ESRI RESEARCH NOTE

Assessing price sustainability in the Irish housing market: a county-level analysis

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IRISH HOUSE PRICE SUSTAINABILITY: A COUNTY-LEVEL ANALYSIS

* Matthew Allen-Coghlan, Kieran McQuinn, Conor O'Toole[1]

1. INTRODUCTION

In the wake of a number of high profile property crashes, a question that has come to the fore recently is; are housing booms and busts clustered in specific areas within countries or do they tend to be more pan-regional? Within the United States for example, considerable variation in the boom-bust cycle has been experienced with the so-called 'sand states' (California, Florida, Arizona, and Nevada) showing much greater fluctuations in prices than other regions following the financial crisis.[2] In an Irish context, a significant issue of interest is the apparent divergence between the Dublin property market and other regional markets as well as the difference between urban and rural areas.

Mainly due to a lack of data, few research papers have assessed the sustainability of house prices in Ireland at a regional level. In this *Research Note*, we compile a series of regional housing indicators to provide insights into the regional dimension of price sustainability and explore how the housing market is developing across Ireland. One of these indicators is the rent-to-house price ratio (yield). This can be used as an indicator of market stability, as depressed yields can indicate asset values increasing beyond the cash flows associated with the asset. This paper extends the work of McQuinn (2017)[3] who considers the developments of Irish house prices in recent years and the extent to which they are explained by economic fundamentals. We apply the same model to each county in Ireland to determine the stability of house prices at a more granular level.

In this Note, we also discuss in more detail the research presented in McQuinn et al. (2019) which uses underlying finance theory and the user cost of capital method to present a Heat Index for Irish counties. This approach has the considerable advantage of having a particular theoretical structure and allows us

[2] Bhattacharya and Kim (2011). 'Economic Fundamentals, Subprime Lending and Housing Prices: Evidence from MSA-Level Panel Data', *Housing Studies*, 26(6).

[3] McQuinn, Kieran (2017). 'Irish house prices: Déjà vu all over again?', *Quarterly Economic Commentary*: Special Articles, Winter, QEC2017WIN_SA_McQuinn.

to decompose investors' attitudes to the housing market. The Heat Index captures the extent to which the yield is departing from the underlying risk-free rate (in our case the mortgage interest rate). Relatively high values of the Heat Index indicate a more unstable market.

Undertaking this research has been made feasible due to the bridging of two considerable data gaps in the Irish housing market in recent years. First, since 2010 the CSO has produced granular regional house price data drawing on the new property price register. Second, since Q3 2007 the RTB in conjunction with the ESRI have published quarterly standardised average rents at a county level. Combining these datasets provides the opportunity to explore trends in the rent-to-house price ratio for each county over time.

Overall, reviewing the rent yield across Irish counties, it is clear that at present yields are greater than the current borrowing rate and above the rate they were during the tail end of the housing boom. In general, the critical indicators of sustainability indicate that the market is well explained by fundamentals, though it should be noted the relationship between prices and fundamentals can change rapidly. A sharp increase/decrease in house prices and/or significant change in one of the factors in the user cost model could lead to prices moving out of line with the underlying value of housing. It is therefore proposed that these indicators are updated and used on an ongoing basis as a means of continually assessing property price developments in the Irish market.

Across counties, there is considerable variation in the sustainability indicators with more rural counties appearing to be the least at risk of overheating. This is likely due to failure of house prices to recover in these areas following the major decline in prices after the financial crisis. Counties in the South and South-East appear to have the highest values of the Heat Index, however this is not to be read as evidence that these markets are experiencing unsustainable inflation in prices or that the market is out of sync with fundamentals.

The rest of this *Research Note* is organised as follows: Section 2 outlines the theory for the indicators of price sustainability. Section 3 documents trends in rental yields across Irish counties. Section 4 documents trends in price sustainability using the Heat Index. Section 5 concludes.

2. MEASURING HOUSE PRICE SUSTAINABILITY: A USER COST APPROACH

The price to rent approach to assessing housing markets can be characterised by an underlying notion of arbitrage, with the returns to investing in housing relative

to some other asset evaluated, or the costs and benefits of renting a house relative to buying compared. The approach, which builds on the Jorgensen (1963; 1967) theory of the user cost of capital, was first applied to housing markets by Poterba (1984) and assumes that, absent substantial frictions and credit restrictions, arbitrage between owner-occupied and rental housing ensures that the rent-to-house price ratio depends on the real user cost of capital. Himmelberg et al. (2005) construct a variant measure of the user cost of housing; the imputed annual rental cost of owning a home. This measure compares the value of living in a property for a year (the 'imputed rent') and the income lost for not investing in an alternative investment (the 'opportunity cost of capital'). It takes into account differences in taxes, expenses, anticipated capital gains and risk.

$$rent_t = hp_t \left(r_t^{RF} + r_t^{RP} + \sigma_t + \tau_t - \Delta hp_t^e \big/ hp_t \right) \qquad (1)$$

Where hp_t is real house prices, hp_t^e is expected real house prices, $rent_t$ is actual rent levels, τ_t relates to any property taxes to which the homeowner is liable, σ_t is the natural rate of depreciation of the house, r_t^{RF} is the real risk-free interest rate and r_t^{RP} is the additional risk premium to compensate homeowners for the higher risk of owning versus renting.[4]

Re-arranging (1) gives the following

$$rent_t \big/ hp_t = \left(r_t^{RF} + r_t^{RP} + \sigma_t + \tau_t - \Delta hp_t^e \big/ hp_t \right) \qquad (2)$$

Taxation can have a significant impact on the user cost of capital that can either be negative or positive depending on whether the tax is favourable or not for homeowners. For example, Barham (2004) found that due to homeowners not being taxed on capital gains to housing, the user cost of capital was negative over much of the period 1976-2003. However, taxation is not the focus of this paper and its inclusion would require us to use a representative family structure which would reduce our indicators' generality for the market as a whole. For the purpose of obtaining valuable expressions for evaluating the sustainability of the property market we omit both taxation and depreciation. Using data and taking this simplified version of (2), we obtain an expression for the rent yield:

$$rent_t \big/ hp_t = \left(r_t^{RF} + r_t^{RP} - \Delta hp_t^e \big/ hp_t \right) \qquad (3)$$

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[4] Risk premiums can change over time depending on the volatility of house prices. Large fluctuations in house prices are likely to increase the risk of owning versus renting and thus increase the risk premium.

The simplified rent-to-house price ratio is now a function of three factors: the ratio can be low due to real interest rates being low; or because people feel that house prices will grow fast; or they feel good about risk and are prepared to accept a low risk premium.

It is important to note that the expression (3) does not quantify how irrational investors are. The housing market may be overvalued, for example, when either forecasts of price increases are too high or the risk premium is too low. If these concepts are combined together, a 'Heat Index' of the housing market can be provided:

$$Heat\ Index = \frac{\Delta hp_t^e}{hp_t} - r_t^{RP} = r_t^{RF} - \frac{rent_t}{hp_t} \tag{4}$$

A particular economic or housing related shock may result in households revising their estimate of risk and, consequently, their expected return. A combination of these two factors can cause house prices to increase vis-à-vis their fundamental levels. If a significant deviation between the actual and fundamental price emerges, then estimates of risk are likely to increase until the observed level of risk is so high, housing demand falls and house prices decline sharply.

3. TRENDS IN THE RENT-TO-HOUSE PRICE RATIO ACROSS IRELAND

To begin our assessment of price sustainability at a county level in Ireland, we review trends in the rent-to-house price ratio (yield) across counties to contextualise the discussion. Following the financial crisis in Ireland, both rental prices and house prices plummeted as economic fundamentals deteriorated. The severity of the economic crisis in Ireland was extreme by international standards and highly correlated to the major price inflation for both rents and house prices during the boom phase of the credit cycle, 2002-2007. Though the rise and fall of the Irish property market has been well documented, few papers have considered the regional variation in the Irish house market over this period, with McCann (2016)[5] and Morgenroth (2014; 2016)[6] being notable exceptions. However, neither of these papers considered trends in rental yields as a measure of house price sustainability. One study which does model the change in yields in Ireland is Lyons (2017)[7] who models the effect of credit conditions on rental

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[5] McCann, Fergal (2016). 'Exploring developments in Ireland's regional rental markets', No 13/EL/16, *Economic Letters*, Central Bank of Ireland.

[6] Morgenroth, Edgar (2014). *Modelling the Impact of Fundamentals on County Housing Markets in Ireland, MPRA Paper*, University Library of Munich, Germany.
Morgenroth, Edgar (2016). *Housing Supply and House Price Trends at the County Level*, No RN2016/1/1, *Research Notes,* Economic and Social Research Institute (ESRI).

[7] Lyons, Ronan (2017). *Credit conditions and the housing price ratio: evidence from Ireland's bubble and crash*, Economic Papers, Trinity College Dublin, Economics Department.

yields. We build on this research by focusing on exploring trends in the more recent time period (2010-2018) when prices have been recovering rapidly.

It should be noted that there will be a degree of endogeneity between rent and house prices that may lessen the value of rent yield as a measure for the sustainability of house prices. As house prices increase, less people will be able to afford to purchase a home and more people will be forced into the rental market, which in turn will drive up rent levels. This is especially true in urban areas where housing supply is insufficient to meet structural demand and where the Central Bank macroprudential rules, which place limits on the LTI and LTV ratios, are more binding. If an increase in house prices in a county directly leads to an increase in rents, then the yield will be less informative as a measure of sustainability.

The trend in yield over time in Ireland is presented in Figure 1. The chart presents the national average, the national median and the dispersion in rents across counties. The interquartile range is also presented which allows us to document how varied or compressed yields were across the 26 counties over the period 2010-2018. We use this analysis period as it coincides with the CSO new property price indices which were first released in 2010. The county with the minimum and maximum yields are also presented to give a full description of the underlying distribution. Over the period 2010-2014, yields increased in Ireland from under 4 per cent to just over 6 per cent in Q1 2014. As both house prices and rents decreased over the period, the increase in the yields comes through house prices falling faster than rents. From 2014 to mid-2015, the yield appears to have stabilised before falling again as rental price inflation outpaced house price growth. As of Q3 2018 the national average yield stood at about 4.7 per cent. In terms of the cross-county variation, the narrow band on the interquartile range indicates that most counties in Ireland have similar rental yields. The generalised trend over time shows that many counties co-move with overall country variation. This highlights the interlinkage of the national property market and perhaps lends evidence to the theory that housing booms and busts are pan-regional in nature.
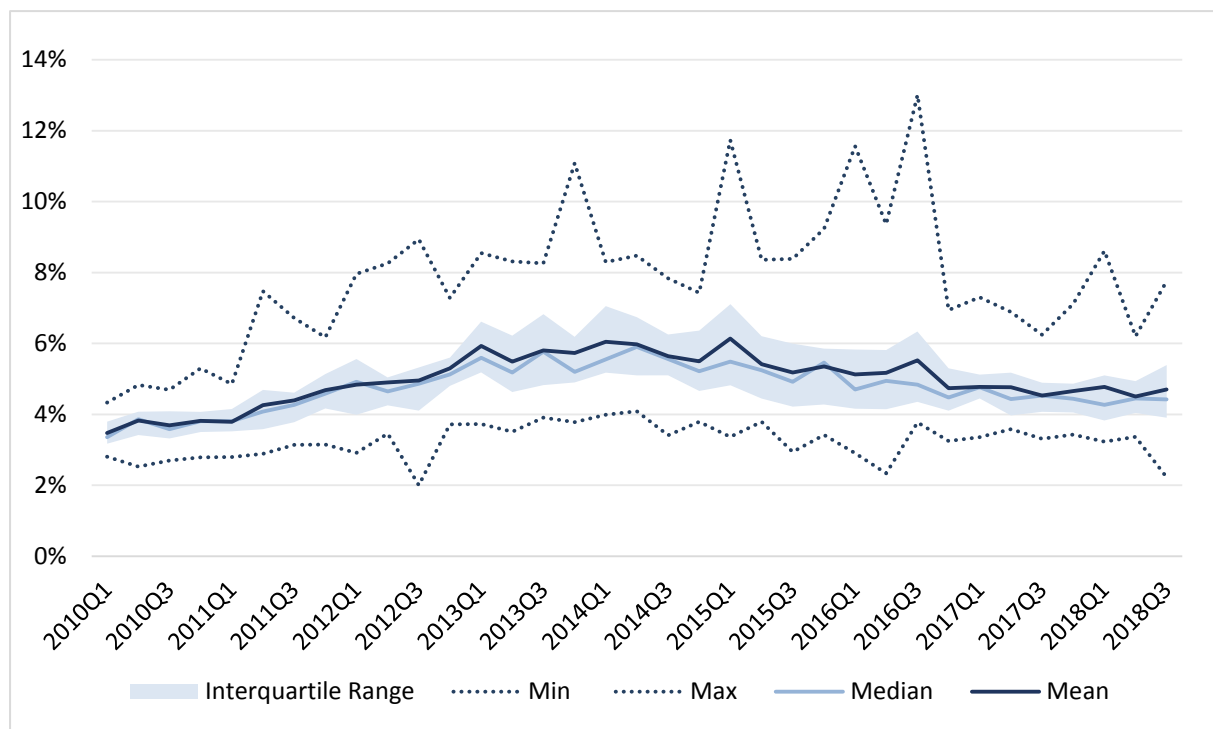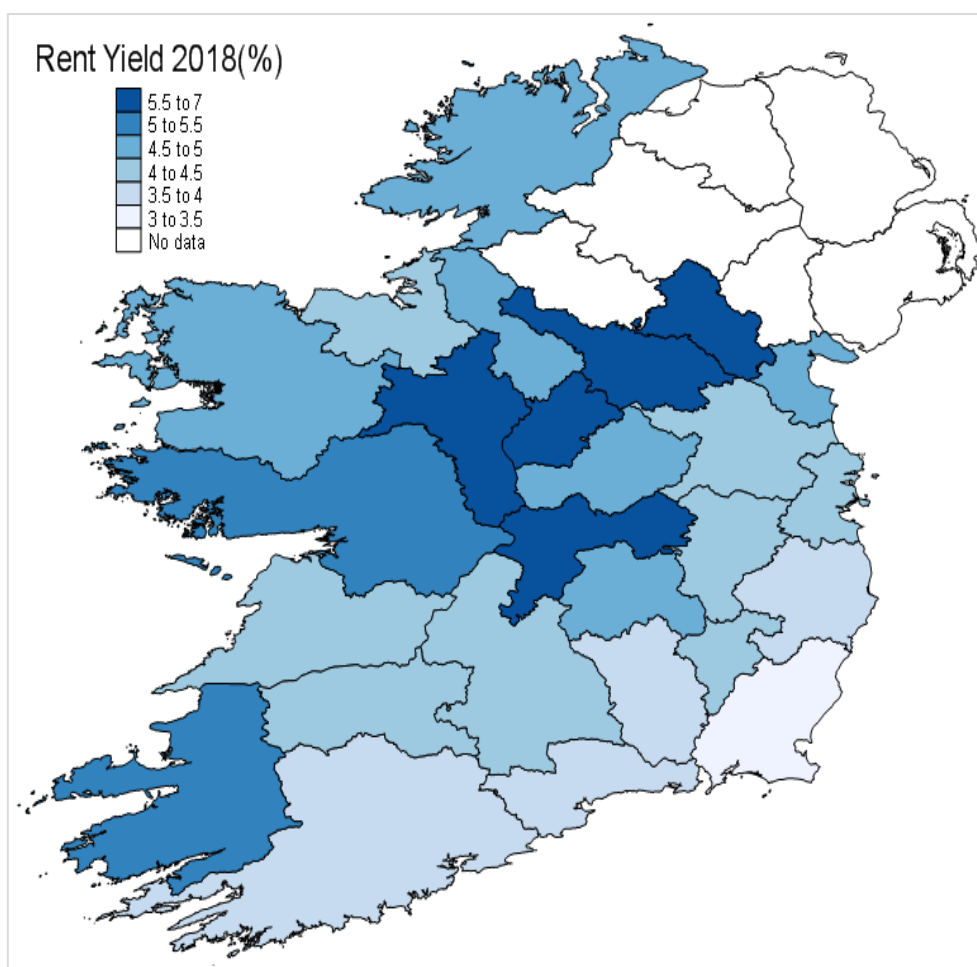
Source: ESRI analysis of CSO and RTB data.

Figure 2 displays the rental yields across counties for 2018. The highest yields are in the Midland and Border regions. House price declines were steep in these areas following the crisis and have not recovered to the same extent as in Dublin and the larger urban centres where labour market improvements and economic expansion have been greatest. Rents have increased in these areas more recently which has led to an improvement in the yield. The county with the highest yield in Ireland in 2018 was Roscommon at 6.7 per cent, followed by Offaly at 6.2 per cent and Monaghan at 6.0 per cent. The lowest rental yields were in counties in the South-East where house prices have recovered to a greater extent than rental prices. Wexford had the lowest yield in 2018 at 3.4 per cent with Kilkenny and Wicklow on 3.6 per cent.

FIGURE 2   **MAP OF RENTAL YIELDS ACROSS COUNTIES 2018**

To provide insight into how yields develop over time, Figure 3 presents a map of the change in rental yields per county over the period 2013-2018. In all counties except Offaly (where yields grew marginally at 0.6 percentage points), yields declined over the period 2013-2018. The biggest decline was 2.1 percentage points in Kilkenny followed by 1.9 percentage points in Wexford, Mayo and Sligo. The national average yield declined by 1.1 percentage points over the period. Dublin yields declined by 1 percentage point from 5.3 per cent to 4.3 per cent while yields in Cork declined by 1.5 percentage points from 5.3 to 3.8 per cent. Table A.1 provides an overview of the figures for all counties.
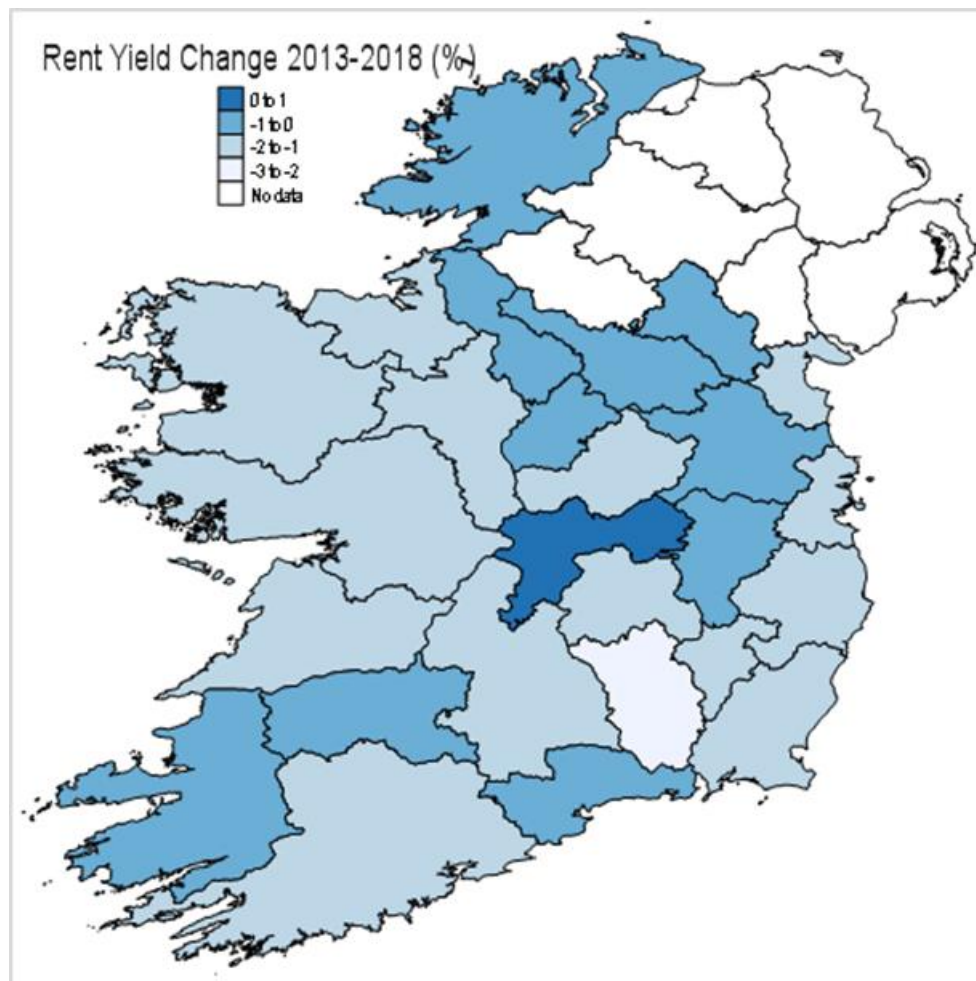
4. ASSESSING COUNTY-LEVEL PRICE SUSTAINABILITY
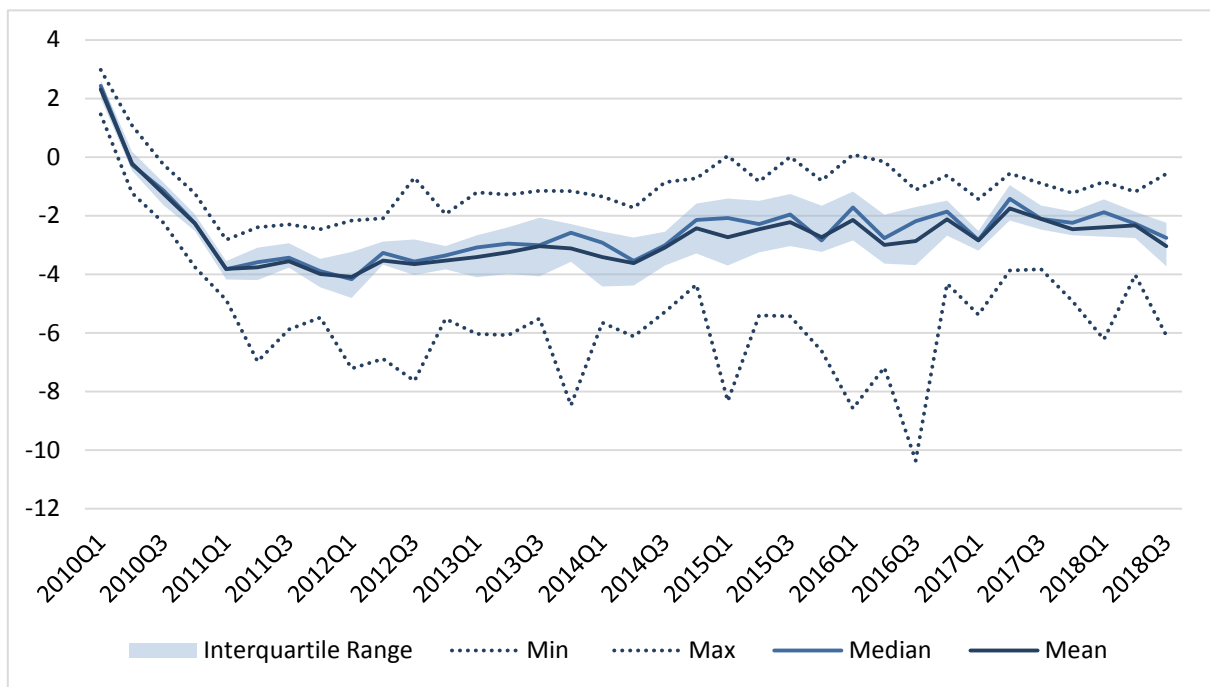
A county-level Heat Index

In this section, we present the results of the Heat Index across Irish counties over the period 2010-2018. The interpretation of the Heat Index is as follows: house prices are more likely to be overvalued when the Index is high, i.e. when the rent yield is low relative to the risk-free rate. This will be the case when expectations of house price growth are high or investors' risk premiums are low. By definition, when the housing market is overvalued, expectations of house prices are *too* high and/or the risk premiums of those who purchase houses are *too* low (i.e. they are undervaluing the level of risk of a house purchase). This leads to the Heat Index being at a higher level than it should be based on the fundamental value of housing. However, whether the housing market is overvalued can only be determined after the fact when past house price expectations are compared against the eventual realised house prices. Even if the Index is high, if house price

expectations and risk assessments turn out to be correct then the market cannot be considered overvalued. While the Index can't explicitly tell us if the market is currently overvalued, by comparing against past levels of the Index we can get an idea if current attitudes towards risk and perceptions about the future growth of house prices bear a resemblance to those seen during periods when the market was frothy.[8]

Figure 4 outlines the dispersion of the Heat Index over time for Irish counties. It includes the mean, median, minimum and maximum levels as well as the interquartile range for each period. Throughout 2010, the Index was declining as the legacy of the housing crash began to abate and the yields rose. In early 2011, the Heat Index had stabilised overall and has remained relatively static through to 2018. The stability of the Index over the past several years and the fact that yields have been significantly above both the risk-free rate and previous yield levels during the tail end of the housing boom suggests that Irish yields are not indicating that the market is currently overheated. This finding is in line with McQuinn (2017) that the Irish housing market appears close to equilibrium with prices explained by fundamentals.

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[8] Though housing has the potential to generate returns through rent and capital appreciation it cannot be thought of as strictly a financial asset. Housing has both an investment and consumption component. As it is not purchased solely as an investment there is a limitation to applying a financial model to assessing it. This should be kept in mind when comparing the index between counties as there are likely to be different underlying factors driving demand for housing between counties beyond their risk return outlook.

FIGURE 4   DISPERSION OF HEAT INDEX Q1 2010-Q3 2018

Source: ESRI analysis of CSO and RTB data.

While the county-level data behind the Heat Index are only available from 2010 onward, a national Heat Index can be calculated going back before the financial crisis. Figure 5 shows that from 2006 there was a sharp increase in the Heat Index which peaked in 2009 before declining sharply in 2010. It is clear that the level of the Heat Index from 2006 to 2009 is significantly higher than the prevailing rate in the post-crisis years. We propose that the Index over this time period be used as a benchmark by which to compare the current level of the Index and thus be used as an indicator as to whether the housing market is showing signs of overheating.

FIGURE 5   HEAT INDEX MEAN Q3 2006-Q3 2018
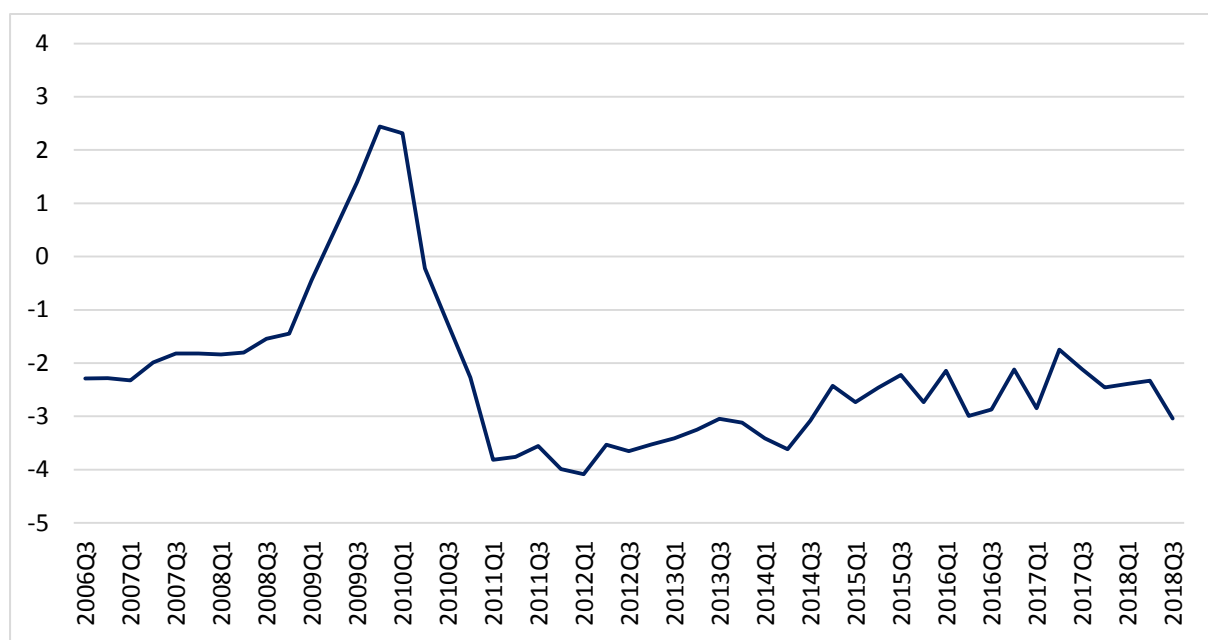
Source: ESRI analysis of CSO and RTB data.

A key contribution of this research is to look at the variation across counties, and to explore the extent to which differences may exist in the alignment of regional market prices to fundamentals. In this regard, it is clear from Figure 6 that, while some county outliers do exist across the country, a majority of counties follow the national picture as the Heat Index is closely dispersed across counties.

Figure 6 displays the Heat Index across counties for 2018. The lighter colour counties are those with the lowest (most negative) values of the Heat Index while the darker counties have the highest (least negative) values. Again, the closer the Heat Index to positive values, the frothier the county market is in comparison to the national average. It is clear that the counties with the highest levels of the Heat Index are along the South and South-East coast. As of 2018, the county with the lowest level of the Heat Index market was Roscommon with a value of -4.65, while Offaly and Monaghan had the second and third lowest levels respectively. In these counties, where house prices dropped dramatically and the convergence back following the recovery has been slow, it is unsurprising that the risk of overheating is the lowest. The county with the highest number in the Heat Index is Wexford at -1.36, with Kilkenny, Wicklow and Cork close behind. These counties, where house prices have recovered more rapidly than rents, have higher levels of the Heat Index as yields are closer to the risk-free rate.

**FIGURE 6   MAP OF HEAT INDEX ACROSS COUNTIES 2018**
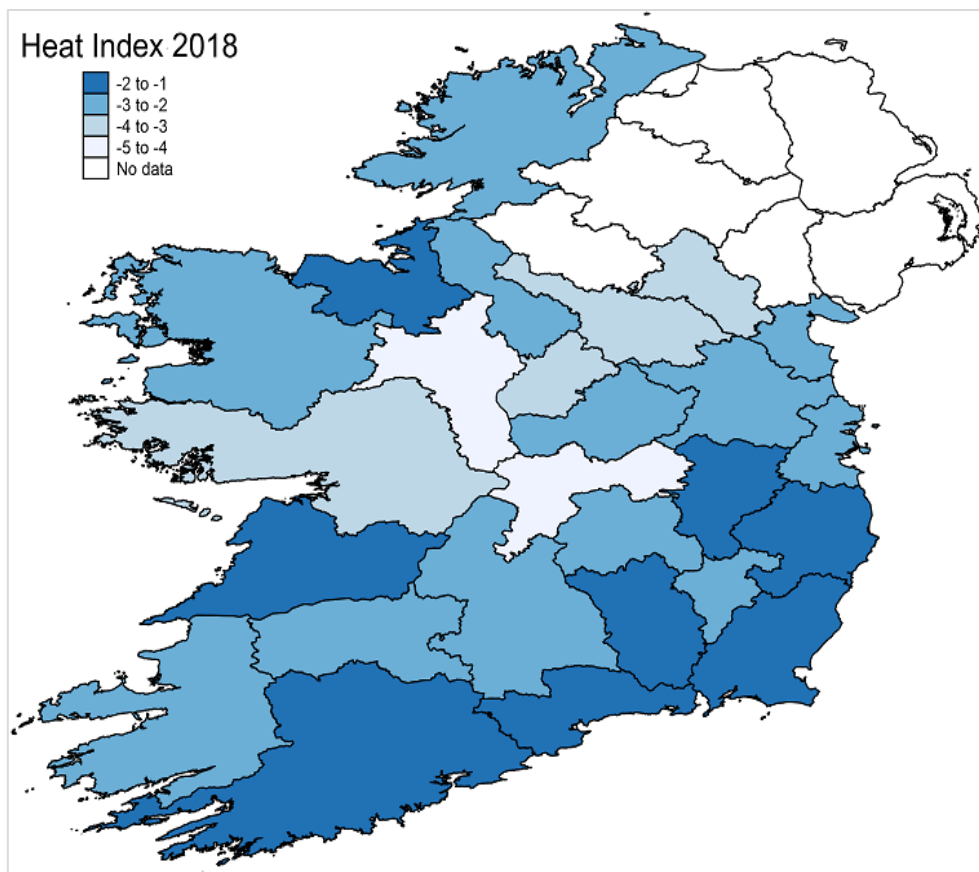
Source: ESRI analysis of CSO and RTB data.
Note: The time period combined for 2018 is Q1-Q3.

To provide insight into the county-level change in the Heat Index over time, Figure 7 presents a map of the change in the Index per county over the period 2013-2018. The biggest increase in the Heat Index was in Wexford, Kilkenny, Mayo and Sligo. The Heat Index declined in a number of counties including Offaly, Meath, Cavan, Monaghan, Clare and Limerick.

Overall, reviewing this critical indicator of price sustainability across Irish counties, it is reasonably clear than the Irish housing market is not currently displaying signs that it is overvalued. Across counties there is some variation with more rural counties, which experienced a major decline in house prices with less of a recovery, appearing to be the least at risk of overheating. Counties in the South and South-East appear to have the highest levels of the Heat Index, however, this is not to be read as evidence that these markets are experiencing a degree of unsustainable inflation in prices or that the market is out of sync with fundamentals.
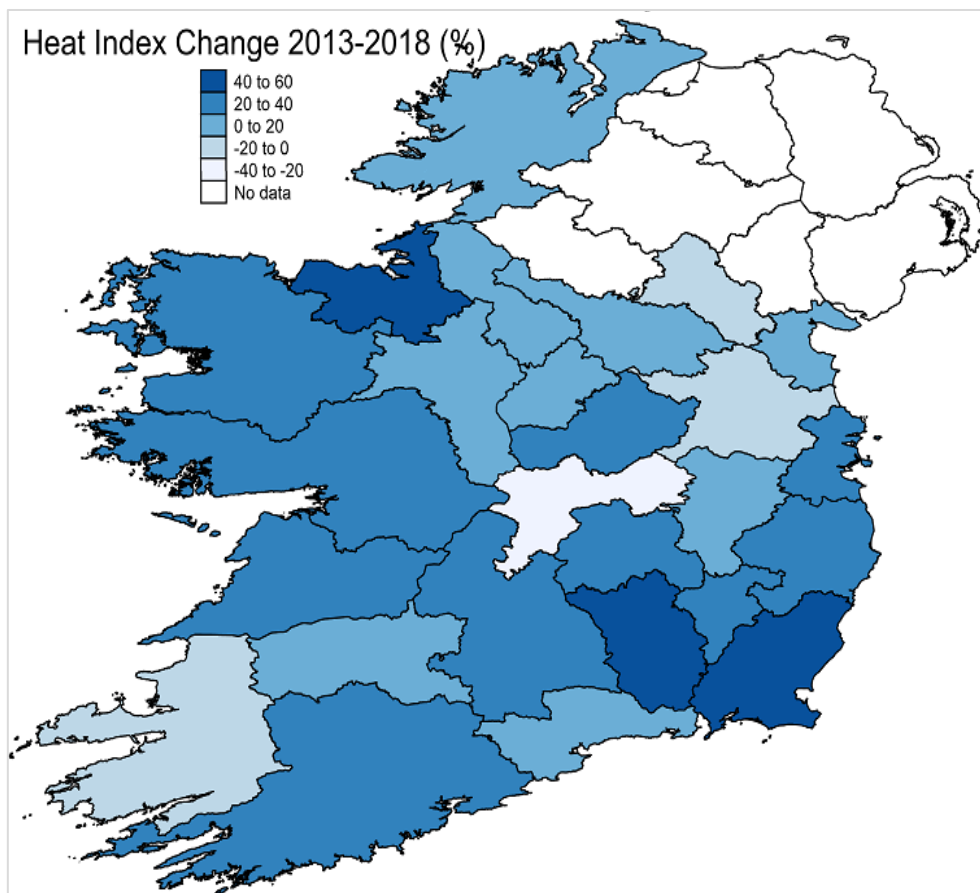
Source: ESRI analysis of CSO and RTB data.
Note: The time period combined for 2018 is Q1-Q3.

To emphasise the heterogeneity in the property market across Ireland, the relationship between the degree of urbanisation and the Heat Index for each county is presented in Figure 8. This graph shows that counties with the highest levels of urbanisation (the highest proportion of residents living in urban areas) tend to be higher on the Heat Index. This illustrates the point that the risk of markets overheating is less of an issue for rural counties where house prices have yet to fully recover following their collapse in the years after the financial crisis.
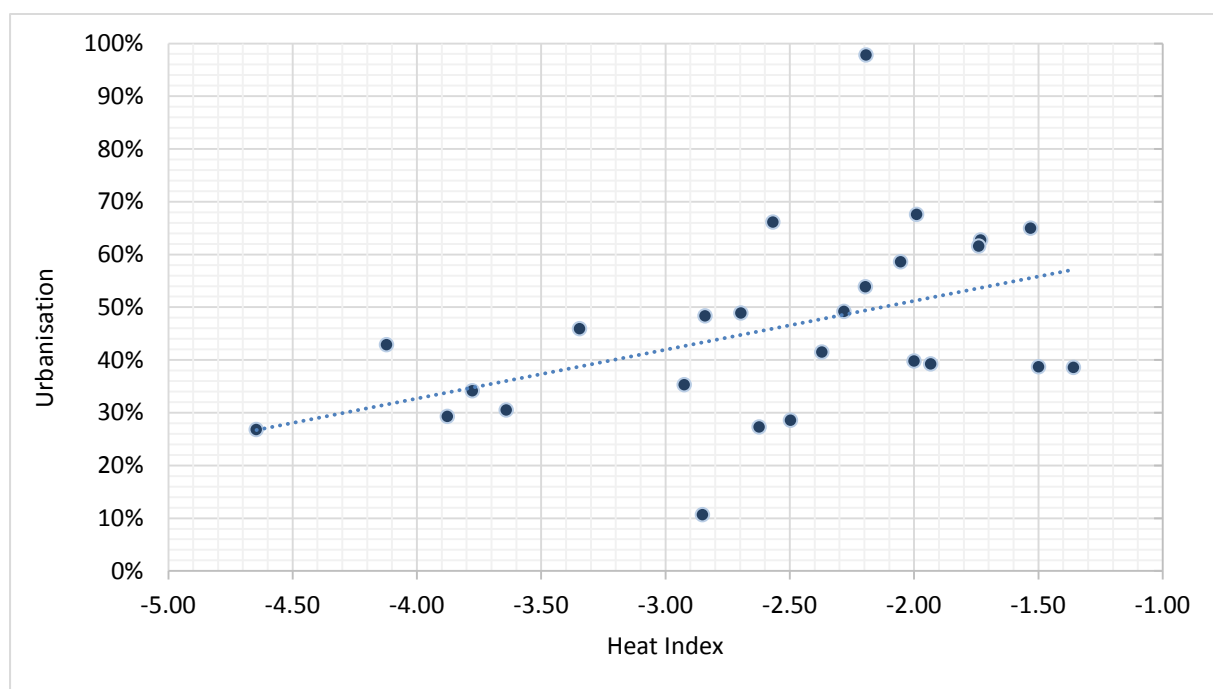
5. CONCLUSION

In this *Research Note*, we explore trends in the rent-to-house price ratio in Ireland for the period 2010-2018 to provide insights into the regional dimension of price sustainability and explore how the housing market is developing across Ireland. The rent-to-house price ratio, or rental yield, can be used an indicator of market stability, as depressed yields can indicate asset values increasing beyond the cash flows associated with the asset.

More specifically, we present a Heat Index for Irish counties. The Heat Index captures the extent to which the yield is departing from the underlying risk-free rate (in our case the mortgage interest rate). Higher than average values of the Heat Index are an indicator that the market may be becoming unstable.

Overall, reviewing trends in the Heat Index as a measure of price sustainability across Irish counties, it is clear that the Irish market is not displaying yields that are below the borrowing rate or that are below yields seen pre-2011. This indicates that at present the Irish housing market is not overvalued from a user cost perspective. Overall the market appears to be explained by fundamentals with some variation across counties. More rural counties which experienced a major decline in house prices and less rebound in the recovery would appear to be the least at risk of overheating. Counties in the South and South-East appear to have the highest levels of the Heat Index, however, this is not to be read as

evidence that these markets are experiencing unsustainable inflation in prices or that the market is out of sync with fundamentals.

From a policy perspective, a number of findings emerge. In general the Irish market does not currently display significant evidence of unsustainable house prices from a macro-financial perspective. We also do not find major differences across counties which would suggest any specific geographic areas are becoming unsustainable. Indeed, the close variation in the regional yields and price sustainability indices would suggest that county markets co-move closely in Ireland. This co-movement in prices may be explained by household mobility, as prospective purchasers react to high prices in one county by purchasing in an adjacent county, thereby increasing demand, and prices, in the latter.

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APPENDIX 1

TABLE A.1   COUNTY YIELDS

County	Rent:HP 2018 %	Rent:HP 2013 %	Difference %
Offaly	6.2	5.6	0.6
Kerry	5.0	5.1	-0.1
Meath	4.1	4.3	-0.1
Monaghan	6.0	6.2	-0.3
Limerick	4.3	4.8	-0.6
Kildare	4.1	4.7	-0.6
Cavan	5.7	6.4	-0.6
Longford	5.9	6.6	-0.7
Leitrim	4.9	5.8	-0.8
Waterford	3.8	4.7	-0.9
Donegal	4.7	5.7	-1.0
Dublin	4.3	5.3	-1.0
Roscommon	6.7	7.8	-1.0
National Average	**4.7**	**5.7**	**-1.1**
Louth	4.6	5.7	-1.1
Wicklow	3.6	4.8	-1.2
Laois	4.9	6.3	-1.4
Cork	3.8	5.2	-1.4
Carlow	4.4	5.8	-1.4
Westmeath	4.8	6.3	-1.5
Clare	4.0	5.6	-1.6
Tipperary	4.4	6.1	-1.6
Galway	5.4	7.2	-1.7
Sligo	4.1	6.0	-1.9
Mayo	4.6	6.5	-1.9
Wexford	3.4	5.4	-1.9
Kilkenny	3.6	5.7	-2.1

Source: ESRI analysis of CSO and RTB data.

TABLE A.2   COUNTY HEAT INDICES

County	Heat Index 2018	Heat Index 2013	Difference %
Kilkenny	-1.50	-3.18	52.9
Wexford	-1.36	-2.83	52.0
Sligo	-2.00	-3.42	41.6
Clare	-1.93	-3.07	37.1
Mayo	-2.50	-3.96	37.0
Cork	-1.73	-2.67	35.2
Wicklow	-1.53	-2.31	33.7
Tipperary	-2.37	-3.54	33.0
Carlow	-2.28	-3.25	29.7
Galway	-3.35	-4.63	27.8
Westmeath	-2.70	-3.72	27.6
Laois	-2.84	-3.74	24.1
Dublin	-2.19	-2.76	20.5
Waterford	-1.74	-2.17	19.9
Louth	-2.57	-3.21	19.9
National Average	**-2.59**	**-3.21**	**19.3**
Donegal	-2.62	-3.14	16.4
Leitrim	-2.85	-3.23	11.8
Roscommon	-4.65	-5.22	11.0
Kildare	-1.99	-2.16	7.9
Longford	-3.78	-4.02	6.0
Cavan	-3.64	-3.82	4.7
Limerick	-2.19	-2.29	4.2
Monaghan	-3.88	-3.68	-5.3
Kerry	-2.92	-2.53	-15.4
Meath	-2.05	-1.72	-19.5
Offaly	-4.12	-3.08	-34.0

Source: ESRI analysis of CSO and RTB data.