The costs and benefits of urban development

Peter Nunns, Principal Economist
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• The macro effects of micro policies
MRCagney – who we are

• We work for better places – well-connected, vibrant and liveable places where people can make better, more sustainable travel choices.
• We were formed in 2000 and have grown to employ around 50 staff from offices in Brisbane, Auckland, and Melbourne.
• Our company is fully owned by employees, ensuring the independence of the advice that we provide.

Our areas of focus:

• Transit
• Transport Strategy and Research
• Traffic Engineering
• Transport Technology
• Urban Design
• Economics and Business Cases
• Design Services
• Planning
• GIS and Analytics
Some recent projects

**Planning and housing**
- Auckland Unitary Plan – economic evidence on 7(ish) topics
- National Policy Statement on Urban Development Capacity
- Auckland Mayoral Housing Taskforce
- Housing New Zealand redevelopment assessment

**Transport planning**
- Northwest Rapid Transit Corridor Indicative Business Case
- Auckland Cycling Programme Business Case 2018-28
- North Shore Rapid Transit Network PBC
- Christchurch bus network review
- Brisbane park-and-ride demand modelling
Research to support planning strategy

The Pigovian perspective on urban planning

- Manage positive and negative spillovers in cities by regulating:
  - **Activity location**, eg residential, business, rural zoning
  - **Intensity** of development, eg height limits, minimum lot sizes
  - **Design** of buildings, sites, and subdivisions, eg MPRs, dwelling size rules
  - **Connections to infrastructure**, incl. development contributions
  - **Environmental quality**, eg air and water discharges

Planning and housing market dynamics

• Nunns and Denne: Inefficiently designed rules can affect market functioning – reducing elasticity of supply

• Two principal mechanisms:
  • Limits on appropriately zoned land increase the market power of landowners with ’good’ zoning vis a vis developers and buyers
  • Regulatory policies and processes can impose barriers to entry in the form of cost, delay, or uncertainty on developments
A pricing rule for urban planning

• Microeconomic theory: In a well-functioning market, prices should equal costs:

\[ P = MPC + MEC \]

- Market price
- Private costs, eg opportunity cost of land, land development costs
- External costs, eg public infrastructure, environmental impacts

• Comparison of prices and costs tells us desirable direction of travel – are there opportunities to improve wellbeing by changing the rules?
Three examples of distorted prices

<table>
<thead>
<tr>
<th>P</th>
<th>MPC</th>
<th>MEC</th>
<th>Further reading</th>
</tr>
</thead>
<tbody>
<tr>
<td>Price of residential land immediately inside city boundary</td>
<td>Opportunity cost of converting rural land, land development and subdivision costs</td>
<td>Public infrastructure costs, environmental impacts, loss of open space amenity</td>
<td>Covec and MRCagney; Nunns and Denne</td>
</tr>
<tr>
<td>Price of city centre apartments</td>
<td>Marginal cost of constructing added storeys</td>
<td>Public infrastructure costs, loss of light and views</td>
<td>Covec and MRCagney; Nunns and Denne</td>
</tr>
<tr>
<td>Price of commuter parking</td>
<td>Opportunity cost of land, cost to build parking structures, operating costs</td>
<td>Cost of unpriced congestion and other transport externalities</td>
<td>Nunns; Donovan and Nunns; MRCagney</td>
</tr>
</tbody>
</table>
Land prices at the edge of the city are distorted by a shortage in development opportunities in / around the city.

Could be due to:

a) limited extent of urban zoning
b) restrictions on density / redevelopment in urban area
c) landowner behaviour, eg land banking

http://dataviz.thespinoff.co.nz/unitary/
Case 1: Can we explain fringe land prices?

![Bar chart showing residential land value ($m/ha) for Auckland, Wellington, Tauranga, Hamilton, Nelson, and Palmerston North.](chart.png)
Case 1: Can we explain fringe land prices?

Auckland, Wellington, Tauranga, Hamilton, Nelson, Palmerston North

Residential land value ($m/ha)

Average land value for similar land outside boundary

Difference in average land value
Case 1: Can we explain fringe land prices?

Average LV for land outside boundary ■ Estimated land development costs
Remaining unexplained difference

Residential land value ($/m²)

<table>
<thead>
<tr>
<th>City</th>
<th>Average LV</th>
<th>Development Costs</th>
<th>Unexplained Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auckland</td>
<td>1.5</td>
<td>0.5</td>
<td>0.5</td>
</tr>
<tr>
<td>Wellington</td>
<td>2.0</td>
<td>0.7</td>
<td>0.7</td>
</tr>
<tr>
<td>Tauranga</td>
<td>2.5</td>
<td>0.9</td>
<td>0.9</td>
</tr>
<tr>
<td>Hamilton</td>
<td>1.0</td>
<td>0.3</td>
<td>0.3</td>
</tr>
<tr>
<td>Nelson</td>
<td>1.5</td>
<td>0.6</td>
<td>0.6</td>
</tr>
<tr>
<td>Palmerston North</td>
<td>1.2</td>
<td>0.4</td>
<td>0.4</td>
</tr>
</tbody>
</table>

The remaining unexplained difference is as follows:
- Auckland: 25%
- Wellington: 25%
- Tauranga: 25%
- Hamilton: 19%
- Nelson: 40%
- Palmerston North: 25%
Case 1: But what about external costs?

- External costs – public infrastructure, congestion, environmental impacts, etc – could be large enough to justify the remaining gap
- Rough estimate from Auckland: MEC equal to 15-40% of private land development costs
- Not large enough to explain Auckland gap, but probably Hamilton and Palmy

<table>
<thead>
<tr>
<th>Attribute</th>
<th>External cost per 600m² section</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduced freshwater quality</td>
<td>$1,800 to $3,600</td>
</tr>
<tr>
<td>Reduced coastal water quality</td>
<td>$1,900 to $3,800</td>
</tr>
<tr>
<td>Loss of peri-urban open space</td>
<td>$2,700 to $4,700</td>
</tr>
<tr>
<td>External costs for network infrastructure</td>
<td>$12,100 to $36,500</td>
</tr>
<tr>
<td><strong>Total external costs</strong></td>
<td><strong>$18,500 to $48,600</strong></td>
</tr>
</tbody>
</table>
Case 2: Apartment prices (P>MPC)

Apartment prices are distorted by:

a) building height limits and other limits on density like minimum lot size, boundary setbacks

b) developer constraints, eg lack of financial capacity to manage large projects

https://en.wikipedia.org/wiki/Auckland_Northern_Motorway
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Case 2: Ratio of apartment prices to build costs

Auckland city centre

Wellington city centre
Case 2: Ratio of apartment prices to build costs

Prices persistently exceed marginal build costs, even in lower quartile!
Case 2: But what about external costs?

- External costs – loss of views, sunlight – could be large enough to justify high prices
- Evidence from Auckland: water views + sunlight add 25-37% to property value
- Even if every new apartment blocked light and views to one existing dwelling, this would still not explain the gap

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Impact on property values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Views of water</td>
<td>+8.3% to +20%</td>
</tr>
<tr>
<td>Views of land</td>
<td>+0% to +6%</td>
</tr>
<tr>
<td>Access to sunlight (proxied by north-facing apartments)</td>
<td>+17.3%</td>
</tr>
</tbody>
</table>
Parking prices are distorted by:

a) regulatory requirements to supply parking with most new developments
   - Typical MPRs: 1 carpark per 20m² retail GFA; 1 carpark per 40m² office GFA
   - Results in 40-60% of site devoted to parking

b) public subsidies – councils build sub-economic parking facilities or offer free kerbside parking
Case 3: Commuter parking prices vs supply costs
Case 3: Commuter parking prices vs supply costs
Case 3: Commuter parking prices vs supply costs
Case 3: Parking price adjustment following reform

Auckland city centre employment and long-stay parking supply

- Long-stay parking
- Employment

Rose 24%
Fell 3.4%

All-day parking rate in Auckland Transport's Civic Car Park

Rose 85%
2012-2015

Rose 63%
2002-2012
Case 3: Parking price adjustment following reform

Auckland city centre employment and long-stay parking supply

- Long-stay parking
- Employment

Prices catch up with marginal private costs

All-day parking rate in Auckland Transport's Civic Car Park

- Rose 63%
- Rose 85%

2002-2012
2012-2015

MRC
A rough CBA of enabling more development

What could we expect from more responsive housing supply in New Zealand cities?

1. Benefits to new entrants (consumers of housing), who will be able to obtain benefits of living in NZ cities at a lower cost
2. Cities will grow slightly larger, possibly with different spatial forms
3. This may cause additional positive and negative externalities from development and city size
Enabling housing benefits new entrants

- Nunns and Denne used simple microeconomic models of market dynamics in response to demand growth
- Models focus on ‘growth path’ – how much do prices tend to rise under different elasticities?
- Key estimate: ~$100-130,000 in consumer surplus benefits per added household
There are both positive and negative spillovers

- Nunns and Denne also estimated other costs and benefits of larger cities, eg congestion, infrastructure, nuisances, agglomeration economies

- Key insight: The external effects of growth could easily be positive!

<table>
<thead>
<tr>
<th>Location</th>
<th>MEC scenario</th>
<th>External costs*</th>
<th>External benefits **</th>
<th>Net MEC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urban intensification</td>
<td>Low</td>
<td>-$29,800</td>
<td>+$92,900</td>
<td>+$63,100</td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>-$71,300</td>
<td>+$46,400</td>
<td>-$24,900</td>
</tr>
<tr>
<td>Greenfield</td>
<td>Low</td>
<td>-$56,900</td>
<td>+$92,900</td>
<td>+$36,000</td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>-$101,400</td>
<td>+$46,400</td>
<td>-$55,000</td>
</tr>
</tbody>
</table>

* External costs include socialised infrastructure costs, congestion, environmental impacts, overshadowing / blocked views

** External benefits only include agglomeration economies in production from larger city size
Local decisions with macroeconomic implications

- Ganong and Shoag (2013): Income convergence, migration slowed due to restrictions
- Hsieh and Moretti (2015): US GDP would be 9.5% larger with less restrictive rules in SF, SJ, NYC
- Glaeser and Gyourko (2017): US GDP would be 2% larger in the same scenario
Is New Zealand at risk of similar macro effects?

- Grimes et al (2016): From 1926 to 2006 proximity to Auckland was positively associated with population growth
- Sinning and Stillman (2012): Trans-Tasman migration from 1996 to 2006 responded to higher incomes but was not dissuaded by house prices
Are inflexible zoning rules intrinsically economically inefficient?

If they reduce supply elasticity, deadweight losses may increase over time, potentially without limit.

This is only efficient if net negative urban externalities also rise with city size… which doesn’t seem to happen!

A provocation for research
Thank you for listening

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