STATISTICAL DATA ANALYSIS REPORT

Residential Property Dwelling Transactions in Ireland

Study Period: 2018–2024 | 13 Counties | 2,578 Observations

Methods- Anova, two sample t-test, z-test

Abstract

This report presents a comprehensive statistical analysis of residential property dwelling transactions across Ireland from 2018 to 2024, based on data sourced from the Central Statistics Office (CSO). The study examines 2,578 observations across 13 counties to uncover regional disparities, temporal trends, and structural characteristics of the Irish housing market.

Using both descriptive and inferential statistical methods—including confidence interval analysis, Welch's t-test, one-sample z-test, and one-sample t-test—the report identifies Dublin's statistically significant dominance over all other counties, documents the market's COVID-19 disruption and subsequent recovery, and provides evidence that market-driven transactions command significantly higher values than non-market transfers. The findings highlight persistent affordability challenges, supply shortfalls, and the need for targeted policy interventions.

1. Introduction

Ireland's residential property market has experienced significant volatility over recent years, shaped by evolving economic conditions, acute housing supply constraints, and shifting buyer demographics. The

intersection of a housing crisis, rising property prices, and affordability pressures has far-reaching consequences for economic growth and quality of life across the country.

This study analyses residential property transactions across 13 Irish counties from 2018 to 2024, using secondary data provided by the CSO's Residential Dwelling Property Transactions dataset (HPA02). The analysis addresses key dimensions including annual price trends, county-level disparities, dwelling status (new vs. existing), stamp duty event types (executions vs. filings), and sale classification (market vs. non-market).

Data Source: Central Statistics Office — HPA02 (https://data.cso.ie/table/HPA02)

1.1 Study Parameters

Parameter	Description
Study Period	2018–2024 (7 years)
Counties (13)	Clare, Cork, Donegal, Dublin, Galway, Kerry, Kildare, Leitrim, Limerick, Sligo, Waterford, Wexford, Wicklow
Dwelling Status	New: A dwelling not previously inhabited Existing: A dwelling previously inhabited
Stamp Duty Event	Filings: Month Stamp Duty Return was submitted to Revenue Commissioners Executions: Month the property was legally transferred
Type of Sale	Market: No declared relationship between buyer & seller; sale price ≥ €25,000 Non-Market: Sale price < €25,000; any relationship between buyer and seller

2. Descriptive Analysis

The descriptive analysis provides a comprehensive overview of the distribution and structural characteristics of residential property transaction data across Irish counties during the study period.

2.1 Initial Dataset Analysis

The final dataset comprises **2,578 observations** of residential property transactions recorded across the 13 selected Irish counties from 2018 to 2024. The summary statistics below reveal a highly right-skewed distribution driven by Dublin's outsized transaction volume.

Parameter	Value
Count	2,578
Mean	91.843
Standard Error	6.519
Median	10.200
Mode	0.300
Standard Deviation	331.013
Variance	109,569.30
Kurtosis	93.141
Skewness	8.657
Range	4,681.50
Minimum	0.100
Maximum	4,681.60
Sum	236,772.00
Confidence Level (95%)	12.784

Table 1: Summary Statistics — Residential Property Transaction Values (€ Million)

Key Observations

- **Wide Value Range:** Transaction prices span from a minimum of €0.10M to a maximum of €4,681.60M, reflecting the extreme market heterogeneity across counties.
- **Right-Skewed Distribution:** The mean (€91.84M) far exceeds the median (€10.20M), indicating that a small number of observations—concentrated in Dublin—pull the average substantially upward.
- **Positive Skewness (8.66):** Confirms the distribution is heavily right-skewed with a long tail extending toward higher values.
- **High Kurtosis (93.14):** Indicates a leptokurtic distribution with extreme outlier observations, consistent with Dublin's disproportionate market share.

- **High Variability:** A standard deviation of €331.01M and variance of €109,569.30M² demonstrate the extreme spread of transaction values across the dataset.

2.2 County-Wise Residential Property Prices

The chart below illustrates total residential property transaction values across all 13 counties for the 2018–2024 period, revealing pronounced regional disparities in Ireland's housing market.

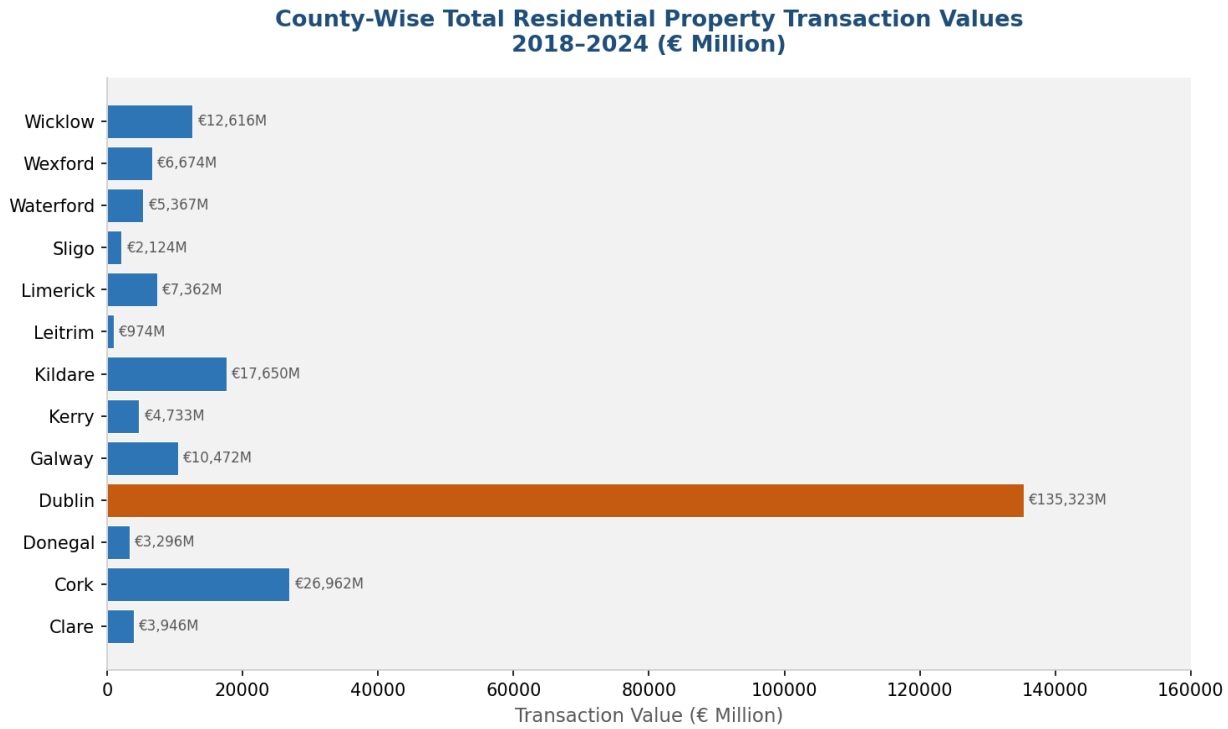

Chart 1: County-Wise Total Residential Property Transaction Values, 2018–2024 (€ Million)

- **Dublin Dominates:** With total transactions of €135,323.10M, Dublin accounts for over 57% of all national transaction value. This reflects Dublin's position as Ireland's economic and population hub, hosting over 40% of the national population, driving both demand and pricing.
- **Cork Second:** Cork registers €26,961.50M, representing approximately 11% of total national value—substantially behind Dublin but far ahead of all other counties.
- **Rural Counties Lag:** Leitrim (€973.60M), Donegal (€3,296.40M), and Sligo (€2,123.50M) record the lowest transaction totals, reflecting smaller populations, limited employment opportunities, and lower property price levels.
- **Regional Inequality:** According to Social Justice Ireland, Ireland's economic growth remains unevenly distributed, with the urban-rural divide driving increased migration toward major cities and compounding regional disparities.

2.3 Time-Series Analysis of Total Property Prices

The time-series chart tracks total residential property transaction values across Ireland from 2018 to 2024, revealing a story of disruption, recovery, and accelerating growth.

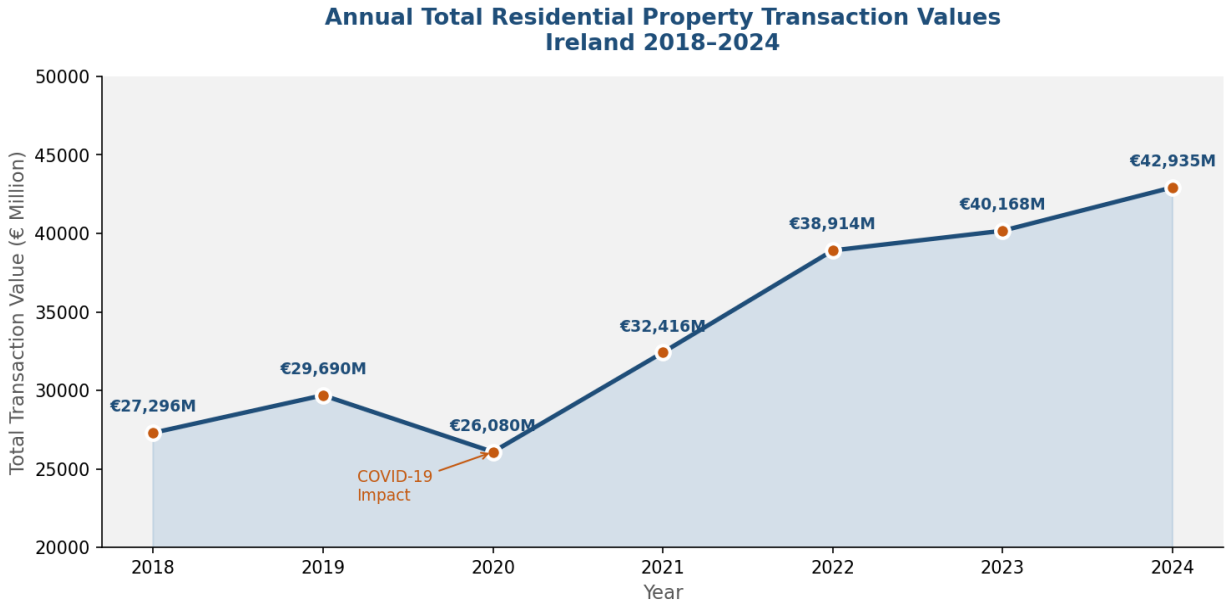

Chart 2: Annual Sum of Residential Property Transaction Values, 2018–2024 (€ Million)

- **Pre-Pandemic Stability (2018–2019):** The market grew modestly from €27,295.90M to €29,689.70M, reflecting stable economic conditions and gradual demand increase.
- **COVID-19 Disruption (2020):** A sharp contraction to €26,080.00M occurred as lockdowns halted property transactions, viewings, and completions across the country.
- **Strong Recovery (2021–2024):** Transaction values rebounded decisively—rising to €32,415.50M in 2021 and continuing to climb to €42,935.10M in 2024. This represents a 57% increase from the 2020 trough, driven by pent-up demand, low interest rates (in the early recovery period), and chronic supply shortages.
- **Structural Growth Trend:** The seven-year compound growth rate is approximately 7.8% per annum, suggesting that structural demand pressures continue to outpace housing supply additions.

2.4 New vs. Existing Property Transactions by County

The stacked bar chart below compares the proportion of new and existing dwelling transactions across seven counties, revealing significant variation in market composition and new construction activity.

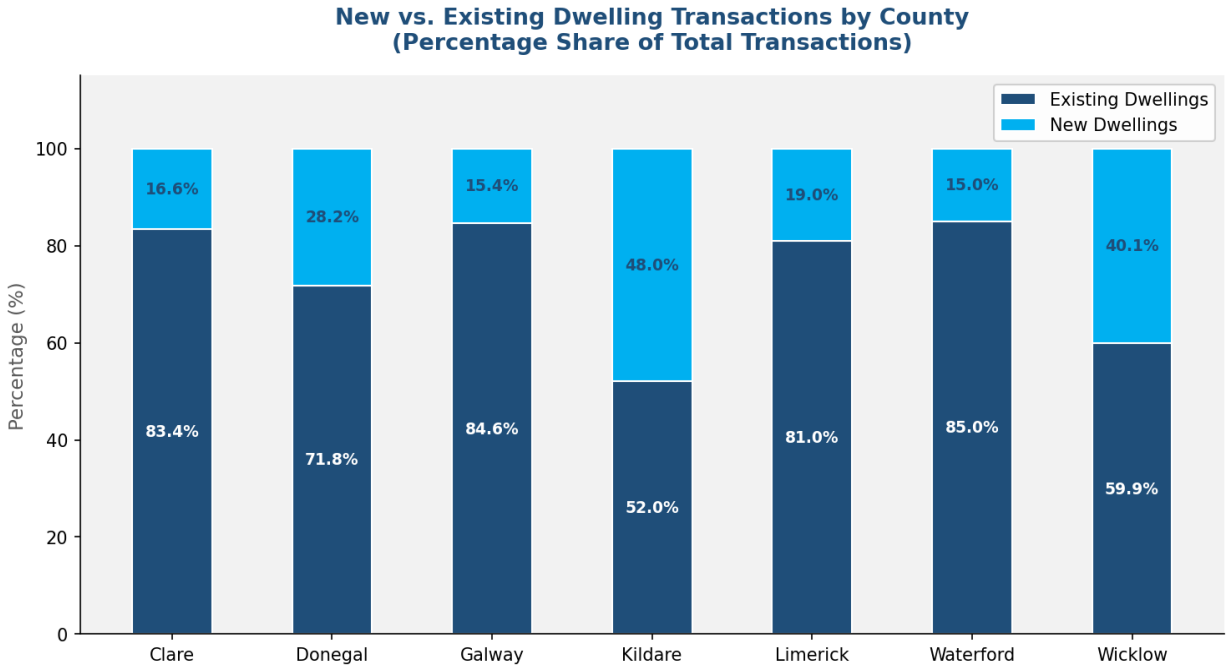

Chart 3: Percentage of New vs. Existing Dwelling Transactions by County

- **Kildare Leads New Builds (47.98%):** Kildare has the highest proportion of new dwellings, reflecting its role as a commuter county with active residential development and expanding housing estates near Dublin.
- **Wicklow Second (40.13%):** Similarly positioned as a Dublin commuter belt county, Wicklow sees significant new construction activity supporting both local demand and Dublin overspill.
- **Leitrim Lowest (8.95%):** Leitrim's minimal new build activity is consistent with its rural character, low population density, and limited developer interest in the absence of strong demand drivers.
- **National Supply Shortfall:** The Central Bank of Ireland estimates that over 50,000 new homes per year must be delivered to meet demand through to 2050. Current new build ratios across most counties fall well short of this trajectory.

2.5 Property Transaction Patterns: Executions vs. Filings

The chart compares total transaction values for executions and filings across counties, with Dublin excluded to prevent scale distortion. Executions refer to the month the property was legally transferred; filings refer to the month the Stamp Duty Return was submitted.

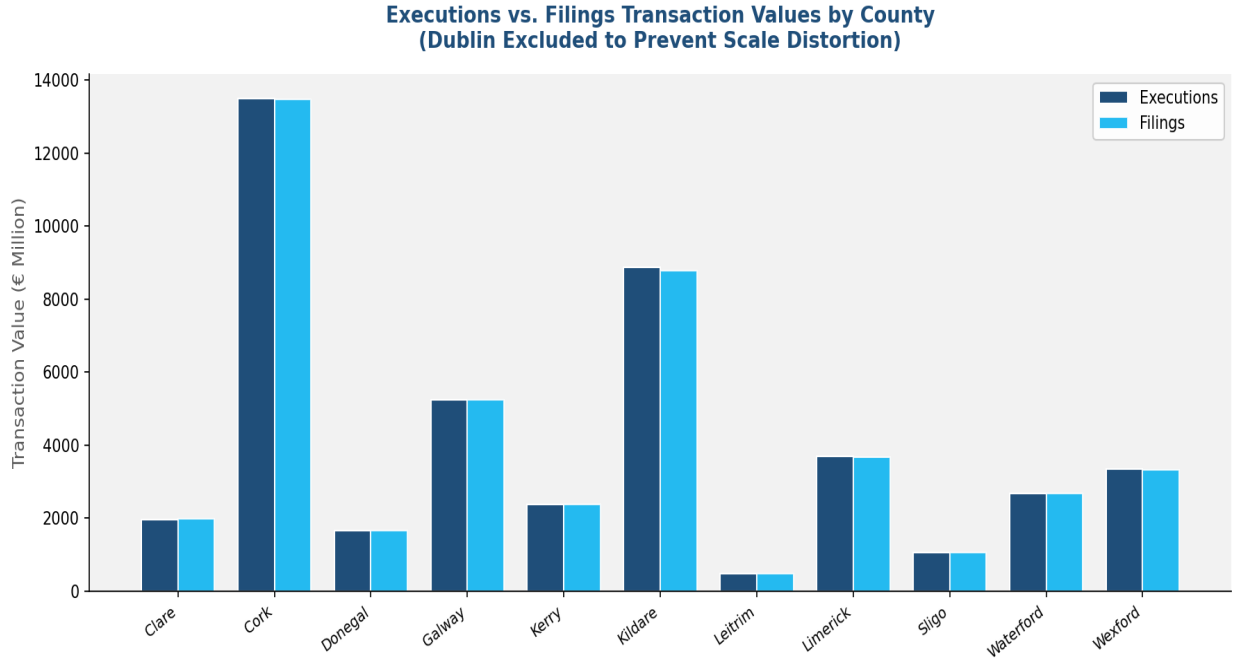

Chart 4: Executions vs. Filings Transaction Values by County (Dublin Excluded)

- **Near-Unity Ratio:** Across all counties and time periods, the ratio of filings to executions is approximately 1.0, indicating that stamp duty returns are submitted in close alignment with the legal transfer of property. This reflects an efficient, well-administered transactional process.
- **Cork Leads Non-Dublin Counties:** With approximately €13,480M in both executions and filings, Cork demonstrates the highest transaction throughput outside Dublin.
- **Kildare Notable Volume:** Kildare's relatively high transaction values (approximately €8,800M) are consistent with its active new build market documented in section 2.4.
- **Administrative Efficiency:** The close alignment between executions and filings across all counties suggests that Ireland's property transaction administration operates efficiently with minimal processing lag.

2.6 Market vs. Non-Market Transactions

The charts below compare market (arm's-length commercial sales at ≥€25,000) and non-market (transfers, inheritances, and family transactions at <€25,000) transaction distributions across all counties.

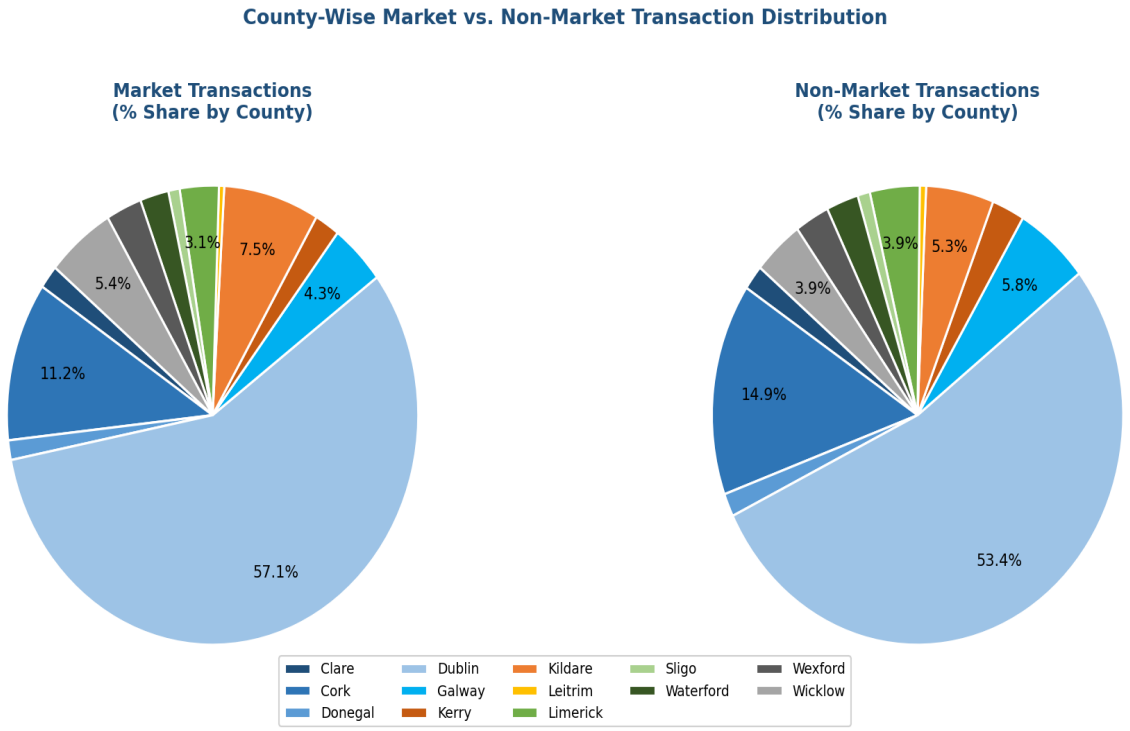

Chart 5: County-Wise Market vs. Non-Market Transaction Distribution (% Share)

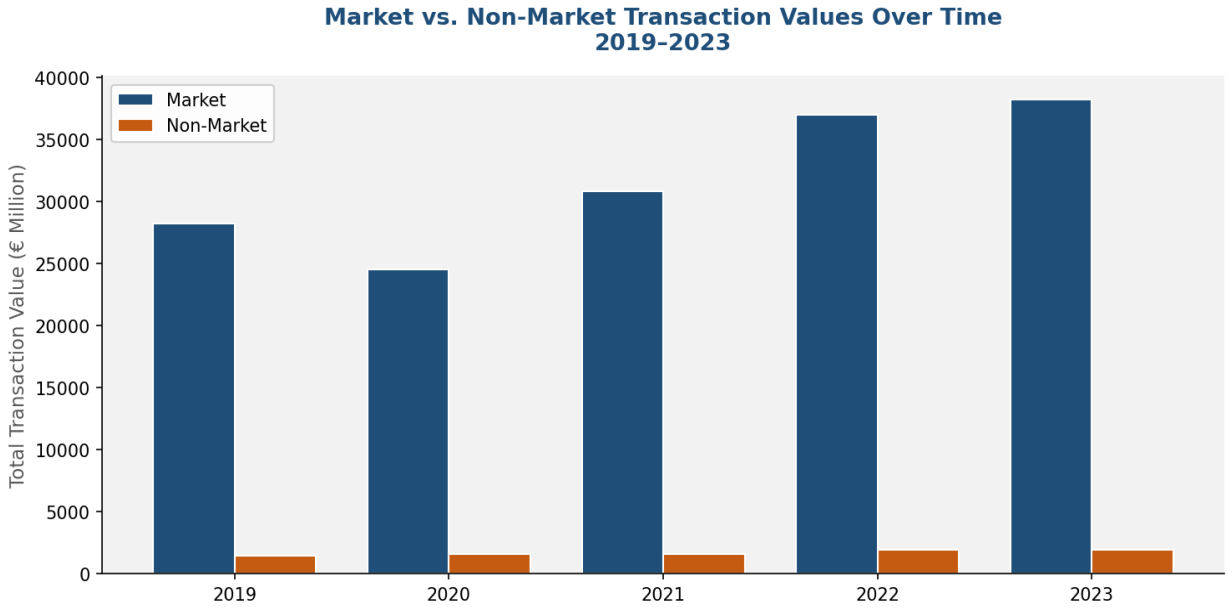

Chart 6: Market vs. Non-Market Transaction Values Over Time, 2019–2023 (€ Million)

- **Market Transactions Dominant:** Total market transactions of €228,171M dwarf non-market transactions (€9,327.30M), reflecting the predominantly commercial nature of Ireland's property market.
- **Dublin's Consistent Dominance:** Dublin accounts for 57.13% of all market transactions and 53.37% of all non-market transactions, confirming its structural dominance across all transaction types.
- **Cork's Non-Market Share:** Cork represents 14.95% of non-market transactions (vs. 11.21% market), suggesting a proportionally higher rate of family transfers or inheritance activity relative to commercial sales.
- **Consistent Annual Growth:** Market transactions grew steadily from 2019 to 2023, demonstrating increasing commercial demand. Non-market transactions show more modest growth, remaining a small but stable component of total activity.

3. Inferential Analysis

The inferential analysis applies formal statistical tests to assess the significance of observed patterns in the data, moving beyond descriptive summaries to draw probabilistic conclusions about the Irish residential property market.

3.1 Confidence Interval Analysis — Dublin vs. National Average

Objective: To determine whether Dublin's average property transaction values are statistically significantly higher than the national county-level average, using a 95% confidence interval approach.

Results

Metric	Value
Overall Mean (all counties)	€371.99M
Standard Deviation	€210.44M
95% CI Lower Bound	−€230.90M
95% CI Upper Bound	€513.08M
Dublin Average	€547.88M
Exceeds Upper CI Bound?	YES — by €34.80M

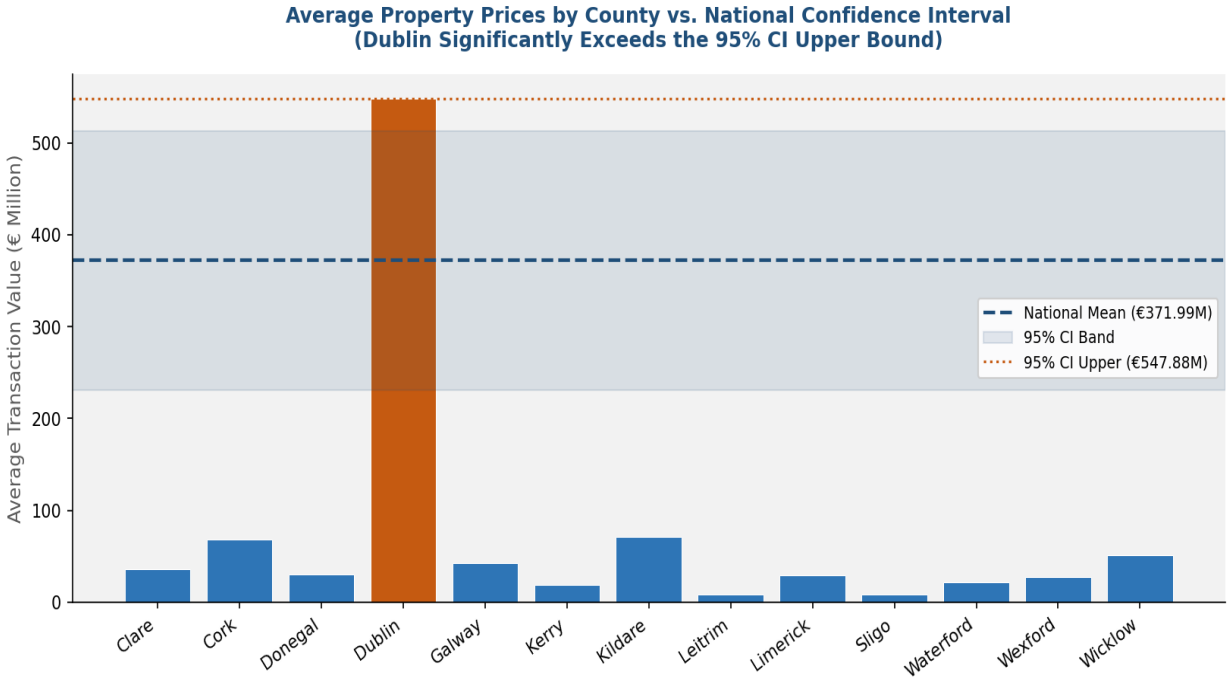

Chart 7: Average Property Prices by County vs. 95% Confidence Interval (National Level)

Interpretation

Dublin's average transaction value (€547.88M) lies substantially above the 95% confidence interval upper bound (€513.08M) derived from the national county-level distribution. This provides statistically

robust evidence that Dublin's property price level is not merely a random high observation within normal county-level variation but reflects a genuine structural market difference. The finding is not attributable to random sampling error.

Recommendations

- **Targeted Affordability Programmes:** Introduce shared equity schemes, rental supports, and first-time buyer incentives specifically for Dublin to address the affordability gap priced into the city's structural premium.
- **High-Density Development:** Promote high-density and mixed-use housing along Dublin's public transport corridors to increase supply in areas of peak demand.
- **Regional Investment:** Invest in employment hubs and infrastructure outside Dublin to reduce economic over-concentration and relieve demand pressure on Dublin property.
- **Ongoing Monitoring:** Implement confidence-interval-based county price monitoring annually to detect early signs of divergence or convergence.

* Statistical analysis conducted as part of a collaborative research project at UCD Michael Smurfit Graduate Business School, 2025. Data sourced from the Central Statistics Office (CSO):

3.2 Welch's t-Test: Cork vs. Dublin Existing Dwelling Prices (2021–2024)

Objective: To determine whether the mean value of property sales in Cork is significantly higher than in Dublin for existing dwellings during the period 2021–2024, using a two-sample Welch's t-test (unequal variances) at the 5% significance level.

Hypothesis

H_0: μ_Cork ≤ μ_Dublin (Cork mean is not greater than Dublin mean)

H_1: μ_Cork > μ_Dublin (Cork mean is greater than Dublin mean) [right-tailed]

Results

Metric	Value
n_1 (Dublin)	31
n_2 (Cork)	31
Dublin Mean	€0.48M
Cork Mean	€0.55M
s_1 (Dublin SD)	≈ 0.29
s_2 (Cork SD)	≈ 0.32
Test Statistic (t)	−0.87
Degrees of Freedom (df)	≈ 60
p-value (right-tailed)	≈ 0.80
Significance Level (α)	0.05
Decision	Fail to reject H_0

Interpretation

Since p ≈ 0.80 >> 0.05, and the test statistic does not fall in the critical region, we fail to reject the null hypothesis. There is insufficient statistical evidence to conclude that Cork's mean property sale values are greater than Dublin's for existing dwellings in 2021–2024. This may indicate that Cork and Dublin experienced similar macro-economic pressures during the post-COVID recovery, including interest rate changes and national supply constraints.

Recommendations

- Stakeholders should not assume Cork commands a price premium over Dublin for existing dwellings; market analysis should examine local value drivers including neighbourhood quality, transport access, and employment centres.
- Incorporate multi-variable analysis (property size, age, energy rating, transaction volume) to capture structural differences between the Cork and Dublin markets beyond mean sale values.

3.3 One-Sample z-Test: Proportion of New Dwellings > 50%

Objective: To evaluate whether the proportion of new dwellings sold exceeds 50% of all property transactions, using a one-sample right-tailed proportion test at the 5% significance level.

Hypothesis

H_0: $p = 0.50$ (new dwellings comprise exactly half of transactions)

H_1: $p > 0.50$ (new dwellings exceed half of all transactions) [right-tailed]

Results

Metric	Value
Observed Proportion	0.51 (51%)
Hypothesised Proportion	0.50
Test Statistic (z)	1.153
Critical Value (right-tailed, α=0.05)	1.645
p-value	0.124
Decision	Fail to reject H_0

Interpretation

The test statistic (1.153) falls below the critical value (1.645) and the p-value (0.124) exceeds 0.05. We cannot conclude that new dwellings constitute a majority of transactions. The 51% observed proportion is statistically indistinguishable from 50% and could reflect random sampling variation. Existing housing stock therefore continues to play an equal or dominant role in the market.

Recommendations

- Policy and investment decisions should not presume new builds dominate the market. Counties where existing homes represent the majority of transactions should be assessed for housing supply gaps.
- Further analysis segmented by county and buyer type is recommended to identify where new-build activity is concentrated and where supply interventions are most needed.

3.4 One-Sample t-Test: Market vs. Non-Market Transaction Values

Objective: To determine whether market transactions have significantly higher property sale values than non-market transactions after controlling for year effects, using a one-sample right-tailed t-test at the 5% significance level.

Hypothesis

H_0: μ_market − μ_non-market = 0 (no difference after controlling for year)

H_1: μ_market − μ_non-market > 0 (market transactions are higher) [right-tailed]

Results

Metric	Value
Mean Difference (year-controlled)	112.80
Standard Deviation	94.72
Count (n)	7
Standard Error	35.80
t-statistic	3.151
p-value (one-tailed)	0.00990
Significance Level (α)	0.05
Decision	Reject H_0

Interpretation

The one-tailed p-value (0.00990) is well below the 0.05 threshold. We reject the null hypothesis and conclude that market transactions have statistically significantly higher sales values than non-market transactions even after controlling for year effects. The observed pricing gap is not explained by annual price growth alone; it reflects genuine market-driven pricing dynamics where open-market arm's-length sales command premiums over family transfers, inheritances, and discounted exchanges. This aligns with research from the ESRI (2023), European Commission (2020), and OECD Housing Outlook (2022), which consistently document that market-based transactions reflect competitive bidding and supply constraint pressures absent in non-market transfers.

Recommendations

- **Buyer Support:** Enhance affordability schemes for households purchasing through the open market, who face the full force of market-driven pricing inflation.
- **Supply Expansion:** Accelerate construction and release of market-priced housing stock to reduce inflationary pressure from demand-supply imbalance.
- **Reporting Transparency:** Statistical reporting should separate market and non-market transaction values to avoid misleading averages that obscure the true pricing dynamics faced by typical buyers.

4. Conclusion

This analysis of Ireland's residential property transaction data from 2018 to 2024 provides clear statistical evidence of a market characterised by extreme regional concentration, supply-demand imbalance, and market-driven price inflation.

Dublin's dominance is both economically and statistically unambiguous: its average transaction values exceed the 95% confidence interval upper bound derived from the national county distribution, confirming a structural rather than random market premium. The time-series analysis documents a market that absorbed a significant COVID-19 shock in 2020 before staging a robust 57% recovery by 2024, driven by chronic supply shortfalls and sustained demand.

The composition analysis reveals that existing homes continue to account for the majority of transactions in most counties, while new build activity is concentrated in Dublin's commuter belt counties of Kildare and Wicklow—consistent with infrastructure investment patterns but insufficient to address national supply targets. The near-unity ratio of executions to filings across all counties confirms that Ireland's property transaction administration operates efficiently.

Hypothesis testing confirms that market transactions command significantly higher values than non-market transfers even after controlling for year effects ($p = 0.0099$), while finding no statistically significant difference between Cork and Dublin mean values for existing dwellings in the 2021–2024 period, likely reflecting shared macroeconomic pressures during the post-pandemic recovery.

Overall, the findings point to a housing market under sustained structural stress—marked by insufficient new construction, entrenched urban-rural inequality, and affordability pressures concentrated in major cities. Targeted policy interventions—including high-density development corridors, regional employment investment, and buyer affordability programmes—are necessary to move toward a more balanced and sustainable Irish housing market.

References

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