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Abstract

In this paper, we use a novel micro dataset of planning permissions, planning duration and building commencements in Ireland to test the sensitivity of housing supply timelines to a range of factors. This includes strategic planning policies, planning appeals, financial, economic and cost factors as well as differences across developer/contractor types and spatial competition effects. Our key dependent variables are: a) the time-frame from planning application to planning grant; and b) the time from planning grant to building commencement. Overall we find that the activation phases is longer than the planning phase and the planning phase timelines have remained relatively static over the sample. Activation phases have doubled in duration on average between 2017 and 2024. We find that appeals to the planning commission and requests for information lengthen planning timelines. In terms of commencement activity, we find that increases in interest rates and labour costs prolong housing starts while capacity constraints (reflected in tighter labour markets) also extend the time to commencement. Heterogeneous effects are evident across single-unit housing developments and multi-unit production.

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1 Introduction

The provision of new housing supply has become a major economic and social challenge for Western economies since the recovery from the financial crisis. Housing affordability difficulties have risen as rental prices and house prices have increased sharply in recent years. As economies and populations grow, housing production has been lagging and struggling to keep pace with underlying demographic and economic developments. In this regard, a range of recent studies have begun to explore the determinants of housing supply and have attempted to understand why housing production is increasingly under-providing relative to societal needs. International evidence has shown that despite rising housing prices, there is often a lack of response in the supply of new housing. This has been attributed to local regulations on land use and planning processes, macroeconomic factors, and volatility in the construction sector (Gyourko, 2009; Glaeser & Gyourko, 2018).

Given this context, in this paper, we use a novel micro dataset of planning permissions, planning decisions and building construction starts in Ireland to test the sensitivity of housing supply timelines to a range of factors. This includes strategic planning policies, planning appeals, financial, economic and cost factors as well as differences across developer/contractor types and spatial competition effects. In our research, we focus on the duration from the receipt of a planning application to the start of construction, which we refer to as the **pre-construction stage**. This framing allows us to capture the extent of the full timeline that takes place before the start of construction. More specifically, our key dependent variables are: a) the time-frame from planning application to planning grant; and b) the time from planning grant to building commencement.

Our data are novel and come from a number of sources. First, we use a dataset of all housing starts in Ireland which comes from a commencement notice databank. In Ireland, projects are legally required to submit a commencement notice to the local authority and these data are made available in the Building Control Management System (BCMS) dataset. These data have been used to explore issues around time-to-build by Lyons & Sweeney (2025). Coupled to these data, we draw on a database of planning permissions which contains more accurate information on planning submission dates and decision outcomes for planning activities than the BCMS (which is self-reported). These data are joined using planning IDs or when not available, through spatially

matching using address and coordinate-matching techniques. Finally, we also append to these datasets additional information scraped from the planning appeals commission (An Coimisiun Pleanala, formerly An Bord Pleanala) website which contains information on appeals, requests for information and Strategic Housing Developments. The spatial aspects of these data also allow us to develop a spatial concentration index similar to Leishman (2015) to capture local market competition. Over and above these microdatasets, which run from 2017 to 2024, we include a range of control variables from various sources. This includes regional information on house prices and unemployment, and land use from the EU Copernicus Land Monitoring Service. We also include time-varying controls for the cost of finance and labour costs to capture broader trends.

A number of studies are close to our research. The closest study is Lyons & Sweeney (2025) who exploit the BCMS dataset and have found that the more certain the outcome of the planning process is, the shorter time it takes for a development to progress from planning permission to completion. In this paper, we also build on their analysis by expanding the analysis to all of Ireland and at the same time incorporating appeals to An Bord Pleanala[1] into our model, which are considered to be one of the major sources of uncertainty. Rather than focusing on the build-out phase as in Lyons & Sweeney (2025), we focus on the previous stage which is the planning time-frame element.

Our research is close to Somerville (2001) who tests the real options theory in construction and finds that pre-building permit is a critical time-frame as developers have the flexibility to proceed or not. Our research is close to this analysis as we explicitly test what impacts the time between when a project receives planning and before the development begins the construction phase. Understanding what drives the timing from applications received to permission approval, as well as the phase from approval to commencement, enables policymakers to better understand the process and design policies to offset risks to producers who hold this option, thereby making the commencement more likely. Furthermore, analysing the determinants of duration from approval to commencement can help us differentiate between strategic option holding or genuine delivery constraints, which is essential for effective policy intervention.

Our research is also close to the work of Bramley (1998) and Caesar (2016) who consider the issue of development delays. Ball et al. (2024) also explores the

[1] The Irish planning appeals commission.

issue of development delays and finds they base their decisions on market conditions as well as strategic concerns.

A number of findings emerge from our research. First, in terms of the administrative application stage, we test different effects for single-unit housing and multi-unit housing. For single-unit housing, appeals to the planning board are a particularly large determinant of the length of time - an appeal adds approximately 83 days on average to get a granted result. For larger, multi-unit developments, this increases to around 127 days. All results are statistically significant at the 1 per cent level. It must be noted that planning policies containing appeals are part of the institutional structure[2] and this structure is built to attempt to prevent harm and maximise the welfare gains from good planning outcomes. However, the exact system of appeals does have a time implication which must be counted as additional time costs from an economic perspective.

We also find that the type of site and the existing built environment matter as protected structures take 11 days longer while urban areas also take longer. In terms of large multi-unit housing activity, we find that newly introduced strategic housing development policies which streamline the planning process shortened the time-frame significantly by approximately 35 days for SHD and almost 60 days for LRDs. However, it must be noted that SHD policies led to a very large up-tick in judicial review cases therefore this likely overstates the benefit of these policies. Indeed, their replacement with LRDs was a notable policy change which occurred due to the policy's apparent challenges. We find that, relative to greenfield sites, sites with existing activities took 11 days longer to receive a granted status.

In terms of the period between the grant of planning to commencement, we test the impact of a range of factors across single-unit housing and multi-unit developments. First, for single-unit housing, we find that those activities with planning appeals in the previous stage, continue to be impacted and extend the commencement phase. This lengthens the time-frame by more than 60 days. We find that the degree of local competition increases the time-frames notably. In terms of economic and financial factors, we find that time-frames are shorter in areas with lower levels of house prices but that house price growth increases

[2] Under the Aarhus convention, the right to consultation is agreed. The right to appeal, even for 3rd parties, is committed to in Ireland under the various Planning and Development Acts.

time-frames. Rises in construction costs (labour costs) increase project duration: a one per cent change in labour costs increases time-frames by approximately 4 days. Changes in interest rates have a very significant effect on commencement start: a one per cent increase in interest rates increases the time to build from 50 to 68 days. Build times are also extremely sensitive to capacity constraints and the degree of economic activity: a one per cent point increase in the unemployment rate shortens the time to commence by 53 days. These findings also hold across multi-unit developments but with some differences in magnitudes. For example, multi-unit developments are much more sensitive to interest rates with the marginal effect rising to an additional 89 days for every one per cent increase in interest rates. For these developments, we find a different effect of spatial concentration; a negative effect suggesting a potential rush-to-market effect whereby the more activity that is being undertaken, this spurs additional activity. However, we also find evidence of strategic behaviour with rising house prices increasing time to commence, potentially due to developers intentionally waiting for greater profitability through rising prices. Differential effects for single-unit housing rather than multi-unit housing are expected as, in Ireland, typically single-unit housing is one-off housing produced in more rural areas. These would be driven by individual households and the economic determinants of these decisions would differ from those of construction and development firms who are producing multi-unit housing.

The paper will proceed as follows. Section 2 below provides a background to the stages of the development process in Ireland, from zoning to completion, encompassing the many stages of the planning process as well as examining the literature on housing supply. In Section 3 we discuss the data that we use in our study. Section 4 provides descriptive statistics of the dataset, while in Section 5 we carry out regression analysis with accompanying discussion of our results. Section 6 concludes.

2 Background and literature

2.1 Background

In Ireland, the process by which a tract of land becomes a completed residential development involves several stages. In the first stage, land is zoned through

development plans at the local government level, known in Ireland as a local authority (LA). There are 31 local authorities in Ireland, each with elected councillors who agree on the development plan, which remains in place for 6 years (Planning and Development Act, 2000). Recent legislation (Planning and Development Act 2024), commenced in December 2025, increased the lifetime of the development plan to 10 years. To allow residential development on a piece of land, the development plan must zone that land for residential, or mixed-use that allows residential uses.

In the second stage, prospective developers, of either single-unit or multi-unit developments, must submit a planning application to obtain permission to begin development. Normally, developers submit their planning application to the local authority in which they wish to build. Once the local authority receives the application, they have a statutory obligation to make a decision within 8 weeks (Planning and Development Act, 2000). In cases where the local authority requests additional information, they must make a decision within 4 weeks of the receipt of the information, unless the request for additional information relates to an Environmental Impact Assessment, in which case, the local authority must make a decision within 8 weeks from the receipt of the requested information. As such, local authorities should make a decision within 8 weeks but this can vary depending on request for additional information. Between 1990 and 2013, Lyons (2015) found that the median time-to-planning decision was 61 days (approximately 8.7 weeks) and the mean time-to-planning decision was 103 days (approximately 14.7 weeks). Reidy & Breen (2022) found similar results for planning applications between 2012 and 2020; the median decision time for local authorities in this period was 9 weeks, while the mean was 14.1 weeks.

The local authority can decide to grant, grant with conditions, or refuse a planning application. Any person, or interested group, can make submissions or observations about the planning application while that application is under consideration by the local authority. If the applicant or any third party that made a submission is unhappy with the decision of the local authority, they can appeal the decision to An Bord Pleanála (ABP)[3], the independent national planning

[3] On the 18 June 2025, upon the commencement of section 495 of the Planning and Development Act 2024, An Bord Pleanála became An Coimisiún Pleanála. As this name change occurs after our study period we will refer to the planning body as An Bord Pleanála throughout the document.

body. The appeal must occur within 4 weeks from the day of the decision by the local authority (Planning and Development Act, 2000). According to Reidy & Breen (2022), approximately 7.1 per cent of applications are appealed to An Bord Pleanála, with the appeal rate higher for multi-unit developments (13 per cent) compared to single unit developments (3 per cent). An Bord Pleanála should ensure that appeals and referrals are processed promptly, with legislation setting an objective that every appeal or referral is determined within 18 weeks of receipt Planning and Development Act, 2000)[4], however; in practice the average time for decision is 20 weeks (Reidy & Breen, 2022). An Bord Pleanála have the same decision options as the local authority; they can decide to grant, grant with conditions, or refuse a planning application. Most appeals to ABP between 2012 and 2020 upheld the decision of the local authority (71.6 per cent), while a small proportion of ABP decisions overturned LA decisions to grant (16.1 per cent) or LA decisions to refuse (12.3 per cent) (Reidy & Breen, 2022).

An Bord Pleanála are the final decision makers in the planning process, however; their decision can be challenged by judicial review. A judicial review does not examine the merits of the planning decision; instead, it focuses on the point of law and will decide whether ABP followed the correct processes in making it's decision. The deadline to apply for judicial review is 8 weeks from the date of the decision (Planning and Development Act, 2000). Given the number of stages to progress through the planning process, and the length of time taken at each stage, the planning process can cause long lead-in times prior to construction.

It must be noted that the process of planning applications, requests for additional information and an institutionalised appeals process is aimed to provide for rights under the Aarhus Convention and also to maximise the welfare gain from good planning. Poor planning outcomes can have negative welfare effects and a thorough process of appeal and review aims to attempt to maximise welfare and minimise poor outcomes. However, the timeframes which occur under the specific institutional design used in Ireland, or any country, do have an impact on housing production in terms of time costs. These economic opportunity costs are important and must also be considered as well as positive planning outcome benefits. Our study therefore discusses the impact on the

[4] The Planning and Development Act 2000 did not include a requirement to meet a specific timeframe, only an objective; the Planning and Development Act 2024 will replace this with a mandatory timeline.

timelines of specific factors, but we do not imply that the optimal timelines would be for these institutional features (such as appeals) to be instantaneous.

In an effort to incentivise the activation of large-scale residential developments, and with the explicit aim to ”bring on earlier provision of increased housing supply” (Government of Ireland, 2016), policymakers introduced a fast-track planning process beginning in 2017 called Strategic Housing Developments (SHD). The SHD process targeted large developments, consisting of 100 or more houses, or 200 or more bed spaces for student accommodation (Planning and Development (Housing) and Residential Tenancies Act 2016) and allowed eligible developments to submit applications directly to An Bord Pleanála. As described by Reidy & Mulryan (2024), the SHD process aimed to reduce planning time by removing the possibility of planning appeals of local authority decisions, and by introducing a comprehensive pre-application consultation process between the developer, ABP, relevant planning authorities, and infrastructure providers prior to submission of the SHD planning application. An Bord Pleanála must issue a decision on a SHD planning application within 16 weeks, however; when ABP decide to hold an oral hearing on the application, they must issue a decision within 24 weeks. Reidy & Mulryan (2024) found the average time for SHD decision was 15.7 weeks with 66 per cent of applications decided within 16 weeks. Only 3.7 per cent of SHD decisions exceeded 24 weeks. Although SHD applications lack an appeals process, they can still be subjected to a judicial review, and; of the 401 SHD applications in their study, Reidy & Mulryan (2024) found that 23.4 per cent were challenged legally. Despite finding that a large proportion of applications were subjected to judicial review, they found that the SHD process was between 10 (median) and 19 (mean) weeks faster than the traditional two-tiered local authority process for large-scale developments.

The SHD process ended in 2022 and was replaced by the Large-scale Residential Development (LRD) process. The LRD process returns to a two-tier planning application process with the objective of reducing the occurrence of judicial reviews witnessed under the SHD process (Reidy & Mulryan, 2024). LRD will still apply to projects of the same size as SHD, but will now allow for additional floor space for non-residential uses. The LRD will retain the pre-application process whereby developers engage with relevant bodies prior to submission of the application.

In the third stage, a site proceeds to construction commencement. Prior to construction the person intending to carry out the works, such as a developer or builder, must give notice to the local authority that a project, such as the erection of buildings or carrying out of works, will begin (Building Control Act, 1990). For a regular commencement notice, the person must give at least 14 days notice, but no more than 28 days notice to the local authority that they intend to begin construction activity (Building Control Regulations, 1997). In some cases, the person carrying out the work can submit a 7-day notice. The 7-day notice is similar to the regular commencement notice, in that it notifies the local authority that works are about to commence, however; it differs in two key ways. First, it requires a shorter minimum notice period (at least 7 days instead of 14), and second, it is used for works that will commence before the issuance of a Fire Safety Certificate (Building Control Act 2007). In place of the Fire Safety Certificate, the 7-day notice requires a valid Fire Safety Certificate application number. Most construction projects undertaken in Ireland are required to have a completion certificate, signed by the builder and the assigned certifier before they can be opened, occupied or used (Building Control (Amendment) Regulations 2014). The signed certificate of completion shows that the buildings or works comply with the requirements of the Building Regulations. In some instances, a commencement notice can be accompanied by a Declaration of Intention to Opt Out of Statutory Certification (Building Control Regulations, 1997). The option to opt-out of the completion certificate process is only available in the case of a new single dwelling or single-unit house, or for the extension of a building (Building Control (Amendment) (No. 2) Regulations 2015).

In the fourth stage, the site proceeds to completion. During this stage, the actual construction of the project occurs. Once the building(s) near completion, the developer or builder must notify the local authority by submitting a certificate of compliance on completion. Once the local authority receives this document, they have 21 days to consider it's validity (Building Control (Amendment) Regulations 2014). If the local authority does not feel that the certificate of compliance is valid, they must provide reasons why the certificate does not comply with plans or regulations. If the local authority thinks that the certificate is valid, they will enter the details of the project on the register, and notify the submitter that the certificate of compliance on completion is valid. Once the certificate of completion is validated, the property is suitable for use as

described in the previous paragraph. Developers also have the option to provide a pre-notification of completion. Pre-notification allows the developer to submit the certificate of compliance between 3 and 5 weeks prior to the completion of the building(s).

This paper will focus on the second stage, time between planning application and permission, and the third stage, time between planning permission and commencement.

2.2 Existing literature

A growing body of research in urban economics and policy emphasizes the significance of the time required to bring new housing to market. This is a multi-stage process, each stage subject to distinct constraints that can extend the delivery timeline. The function of understanding the constraints around time to market relates to the growing literature on the sluggish housing supply in recent years (Glaeser & Gyourko, 2025) and its relationship to the challenges faced in terms of housing affordability.

As mentioned in Section 2.1, the planning phase is the period between planning applications being received and the granting of development permits. According to Lyons & Sweeney (2025), the activation phase is the time between final planning approval and the start of developments, whereas the build-out phase refers to the construction period, from breaking ground to completion. In our research, we focus on the duration from the receipt of a planning application to the construction start, which we refer to as the pre-construction stage. This framing allows us to capture the extent of the length of time before the start of construction.

There are several reasons why it's important to analyse these durations together. First, the drivers of duration at each stage might differ. Second, by looking at both timelines, we can observe within which stage the increase happens. Understanding both timelines enables policymakers to make targeted, stage-specific policies, which are essential for unlocking housing supply.

This paper adds a number of contributions to the literature on housing supply. Our study is the first in Ireland to explore factors that affect both the planning phase and the activation phase, stages increasingly recognised in the existing

literature as critical in shaping the responsiveness of housing supply. We are using a granular dataset that tracks residential developments across Ireland from application to commencement. Wrenn & Irwin (2015), in their study that sought to link the approval delays with development timing, have shown that longer approval times significantly reduce the probability of development. [5] Furthermore, Somerville (2001) found that if developers treat development as a real option, the decisive stage is at or before building permits are issued. This is the time when developers weigh risks, returns, and the timing of investment to decide to proceed to development stage or not. Second, our study adds to a growing body of literature that argues uncertainty in the planning process is a major barrier to the delivery of housing. Any aspects of unpredictability and procedural complexity in the planning application process, rather than just the length of time it takes, will hinder timely housing delivery. Lyons & Sweeney (2025) have found that the more certain the outcome of the planning process is, the shorter time it takes for a development to progress from planning permission to completion. In this paper, we build on their analysis by expanding the analysis to all of Ireland and at the same time incorporating appeals to An Bord Pleanála[6] and this is considered a source of uncertainty.

In this paper, our main goal is to estimate the factors that affect both planning and activation durations, which are seen as major aspects in the delivery of housing. Somerville (2001) tested the real option [7] model and proved that the most decisive phase affecting housing supply occurs at or prior to the issuance of building permits. At this stage, developments are held as real options. Developers still have the flexibility to proceed or not. This literature assumes that once construction begins, developers usually finish the project regardless of how market conditions change, which at the same time shows that the construction process lacks option properties. This finding helped change the

[5] Using subdivision data from Maryland, they found that a 1 per cent increase in expected approval time would lead to a 0.94 per cent decrease in the probability of starting development, nearly a 1:1 elasticity.

[6] The decision to appeal granted applications causes significant delays in any planning application and additional control variables. According to administrative backlogs at the appeals board, decisions usually take more than a year (Kelly, 2023).

[7] According to real options theory, investment opportunities, like developing a housing complex, are flexible decisions that may be delayed, or terminated depending on market conditions. Real options theory has been applied to describe a broad range of real estate investments (Titman, 1985; Williams, 1991, 1993; Grenadier, 1996; Somerville, 2001; Bulan et al., 2009).

focus to recognise planning and pre-construction phases as major stages that have an impact on the responsiveness of housing supply. Understanding what drives the timing from applications received to permission approval enables policymakers to reduce the costs and risks developers face while holding this option, thereby making the commencement more likely. Furthermore, analysing the causes of delays from approval to commencement can help us distinguish between strategic behaviours and genuine delivery constraints, which is essential for effective policy intervention.

The existing literature has shown that the pre-construction stage for housing is a complicated issue affected by both public and private factors. It is not simply the duration of these processes but the inherent uncertainty they bring about. In addition, developer behaviours, such as landbanking and strategic phasing of projects, can also delay delivery.

The literature on housing development duration demonstrates the impact of both the public and private sectors. Regarding the public sector, the extended timelines are often attributed to legal and planning procedures. Bramley (1998) emphasized the role of political influences within the planning process, which note that they can often delay new developments. Caesar (2016) pointed out that inconsistencies in how land is distributed among private developers also cause delays.

Developer behaviour is also recognised as an important factor that can affect both planning and activation phases. Murray (2020) points out that developers sometimes maintain land banks and consider from a business perspective what the best flow of land is into the market (such as given price changes). This practice may add a friction that can impact delivery timelines, in particular those between planning and commencement as in this study.

Looking at a different context, Rahmawati et al. (2025) compares delays caused by ”private speculation” with those caused by ”public inefficiency” in a rapidly urbanising Indonesian city. The study finds that delays cannot be attributed to only private or public factors. Both play a role and need to be addressed. Similarly, Ball et al. (2024) shows that developers may intentionally manage the speed of housing delivery based on market conditions and their own strategies, not just because of planning regulations. It must be noted that it is a rational business decision for developers who need land as a factor of production and manage their land holdings within the context of their operational activities.

Leishman (2015) also looks at what drives developer decisions. He argues that the microeconomics of developers, such as business strategy, risk-averse behaviour, and financial constraints, have a considerable impact on housing supply. This perspective is complemented by Lai et al. (2016), who examines the strategy of recurrent planning applications by developers in Hong Kong. They found that developers prolong development voluntarily, often not because of the inefficiency in the planning system. They are actually responding to changing market conditions (e.g. waiting for prices to rise). The paper identifies that repeated submissions of master layout plans are used as a tool by developers to keep permissions alive while postponing construction. They also discovered that developers may use this strategy to improve building design based on feedback from the planning board.

Another contribution of our paper is to find empirical evidence about the impact of uncertainty in the planning process in the Irish context, specifically by employing key factors considered indicators of uncertainty, like appeals to An Bord Pleanála. The term ”uncertainty” is used in a number of different contexts in the housing and planning literature. In the Irish context, Lyons & Sweeney (2025) show that more certain, ”rules-based” planning systems lead to shorter activation times. Specifically, the average unit-weighted duration from permission to completion for finished units in their dataset is significantly shorter for projects in the Strategic Development Zone (SDZ) or SHD developments. Glaeser & Gyourko (2025) find that housing supply growth has slowed in many U.S. cities, especially in the once fast-growing Sunbelt area. Prices keep rising, but building has dropped, especially in low-density, high-price neighborhoods. They argue that this is because local barriers to building have increased and vary by place. Ball (2011) also finds that in the UK, a restrictive planning regime can hold back new housing construction.

In their study of the Israeli housing market, Rubin & Felsenstein (2019) proved that although a planning delay would not directly affect housing supply, the uncertainty of that delay is a significant constraint. These findings suggest that a transparent and predictable, albeit slow, process might be less detrimental to development than one that is quick but hard to predict.

In this paper, we will focus on project-level procedural uncertainty, specifically the uncertainty that arises when a planning application is up for appeal to An Bord Pleanála. These occurrences can significantly increase both the time it

takes to reach a final decision and the unpredictability of outcomes. By capturing these dynamics empirically, our paper adds a new layer to the existing literature on how planning procedures affect housing delivery timelines. To our knowledge, we are the first study to consider these channels.

While all studies have findings that that may be insightful on an international basis, it is likely that the specific context within which the study took place, with numerous differences such as market structures, legal frameworks, policies, and geography, will limit the generalisability of any findings. This should be taken into consideration when considering the transferability of research findings to the Irish context.

3 Data

In this research, we compile a novel micro-level dataset to analyse activation times using a range of underlying datasets. We utilise two main datasets: the Building Control Management System (BCMS) and the National Planning Application Database (NPAD). In this section, we discuss each of these in turn and then outline the additional data.

3.1 Construction commencements (BCMS)

The Building Control Management System (BCMS) is an Irish national administrative database that provides information on construction activity in Ireland, regulated under the Building Control Acts. The BCMS was introduced in 2014 and has tracked data since then. It is managed by the Local Government Management Agency and used by all 31 local authorities across the country to support regulatory compliance with Irish building standards. For background on the data collection process and its history, see Kitchin et al. (2025).

The main component of the BCMS database is commencement notices, which are legal documents that must be submitted prior to starting most types of construction. Each unique commencement notice contains information about the type of development (e.g., new build, extension, or material alteration), the number and type of housing units (e.g., apartment, detached, semi-detached), geographic coordinates, and the intended date of commencement. Generally,

submission of a commencement notice happens at least 14 days prior to the beginning of construction, with some exceptions that allow for a 7-day notice.

The database also provides basic project characteristics such as the project name, a description of the works, development address, the type of works (new building, extension, material alteration), and the proposed use of the building (residential, agricultural, industrial, shop, etc.). Other information includes the total floor area, the number of buildings, and the number of apartments within the development. All these data are generated by the owner or developer and are not verified and are therefore subject to reporting error.

Further optional details about phases of planning and construction can be found for some commencement notices. This includes the responsible local authority, the planning permission number, the date planning permission was granted, and the expiry date of that permission.

Additionally, the commencement data can be supplemented with information from the BCMS Register, which allows us to identify key stakeholders like owners, builders and designers. This can help us understand the roles of different actors in the Irish housing market. This information is not available for all commencement notices. We follow Lyons & Sweeney (2025) to identify contractors and Fallon (TBD) for classifying developers by size and ownership structure.

As of the end of July 2025, the BCMS contains over 139,000 commencement notices. About 20 per cent of these relate to non-residential developments that we excluded from our analysis. Within the residential category, approximately 35 per cent are extensions and other minor works to the existing buildings that we also omit from our analysis. This results in about 65,000 remaining new residential commencement notices.

3.2 Planning applications (NPAD)

The National Planning Application Database, published by the Department of Housing, Local Government and Heritage (DHLGH) provides a structured record of planning applications submitted to local authorities across Ireland. The database contains applications dating back to before 2010. However, over time

the dataset becomes more reliable as it is updated on a more regular basis and there are consistent variable definitions across different planning authorities.

Key variables in the dataset include the application number, development address, project description, and planning authority. The dataset also provides information about the status of the application, the final decision outcome (e.g., granted, refused), the date of grant, and the expiry date of the permission. Other information is also available, such as each site's geographic coordinates (polygon longitude and latitude).

The dataset also includes indicators for planning appeals submitted to An Bord Pleanála (ABP), offering insight into how often planning decisions are challenged. Key details related to appeals are available, such as the appeal reference number, status, decision, and the date of the final decision. The dataset contains more than 490,000 separate planning applications. Of these, approximately 315,000 have been granted planning permission (including extensions and non-residential applications).

Strategic Housing Developments are not included in the NPAD dataset, as these applications go directly to ABP. We use the list of SHD from ABP which includes basic information, including the ABP case ID, date of application, date of approval and spatial coordinates.

3.3 Merging between BCMS, NPAD and SHD

While the National Planning Application Database and BCMS offer valuable information, combining the two provides a clearer picture of how development projects progress.

One of the main advantages is that it allows us to measure the duration between the receipt of planning applications and the start of construction. This helps us identify developments that have stalled. More importantly, it shows at what stage the projects stalled, either during the planning process or after approval but before commencement. We can then understand what might be causing the increase in duration, or what policy change might be pushing a development to go to the commencement phase quicker.

Another reason for merging the datasets is to improve data accuracy. Planning permission granted dates are available in both datasets, but these dates don't

always match. In cases of discrepancy, we prioritize grant dates based on planning data, which are often more credible because grant dates in BCMS are self-reported.[8] This helps to standardise the merged dataset and ensures that our timeline of events is as accurate as possible.

There are two primary steps to link planning applications with commencement notices: merging and verification. In the merging stage, we use two methods: merging through identifiers; and spatial joins. For identifier merging, we match records using identifiers available in both datasets. The BCMS dataset often (but not always) contains the planning application number, which if these numbers are completely identical to number in the NPAD dataset, we consider a perfect match.

The second methodology uses spatial merging. To undertake this process, we perform a point-in-polygon spatial join using the geographic coordinates present in both datasets. Using this method, we can link records that share the same location. We also use nearest-neighbour matching, which links observations within a defined distance threshold (i.e. 10 metres). This helps identify potential matches where coordinates don't exactly align but are close enough, likely due to minor inaccuracies in self-reported BCMS coordinates. However, these proximity-based matches are treated as provisional and subject to a stricter condition in the verification phase. This results in a merged dataset in which some observations are matched through both identifier and spatial methods, while others are joined using one of the two approaches.

The second stage focuses on verifying the accuracy of the merged subset. For those matched through identifiers, we cross-check fields such as the similarity in address, grant date, and project description. Most of these matched perfectly. For the nearest neighbour matches, we apply stricter conditions. In some cases, manual checks are conducted to determine whether a match is valid. To support the verification of the spatially matched records, we also use a supplementary dataset created using the Google Geocoding API to convert the addresses in the BCMS into coordinates. This allows us to cross-check the spatial join results and strengthen the reliability of the matches already identified. The two-step

[8] NPAD dataset includes both 'decision date', which is when the local authority made the initial decision, and the 'grant date' which when the decision comes into legal effect. Typically, the grant date is 4 weeks after the decision date. In this report we do not use the decision date.

process allows us to build a more reliable dataset that connects planning with actual building activity.[9]

To enhance our sample, we also merge it with the Strategic Housing Development (SHD) dataset; these data are available on the planning appeals commission's website. Out of 532 developments in the SHD dataset, more than 330 have been granted permission. We link the SHD records to our sample dataset using both methods: first, by matching the An Bord Pleanála case ID, and second, by using spatial joins as discussed earlier. We conduct the same verification process to ensure that the merged dataset is reliable to for analysis.

3.4 Other data

Both the NPAD and BCMS databases contain the geographical coordinates of the development. This allows us to supplement our main data with various characteristics of the area of the development.

First, we use the European Union's Copernicus Land Monitoring Service data for the land-use in 2018 of the project locations. The land-use map has a spatial resolution of 100 metres. We group land-use classifications into three categories: brownfield (pre-existing industrial land use), greenfield (agricultural land, forest or wetlands), and urban fabric (both continuous and discontinuous build areas). Appendix A contains a full list of land-use classifications.

Next, we use the coordinates and the boundary information from CSO[10] to determine each development's Local Electoral Areas (LEA), one of the 166 subdivisions of Ireland, based on the 2019 boundaries. This allows us to merge Gillespie et al. (2025) estimates of the LEA-level unemployment rate. Using the same process we obtain each area's Eircode routing key[11], the first three symbols of the Irish postcode, which allows us to use the local property price index from the CSO as a covariate.

[9] Developments affected by Cork County-Cork City boundary change in 2019 are counted under Cork City. Developments in that area that both applied for planning permission and commenced prior to 2019 are counted under Cork County.

[10] https://www.cso.ie/en/census/census2022/census2022smallareapopulationstatistics/

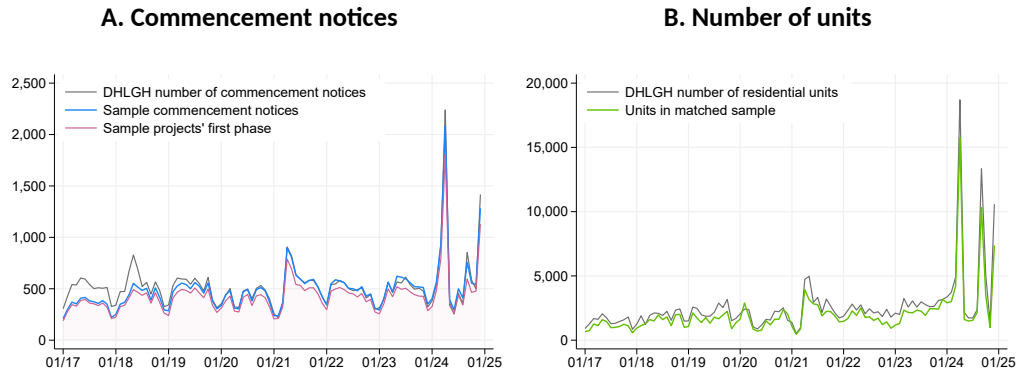
[11] https://www.arcgis.com/home/item.html?id=bad8348841ca45a7b271364577afd7a5

4 Descriptive statistics

4.1 Final sample

Our matched dataset covers commencement notices for new residential developments in Ireland from 2017 to 2024. It contains 46,944 distinct commencement notices. This represents 41,290 separate developments, 35,736 of which are single-unit housing. These commencement notices cover a combined 195,127 housing units.

Figure 1: Number of new residential notices, units in matched sample compared to DHLGH residential commencements statistics



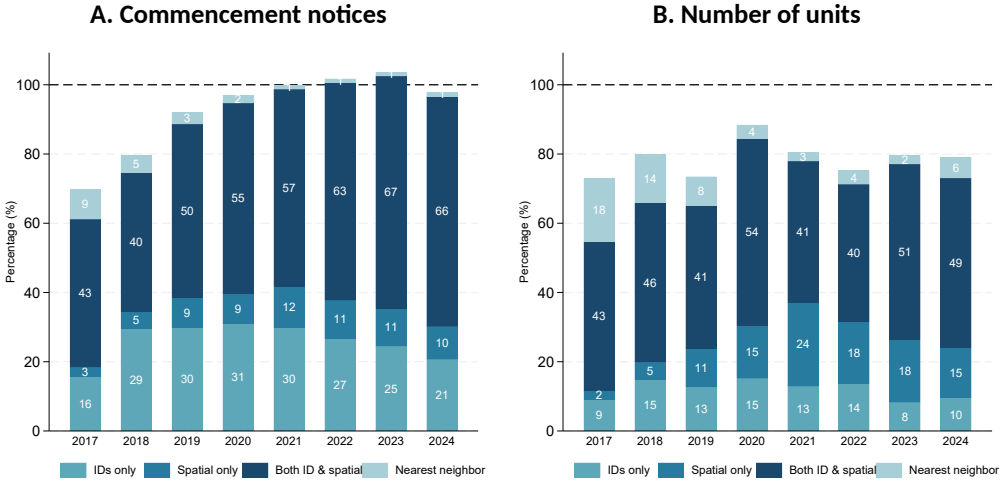
Source: Merged BCMS-NPAD-ABP dataset, CSO website for DHLGH data.

To assess our final sample, and the matching process, we compare our sample to the official statistics from the Department of Housing, Local Government and Heritage (DHLGH) and published by Ireland's Central Statistics Office (CSO). As shown in Figure 1, our matched sample captures a large proportion of residential commencement notices, including both the number of units and projects. The coverage in the first two years is around 80% of commencement notices, but then improves over time to a near-complete match. Thus, the merged sample provides strong coverage and reliability for our analysis.

In addition to matching DHLGH numbers, panel A of Figure 1 shows the number of new development projects started each month. A single project, as measured by the planning permission number, can have multiple commencement notices, each with a different number of units. Typically, larger projects will have more notices.

The spikes in commencements seen in March and December 2024, were due to a temporary "Development Levy Waiver" scheme which was aimed to encourage commencements for those developments with planning already approved by reducing local taxes and providing a rebate on water and wastewater connection charges (Department of Finance, 2025).

Figure 2: Final sample match rate compared to DHLGH residential commencements statistics



Source: Merged BCMS-NPAD-ABP dataset, CSO website for DHLGH data

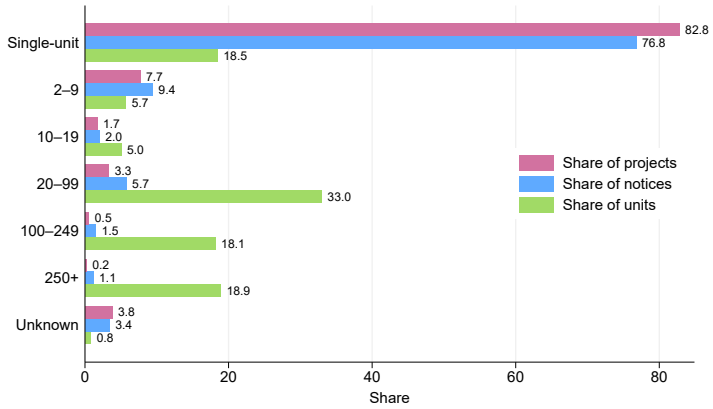
In Figure 2, we explore the final sample based on the matching method used to identify matches between BCMS notices, NPAD applications and SHD data. The match rate is calculated as the number of notices (or units commenced) relative to the numbers reported by the DHLGH. As was already seen in Figure 1, the match rate has improved over time. Most of the matched sample is matched both spatially and by planning permission ID number, followed by matches based only on the ID (where coordinates were either missing or misreported). The remaining 10% of matches are based on the spatial data (either a direct match between a point in BCMS and a polygon from NPAD or SHD, or through finding the nearest polygon). All the matches reported in this figure have been validated as discussed in Section 3.3. Note that the DHLGH statistics include additional validations and filtering[12]. Therefore the rates may exceed 100%.

[12] More information on https://www.gov.ie/en/department-of-housing-local-government-and-heritage/publications/residential-commencement-notices-background-and-methodology/.

Panel B of Figure 2 shows that our sample accounts for around 80% of the units commenced. The gap is likely due to missing values and misreporting of the number of units in the BCMS, which are corrected for in the official statistics.

4.2 Sample composition

Figure 3: Composition of sample by number of projects, commencement notices, and units

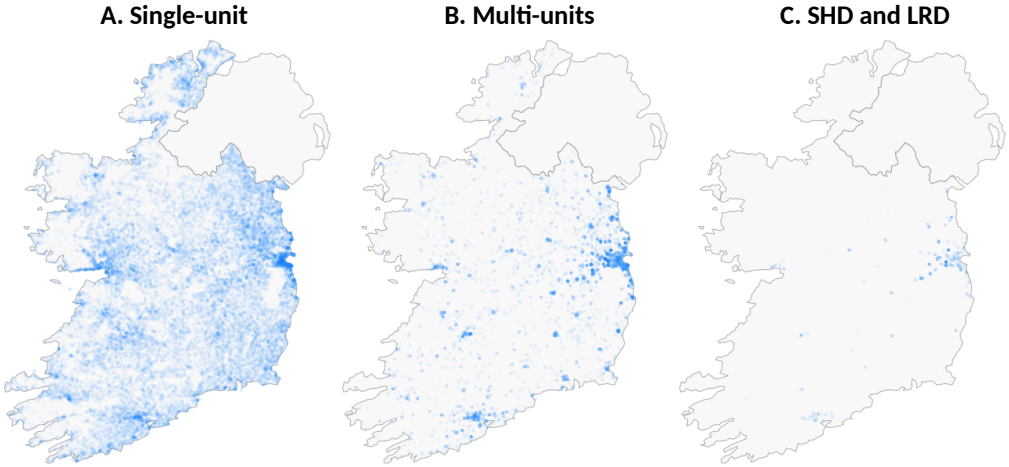


Source: Merged BCMS-NPAD-ABP dataset.

The relationship between the number of projects, the number of commencement notices and the number of units in our final matched sample is explored further in Figure 3. Single-unit housing makes up 82.8 per cent of development projects and 76.8 per cent of notices, but it provides only 18.5 per cent of all units. On the other hand, developments with 20–99 units contribute more than 33 per cent of all units, although they make up only 3.3 per cent of all projects and 5.8 per cent of notices. These are followed by development projects with over 250 and those with 100–249 units, which make up just under 20 per cent of all developments.

Next, we turn to geographical differences across all 31 local authorities. Table 1 shows the number of projects, commencement notices and units, as well as the share of single-unit developments and the average number of units per notice for each local authority. The highest number of distinct projects and notices is found in Cork County Council. However, more new units (over 20,000) in the

Figure 4: Location of commencement notices by size and type



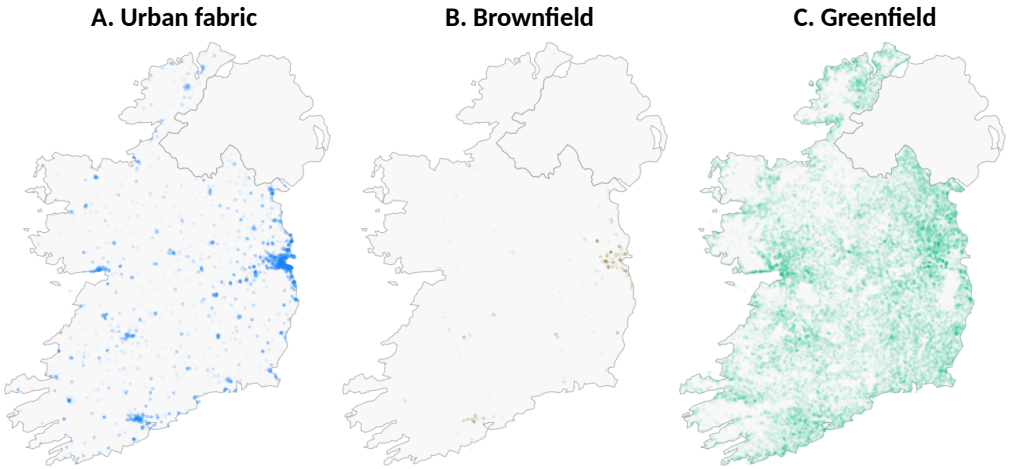
Source: Merged BCMS-NPAD-ABP dataset.

data commence in Dublin City, as well as in the surrounding areas. Single-unit housing is most common in rural locations, such as; Monaghan, Donegal, Galway County, Leitrim and Roscommon where it accounts for over 90% of commencement notices. This is not surprising as in rural areas one off housing predominates as the housing type.

Table 1 also compares SHD and LRD developments with planning applications processed through the regular process. The 253 identified SHD and LRDs projects represent less than 0.6% of all projects, but account for 23% of all commenced units.

Figure 4 shows the location of commencement notices with a known location. Single-unit commencement notices shown in panel A are spread throughout the country. Multi-unit notices shown in panel B are concentrated in major cities, as well as in county towns. Panel C shows the location of SHD and LRD developments. Most are located in and around Dublin, with some in Cork City, Galway City and the surrounding areas.

Figure 5: Location of commencement notices by land use in 2018



Source: Merged BCMS-NPAD-ABP dataset and CORINE[13] Land Cover (Copernicus Land Monitoring Service).

Next, we overlay the location of developments with the 2018 land-use map from the EU Copernicus Land Monitoring Service. Figure 5 panel A shows that concentrated developments which are classified as having an existing residential urban fabric (in cities and towns). Panel B shows that a small number of brownfield developments are found near urban centres. Greenfield commencements in panel C are spread through the country.

[13] Coordination of Information on the Environment

Table 1: Number of projects, commencement notices and units by local authority

	#Project	#Notices	#Units	%Single-unit	Av. units
Carlow	602	712	1,602	83%	2.25
Cavan	873	1,009	1,809	82%	1.79
Clare	1,390	1,477	3,011	86%	2.04
Cork City	625	759	7,824	53%	10.31
Cork County	4,043	4,457	13,516	83%	3.03
Donegal	2,603	2,732	4,016	92%	1.47
Dublin City	1,133	1,263	20,416	62%	16.16
Dún Laoghaire–Rath.	960	1,122	12,183	59%	10.86
Fingal	1,154	1,428	18,439	55%	12.91
Galway City	301	362	2,276	62%	6.29
Galway County	3,415	3,860	6,077	92%	1.57
Kerry	1,696	1,829	3,341	86%	1.83
Kildare	1,583	2,063	14,958	60%	7.25
Kilkenny	1,260	1,416	3,177	88%	2.24
Laois	1,054	1,140	4,055	85%	3.56
Leitrim	247	269	436	90%	1.62
Limerick	1,733	1,983	5,314	84%	2.68
Longford	413	432	965	86%	2.23
Louth	1,187	1,415	7,847	72%	5.55
Mayo	1,593	1,773	2,590	86%	1.46
Meath	2,491	3,142	12,161	78%	3.87
Monaghan	1,088	1,146	1,965	93%	1.71
Offaly	922	1,030	2,393	83%	2.32
Roscommon	670	784	1,106	90%	1.41
Sligo	501	549	1,232	86%	2.24
South Dublin	532	852	16,910	37%	19.85
Tipperary	1,518	1,691	3,322	88%	1.96
Waterford	1,106	1,183	4,365	83%	3.69
Westmeath	1,035	1,134	3,240	81%	2.86
Wexford	2,232	2,413	6,738	85%	2.79
Wicklow	1,330	1,519	7,843	73%	5.16
SHD and LRD	253	823	44,904	0%	54.56
Regular applications	41,037	46,121	150,223	82%	3.26
Total	41,290	46,944	195,127	80%	4.16

Source: Merged BCMS-NPAD-ABP dataset.

Average number of units per notice.

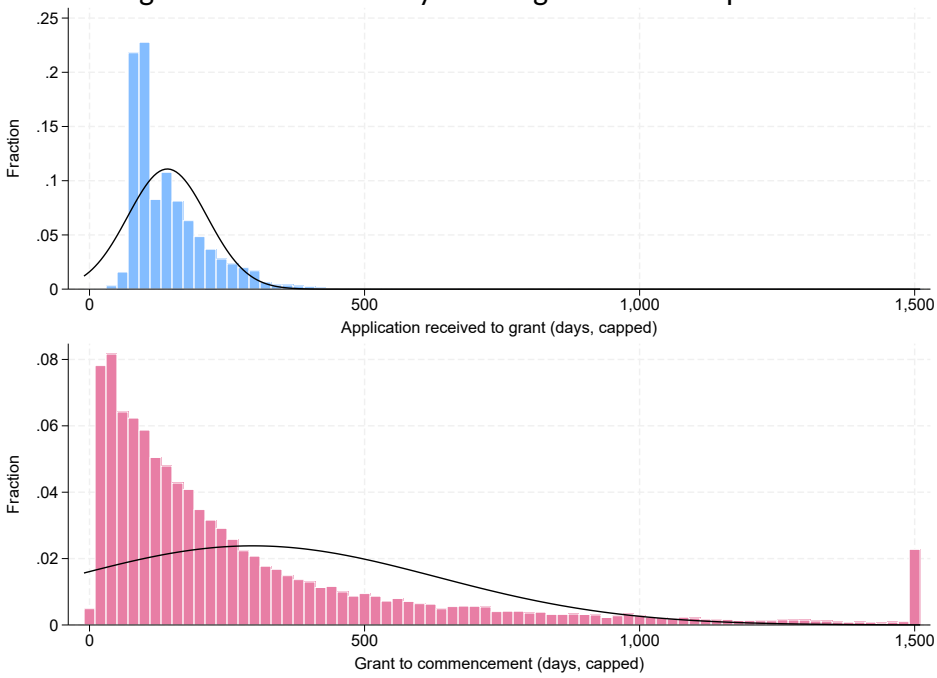
Developments affected by the Cork County-Cork City boundary change in 2019 are counted under Cork City. Developments in that area that applied for planning permission and commenced prior to 2019 are counted under Cork County.

4.3 Duration of the process

This analysis focuses on two principal durations of interest. Initially, we determine planning time, defined as the duration from the receipt of applications to the issuance of final planning permits. Second, we determine activation time, defined as the time between the issuance of the final planning permit and the start of construction. In both instances, we calculate these durations in days. The descriptive statistics are weighted by the number of units, thus we measure the duration for the average unit, rather than the duration of the average project.

We also make a distinction between single-unit housing and multi-unit housing as they have very different characteristics. The histograms in Figure 6 and Figure 7 show the distribution of time from planning application to permission for single-unit houses and multi-unit developments.

Figure 6: Number of days for single-unit developments

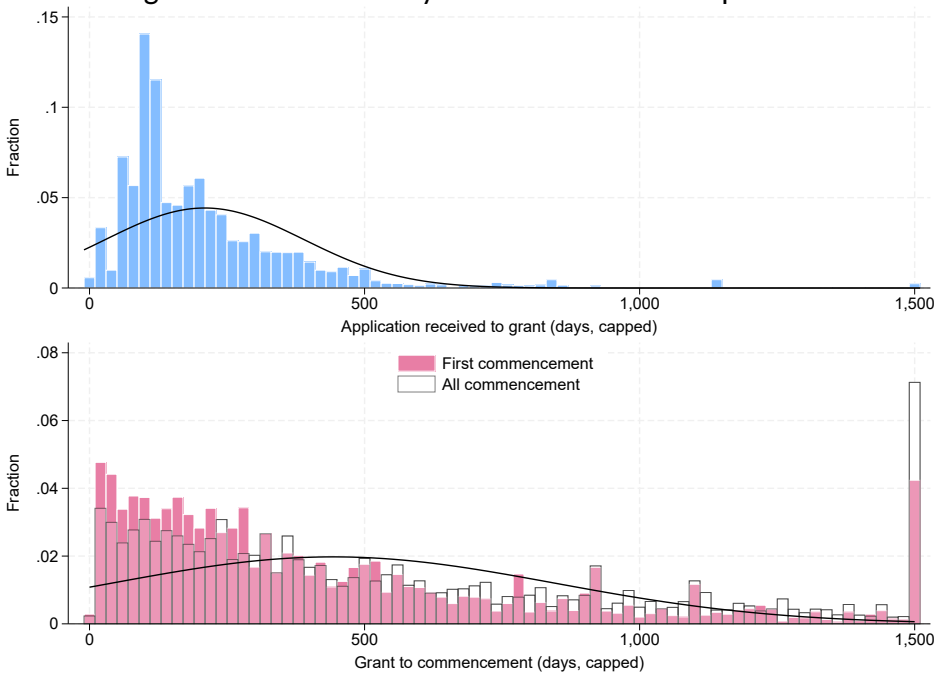


Source: Merged BCMS-NPAD-ABP dataset.

In terms of duration from the receipt of application to the granting of building permits, for single-unit houses, the distribution is closely concentrated around a

shorter time frame, usually 3 to 4 months. Multi-unit developments, defined as developments with 2 or more units, show a wider spread. While the majority are approved within 5 to 6 months, some take a year or longer. This reflects the added complexity associated with larger-scale projects, as well as additional paperwork, planning and pre-construction input required for larger projects. (see Figure 6 and Figure 7)

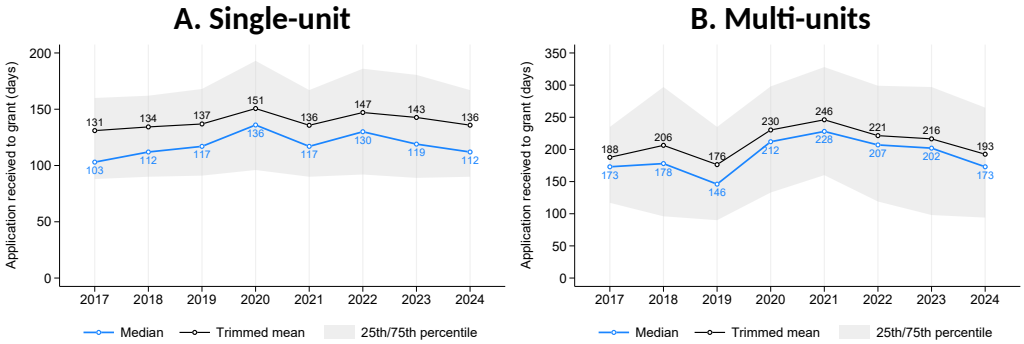
Figure 7: Number of days for multi-unit developments



Source: Merged BCMS-NPAD-ABP dataset.

Similarly in the planning phase, the distribution of days from planning permission grant to commencement is right-skewed for both single-unit and multi-unit developments. However, the activation phase is generally longer, and more dispersed. Especially in the case of multi-unit developments, the activation period is generally longer and more varied.

Figure 8: Time from application to grant by the year of grant

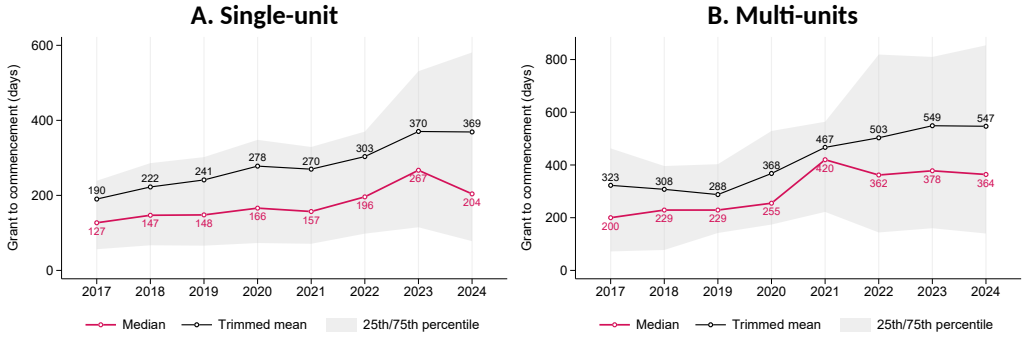


Source: Merged BCMS-NPAD-ABP dataset.

As shown in Figure 8, it is evident from Panel A (single-unit housing) and Panel B (multi-unit housing) that the duration from the receipt of planning applications to final approval has remained relatively stable over the years. There is little variation in how long applications stayed within the local authority approval system. The only notable increase in the median duration for both housing types occurred during, and shortly after, the COVID-19 period, which is unsurprising given the widespread disruption to administrative processes during the pandemic. Following this period, durations for both types of housing declined and remained at around 112 days for single-unit housing and 173 days for multi-unit housing in 2024.

Again, the duration for multi-unit developments is longer because of the greater complexity of the process and these types of housing are also potentially more prone to appeals. The risk of appeal could also affect the longer activation stage for multi-unit developments, as developers will postpone detailed planning until the grant decision is final and the appeal deadline has passed.

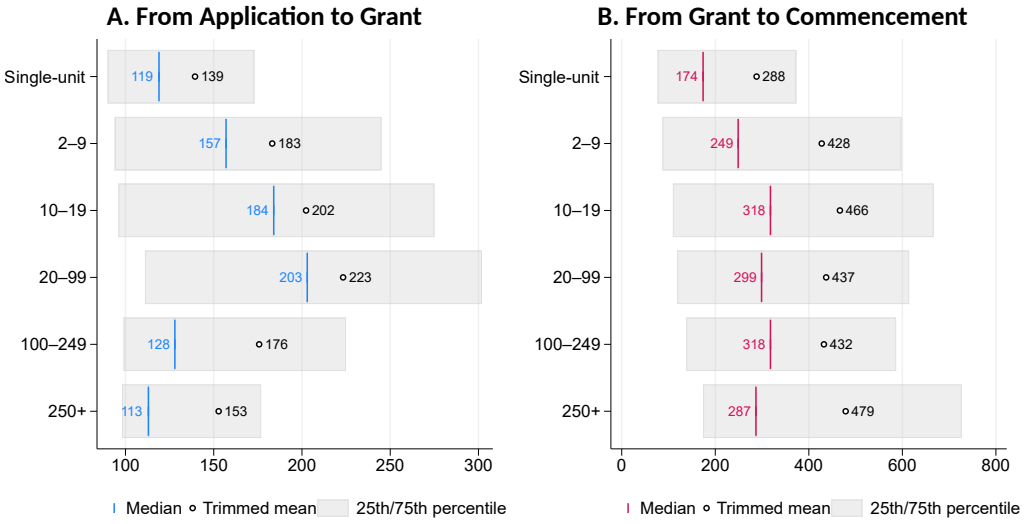
Figure 9: Time from grant to commencement by the year of commencement



Source: Merged BCMS-NPAD-ABP dataset.

Figure 9 shows that time to commence has consistently increased over time, and this has occurred for both single-unit housing and multi-unit housing. For multi-unit developments, activation duration increased from 200 days in 2017 to 364 days in 2024, and for single-unit housing, this duration increased from 127 days in 2017 to 204 days in 2024.

Figure 10: Duration by number of units

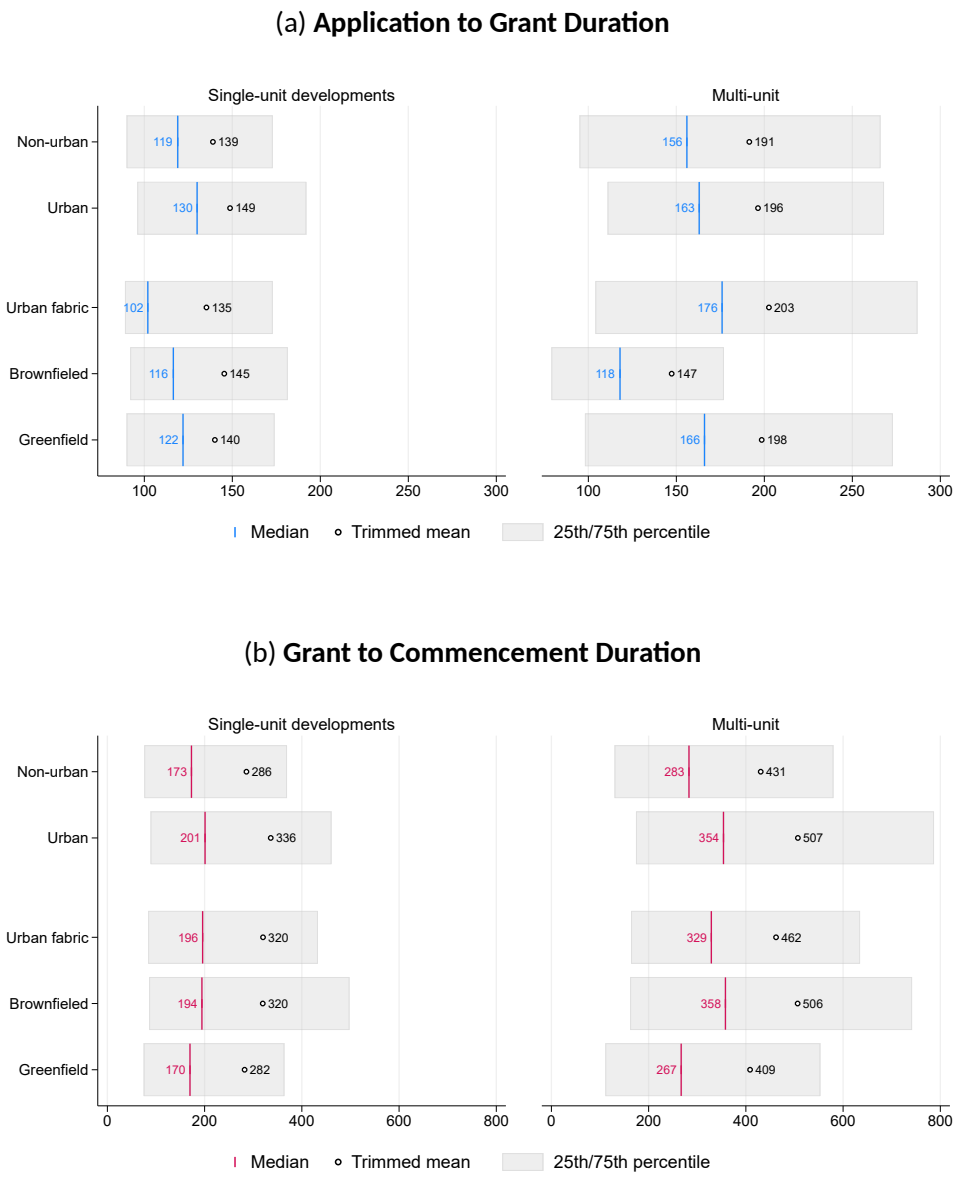


Source: Merged BCMS-NPAD-ABP dataset.

Both durations from the application to grant and from grant to commencement phases usually take longer for larger developments. This suggests that bigger projects generally face longer timelines. However, for developments with more

than 100 units, the approval time appears to decrease. This is understandable given that many of these developments fall under the SHD and LRD category. The planning duration is longest for developments containing 20 to 99 units, at 203 days, and the activation duration is longest for developments with 10 to 19 units and developments with 100 to 249 units, at 318 days.

Figure 11: Duration across area and land-use



Source: Merged BCMS-NPAD-ABP dataset.

When compared to non-urban areas, urban areas (defined at the LEA-level) often have longer planning and activation durations. This holds true for both

single-unit and multi-unit developments, given the added complexity of urban logistics.

Looking at land-use types, the patterns vary across development types. For single-unit housing, the planning duration is highest for sites which are urban in nature and is longest in greenfield areas. However, for multi-unit developments, brownfield sites have the shortest planning duration, and urban fabric developments take the longest, which is the same as for single-unit housing.

In terms of activation duration, single-unit developments face the longest time in urban fabric areas and the shortest time in greenfield areas. For multi-unit developments, brownfield areas experience the longest time before commencement at 358 days on average. This is unsurprising given that, on brownfield sites, remediation efforts and preparation work can require extra time before construction starts.

5 Regression analysis

5.1 Methodology

Section 4 shows noticeable differences across various development characteristics. In this section, we aim to explore these differences further using regression analysis. We use a Poisson model with the number of days from application receipt to grant, or from grant to commencement as the main dependent variables in the analysis.

The first regression model for the number of days between the date an application received t_1 and the day of grant t_2 for unique development project i is:

$$\text{\#Days}_{i,t_1,t_2} = \exp\left(\alpha_1 \mathbf{X}_i + \alpha_2 \mathbf{Y}_i + \gamma_{\text{Area}} + \gamma_{\text{Time}}\right) + \varepsilon_{i,t_1,t_2} \tag{1}$$

There are two broad groups of explanatory variables, listed in full in Table 2. First, $\mathbf{X}_i$ represents planning-process-related characteristics of the development. These include a dummy variable indicating whether the planning application

had a request for further information, which extends the decision time; it is also a proxy indicator for the quality and complexity of the application. The second dummy variable indicates whether the application was appealed. The final two dummies in this set are the SHD and LRD dummies. These indicators, and some other variables, are not applicable to single-unit developments.

The second group $\mathbf{Y}_i$, consists of the developments' physical characteristics and developer information. This includes a dummy for a protected structure and a dummy for public developments (such as social housing) which are extracted based on keywords in the BCMS description. The BCMS includes information on development type (houses, apartments, mixed-use developments), and the number of units. The regressions include the number of units and the number of units squared to control for development size and capture non-linear relationships.

By matching the BCMS Register and the categorisation of major developers from Fallon (TBD) and Lyons & Sweeney (2025), we create a category of developer type and a separate dummy for developments that had a major contractor. Note that the information on builders, developers or owners are incomplete and majority of observations have an unknown type.

Using geolocation and 2018 satellite-derived data from the Copernicus Land Monitoring Service, we identify the land-use category of each development area (100 m grid). We use three main categories as described in Appendix A, which are: greenfield, existing residential urban fabric, and brownfield. From the coordinates we also obtain the Local Electoral Area (LEA). If the LEA is in either Cork City, Dublin City, Galway City, Limerick or Waterford City.

Finally, the model includes fixed effects (FE) for time and area. In the first specification, there are 31 local authority FEs and three broad period FEs (up to 2019, COVID, post-2021). In an alternative, more restrictive, speciation we use 166 LEA fixed effects and and a fixed effect for the year of the grant.

For the regression model on the number of days from the grant date t_2 to the commence date t_3, the specification is broadly similar:

$$\#\text{Days}_{j,t_2,t_3} = \exp\left(\beta_1 \mathbf{X}_j + \beta_2 \mathbf{Y}_j + \beta_3 \mathbf{Z}_{t,\Delta t} + \eta_{\text{Area}} + \eta_{\text{Time}}\right) + \varepsilon_{j,t_2,t_3} \quad (2)$$

In this case, the observations are commencement notices j, and the time fixed effects refer to the year of commencement. The variables on economic

conditions measure the change between t_3 and t_2. The number of units only counts the number of units for the corresponding notice.

The regression includes two additional variables. First, we include dummy variables for the commencement notice sequence within the overall project. Large developments will generally have multiple phases of construction, each with a separate commencement notice. These variables measure the extra time required relative to the very first one.

The second additional variable is the spatial concentration of commencements. The index is based on Leishman (2015) and it measures other recently-commenced alternatives in the area as:

$$SI_i = \sum_k \frac{\#\text{Units}_k}{\text{Distance}_{ik}} \tag{3}$$

Where Distance_{ik} is the geodesic distance between i and j and $\#\text{Units}_k$ is the total number of units for development k. We restrict k to all developments that commenced within the two years before the first commencement of development i.[14]

These specifications include a third set of variables, $\mathbf{Z}_{\triangle t}$. This vector contains variables that capture both local and national economic conditions beyond fixed effects. This includes the local house price based on the Eircode routing key in the month of the grant date. The remaining four variables are measured as a change between t_3 (commencement date) and t_2 (grant date). They are: change in local house prices, change in interest rates, change in unit labour cost in construction sector, and the change in the local unemployment rate.

$\mathbf{Z}_{\triangle t}$ includes the change in the interest rate on 1–5-year loans to non-financial corporations in the model to capture the impact of financing costs. This overall metric may not fully capture the complexity of financing models used in the development and housing production process. For example, most projects likely use a mix of debt and equity financing, through own capital as well as private external equity. This likely differs across developers from the listed producers to the smaller developers and the cost of finance will differ materially across these entities. Indeed, the complexity of developing a financing mix across different

[14] Leishman (2015) counts the number of competing new units being on the market at the time of the sale transaction for property i. Due to data restrictions, we can only look at commencement date and instead use a 2-year cut-off instead.

market actors likely will impact the activation times as legal and other arrangements differ in complexity. These differences are unlikely to be fully captured by our financing cost interest rate variable.

Some variables are not always applicable to the outcome variable (e.g. phase number is not possible in the regression on application-to-grant duration), or are not applicable to the type of development (e.g. there are almost no single-unit developments with mixed-use). Column 3 of Table 2 shows the full list of variables across the regression models.

Table 2: List of variables

Description	Sources	Note
Received date	NPAD, ABP	
Granted date	NPAD, BCMS, ABP	
Commencement date	BCMS	
Application received to grant (days)	Calculated from dates	
Grant to commencement (days)	Calculated from dates	
Planning and legal:		
Request for further information	NPAD	†
Appeal dummy	NPAD	
SHD dummy	ABP, BCMS (keyword)	*
LRD dummy	BCMS (keyword)	*
Development characteristics:		
Protected structure	BCMS (keyword)	
Public development dummy	BCMS (keyword)	*
Development type category	BCMS	*
Commencement sequence number	BCMS	*‡
No. of units in this commencement	BCMS, DHLGH	*
Total no. of units of the project	BCMS, DHLGH	*
Developer type category	BCMS (keyword), Fallon	*
Contractor dummy	BCMS (keyword), Fallon, Lyons et al.	
Commencement spatial concentrations	Calculated BCMS	‡
Land use in 2018 category	Copernicus, from coordinates	
Local authority	NPAD, BCMS	
Local electoral area (LEA)	Derived from coordinates	
Urban area dummy	Based on LEA	
Economic conditions:		
Local house prices level (log)	CSO + filter	‡
$\triangle$Local house prices	CSO + filter	‡
$\triangle$Average 5y interest rate	CBI	‡
$\triangle$Unit labour cost in construction	CSO	‡
$\triangle$Local unemployment rate (LEA level)	Gillespie et al. + CSO (national)	‡

* = only for multi-unit developments, † only application to grant, ‡ = only grant to commence.
ABP=An Bord Pleanála, BCMS=Building Control Management System database, CBI=Central Bank of Ireland, CSO=Central Statistics Office, DHLGH=Department of Housing, Local Government and Heritage, NPAD=National Planning Application Database.
Number of units and number of total units is based on records validated by the DHLGH when available, and self-reported BCMS number otherwise.
Development type categories: mixed use, residential-only with flat, only house(s).
Developer types categories: listed, institutional, family-owned, other/unknown.
Land-use categories: urban fabric, brownfield, greenfield.
Interest rate: average interest rate for non-financial corporation on new loans with maturity between over 1 and up to 5 years.
House price on Eircode routing key level, unemployment rate on LEA level (or change in national unemployment rate, when not local estimates are not available) .

5.2 Application to grant

In this subsection, we focus on the duration from application to grant. We split the sample into single-unit developments and multi-unit developments. These two types of developments likely have very different determinants due to different technical requirements, as well as different types of developers. Each group is estimated under three alternative fixed-effect specifications to test the robustness and stability of our key results. The first includes local authority fixed effects and period dummies (including COVID-19 and post-COVID periods). The second adds LEA and year-of-grant fixed effects. The third includes LEA$\times$year fixed effects, which absorb all LEA-specific time variation. Throughout, the results are presented as marginal effects, i.e. the number of additional (or fewer) days associated with changes in each explanatory variable. Robust standard errors are used in all results. Columns 1-3 report results for the first, second, and third specifications, respectively.

Table 3: Number of days received to grant for single-unit developments: Poisson regression marginal effect

	(1) Received to Grant Single-unit	(2) Received to Grant Single-unit	(3) Received to Grant Single-unit
Request for information dummy	41.166***	40.471***	39.683***
	(0.626)	(0.623)	(0.624)
Appeal dummy	83.124***	83.022***	83.066***
	(1.891)	(1.897)	(1.938)
Protected structure dummy	9.661***	10.394***	9.658***
	(2.495)	(2.551)	(2.556)
Land use: residential	-4.052***	-3.357***	-2.944***
	(1.054)	(1.085)	(1.076)
Land use: brownfield	-0.426	0.257	-0.809
	(3.431)	(3.441)	(3.355)
Urban area dummy	8.890***		
	(2.737)		
Contractor dummy	4.811*	4.241	3.660
	(2.618)	(2.587)	(2.587)
Period: COVID-19	7.173***		
	(0.718)		
Period: 2022–2024	8.281***		
	(0.735)		
Observations	35,007	35,006	34,901
Pseudo R-squared	0.172	0.188	0.227
Fixed effect	LA	LEA & year	LEA$\times$year

Robust standard errors in parentheses: *** p$<$0.01, ** p$<$0.05, * p$<$0.1
Source: Authors' estimates from combined BCMS-NPAD-ABP dataset.

For single-unit housing, as shown in Table 3 the variables we are interested in include the appeal dummy and the variable capturing the request for information dummy. We are also interested in the impact of the variables capturing site characteristics. In both specifications, the magnitude, signs, and significance of all these variables remain consistent, demonstrating the robustness of our results.

The projects received requests for further information took an extra 40 days to secure approvals. Developments that were subject to an appeal took 83 days longer to gain planning approval compared to those that were not appealed.

When it comes to the site characteristics, an application in an urban area is associated with an increase in planning duration. Developments involving protected structures also face longer timelines. All coefficients for the above variables are statistically significant at the 1% level.

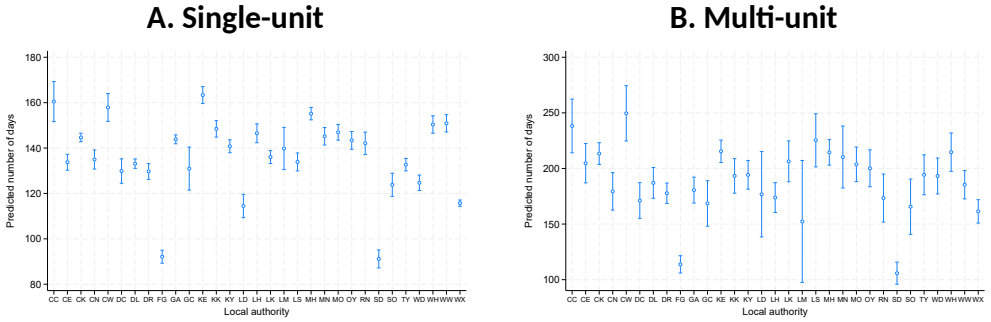
Next, we turn to multi-unit developments in Table 4. This model includes additional variables which were either not applicable to single-unit developments in 3, or did not have sufficient variation. The additional variables are: dummy variables for SHD and LRD developments, a dummy for developments of social housing and other public developments, development type (mixed-use developments, apartments, reference category: houses-only residential), developer type dummies (listed companies, institutional developers, mid-size and large-sized family-owned businesses, reference: other or unknown developers). To control for differences in size, the model includes linear and quadratic terms for the total number of units in the project.

Appeals continue to have a strong effect, increasing the planning duration by 128 days. In contrast, both SHD and LRD developments are associated with shorter planning durations by 30-60 days This reflects the streamlined procedure under fast-track regimes. Public developments receive planning permission more than 50 days faster. Projects that received requests for further information take an extra 54 days on average to secure approvals.

In the case of multi-unit applications, building on land which is specified as residential in the land-use classification corresponds to an extra of 11 days to the planning time compared to building on greenfield (as classified by Copernicus).

Overall, as we can see in Table 3 and Table 4, a key insight emerges in terms of planning duration. First, appeals are a major source of increased duration in

Figure 12: Application received to grant local authority fixed effect expressed as conditional predicted number of days



Source: Authors' estimates from combined BCMS-NPAD-ABP dataset.

both housing types, and the effect is more severe for multi-unit developments, which might be attributed to their larger scale and greater community scrutiny. Beyond the headline findings, several other patterns are notable. Urban fabric locations are also associated with longer planning times for both housing types, and the effect is more pronounced for multi-unit developments. This reflects the added complexity in dense urban areas. Multi-unit developments are more sensitive to developer-related variables (e.g., type of developer, whether the developer is a contractor). Listed developers and contractors tend to have shorter planning duration.

Table 4: Number of days received to grant for multi-unit developments: Poisson regression marginal effect

	(1) Received to Grant Multi-unit	(2) Received to Grant Multi-unit	(3) Received to Grant Multi-unit
Request of information dummy	54.125***	53.588***	57.493***
	(2.714)	(2.690)	(2.857)
Appeal dummy	128.416***	128.119***	126.231***
	(3.649)	(3.632)	(3.650)
SHD dummy	-32.254***	-36.053***	-35.806***
	(11.498)	(11.279)	(10.593)
LRD dummy	-57.197***	-58.830***	-57.917***
	(15.972)	(16.686)	(15.809)
Public development dummy	-51.381***	-46.882***	-57.081***
	(11.794)	(12.625)	(11.873)
Development type: mixed use	8.821	6.002	9.621
	(7.720)	(7.304)	(7.387)
Development type: apartments	-0.651	-0.690	0.974
	(3.899)	(3.916)	(3.963)
Protected structure dummy	8.125	9.148*	7.155
	(5.694)	(5.558)	(5.262)
Land use: residential	10.895***	11.419***	11.783***
	(2.889)	(2.937)	(3.086)
Land use: brownfield	-6.588	-6.057	-3.809
	(6.408)	(6.502)	(6.214)
Urban area dummy	3.370		
	(9.538)		
Developer type: listed	-7.722	-4.858	-5.981
	(9.672)	(10.014)	(9.731)
Developer type: institutional	-10.775	-14.457	-19.001
	(13.544)	(13.513)	(12.730)
Developer type: family-owned	4.831	5.206	14.889**
	(6.996)	(7.064)	(7.166)
Contractor dummy	-1.048	0.044	-0.892
	(3.946)	(3.918)	(4.114)
Total units	0.333***	0.328***	0.322***
	(0.050)	(0.049)	(0.051)
Period: COVID-19	28.336***		
	(2.978)		
Period: 2022–2024	39.422***		
	(3.062)		
Observations	5,588	5,588	5,281
Pseudo R-squared	0.366	0.390	0.514
Fixed effect	LA	LEA & year	LEA×year

Robust standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1

Source: Authors' estimates from combined BCMS-NPAD-ABP dataset.

5.3 Grant to commencement

In this subsection, we focus on the duration from grant to commencement. We continue splitting the sample into single-unit developments and multi-unit developments. The regression for each group is estimated under two alternative specifications to test the robustness and stability of our key results. The first includes local authority fixed effects and period dummies (including COVID-19 and post-COVID periods). The second adds LEA and year-of-grant fixed effects.

For single-unit housing, the results are shown in Columns 1 and 2 respectively of Table 5. The variables of interest include the appeal dummy, as well as the following local economic and macroeconomic indicators: average house prices at application, changes in market house prices, construction labour costs, interest rates, and local unemployment rates. The spatial concentration index variable, which captures the extent of concurrent development activity in the surrounding area, a factor that may influence the decision of when to commence, is also added. In both specifications, the magnitude, signs, and significance of all these variables remain consistent, reflecting the robustness of our results.

A number of findings emerge. Developments that were appealed during the planning stage faced an additional 61 to 66 days in the activation stage compared to those without an appeal. A one-percentage-point increase in interest rates is associated with an extension of 50 to 68 days while higher local competition, which is captured by the spatial concentration index variable, also adds 55 days to the activation period. Similarly, a higher local unemployment rate is again linked to shorter timelines, with a one-percentage-point increase reducing the duration to commencement by 51 to 54 days.

Regarding other variables, the results indicate that higher construction labour costs are associated with a longer time to activation, while increases in average house prices at the time of application are associated with a shorter time to commence. All coefficients for these variables are statistically significant at the 1% level. It must be noted that the majority of single-unit housing is undertaken by private individuals rather than developers whose motivations and driving influences are likely to differ from developers undertaking multi-unit activities. However, the overall factors such as costs, the availability of labour and financing are likely to impact their activities as well and this is confirmed by our regression analysis.

For multi-unit housing, we run two sets of models: one that includes all notices for a project (Column 1 and 2) and another that includes only the first notice (Coulumn 3 and 4). Since multi-unit developments are often delivered in phases, we can then identify factors that affect the timeline of the whole project and those that affect the initial activation of construction.

For each model, we run both specifications: one with local authority fixed effects (Column 1 and 3) and another with LEA and time fixed effects (Column 2 and 4). This approach allows us to check whether the relationships we observe hold true across multiple geographic and time controls.

Across all specifications, a number of variables consistently have strong and statistically significant effects. Notably, a one-percentage-point increase in interest rates during the activation period is associated with a significant increase in the duration between planning approval and commencement (45 to 89 days). It is likely that the delaying effect of interest rates on commencement relates to the fact that increases in rates change viability and therefore lead to a reappraisal of whether to move forward with the project. Additionally, an increase in interest rates can lead to the need for refinancing or new funding streams, resulting in longer commencement times. Indeed, if we were exploring the build time phase (from commencement to completion), we may find a different effect whereby increases in interest rates cause a "rush to market" to protect profitability at given prices.

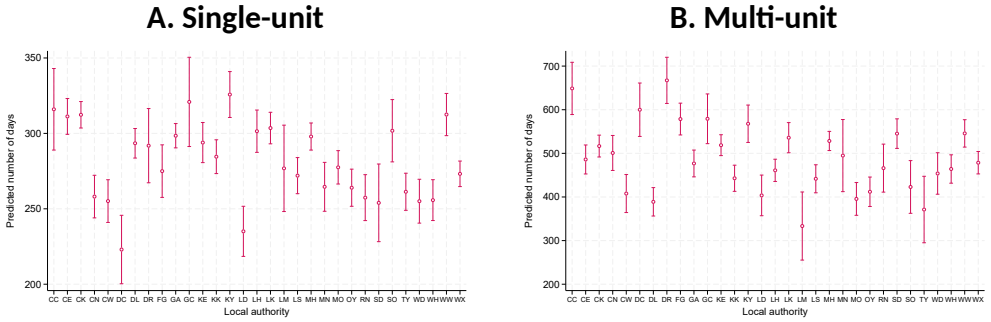
Higher local unemployment rates are significantly associated with faster activation (43-48 fewer days). An increase in market house prices and construction labour cost also leads to longer activation periods, although the effect is modest in magnitude.

When it comes to spatial characteristics, developments in residential land or brownfield areas are associated with longer durations compared to greenfield developments. Residential land-use adds 25-36 days, while building on a brownfield area adds an extra of 34-54 days.[15]

The characteristics of the developer also matter. Projects developed by listed companies are associated with shorter activation times. This suggests that different types of developers encounter distinct constraints, which in some

[15] Please note that this clarification relates to the current use of the land, rather than the specific zoning on the land as per Copernicus. Please see the data section for more details.

Figure 13: Grant to commence local authority fixed effect expressed as conditional predicted number of days



Source: Authors' estimates from combined BCMS-NPAD-ABP dataset.

cases might be linked to access to capital. Developments that have a major contractor as a builder add an extra 28-53 days to commencement time. This could be due to the extra time needed to find the contractor in environment with a capacity-constrained construction sector, as well as the fact that these are more complex developments that need longer preparation time.

Public developments shorten the time to commencement by 44-81 days. Projects in areas with a higher concentration of development activity experience faster activation, with a reduction of 16-34 days.

Overall, as shown in Table 5 and Table 6, three key insights emerge. First, cost pressures lead to delays in the process. We find that an increase in interest rates is consistently associated with longer activation durations, and this effect is much stronger for multi-unit housing. In addition, higher construction labour costs also result in additional days being added to the timeline.

Second, there is evidence that the unemployment rate is negatively related to development duration i.e. as the unemployment rate increases, the time-frames drop. This is likely capturing capacity constraints in the construction sector as the Irish economy is operating at full employment at present.

Thirdly, both the location and the development's characteristics also matter. Projects on residential land and brownfield areas, where extra work like site remediation prior to actual construction activities is often needed, took longer to reach commencement. Public developments, such as social housing, normally experience shorter time to commencement compared to private sector developments.

Table 5: Number of days grant to commence for single-unit developments: Poisson regression marginal effect

	(1) Grant to Commence Single-unit	(2) Grant to Commence Single-unit
Appeal dummy	65.903***	61.247***
	(7.512)	(7.270)
Protected structure dummy	22.484**	14.873
	(9.885)	(9.743)
Land use: residential	4.870	3.810
	(3.704)	(3.682)
Land use: brownfield	18.198	12.586
	(11.940)	(12.018)
Urban area dummy	10.952	
	(8.941)	
Contractor dummy	10.820	9.150
	(9.402)	(8.738)
Spatial concentration index	54.983***	55.043***
	(4.915)	(6.353)
Av. house prices at grant	-14.969***	-58.538***
	(5.806)	(7.573)
Change in market house prices	7.952***	7.420***
	(0.171)	(0.156)
Change in construction labour cost	4.331***	4.319***
	(0.097)	(0.096)
Change in interest rate	50.381***	68.016***
	(1.405)	(1.448)
Change in local unemployment rate	-50.589***	-53.693***
	(1.215)	(1.244)
Period: COVID-19	86.064***	
	(3.678)	
Period: 2022–2024	42.073***	
	(4.163)	
Observations	36,818	36,818
Pseudo R-squared	0.539	0.561
Fixed effect	LA	LEA & year

Robust standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1

Source: Authors' estimates from combined BCMS-NPAD-ABP dataset.

Table 6: Number of days grant to commence for multi-unit developments: Poisson regression marginal effect

	(1) All notices	(2) All notices	(3) First notice	(4) First notice
Appeal dummy	25.418***	20.788**	21.396*	13.592
	(9.322)	(9.131)	(11.210)	(10.474)
SHD dummy	1.672	-10.405	19.759	3.996
	(12.144)	(12.543)	(18.789)	(19.262)
LRD dummy	-202.062***	-126.155***	-118.242**	-45.850
	(37.357)	(36.626)	(50.208)	(50.370)
Public development dummy	-58.442***	-29.477	-36.339	-19.195
	(20.168)	(25.063)	(22.903)	(25.259)
Development type: mixed use	50.105**	32.637*	46.124**	29.885
	(19.929)	(19.323)	(22.889)	(21.664)
Development type: apartments	6.360	4.047	17.427	17.292
	(9.778)	(9.623)	(12.550)	(11.918)
Protected structure dummy	-15.767	-22.844	-11.697	-10.190
	(15.920)	(16.009)	(18.452)	(17.642)
Land use: residential	35.255***	35.958***	24.216***	26.000***
	(7.183)	(6.766)	(8.712)	(8.258)
Land use: brownfield	32.207**	34.938***	40.477**	53.506***
	(12.902)	(13.288)	(17.022)	(17.467)
Urban area dummy	-43.137**		-22.367	
	(21.823)		(25.632)	
Developer type: listed	-49.037***	-29.394*	-37.970	-35.786
	(16.772)	(17.778)	(25.002)	(26.836)
Developer type: institutional	-4.714	-6.208	41.012	42.766
	(16.441)	(18.871)	(34.355)	(35.015)
Developer type: family-owned	7.177	-2.085	-11.525	-28.074
	(13.928)	(14.042)	(20.320)	(20.859)
Contractor dummy	50.003***	33.980***	33.181***	27.335**
	(7.817)	(7.839)	(11.306)	(10.814)
Spatial concentration index	-15.834**	-34.201***	-2.966	-14.560
	(7.657)	(8.360)	(8.196)	(9.242)
Av. house prices at grant	3.109	-109.088***	-27.474	-101.472***
	(16.623)	(22.014)	(19.036)	(23.949)
Change in market house prices	13.876***	13.317***	11.539***	11.163***
	(0.592)	(0.404)	(0.787)	(0.493)
Change in construction labour cost	7.037***	6.703***	6.406***	6.214***
	(0.250)	(0.224)	(0.325)	(0.285)
Change in interest rate	44.784***	87.708***	56.340***	86.570***
	(3.740)	(4.130)	(4.658)	(4.542)
Change in local unemployment rate	-45.616***	-48.711***	-43.443***	-48.077***
	(3.255)	(2.766)	(4.587)	(3.486)
Commencement: 2nd	80.529***	73.124***		
	(8.614)	(7.389)		
Commencement: 3rd	131.862***	115.181***		
	(11.094)	(10.304)		
Commencement: 4th	138.540***	131.174***		
	(13.873)	(12.562)		
Commencement: 5th or later	145.529***	129.972***		
	(10.892)	(10.294)		
Period: COVID-19	224.442***		180.700***	
	(10.847)		(12.596)	
Period: 2022–2024	120.720***		89.778***	
	(12.529)		(14.587)	
Units in phase	0.531***	0.654***		
	(0.150)	(0.153)		
Total units			0.019	0.101
			(0.097)	(0.096)
Observations	9,064	9,064	5,416	5,416
Pseudo R-squared	0.617	0.654	0.597	0.632
Fixed effect	LA	LEA & year	LA	LEA & year

Robust standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1

Source: Authors' estimates from combined BCMS-NPAD-ABP dataset.

5.4 Heterogeneity within multi-unit group

In previous sections, we split the sample into single-unit developments and developments that had two or more units. However, this multi-unit group is still a very diverse mix of developments, that's why, in this section, we split the group further. First, we split the developments that are predominantly houses (where houses account for more than half of the units) vs. developments with predominantly apartments (apartments are half or more of the units). Second, we use an alternative split based on the total number of units in the development project, using 50 units as a threshold.

Results in Table 7 show the split-sample regression results for the duration from application receipt to grant, corresponding to model 2 in Table 4. A couple of notable differences emerge. First the SHD effects appear to have been focused on larger developments including more apartments, while the LRD effects are more impactful for house-dominated developments and larger developments (greater than 50 units). Listed developers had shorter grant durations for housing developments and for projects with fewer than 50 units. It is possible that the smaller developments or those with housing are less complex to evaluate than larger or apartment-dominated developments.

Finally, Table 8 show the split-sample regression results for the duration from grant to commencement, corresponding to model 4 (first notice) in Table 6. A number of interesting findings emerge from these heterogeneous effects. First, housing-dominated developments and those with fewer than 50 units are more sensitive to the unemployment rate than larger developments and those dominated by apartments. This is potentially due to the capital-labour ratio for these types of developments and potentially an absence of economies of scale for smaller developments.

Differences also emerge in terms of financing conditions. Apartment-dominated and smaller developments appear to be more sensitive to interest rates. This may be due to the specific capital structure of apartments, which relies on global capital financing and is therefore sensitive to international financing costs. Smaller developments are also likely to be more bank-dependent than larger developments which could have more non-bank finance in their activities.

Table 7: Received to grant of multi-unit developments, sample splits

	By composition		By size	
	(1) More apts.	(2) More houses	(3) ≤50 units	(4) >50 units
Request of information dummy	68.931***	51.623***	54.309***	42.609***
	(8.161)	(2.843)	(2.828)	(7.828)
Appeal dummy	125.117***	127.047***	125.661***	111.760***
	(8.607)	(3.990)	(3.883)	(8.451)
SHD dummy	-34.844**	-26.842	-35.205	-33.762**
	(14.884)	(16.638)	(33.215)	(14.502)
LRD dummy	33.792	-92.371***	-18.334	-111.208***
	(38.595)	(15.091)	(32.676)	(21.918)
Public development dummy	-81.328***	-27.065**	-57.362***	-21.907
	(28.318)	(12.889)	(16.532)	(24.477)
Development type: mixed use	11.030	23.115	4.033	14.910
	(11.778)	(23.994)	(7.516)	(20.165)
Development type: apartments	7.551	-8.978	-5.670	-3.365
	(9.954)	(7.150)	(4.295)	(10.118)
Protected structure dummy	7.821	12.505*	9.648	5.440
	(9.398)	(7.307)	(6.104)	(14.005)
Land use: residential	32.082**	11.308***	8.974***	18.487**
	(12.883)	(3.031)	(3.113)	(7.805)
Land use: brownfield	23.690	-9.379	-1.095	-17.298
	(16.665)	(7.274)	(6.958)	(14.577)
Developer type: listed	37.173	-24.534**	-28.236*	5.216
	(24.363)	(9.673)	(15.693)	(13.328)
Developer type: institutional	-5.595	-16.414	5.287	-26.822*
	(21.182)	(16.682)	(24.721)	(15.811)
Developer type: family-owned	7.986	4.070	-19.706**	31.671***
	(12.218)	(8.331)	(8.194)	(10.927)
Contractor dummy	-7.530	2.505	-2.353	-11.389
	(8.171)	(4.434)	(4.457)	(7.132)
Total units	0.091	0.517***	2.033***	0.043
	(0.060)	(0.086)	(0.189)	(0.056)
Observations	778	4,779	4,738	797
Pseudo R-squared	0.498	0.390	0.401	0.552
Fixed effect	LEA & year	LEA & year	LEA & year	LEA & year

Robust standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1

Source: Authors' estimates from combined BCMS-NPAD-ABP dataset.

Table 8: Grant to commence of multi-unit developments, sample splits

	By composition		By size	
	(1) More apts.	(2) More houses	(3) ≤50 units	(4) >50 units
Appeal dummy	-38.923	23.831**	11.070	-30.847
	(23.791)	(11.590)	(12.211)	(36.945)
SHD dummy	-28.765	17.996	12.735	-14.989
	(34.177)	(24.602)	(29.679)	(34.571)
LRD dummy	-239.839*	-23.948	-78.782	-108.080
	(130.260)	(56.213)	(67.433)	(89.047)
Public development dummy	-30.427	-15.977	-8.695	-38.891
	(53.788)	(28.397)	(31.050)	(55.192)
Development type: mixed use	53.058	70.784	24.137	79.693*
	(36.517)	(79.029)	(26.700)	(44.832)
Development type: apartments	-1.543	59.616***	11.264	77.188**
	(31.041)	(21.060)	(13.620)	(37.990)
Protected structure dummy	-10.876	5.480	-5.131	-57.333
	(27.811)	(22.237)	(20.034)	(45.183)
Land use: residential	-41.806	30.576***	23.915**	24.490
	(34.703)	(8.431)	(10.055)	(33.048)
Land use: brownfield	-48.605	64.837***	50.097**	32.408
	(41.393)	(23.196)	(22.215)	(36.514)
Developer type: listed	-44.711	-43.200	-19.632	-43.905
	(50.210)	(32.597)	(41.009)	(39.847)
Developer type: institutional	82.315	22.297	67.693	95.880
	(53.805)	(48.198)	(46.108)	(66.419)
Developer type: family-owned	38.458	-58.199**	-21.060	-36.033
	(41.811)	(23.195)	(26.476)	(40.604)
Contractor dummy	33.005	27.301**	22.973*	45.974*
	(24.280)	(12.167)	(12.777)	(26.842)
Spatial concentration index	-17.073	-14.929	-27.704**	-15.593
	(22.257)	(10.085)	(10.951)	(28.445)
Av. house prices at grant	-173.223***	-77.297***	-96.516***	-145.040
	(64.384)	(25.573)	(27.159)	(95.913)
Change in market house prices	12.452***	11.265***	11.084***	14.193***
	(1.184)	(0.506)	(0.575)	(1.666)
Change in construction labour cost	6.903***	6.090***	6.162***	6.308***
	(0.803)	(0.307)	(0.336)	(0.842)
Change in interest rate	101.189***	85.200***	95.460***	60.413***
	(11.560)	(5.041)	(5.587)	(13.363)
Change in local unemployment rate	-27.039***	-49.338***	-52.442***	-27.259**
	(7.932)	(3.709)	(4.074)	(10.618)
Total units	-0.067	0.268**	0.033	-0.009
	(0.145)	(0.128)	(0.171)	(0.150)
Observations	787	4,601	4,016	415
Pseudo R-squared	0.643	0.647	0.639	0.735
Fixed effect	LEA & year	LEA & year	LEA & year	LEA & year

Robust standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1

Source: Authors' estimates from combined BCMS-NPAD-ABP dataset.

6 Conclusions

The aim of this paper is to explore the factors that might contribute to housing supply constraints in Ireland. A number of findings emerge from our analysis. First, when looking at the timelines for both planning stage and activation phase, we observe that the activation phase is much longer than the planning phase, and at the same time more varied with a longer tail in the distribution. This indicates that the time to commencement can be substantial for some projects which have already received planning permission. Furthermore, planning times have remained relatively stable over the observed period while the activation durations have nearly doubled in length between 2017 and 2024.

Using regression analysis, we examine the impact of key factors on each stage of the process. Starting with the planning stage, we examine the differences between single-unit housing and multi-unit developments. There are likely to be varying extents to which economic and institutional factors impact individuals undertaking single-unit builds relative to the producers of multi-unit housing.

In the case of single-unit dwellings, the length of time is influenced by appeals to the planning board in a statistically significant manner; an appeal typically adds an extra 83 days to the approval process. Requests for further information that local authorities may issue on an application add, on average, 40 extra days to the planning process. For multi-unit developments, requests for further information add 50-60 days, and the appeal process adds well over 100 days. We also find that site characteristics and the surrounding built environment play a role. Developments involving protected structures as well as in urban areas face longer timelines. For large multi-unit housing specifically, we find that SHD and LRD schemes are associated with shorter timeframes. However, it must be noted that, in particular for the SHD applications, a large number of these developments entered into judicial review, causing substantial delays. This is not captured in these data. Therefore, this likely overestimates the reduction in the timelines and the benefits of this scheme which has now been reformed. Indeed, this was one of the reasons why the LRD process replaced the SHD scheme, with the aim of reducing judicial reviews. Another finding regarding multi-unit developments is that, compared to greenfield sites, sites on previously developed land take longer to receive permission, taking 11 days more on average.

In the activation phase, we look at what affects the time it takes to start building, for both single-unit housing and multi-unit developments. For single-unit housing, we find that those applications with an appeal also have longer durations in the commencement phase, suggesting a spillover effect beyond the specific planning application phase. In these cases, commencement times are approximately 60 days longer. We find that single-unit housing is positively impacted by high spatial concentration which may be driven by a lack of local capacity if activity in an area is high. Economic and financial conditions also matter. Areas with higher house prices are more likely to see faster activation, however, rising house prices are linked to slower activation. The impact of interest rates is also substantial: a one percentage point increase leads to 50-68 additional days. On the other hand, time to commencement also depends on the level of economic activity and capacity constraints. A one percentage point increase in the unemployment rate shortens activation duration by 53 days. This suggests that reduced pressure on construction capacity can help shorten the time to the first activity of building. It must be noted that single-unit housing in Ireland is mostly characterised as individual one-off builds, where households are building a dwelling for residential use. It is therefore likely that the factors that impact this housing (such as macroeconomic and financing factors) are likely to differ from those for the broader construction industry. For example, financing availability is likely linked to the mortgage market rather than firm financing conditions. Therefore we would expect these covariates to have different impacts for single-unit housing compared with multi-unit housing.

We can observe similar trends in multi-unit developments; however the effects are often more pronounced. Notably, multi-unit projects are more sensitive to the change in interest rates: a one percentage point increase adds 46-89 days. Development characteristics also play a role. In particular, we find that developments containing apartments take up to approximately 17 days longer to commence, on average. This reflects the greater risk involved in delivering apartment-based housing. Interestingly, we observe a possible ”rush to market” effect, whereby a higher level of activity in surrounding areas is associated with a shorter time to activation. This means that active construction in an area encourages more building as developers seek to capitalise. However, at the same time, there is evidence of strategic behaviour among developers, as shown by the finding that an increase in market house prices adds more days to the timeline. A one percentage point increase in market house prices adds

approximately 11 additional days to the activation duration. This indicates that some developers may intentionally postpone construction to take advantage of expected future price gains, which is also discussed in Leishman (2015) and Murray (2020).

There are a number of implications of our research for policy. Across all specifications, the evidence suggests that the cost to finance is critically important. Targeted policies to lower the cost of finance are therefore likely to facilitate production by reducing the time required to commence construction. In addition, it may be important to support the commencement of developments that contain apartments, as these have come through in our analysis as having notably longer timeframes to commencement.

The issue of the viability, or profitability, of developments is, of course, a considerable factor in determining the timelines around whether developments go ahead. In Ireland, multiple industry studies have highlighted the rise on the cost side in recent years relative to house prices which is compressing viability and lowering the rate at which production is taking place. While we do not have direct data on each projects cost structure (which would be best to assess viability), we have included cost factors covering labour costs, materials costs, and interest rates as well as house prices to attempt to control for viability challenges. Future research could attempt to directly measure viability and its impact on supply if data on project-level costs and returns become available.

A further finding that clearly comes through in our research is that structural policies should aim to increase construction sector capacity, particularly by expanding the labour force capacity, lowering labour costs, and also improving supporting infrastructure. Policies aimed at expanding the labour force capacity might include training and upskilling, attracting workers from abroad, or retaining and re-engaging the existing workforce.

Furthermore, our research has shown that appeals to the planning commission and requests for additional information add time to the process. While appeals and information requests are part of the process to ensure that economic welfare is not affected by poor planning outcomes, there is a time cost from an economic perspective when these processes are elongated. Reforms that can ensure good planning outcomes but shorten the timeframe around the processes are likely to lower uncertainty and the time cost associated with projects. It must also be noted that the dataset under evaluation covers a period

in Ireland with considerable resourcing challenges in the planning system and with the planning commission. Indeed, during the period of our dataset, the planning commission was reformed from An Bord Pleanala to An Coimisium Pleanala as noted in this draft. These changes, and the challenges prior to reform, are likely to have impacted the processing of applications in our analysis window.

There are a number of potential future research avenues that arise from our research. First, we do not have data at the site level which would allow us to explore viability. Bridging this data gap in future research could potentially add considerable understanding to the economics of the development process. Second, if data were available on land transactions this could help explain the time between planning and commencement, for example, if the site changed hands. Third, this research has only looked at the duration from planning to the constructions' commencement. Due to a lack of sufficient data, we do not know the construction timelines; exploring that final phase is an important a component in the housing supply chain. Adding these data would be useful going forward. While our data consider only the projects that commenced, it would also be extremely useful in future research to focus on those projects which gained planning permission but did not commence. For example, if applying for and gaining planning permission can be a process undertaken to improve the value of a parcel of land. There may even be no immediate or medium-term intent to develop the land and this has implications for the analysis focused on the interval between planning consent and commencement.

From the perspective of appeals and litigation, one aspect that was not considered in this paper was that of judicial reviews. These have been used in increasing numbers in recent years. In particular, reform around judicial reviews is a central part of the Irish Government "Accelerating Infrastructure Taskforce" report. The report highlights a number of proposals which aim at simplifying the judicial review process. Indeed, these proposals target reforms that seek to "reduce incentives for excessive litigation, clarify rules on standing and remedies, and introduce fast-track pathways for nationally significant projects that are in the common good through the development of new legislation."

From our perspective, no national register of judicial reviews is available and therefore there is a data challenge in compiling an accurate and verifiable record of those activities that were taken to judicial review. Compiling such a record is

likely to be made more practical by using new AI techniques and is a very worthy avenue for future research on this topic. This is especially the case where it can be merged with the existing housing and planning data.

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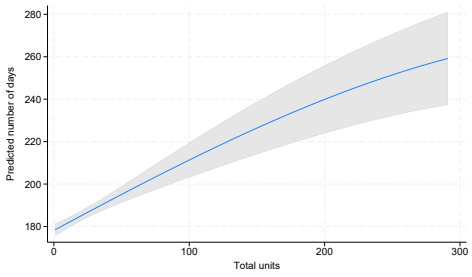
A Appendix

Figure 14: Quadratic term estimates

A. Received to grant



B. Grant to commence

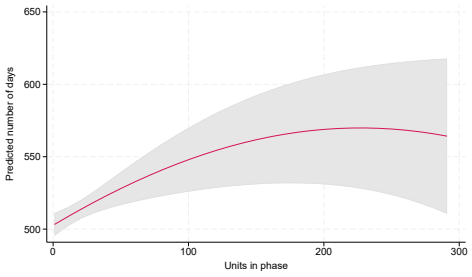


Table 9: CORINE Land use classification

Category	Copernicus CORINE Category	Code
Urban fabric	Continuous urban fabric (S.L. : > 80%)	111
	Discontinuous urban fabric (S.L. : 30 - 80%)	112
Brownfield	Industrial or commercial units and public facilities	121
	Road and rail networks and associated land	122
	Port areas	123
	Airports	124
	Mineral extraction sites	131
	Dump sites	132
	Construction sites	133
	Green urban areas	141
	Sport and leisure facilities	142
Greenfield	Non-irrigated arable land	211
	Permanently irrigated arable land	212
	Rice fields	213
	Vineyards	221
	Fruit tree and berry plantations	222
	Olive groves	223
	Pastures, meadows and other permanent grasslands under agricultural use	231
	Annual crops associated with permanent crops	241
	Complex cultivation patterns	242
	Land principally occupied by agriculture, with significant areas of natural vegetation	243
	Agro-forestry areas	244
	Broad-leaved forest	311
	Coniferous forest	312
	Mixed forest	313
	Natural grassland	321
	Moors and heathland	322
	Sclerophyllous vegetation	323
	Transitional woodland/shrub	324
	Beaches, dunes, and sand plains	331
	Bare rock	332
	Sparsely vegetated areas	333
	Burnt areas	334
	Glaciers and perpetual snow	335
	Inland marshes	411
	Peatbogs	412
	Salt marshes	421
	Salines	422
	Intertidal flats	423
	Water courses	511
	Water bodies	512
	Coastal lagoons	521
	Estuaries	522
	Sea and ocean	523