limiting the scope and depth of the research. In addition, there is a noticeable absence of research focusing on the effects of drinking water quality in the field of economics. More advanced research methodologies, are needed for future improvements, such as longitudinal studies and statistical analysis, Incorporating geographic information systems can provide a spatial perspective on the impact of drinking water quality on housing values, allowing for a more comprehensive understanding of this complex relationship. However, use of data collection and analysis techniques can help to mitigate potential confounding variables and enhance the accuracy of findings in this area of study. By delving into this topic, researchers can uncover the correlation between drinking water quality and the value of residential properties. This paper can shed light on the extent to which access to clean and safe drinking water affects the desirability and marketability of homes. Such research can also provide insights into the overall well-being and living conditions of communities, as access to high-quality drinking water is a fundamental aspect of public health and environmental sustainability.

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