Proceedings of the 8th International Conference on Economic Management and Green Development
DOI: 10.54254/2754-1169/125/2024.17776

Research on the Impact of International Students on US Housing Markets

Yichen Wang[1,a,*]

[1]*College of Social Sciences and Humanities, Northeastern University, Boston, MA 02115, United States*
a. wang.yichen2@northeastern.edu
**corresponding author*

Abstract: The affordability and availability of housing for university students in the United States have become increasingly challenging, especially for international students. This study investigates the impact of international student university enrollment on local housing markets, specifically focusing on Fair Market Rent (FMR) Efficiency. Understanding this relationship is essential for policymakers, university administrators, and local governments as they seek to balance housing supply and demand. This study employs a fixed effect regression model, the primary variables include international student ratios, unemployment rates, median household incomes, real GDP per capita, and university enrollment ratios. By analyzing panel data from 50 U.S. states between 2020 and 2023, this study aims to quantify the influence of international students on FMR Efficiency while accounting for state-level heterogeneity. The results reveal a significant positive correlation between international student ratios and FMR Efficiency, particularly in states with numerous higher education institutions and robust economic profiles. This finding highlights the need for targeted housing policies to manage the increased demand and ensure affordability for all residents.

Keywords: Housing Market, International Student, University Enrollment, Rent.

1. Introduction

Finding affordable and convenient housing has become a challenge for a vast majority of university students in the United States. Over the years, there was a noticeable and consistent increase in rental prices, pushing many students to seek housing farther from campus or share living spaces with multiple roommates to manage costs.

The United States has always been a favored destination for international students, contributing to the local economies of college towns and cities. The number of international students in the U.S. surpassed one million in recent years, and the enrollment surged by 14% in 2022-2023 [1]. With increasing numbers of international students enrolling in U.S. universities, there is a corresponding surge in demand for housing. This heightened demand can have various effects on the housing markets, influencing rental prices, availability, and the overall affordability for all residents.

This research aims to analyze the impact of international student university enrollment on housing markets at the state level in the United States. By employing econometric methods, the influence of rising numbers of international students on housing prices can be quantified. Understanding this relationship is crucial for policymakers, university administrators, and local governments as they

DOI: 10.54254/2754-1169/125/2024.17776

navigate the challenges of accommodating growing student populations while ensuring affordable housing for all residents.

2. Literature review

Studies indicate that areas with higher university enrollment experience increased rental prices and home values. Charles, Hurst, and Notowidigdo highlight that housing booms improve labor market opportunities for young adults, raising their opportunity costs of attending college, and thus reducing enrollment [2]. Conversely, areas with large universities have a huge boost in rental and home prices due to increased demand from students and university employees. This is corroborated by data from RealPage Analytics, which reports record-high rent growth and occupancy rates in student housing sectors following the COVID-19 pandemic disruptions [3].

The presence of universities can create localized economic hubs that drive up housing demand and reduce vacancy rates. Using Zillow Home Value Index (ZHVI) and Zillow Rent Index (ZRI) data, Barr et al. found that areas with large universities exhibit higher home prices and rental rates due to increased demand from students and staff [4]. The study also points out the reduced vacancy rates in these areas, highlighting the role of universities as economic hubs that drive housing market activity. Additionally, Ehrenberg emphasizes the role of universities in shaping local real estate markets, noting that increased student populations can strain housing availability and affordability [5]. Similarly, in the UK, Munro et al. highlighted the role of universities as economic engines that shape local housing markets by attracting both students and staff, thereby driving up the demand [6].

Research by Gyourko et al. shows that the demand pressures in university towns lead to significant increases in local housing prices [7]. Furthermore, Bound et al. found that universities' contributions to local economies could exacerbate housing affordability issues, particularly in regions with high enrollment rates [8].

The long-term impacts of university enrollment on housing markets also include changes in construction trends. Whitaker notes a downfall in new student housing construction since 2019, which could help balance supply and demand in the long term. However, demographic shifts such as a declining college-aged population and fluctuating international student enrollment challenged the sustainability of this growth [4]. As Goodman and Ruggles discuss, understanding the dynamics between university enrollment and housing markets requires considering various economic and demographic factors [9].

Studies have consistently shown that university enrollment significantly impacts local housing markets. These impacts include changes in rental prices, home prices, and housing availability, driven by increased demand from populations associated with higher education institutions.

The literature highlights the significant and multifaceted impact of university enrollment on local housing markets. While increased enrollment drives up rental and home prices, it also supports local economies, particularly during downturns. Future research should explore the long-term effects of demographic changes and the potential for policy interventions to stabilize housing markets affected by university dynamics.

The primary hypothesis to be tested in this study is:

H1: A higher proportion of international students is positively correlated with Fair Market Rent Efficiency.

This hypothesis suggests that a higher ratio of international students within the university population will lead to an increase in Fair Market Rent (FMR) Efficiency. International students often have different housing needs and preferences compared to domestic students, potentially leading to higher demand for certain types of housing. Additionally, international students may be less familiar with local housing markets and more willing to pay premium rents for convenient, high-quality

DOI: 10.54254/2754-1169/125/2024.17776

accommodations. This increased willingness to pay can drive up rental prices in areas with a substantial international student population.

3. Methodology

To better understand the relationship between international student ratios and FMR Efficiency, it is essential to account for state-level differences. For instance, states with a high number of higher education institutions may experience a more pronounced impact due to a larger student population. Additionally, states with higher export abilities tend to have more robust economies, potentially amplifying the effect of international student demand on housing markets. Incorporating these factors through dummy variables will allow for a more nuanced analysis, highlighting variations in how international student enrollment impacts local housing conditions across different states.

3.1. Data

This study employs a quantitative design using secondary data. The research subjects are the 50 states of the United States. The study uses panel data sourced from data released by U.S. government agencies and the Federal Bank from 2020 to 2023.

Fair Market Rent (FMR) Efficiency: Represents the cost of renting an efficiency (studio) apartment in each state, serving as a primary indicator of rental affordability and housing market conditions.

University Enrollment Ratio: The percentage of the eligible population that is enrolled in higher education institutions, and is calculated as the fraction of total university enrollment over the population of 18–24-year-olds in each state.

International Student Ratio: The percentage of international students in a specific state, computed by taking the fraction of the total number of international students in a state over the total university enrollment.

Table 1: Descriptive statistics of states

Variable	Mean	Min	Max	Std. dev.
FMR efficiency ($)	724.47	379	1589	205.74
International student ratio (%)	5.13	1.45	17.76	2.91
Unemployment rate (%)	4.70	1.90	13.50	2.00
Median household income ($)	75126.38	46637	108200	12870.64
Real GDP per capita ($)	62824.34	37146.35	214665.5	24040.28
University enrollment ratio (%)	55.85	28.77	152.78	12.98

As displayed in Table 1, all data comes from United States government agencies [1, 10-13]. By adopting the method of combining a comprehensive survey and a sampling survey, the government ensures the authority and integrity of the statistics.

3.2. Regression Model

To analyze the impact of international student university enrollment on housing markets, a panel data regression model will be employed. This model aims to quantify the relationship between the proportion of international students and Fair Market Rent (FMR) Efficiency, while controlling for other economic variables and accounting for state-level heterogeneity. The model will be specified as follows:

DOI: 10.54254/2754-1169/125/2024.17776

$$\text{FMR Efficiency}_{it} = \beta_0 + \beta_1 \text{IS Ratio}_{it} + \beta_2 \text{UR}_{it} + \beta_3 \text{MHI}_{it} + \beta_4 \text{RGDPc}_{it} + \beta_5 \text{UE Ratio}_{it} + \gamma \text{Dummy}_{it} + \alpha_i + \delta_t + \epsilon_{it} \quad (1)$$

where:

$\text{FMR Efficiency}_{it}$ is the Fair Market Rent Efficiency for state *i* at time *t*.

IS Ratio_{it} is the proportion of international students to total university enrollment in state *i* at time *t*.

UR_{it} is the unemployment rate in state *i* at time *t*.

MHI_{it} is the median household income in state *i* at time *t*

RGDPc_{it} is the real GDP per capita in state *i* at time *t*

UE Ratio_{it} is the ratio of total university enrollment to the population of 18–24-year-olds in state *i* at time *t*.

γDummy_{it} represents the set of dummy variables accounting for heterogeneity across states (indicator for the number of higher education institutions and export ability)

This model isolates the impact of the international student ratio on FMR Efficiency while controlling for other relevant economic variables and accounting for unobserved heterogeneity across states and over time. By incorporating fixed effects, the time-invariant characteristics of each state and common shocks across all states are controlled. This ensures that the estimates reflect the true relationship between international student enrollment and housing market conditions.

4. Results

4.1. Baseline model, fixed effect

Table 2: Fixed effect linear regression for baseline model

Variables	Coefficients			
International student ratio (%)	26.885*** (6.773)	15.741** (6.272)	15.527** (6.159)	14.385** (6.336)
Unemployment rate (%)	-26.404*** (2.282)	-18.246*** (2.401)	-10.432*** (3.880)	-10.059** (3.914)
Median household income ($)		-0.008*** (0.001)	-0.007*** (0.003)	-0.007*** (0.001)
Real GDP per capita ($)			0.008** (0.003)	0.010*** (0.003)
University enrollment ratio (%)				1.250 (1.586)
Overall $R^2 = 0.4148$		F-value = 45.33		

Standard errors in parenthesis; *** p<0.01, ** p<0.05, * p<0.1

The baseline model (Table 2) examines the overall relationship between the international student ratio and FMR Efficiency. The coefficient for the international student ratio is positive and statistically significant at the 5% level, indicating that a higher proportion of international students is associated with an increase in FMR Efficiency. Specifically, a 1% increase in the international student ratio corresponds to an increase in FMR Efficiency by approximately 14.385 units (U.S. Dollar). This supports the primary hypothesis that international students drive up rental prices due to increased housing demand when pursuing their degree.

DOI: 10.54254/2754-1169/125/2024.17776

The unemployment rate is negatively correlated with FMR Efficiency, significant at the 1% level. This suggests that higher unemployment rates tend to reduce FMR Efficiency, possibly due to decreased overall demand for housing. Median household income also shows a significant negative relationship with FMR Efficiency, though with a small effect size, indicating that as household incomes increase, FMR Efficiency slightly decreases.

Real GDP per capita is positively correlated with FMR Efficiency and significant at the 5% level, indicating that more economically prosperous states experience higher rental prices. The university enrollment ratio, however, does not show a significant relationship with FMR Efficiency in this model.

The overall R-squared value of 0.4148 suggests that the model explains approximately 41.48% of the variance in FMR Efficiency, with an F-value of 45.33, indicating the model's overall significance.

4.2. Heterogeneity check

Table 3: Fixed effect linear regression for heterogeneity check

Variables	States with more than 75 higher education institutions	States with less than 75 higher education institutions	States with above median export level	States with below median export level
International student ratio (%)	23.553*** (7.786)	12.584 (8.273)	33.199*** (7.382)	8.028 (8.960)
Unemployment rate (%)	4.213 (5.593)	-13.334*** (4.904)	6.885 (5.072)	-18.446*** (5.568)
Median household income ($)	-0.008*** (0.002)	-0.007*** (0.002)	-0.005*** (0.002)	-0.007*** (0.001)
Real GDP per capita ($)	0.016*** (0.005)	0.010** (0.005)	0.022*** (0.005)	0.007 (0.006)
University enrollment ratio (%)	-2.080 (5.084)	1.756 (1.863)	0.396 (3.956)	1.768 (2.054)
Overall R-squared	0.4644	0.4543	0.4360	0.4448

Standard errors in parenthesis; *** p<0.01, ** p<0.05, * p<0.1

To gain a deeper understanding of the varying impacts of international student enrollment on Fair Market Rent (FMR) Efficiency across different states, a heterogeneity check (Table 3) was conducted by introducing dummy variables for the number of higher education institutions and export ability.

4.2.1. Impact by Number of Higher Education Institutions

For states with more than 75 higher education institutions, the coefficient for the international student ratio is positive and highly significant, with a value of 23.553 ($p < 0.01$). This suggests a stronger impact of international student enrollment on FMR Efficiency in these states compared to the overall baseline model. The presence of a large number of universities likely increases the demand for housing, as a higher concentration of students, both domestic and international, intensifies competition for available rental properties.

In contrast, in states with fewer than 75 higher education institutions, the coefficient for the international student ratio is positive but not statistically significant. This suggests that the overall

DOI: 10.54254/2754-1169/125/2024.17776

demand pressure exerted by international students is lower in states with fewer universities, potentially due to a smaller student population and less competitive housing markets.

4.2.2. Impact by Export Levels

The analysis shows that in states with export levels above the national median, the coefficient for the international student ratio is the highest at 33.199 ($p < 0.01$). This indicates that states with strong export capabilities experience the most significant impact on rental prices due to international student enrollment. Driven by robust export activities, the economic vibrancy in these states likely enhances the attractiveness of these areas for international students. This increased attractiveness further amplifies the demand for housing.

For states with export levels below the national median, the coefficient for the international student ratio is 8.028 and is not statistically significant. These states may have less dynamic economies, which could mitigate the influence of international student demand on housing markets. The lack of significant economic activities related to exports might mean that these areas do not attract as many international students, resulting in a diminished effect on rental prices.

5. Conclusion

This study provides valuable insights into the impact of international student enrollment on local housing markets in the United States. By employing a fixed effect regression model and conducting heterogeneity checks, we identified significant variations in how international student ratios affect FMR Efficiency across different states. The findings confirm that higher proportions of international students are associated with increased rental prices, especially in states with more educational institutions and stronger economic profiles.

These findings carry important policy implications. For states with high concentrations of universities and strong export economies, strategic measures to increase housing supply and manage rental prices are crucial. University administrators and local policymakers should consider developing affordable housing projects, offering subsidies for student housing, and implementing zoning reforms to meet the growing demand. Conversely, states with fewer universities and lower export activity should continue monitoring housing trends to ensure affordability and prevent potential housing crises.

This study has several limitations that could be addressed in future research. The first being that the data were collected at the state level, which may obscure more localized variations in housing market dynamics. Collecting data at the metropolitan statistical area (MSA) level could provide a more granular understanding of how international student enrollment impacts specific housing markets.

References

[1] *Institute of International Education Open doors. (2023), International Students, retrieved from: https://opendoorsdata.org/data/international-students/.*

[2] *Charles, K.K., Hurst, E., & Notowidigdo, M.J. (2018), Housing Booms and Busts, Labor Market Opportunities, and College Attendance. American Economic Review, 108 (10): 2947–94.*

[3] *Whitaker, C. (2023), Student Housing Outlook for 2023. RealPage Analytics Blog, https://www.realpage.com/analytics/student-housing-outlook-for-2023/.*

[4] *Barr, J.R., Hristidis, V., Patil, D., Rivas, R., & Srinivasan, N. (2019), The impact of colleges and hospitals to local real estate markets. J Big Data, https://doi.org/10.1186/s40537-019-0174-7.*

[5] *Ehrenberg, R. G. (2012). American Higher Education in Transition. Journal of Economic Perspectives, 26(1), 193-216.*

[6] *Munro, M., Turok, I., & Livingston, M. (2009). Students in cities: A preliminary analysis of their patterns and effects. Environment and Planning A: Economy and Space, 41(8), 1805-1825.*

DOI: 10.54254/2754-1169/125/2024.17776

[7] Gyourko, J., Mayer, C., & Sinai, T. (2013). Superstar Cities. American Economic Journal: Economic Policy, 5(4), 167-199.

[8] Bound, J., Braga, B., Khanna, G., & Turner, S. (2020). A Passage to America: University Funding and International Students. Journal of Economic Perspectives, 34(4), 163-186.

[9] Goodman, A. C., & Ruggles, P. (2020). Housing Market Dynamics and the Future of Housing Policy. Journal of Economic Perspectives, 34(1), 121-144.

[10] National Student Clearinghouse Research Center. (2024), Current Term Enrollment Estimates – Fall 2023 Appendix, retrieved from: https://nscresearchcenter.org/current-term-enrollment-estimates/cteefall2023-appendix/.

[11] U.S. Department of Housing and Urban Development. (2023), HUD user data sets: Fair Market Rents (40th PERCENTILE RENTS), retrieved from: https://www.huduser.gov/portal/datasets/fmr.html.

[12] Federal Reserve Bank of St. Louis. (2023), Release Tables, retrieved from: https://fred.stlouisfed.org/releases.

[13] U.S. Bureau of Economic Analysis. (2024), GDP by State, retrieved from: https://www.bea.gov/data/gdp/gdp-state.