# Time is money: How landbanking constrains housing supply
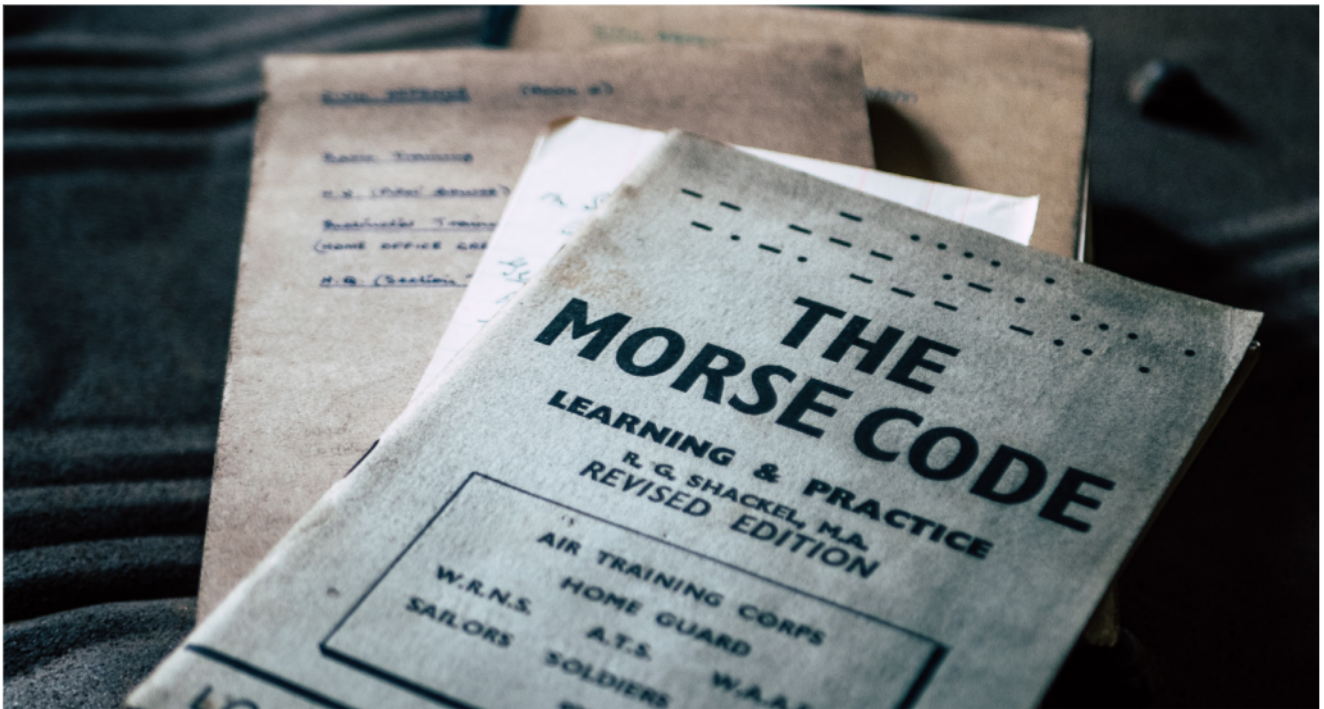
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## Abstract

Landbanking (land hoarding), where land able to be profitably developed for housing is withheld from development for future gains, undermines housing policies that aim to increase supply and reduce prices through rezoning.

We shed light on the problems with the static economic models of housing supply that inform these policies by looking at the degree to which landbanking behaviour is consistent with the predictions of these models. A new dataset of home sales and landbanks from the annual reports of Australia's publicly-listed residential developers, and complete state-level planning approvals and lot production data in Queensland, Australia, are used.

In contrast to the static model prediction that landbanks function as inventories, and are hence minimised, we find that (1) over 200,000 housing lots, or 13 years of new supply, are held in landbanks owned by developers, that (2) nine years of landbanks are held in housing subdivisions that are approved and already for sale, meaning planning delays are not the reason landbanks are held, that (3) the total zoned supply in a region is unrelated to the rate of new housing supply, and (4) that housing developers routinely delay housing production to capitalise on market cycles.

A dynamic model that accounts for capital gains of undeveloped land, including an option premium, is consistent with these empirical patterns. In this dynamic model there is an incentive to delay development when prices are rising to earn landbank value gains, which includes the value of the option to develop to higher densities.

## Introduction

Economic analysis of rapid housing price growth often leads to the conclusion that planning regulations are to blame, as they are thought to constrain the rate of new housing supply. This `planning constrains supply' story has motivated

policies aimed at reducing home prices by relaxing planning controls over the density, design and location of new housing. For example, the New South Wales government holds the view that "[n]ew tools for rezoning will... unblock housing and employment supply" (NSW Government, 2013), while the Australian government established a National Housing Supply Council (NHSC) in 2008 to focus on "planning and development approval arrangements" to solve a "deficiency in supply [that] has contributed to rising house prices" NHSC (2013).

But such policies never seem able to stop rapid home price growth, even in cities and countries widely claimed to have supply-friendly planning regulations (Costello & Rowley, 2010; Gurran & Phibbs, 2013). For example, Houston, Texas, is widely known for its unrestrictive zoning and responsive supply yet home prices increased 49% from 2012 to 2018 (U.S. Federal Housing Finance Agency, 2019). After the 2000s home price boom some prominent urban economists noted that "the fact that highly elastic places had price booms is one of the strange facts about the recent price explosion" (Glaeser et al. , 2008).

We argue that such policy failures occur because they are based on static economic models of production that ignore important dynamic incentives that drive new housing supply. This leaves few explanations for rapid price increases other than that `planning constrains supply'. In static models, new housing is produced from land and construction inputs if its rental price exceeds its input cost, or $r > (l + c)i$, where $r$ is the rental price of a home, $l$ is the price of the land input, $c$ is the construction cost, and $i$ is the interest rate. All potential homes where rents (or prices) satisfy this condition are produced instantly. Subsequently, if rents (or prices) rise sufficiently for marginally unprofitable development locations to become profitable according to this supply condition, then these locations will also be immediately used for housing.

If the regulatory costs of new housing can be reduced, such as by lowering impact fees (reducing total development cost), or by relaxing density restrictions such as minimum lot sizes, or floor-area-ratio limits, that allow each dwelling to use less land (reducing land costs), additional profitable development options will be created and immediately taken up. Rezoning areas that were previously unavailable for housing also triggers immediate new supply by creating new locations that satisfy this supply condition. This is why planning controls are thought to be a powerful tool to combat rising home prices - they can create vast amounts of lower-cost housing supply that rapidly shifts prices to a new lower equilibrium.

Our argument against static models of housing supply is informed by an empirical analysis of the stocks of undeveloped land owned by housing developers - their landbank - and the flows of new home production. This allows us to break open the housing production process to see whether the landbanks (if they exist) have the economic function of an inventory, as static models assume. We would therefore expect to see patterns in the landbank data that are consistent with that function.

To explain these empirical findings we offer a simple economic rationale for the high degree of observed landbanking that rests on four elements not included in static models.

First, an increase in the value of land and the additional income from converting land to higher value uses are of equal significance in the profit function, and hence to the development decisions, of developers.

*That is, shareholders are indifferent between growth in the firm's value resulting from asset revaluation and that resulting from retained profit.*

Second, undeveloped land contains a perpetual real option (but not obligation) to develop to the highest and best use. The value of this option is the sale price of the developed property minus construction costs for the highest and best use at the time the option is struck.

Third, the highest and best use may change over time as housing prices change, affecting the value of the option.

*A plot of land with no density constraints might be most profitably developed today with a building of seven storeys, for example, but if local prices were to rise by, say, 30% it may become profitable to develop to ten storeys instead.*

Fourth, striking the option to develop a smaller building today precludes developing a potentially more profitable larger building later.

These elements together mean that housing developers make a key decision about when to build each unit of housing, rather than immediately building every housing subdivision that meets the supply condition. They also imply that housing developers will delay making irreversible housing investments whenever the return from the value growth of undeveloped land is higher than the additional return from development.

The hurdle condition to undertake new supply is also higher than if the only consideration is profit from new home production alone. It also means that the hurdle condition for new supply is positively related to price growth - delaying development when prices are rising increases landbank value and the final sales price of developed property and, if planning constraints are not binding, potentially increases the optimal intensity of development.

## Extent of landbanks

The first prediction of static economic models of housing supply is that landbanks will be minimised as they are costly inventory. Summary statistics for the landbanks held by Australia's top eight publicly-listed residential property developers are in Table 1, with their combined annual sales representing 9% of the 181,000 new homes (detached houses and apartments) built in Australia per year in the period covered by the data (ABS, 2019). These landbanks are the new housing lots (including apartment lots) these companies are able to produce using their currently-owned stock of approvals and residual planned housing. If landbanks are merely inputs into housing production then holding 13 years of current sales (and in some cases as much as 17 years) as inventory makes little sense. However,

this degree of landbanking is similar to comparable large-scale housing developers in the United Kingdom which have around six year's land supply approved, and another six year's worth of `strategic land banks' on their balance sheets (Jeffreys, 2016).

Table 1: Listed developer residential sales and land bank

| Developer | Data range | Average sales | Average landbank | s |
|---|---|---|---|---|
| FKP | 2009-2013 | 463 | 6,529 | |
| Sunland | 2007-2018 | 644 | 4,857 | |
| Villaworld | 2005-2018 | 849 | 5,334 | |
| Mirvac | 2003-2018 | 2,332 | 26,379 | |
| Frasers/Australand | 2003-2018 | 2,575 | 17,658 | |
| PEET | 2007-2018 | 2,623 | 44,457 | |
| Lendlease | 2001-2018 | 2,960 | 46,032 | |
| Stockland | 2002-2018 | 5,053 | 67,626 | |
| Mean per developer per year | 2001-2018 | 2,464 | 30,744 | |
| Mean total per year | 2004-2018 | 16,633 | 212,945 | |
| Maximum year (total) | 2016 | 22,913 | 252,903 | |

Is it plausible that this is what minimising inventories and maximising the flow of new sales looks like? One could argue that an inventory buyer is necessary due to possible external delays. For example, if it takes two years to get planning approvals on average due to regulatory delays, then holding two year's sales as inventory is necessary - perhaps even three years to provide a buffer against uncertainty. But in Sydney and Melbourne, where over 94% of planning applications made are approved, these approvals typically take three to four months (Gurran & Phibbs, 2014, pp.237-238).

In Queensland, most councils have a fast-tracked process that guarantees a turn-around time of five business days for applications with 10 or fewer housing lots, which is used for 20% of planning applications in Brisbane (Brisbane City Council, 2018). Even exceptionally large housing developments in Queensland are usually approved quickly. Stockland's Caloundra South project, which is expected to produce over 20,000 dwellings alongside numerous retail and commercial lots over a 25-35 year period, gained high-level planning approval in 12 months (Allen, 2011). Planning delays at best explain two or three years of inventory. They cannot explain 13 years of supply held in landbanks.

This data implies that private landbanks are extremely large because of the private decisions of development companies themselves, rather

than because of regulatory decisions. However, such decisions would be financially irresponsible to company shareholders unless landbanks make an economic return without being developed into housing. When reporting to shareholders, landbanks are in fact described as capital investments rather than inventory. For example, the second largest housing development company in Australia, Lendlease, explained to investors that it holds their extensive landbank as an investment in capital efficient structures while it delays converting these land holdings into new housing.

...the Group has a further estimated $44.4 billion of secured urbanisation pipeline representing an estimated 25,917 apartment units and 1,516,000 sqm of commercial space. These projects are typically held in capital efficient structures, providing the Group with flexibility around delivery and timing, in line with market cycles. The pipeline supports our target of delivering 1,000 to 2,000 apartment units per annum and commencing two to three commercial buildings per annum. (Lendlease, 2018, p.75)

The Communities pipeline consists of an estimated 52,333 lots. With an annual target of 3,000 to 4,000 completions, more than a decade of supply has already been secured. The development pipeline provides long term earnings visibility and the flexibility to be both disciplined and patient with the pursuit of future opportunities (Lendlease, 2018, p.76)

Notice that they plan not to develop most of their landback for many decades as they want to be flexible and patient, instead, targeting a minimal rate of conversion of land to new housing of just "1,000 to 2,000 apartments per annum" and "3,000 to 4,000 completions". We can contrast the statements made to investors with comments made to the media by these same developers. For example, Stockland, Australia's largest residential developer, describes landbanks as costly inventory they are forced to hold due to regulatory delays.

Developer Stockland said it has endeavoured to bring projects onto the market as quickly as it can clear complex approval processes, often through multiple local, state and federal authorities. "It is costly and inefficient for developers to hold inactive land," Stockland residential chief executive Andrew Whitson said (Tan, 2016).

Yet Stockland's annual reports show that for the three years before this statement they held 52,057 lots in projects that were zoned for housing but

not yet for sale because of their own decisions to delay planning applications and sales. They also reported to investors their plan to sell just 300-900 new housing lots per year from their approved Caloundra South project that contains over 20,000 lots (Allen, 2011). The national lobby group for developers also puts out public messaging that developers are building as fast as possible, contradicting what these companies tell their investors.

Developers aren't in the business of land banking so that they can make a super profit in the future. All of the developers who are listed want to get that land onto the market as quickly as possible... They want to produce as much supply as possible, but the whole system is rigged against that (Verwer, 2013).

*The fact that landbanks are so extensive, that developers report to investors that they hold these landbanks for their future returns, and that they value flexibility in the timing of their developments, all suggest that landbanks do not perform the economic function of inventories.*



John Cameron, Unsplash

# Housing developer delaying behaviour

In static economic models of housing supply there are no incentives for housing developers to delay either sales or development. All proposed housing that meets the supply condition and has then gained approval should be sold, then constructed, as rapidly as possible to maximise profits.

Yet a variety of delaying behaviours are routinely observed.

1. The staging of large developments by breaking them down into smaller subdivisions is a common delaying behaviour. Rather than accelerating home production by bringing as much new housing to market as possible, staging slows the rate of new housing supply compared to what is possible

2. Another delaying behaviour concerns gaming sunset clauses on off-the-plan new housing contracts. These contract clauses allow for the developer to pull out of the contract without signicant penalties if the development is unable to be completed by the agreed date.

During periods of rapid price growth, however, developers are instead delaying construction and using these contract clauses to reclaim ownership of the previously sold housing to then re-sell at higher prices.

In an overheated Sydney apartment market, some unscrupulous developers realised that if they pulled their work crews off site for a while, the building wouldn't be nished by the deadline so they could legally tear up the contract and re-sell the near-complete apartments for much higher prices than they'd achieved originally. (Thomson, 2018)

3. Option contracts for site purchases are another common delaying behaviour. These contracts allow developers to secure future development sites with little upfront cost while they delay building housing on those sites. A faster way to secure land for development is to purchase immediately or undertake a joint venture with the previous landowner. For example, the largest residential developer in Australia, Stockland, signed a 31-year option contract in 2010 with a landowner to acquire a property expected to produce 11,500 new dwellings in a number of staged parcels (AAP, 2010). The only rationale for this behaviour is that there is an economic return available from securing access to this land even without building new housing.

4. Reducing sales volumes rather than prices is another delaying tactic, although it is rarely presented as one. If a housing developer is able to supply 5,000 new dwellings per year when prices are rising (i.e. demand for new housing is high), they can also supply 5,000 per year when prices are falling. However, they do not, because it further depresses prices and hence the value of their remaining landbank, forcing write-downs. Instead, they reduce the rate of supply rather than the price in response to declining demand, and often offer non-monetary incentives to buyers, which makes little sense in a static economic model of housing supply. The opposite behaviour is expected if landbanks are inventories prices will be reduced further to clear inventory of bad production decisions. Surveys of housing developers have found that they make economic trade-offs regarding the rate at which they sell and the rate at which they change their prices. A thorough development appraisal undertaken on a cash flow basis will match estimated selling prices to a target sales rate. This involves a trade-off between price and sales speed. To sell new homes faster, prices must be more competitive. Conversely, to achieve maximum possible prices, more time must be allowed to attract purchasers....

*But it appears that the usual practice in the industry is to aim for the maximum possible price and accept a slower rate of sales.*

As a different interviewee remarked: `In a buoyant market, developers are willing to put the prices up as far as they possibly can.' Another aimed `to pitch at maximum price at the start and then use incentives (carpets, white goods etc) if prices need to be reduced.' And yet another directly linked land shortages to price maximisation, commenting that `if you're in an area with little or no new housing, you have a throttle on new product.' (Adams et al. , 2009, p. 303)

5. Renegotiating planning approvals is another way in which developers can delay new housing-supply in order to earn higher returns. If home prices rise quickly after a planning approval is granted, the optimal density of the development may have increased. To capture that higher return requires seeking a new approval for a more dense subdivision.

For example, in 2013 Stockland reported to investors that it had nine inactive residential sub-divisions, with a total potential housing supply of 41,200 lots, that it was delaying for at least four years in order to "improve return prior to launch."

A common thread amongst these behaviours and the comments made in company reports is that investment and production strategies are changed in response to cyclical housing markets. During the 2009 downturn Lendlease noted that they "pursue the best opportunities available at each stage of the property cycle and deliver a higher return on Lend Lease's capital." Near the peak of the recent price cycle, Villaworld in their 2017 results presentation noted that they have a "strategy of seeking consistent, through-the-cycle growth."

Instead of landbanks being inventories, as the models assume, they appear to be capital invest-ments that earn a return even without housing production. So what elements are missing from static models that can better explain the data and the behaviours observed?

There are four necessary changes to the economic story that help make sense of the observed patterns in the data.

1. The increase in the value of land owned is of equal significance in the profit function to any income from converting land to housing.

2. The value of undeveloped land comes from its perpetual option to develop to its highest and best use. Therefore its value is the price when developed into housing minus development costs.

3. Over time this highest and best use changes based on evolving market prices, hence changing the value of the option, which is the value of the land.

4. Striking the option to develop today precludes developing a potentially more profitable subdivi-sion (or apartment building) later.

## Conclusion

The existence of vast landbanks suggests that the economic logic behind relaxing planning controls to increase housing supply and lower home prices is flawed, at least in Australia. This paper has examined patterns of landbanking amongst listed residential developers and the relationships between the zoned planned stock, planning approvals, and new lot production in Queensland.

While observational, these empirical patterns, coupled with the shareholder reporting and survey responses of developers, paint a com-pelling picture that town planning regulations are not the binding constraint on the rate of new housing supply. Only because to the application of inappropriate static economic models has housing supply policy focussed so strongly on planning regulations as a cause of high prices.

A very simple dynamic model of housing supply has been put forward to reconcile these empirical patterns with the economic incentives of landowners. This model recognises important elements of the supply story, such as that unde-veloped land is an investment earning a return from capital growth, which includes an option premium.

_Adding these elements demonstrates that the economic hurdle for a landowner to undertake housing development is much higher than in static theories, and positively related to home price growth - high home price growth creates an incentive for landowners and developers to delay new housing production, rather than increase it._

A better understanding of housing supply dynamics and their interaction with planning reg-ulations is going to rely on clear analysis of the stocks, flows in the housing production process, and most importantly, the timing decisions that govern housing production flows.

Read the full report at:
https://ssrn.com/abstract=3417494