Time is money: How landbanking constrains housing supply

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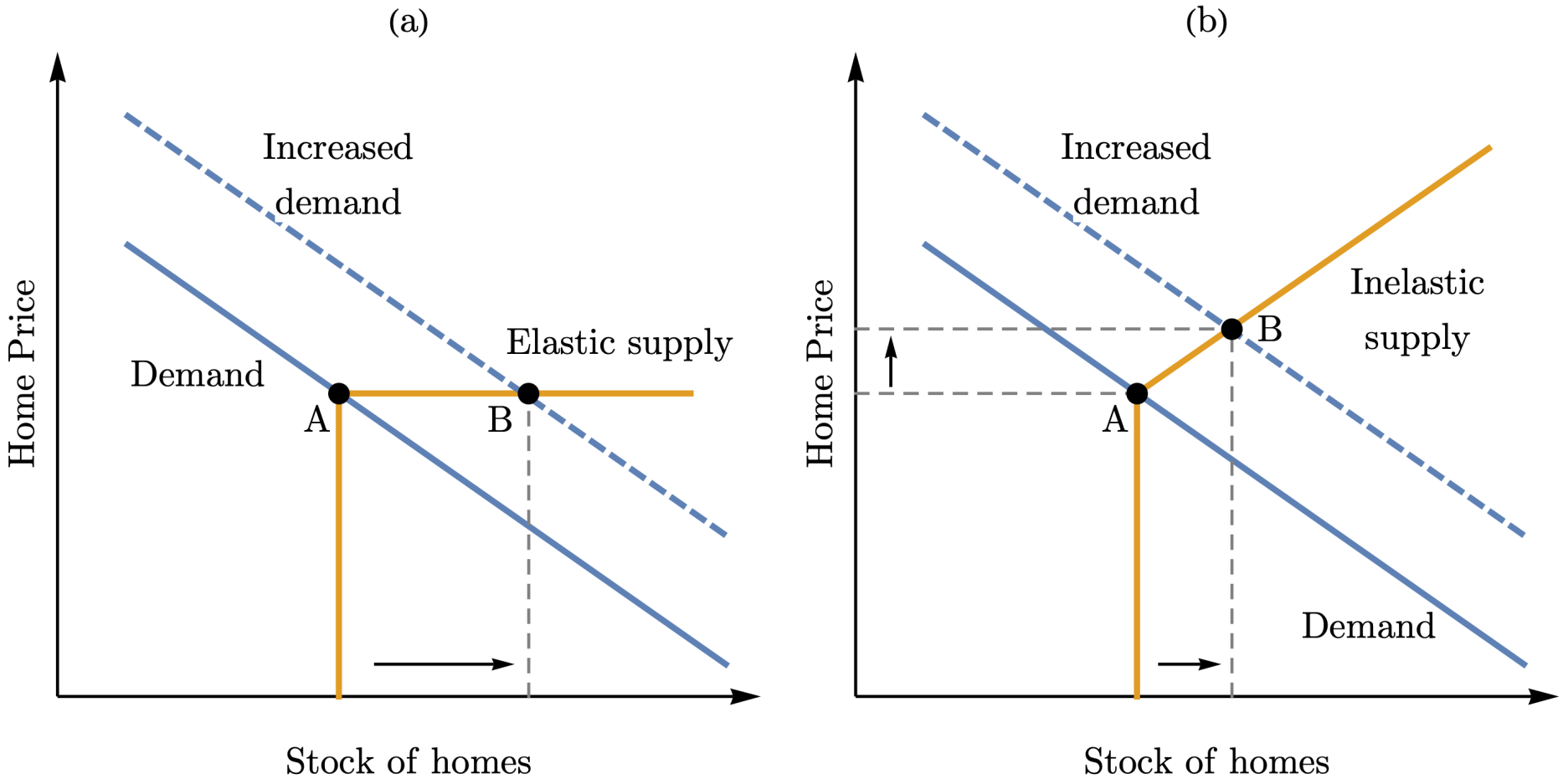
ACE 2019


(a)
Increased
demand
Elastic supply
Demand
A
B
Home Price
Stock of homes
(b)
Increased
demand
Inelastic
supply
B
A
Home Price
Demand
Stock of homes

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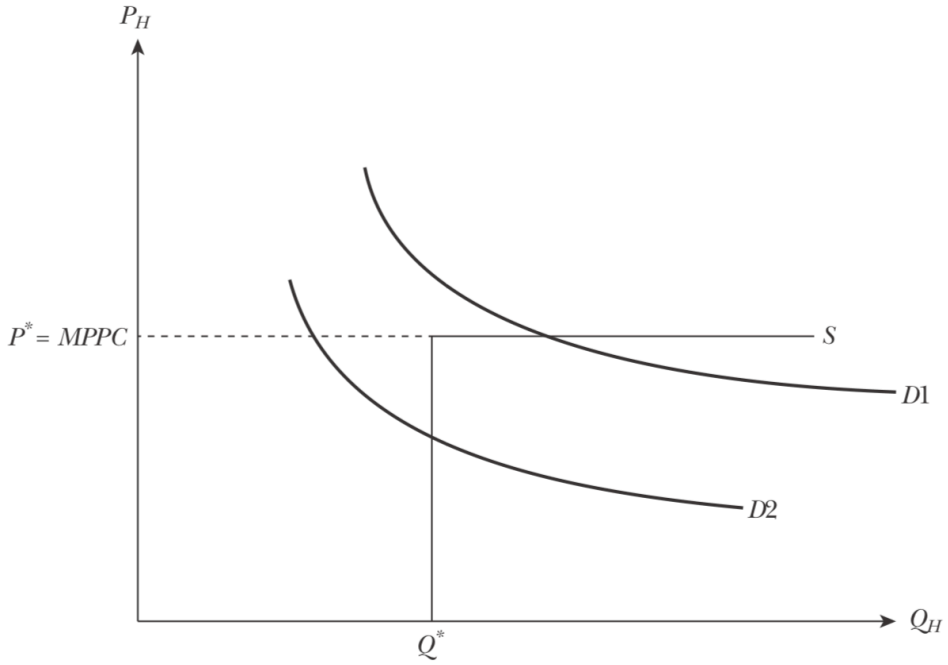
The Economic Implications of Housing Supply

Edward Glaeser and Joseph Gyourko

Figure 1
Kinked Supply Schedule from Durable Housing



What Does It Actually Cost to Supply Homes to the Market?

There are three components to the cost of delivering a unit of housing to the market: 1) the land (L) on which the housing unit sits; 2) construction costs (CC) associated with putting up structure itself; and 3) a rate of entrepreneurial profit (EP) needed to compensate the home builder. Thus, we define the "minimum profitable production cost" (MPPC) of a unit of housing as follows:

$$\text{MPPC} = (\text{L} + \text{CC}) \times \text{EP}.$$

Housing supply

- If $r > (l + c)\ i$ then all possible housing that meets this condition is already constructed.
- l is land input cost, c is development (construction +other) cost, r is rent, and i is the interest rate.
- Comes from the profit function

$\pi = r - (l + c)\ i$

Housing supply

- Lower impact fees reduce development cost.
- Relaxing density restrictions such as minimum lot sizes, or floor-area-ratio limits, allow each dwelling to use less land (reducing land costs).
- Removing planning regulations can therefore create vast amounts of lower-cost housing supply—any new housing opportunities created that meet this supply condition will be immediately taken up.

Landbanks

- In this view landbanks—land that meets the supply condition that is not yet developed—are inventory.
- They are costly to hold for housing developers, and they only hold as much as needed to navigate potentially time-consuming planning controls.

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.

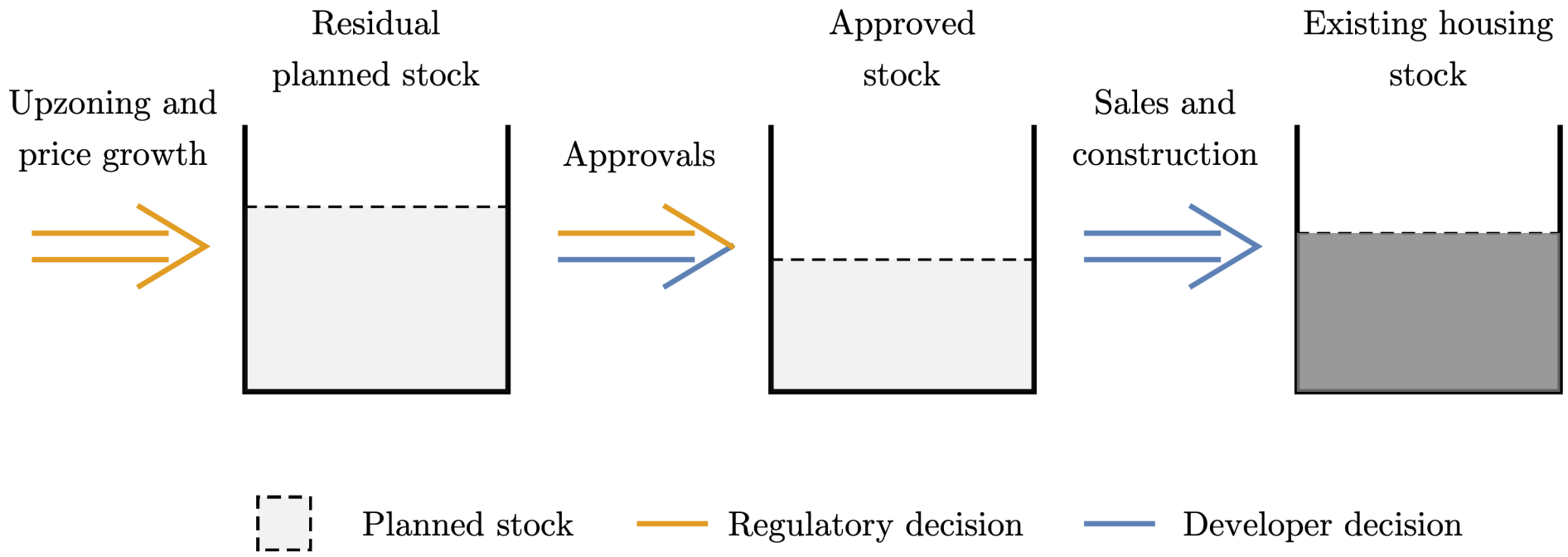
– Peter Verwer, CEO Property Council of Australia, 2013

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.

– Su-Lin Tan, AFR, 2016

Predictions

- Inventories are minimised while the flow of new sales is maximised.
- If large inventories are held, they will only be held prior to any planning approval, and minimised after.
- Increasing the zoned planned stock in a region will increase the rate of new home production.
- Voluntary delays to production are costly and will be rare.


Upzoning and
price growth
Residual
planned stock
Approvals
Approved
stock
Sales and
construction
Existing housing
stock
Planned stock
Regulatory decision
Developer decision

Data

- New database of listed residential developer lot sales (apartments and houses), and landbanks (approved or zoned) from 2003-18.
- Database of all Queensland planning approvals, stock of approvals, lapses, certifications, and estimated housing yield from zoned land. (1998-2018, quarterly, 38 council areas)
- Content of reports to shareholders compared to media comments.

Developer	Data range	Average sales	Average landbank	Years supply
FKP	2009-2013	463	6,529	14
Sunland	2007-2018	644	4,857	8
Villaworld	2005-2018	849	5,334	6
Mirvac	2003-2018	2,332	26,379	11
Frasers/Australand	2003-2018	2,575	17,658	7
PEET	2007-2018	2,623	44,457	17
Lendlease	2001-2018	2,960	46,032	16
Stockland	2002-2018	5,053	67,626	13
Mean per developer per year	2001-2018	2,464	30,744	12
Mean total per year	2004-2018	16,633	212,945	13
Maximum year (total)	2016	22,913	252,903	11

Frasers/Australand excludes 2014 data from the takeover year. Landbank is measured as the number of residential lots (dwellings or land) expected to be built on land controlled by the reporting entity.

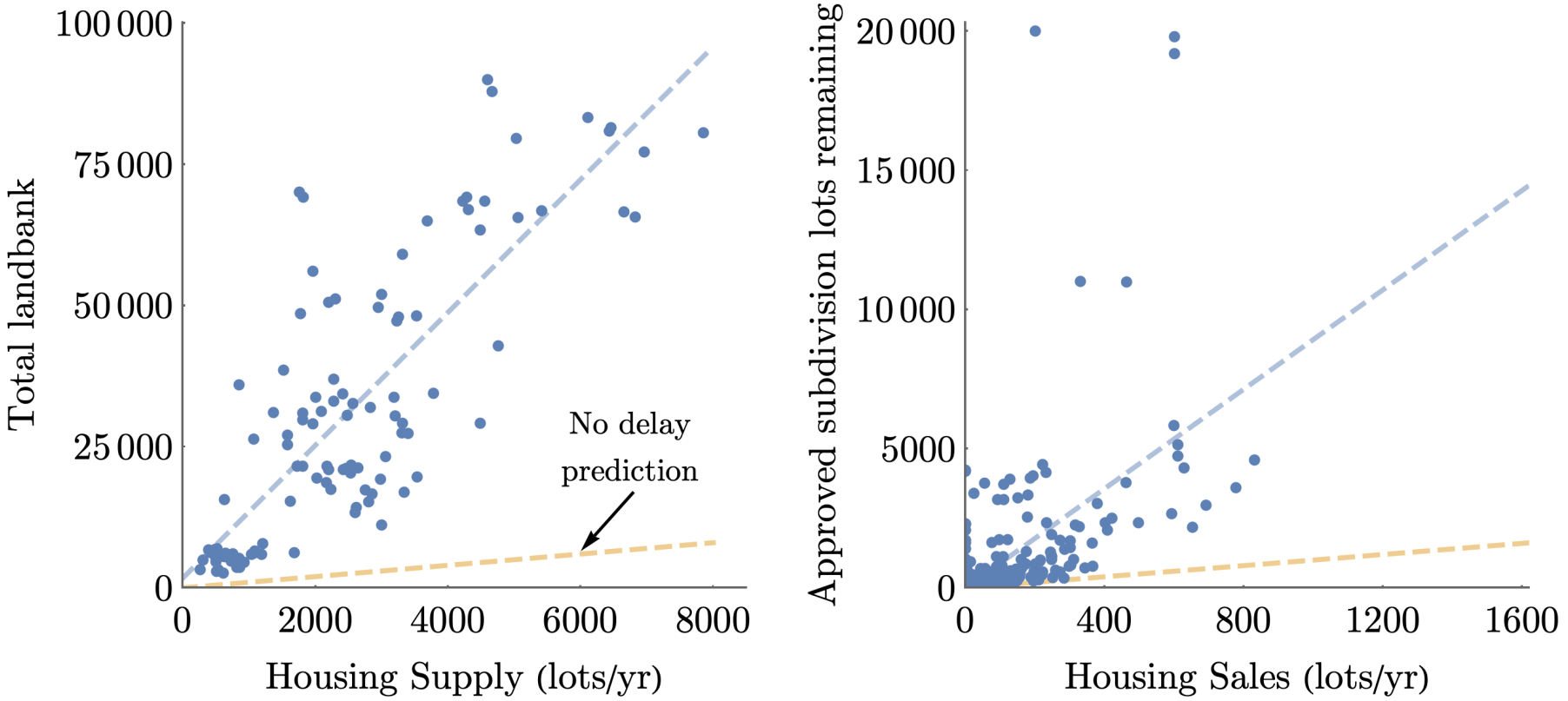
...the Group has a further estimated $44.4 billion of secured urbanisation pipeline representing an estimated 25,917 apartment units...

The pipeline supports our target of delivering 1,000 to 2,000 apartment units per annum

– Lendlease, Annual Report, 2018

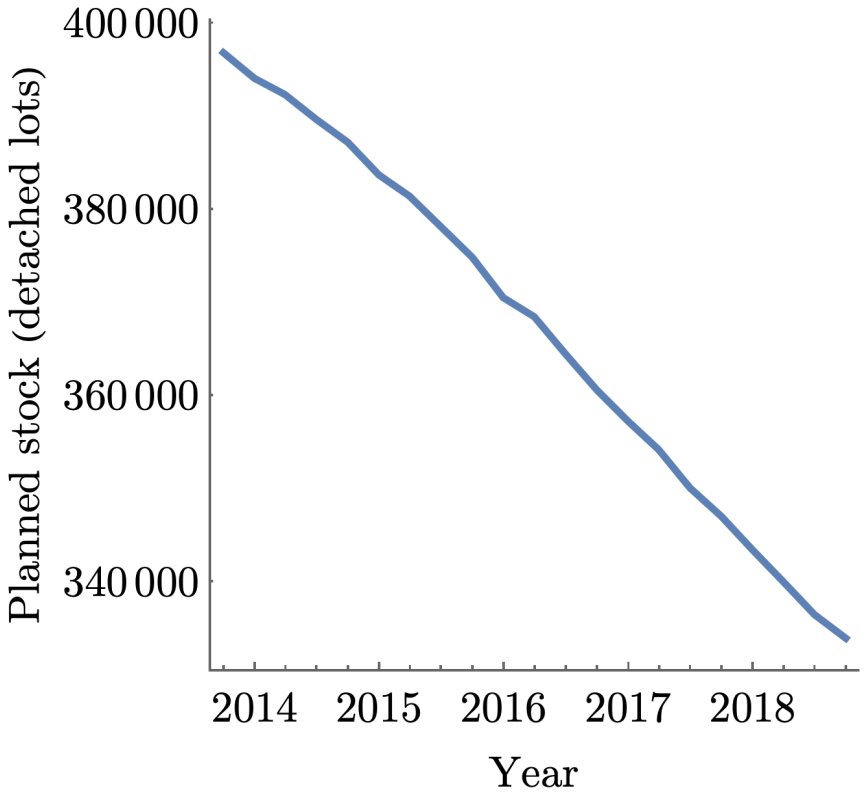
The Communities pipeline consists of an estimated 52,333 lots. With an annual target of 3,000 to 4,000 completions, more than a decade of supply has already been secured. The development pipeline provides long term earnings visibility and the flexibility to be both disciplined and patient with the pursuit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

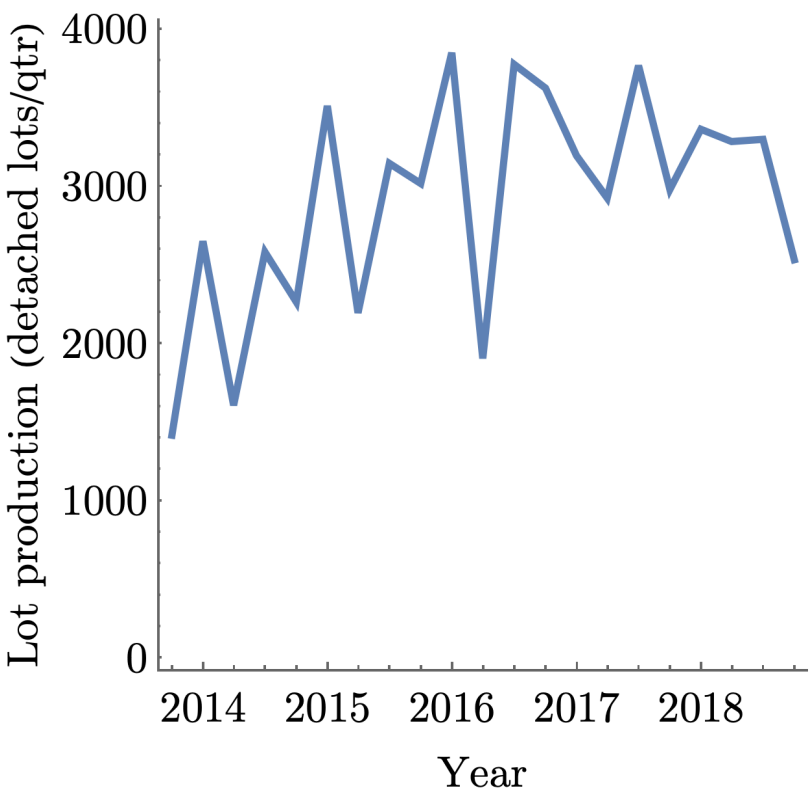
– Lendlease, Annual Report, 2018


Total landbank
100 000
75 000
50 000
25 000
0
0
2000
4000
6000
8000
Housing Supply (lots/yr)
No delay
prediction
Approved subdivision lots remaining
20 000
15 000
10 000
5000
0
0
400
800
1200
1600
Housing Sales (lots/yr)

Development giant Stockland is quietly shopping around one of its best-selling Melbourne residential estates, as it comes under pressure to improve its balance sheet amid the housing slowdown.

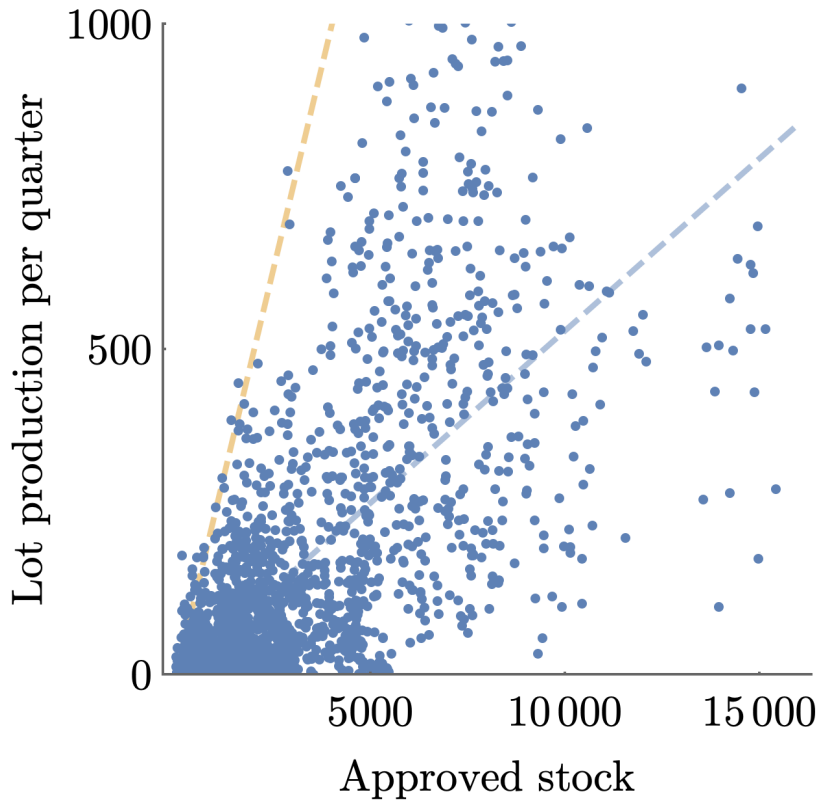
– Larry Schlesinger, AFR, 2018

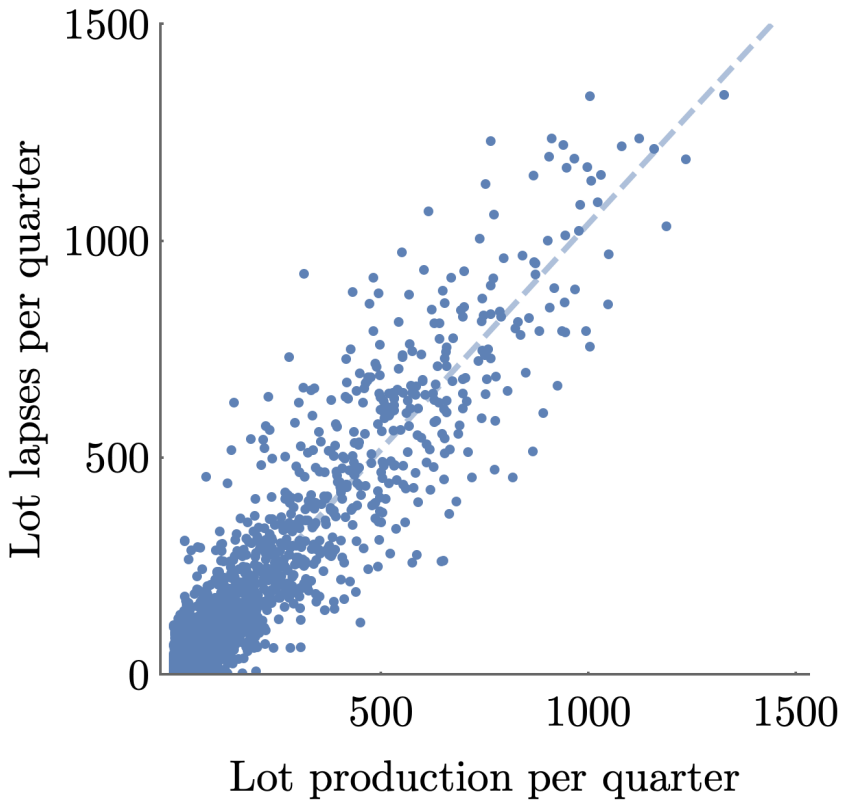

Planned stock (detached lots)
400 000
380 000
360 000
340 000
2014
2015
2016
2017
2018
Year


Lot production (detached lots/qtr)
4000
3000
2000
1000
0
2014
2015
2016
2017
2018
Year

Dependent var:	Detached housing lot production (quarterly)					
Model:	(1)	(2)	(3)	(4)	(5)	(6)
Planned stock	-0.002***	-0.02***	-0.002***	-0.01***	-0.004***	-0.01**
Approved stock			0.01*	0.02	0.02***	0.01
Land price/sqm					0.77***	0.66
Council controls	N	Y	N	Y	N	Y
N	126	126	126	126	126	126
R^2	0.11	0.31	0.13	0.32	0.28	0.33

Notation: * is $p < 0.1$, ** is $p < 0.05$, *** is $p < 0.01$. All Models are: dependent var = $c + \alpha$independent vars + controls + ϵ. Adding year controls made little difference to the direction, size, or significance of these relationships.


1000
500
0
Lot production per quarter
5000
10 000
15 000
Approved stock


1500
1000
500
0
Lot lapses per quarter
500
1000
1500
Lot production per quarter

Dependent var:	Detached housing lot production (quarterly)					
Model:	(1)	(2)	(3)	(4)	(5)	(6)
Approved stock	0.05***	0.15***	0.004***	-0.002	0.04**	-0.002
Lapses			0.82***	0.68***	0.78***	0.66***
Approvals					0.003***	0.03***
Council controls	N	Y	N	Y	N	Y
N	1,811	1,811	1,811	1,811	1,811	1,811
R^2	0.46	0.75	0.86	0.90	0.87	0.90

Notation: * is $p < 0.1$, ** is $p < 0.05$, *** is $p < 0.01$. All Models are: dependent var $= c + \alpha$independent vars $+$ controls $+ \epsilon$. Adding year controls and lagging approvals (from one to four quarters) made little difference to the direction, size, or significance of these relationships.

Delaying

- Staging
- Gaming sunset clauses
- Options contracts for site purchases
- Reducing sale volumes rather than prices
- Renegotiating planning approvals

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 finished 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.

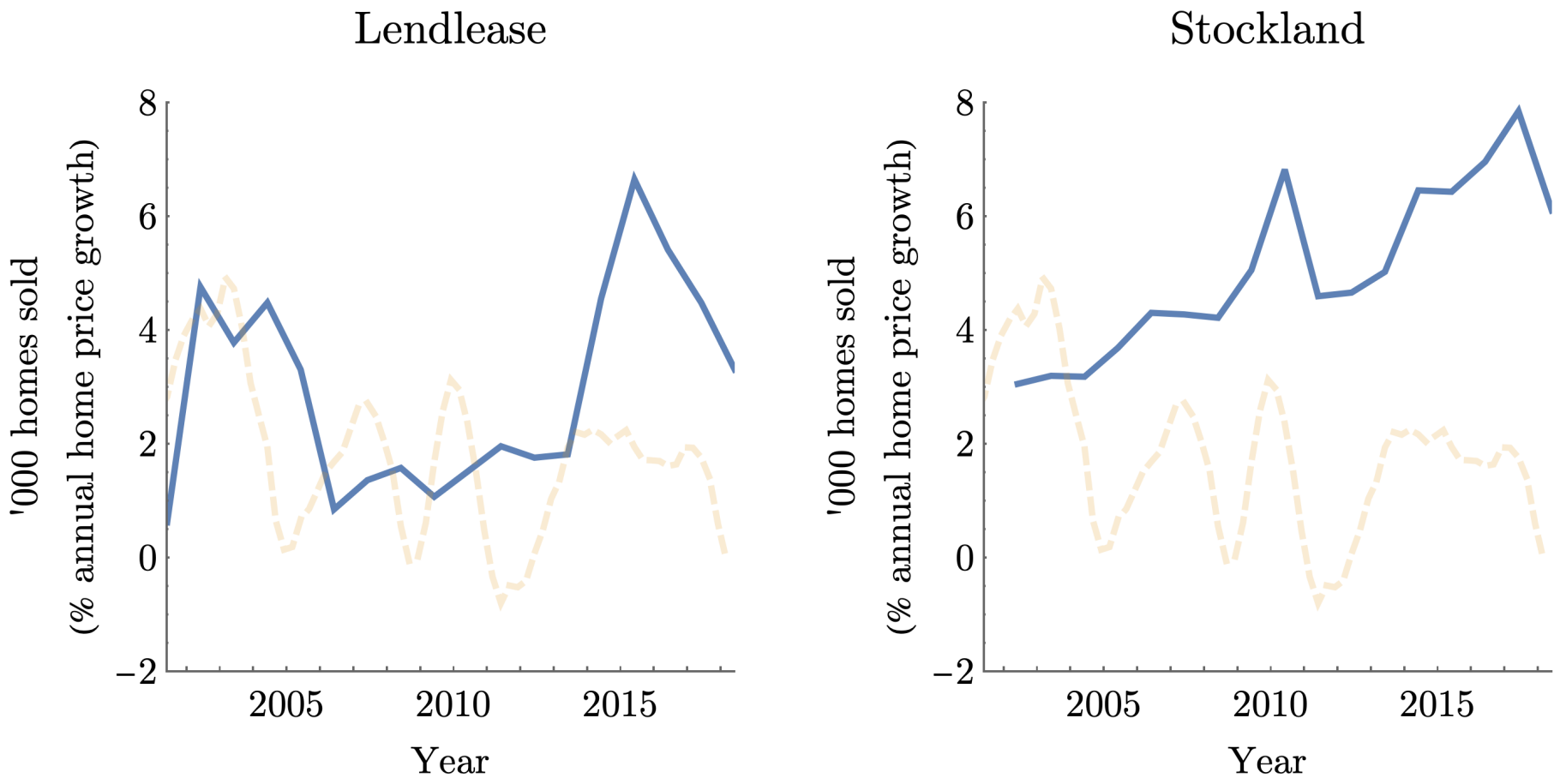
– Jimmy Thomson, AFR, 2018

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.

—Adams et al. 2009


Lendlease
Stockland
'000 homes sold
(% annual home price growth)
8
6
4
2
0
−2
2005
2010
2015
Year

Four elements

- An increase in the value of land owned is equally important to profits from sales.
- The value of undeveloped land is the option value.
- Highest and best use changes with price, hence option value changes.
- Striking the development option precludes delivering a more profitable subdivision later.

Supply condition

- Housing supply only makes sense at a point in time if the total return from combing cash and undeveloped land exceeds the total return of housing.

  Return to housing > return to land + return to cash

  $\boldsymbol{\pi}_R = R_{Ht}$ - $(R_{Lt} + R_{Ct})$

Supply condition

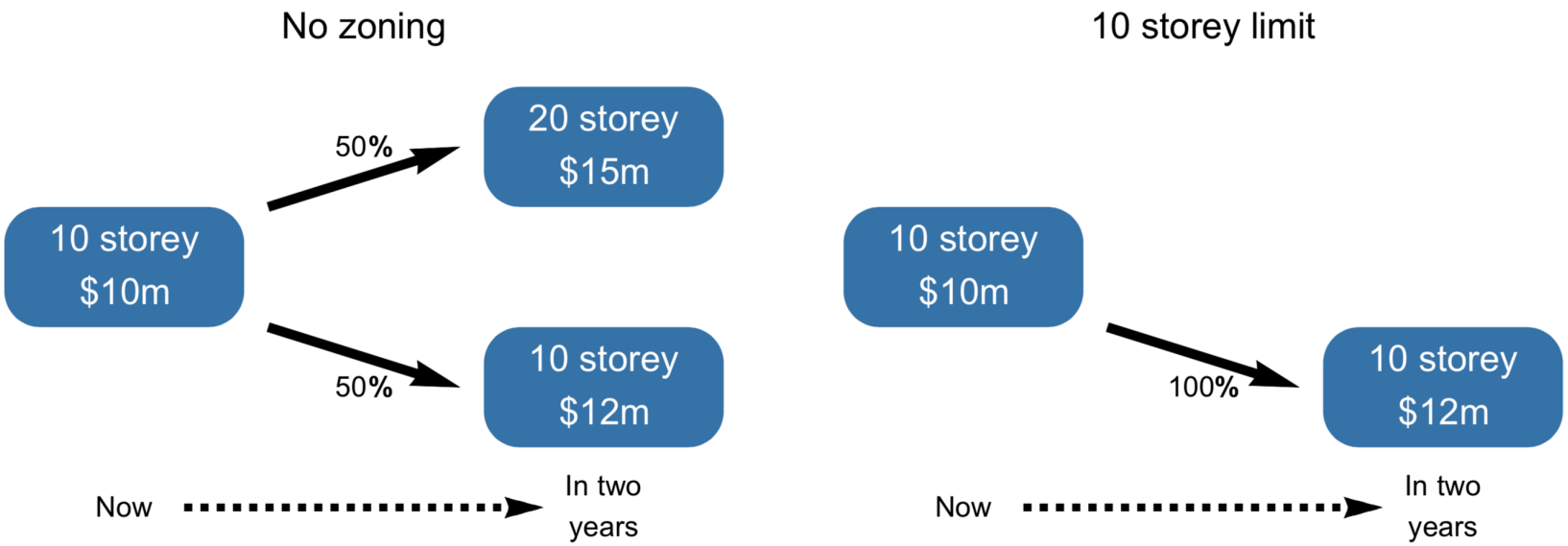
- $R_{Ht} = \dot{P}_t + r_{Ht}$
  where $\dot{P}_t$ *is the price growth, and* r_{Ht} *is the net rent*
- $R_{Ct} = c\ i$
  where c *is the per dwelling development cost and* i *is the nominal interest rate*

  (All are in "per dwelling" terms)

Return to land

- Growth in land value plus current rents from lower-value uses.
- Land value is the housing option value, so land value growth includes $\dot{P}_t$
- But also includes the growth in the "option premium" ($\omega \dot{P}_t$), which comes from changes to optimal density.
- $R_{Lt} = \dot{P}_t + \omega \dot{P}_t \ + r_{Lt}$

Option premium



Example

- A site is currently optimally subdivided into 6 lots when the lot price is $300,000.
- If prices rise to $350,000, the return to land is 6 x $50,000 = $300,000
- But if density can increase to 8 smaller lots, the return now contains the total value of two additional lots.
- As long as the marginal price is below the average, smaller lots increase total revenue.

Example

- If the price of 8 lots is \$320,000 each, the total return to land in this period is (8 x \$320,000) - (6 x \$300,000) = \$760,000
- This is much higher than the \$300,000 return from price growth alone.
- In this case, $\omega = 1.53$

Economic hurdle

- Substitute in our terms and get

  $\boldsymbol{\pi}_R = \dot{P}_t + r_{Ht}$ - $(\dot{P}_t + \omega\dot{P}_t + r_{Lt} + c\ i)$

  $\boldsymbol{\pi}_R = r_{Ht}$ - $(\omega\dot{P}_t + r_{Lt} + c\ i)$

- Which gives the hurdle condition

  $r_{Ht} > \omega\dot{P}_t + r_{Lt} + c\ i$

- home rents $>$ option premium growth + undeveloped rents + interest on construction cost

Price matters

- This means that the willingness to convert land to housing DECREASES with PRICE GROWTH.
  $r_{Ht} > \omega \dot{P}_t + r_{Lt} + c\ i$
- It also implies that when price growth is high, the returns to owning undeveloped land (i.e. landbanking) are also high.
- But planning can bind by setting $\omega = 0$.

Other allocations

- Cash can be swapped for existing or new housing, which increases returns if
  $\dot{P}_t + r_{Ht} > P\ i$
- Notice this condition is positively related to price growth ($\dot{P}_t$) as it typical of asset markets.
- Cash can be swapped for undeveloped land, with the return-increasing condition of
  $\dot{P}_t + \omega \dot{P}_t + r_{Lt} > (P\text{-}c)\ i$

Implications

- Planning binds $\omega = 0$, making the hurdle for new supply less onerous (a restatement of Titman's (1985) real options argument).
- But it also stops an increasing gap between r_{Ht} and r_{Lt} due to higher density.
- The net effect is not clear, but in periods of rising prices it is more likely that price growth is the binding constraint on new supply.

Implications

- Adding development costs per dwelling may accelerate development as it decreases ω.
- Expected future planning changes can lead to lower supply because it increases ω, and hence the value of development later compared to now.

After tracking all planning applications, approvals, and construction over a seven year period in a case study infill area, they find that many infill developments are voluntarily delayed, as "developers anticipate that the planning system will ultimately approve significant increases in height and density". They note that approvals already gained, but undeveloped, "produce significant capital gains that can be cashed without construction."

– Woodcock et.al. , 2018

Conclusion

Planning changes, like rezoning, won't stop price cycles.

The direction of any effect on supply is ambiguous, and the scale far smaller than static models predict.

"rising prices make building today more attractive, but also make waiting more attractive, thus reducing the responsiveness to price"
- Murphy (2018)