

# ***Calculative Practices, Affordable Housing and the Residential Development Process***

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# Introduction

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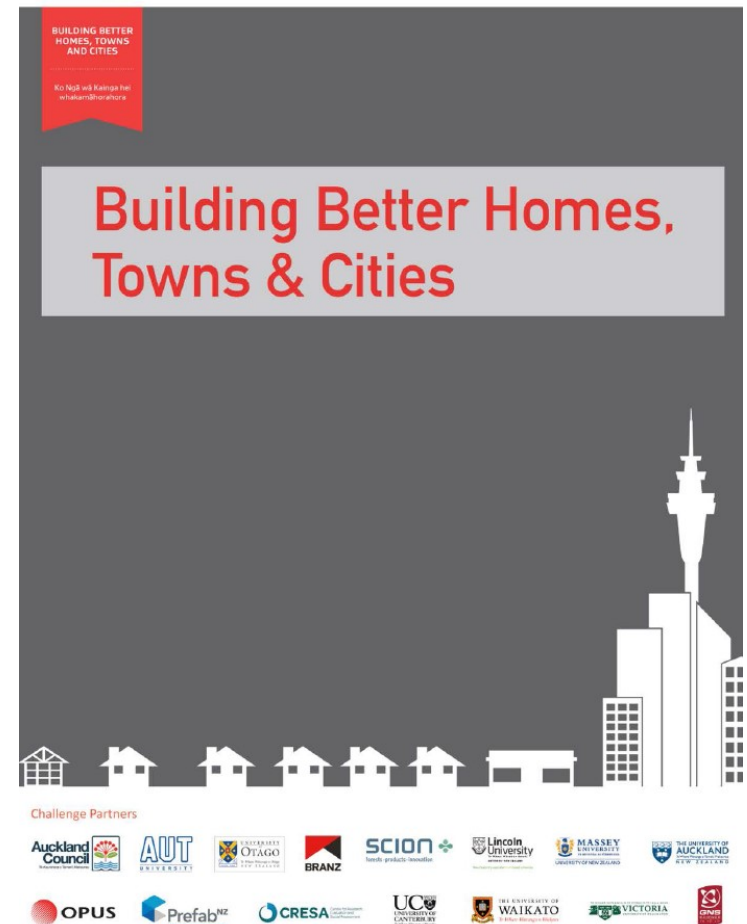
Six research programmes operating over the first 5 years

My research is part of the-  
'*Improving the architecture of decision-making*' research programme



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# ***Calculative Practices, Affordable Housing and the Residential Development Process***

This preliminary paper represents a 'first cut' or 'outline sketch' of a set of issues

## Structure

- 1) Conceptual Issues
- 2) Calculative Practices, Residual Valuation and Housing Development- Technical Issues
- 3) Residual Valuation, Affordability and Inclusionary Housing
- 4) Conclusions

# Part 1: Conceptual Issues

Michel Callon- 'making markets'

1)Assemblage/Agencement

2)Calculative Practices

3)Lock-in

# Agencement

Çalışkan & Callon (2010) “define markets as sociotechnical arrangements or assemblages (agencements) ...’ (p3)

The meaning of the French word agencement “is very close to ‘arrangement’ (or ‘assemblage’)... [it] has the same root as agency: agencements are arrangements endowed with the capacity to act in different ways, depending on their configuration’. (p9)

‘Agencements denote socio-technical arrangements when they are considered from the point view of their capacity to act.” (p9)

# Calculative Practices

Callon views markets as collective calculating devices (Lovell and Smith 2010)

“We suggest the term ‘valorimeters’ to denote the various tools, procedures, machines, instruments or, more generally, devices effecting this controversial translation of values into figures and, more precisely, into monetary amounts...

**Calculative agencies which are able to achieve the imposition of their valorimeters, that is, their numeric calculation tools and algorithms, with their calculatory modes have a good chance of simultaneously being able to impose prices that those tools make it possible to calculate; they become positioned to transform their own valuation into an obligatory passage point and can spread the definitions of value that are more closely aligned with their interests...”** Çalışkan & Callon, 2010, p17

# Calculative Practices

Lovell and Smith explore this ... they argue..

"...calculation is distributed widely across the people and things of the market: it is not affected through a single price mechanism or even through some form of human agency alone.

...this draws attention to the importance of interrogating in detail the variety of market devices that make such calculation possible (Callon et al., 2007). Most usefully for us, **it shows how the practice of making things calculable (like that of calculation itself) is an uneven, unequal and contestable process...** (Lovell and Smith 2010 p460)

Calculative practices associated with processes of **domination** (inequality).

"...the most powerful agencies are able to impose their valuations on others and consequently to impact strongly on the distribution of value" (Çalışkan & Callon, 2010, p13)

# Lock-in

Callon see 'lock-in' as useful for markets.

"Once organised and hence locked-in, the market becomes calculable by the agents." (Callon 1998b cited in Lovell and Smith, 2010).

Lovell and Smith (2010) argue;

"In contrast, and in our view more helpfully, the socio-technical regime literature – perhaps because of its close attention to processes of innovation and change ... – presents lock-in as more problematic" (p461).



# Part 2- Calculative Practices, Residual Valuation and Housing Development

## Residual Valuation- Static Model

### *Residual to land value*

<i>GDV</i>	–	<i>Total costs</i>	=	<i>Gross residual</i>
GDV: value of the completed development		All construction costs. Interest on construction, professional fees and developer's profit		Maximum bid for site includes acquisition costs, professional fees and finance of land purchase

### *Residual to profit*

<i>GDV</i>	–	<i>Total costs</i>	=	<i>Developer's profit</i>
GDV: value of the completed development		All construction costs as above but incl land value as a cost		

Atherton et al (2008)

Calculating residual value is a simple accounting procedure

We can move from Gross Development Value to **Land Value**

Or

From Gross Development Value to **Developer's Profit**.

Total (€)

<i>GDV</i>			
Rental income	€427,500		
ARY	6.5 per cent		
Total GDV			6,576,923
<i>Building costs</i>			
Total construction costs		€1,750,000	
Architect (of costs)	6.00 per cent	€105,000	
Engineers (of costs)	2.00 per cent	€35,000	
Quantity surveyors (of costs)	3.00 per cent	€52,500	
Agents (sales/letting; of GDV)	3.00 per cent	€197,308	
Total building cost			– 2,139,808
<i>Funding of construction</i> [11]			
Interest rate (per qtr)	3 per cent	€340,816	
Average time of borrowing is half of build period + void[12]	5		
Total funding costs			– 340,816
<i>Land costs</i>			
Site		€2,500,000	
Costs of land purchase	7.5 per cent	€187,500	
Interest on land purchase (qtr) is build period + void	3 per cent (8)	€716,945	
Total land costs			– 3,404,445
GRP			691,855

This is a static model – does not take account of the time value of money

**Table II.**  
Residual valuation  
to profit

Atherton et al (2008)

# Developer's Dynamic model

A cash flow model takes account of the timing of expenditure and revenues.

This offers a more accurate estimate of the profitability of the development

The cash flows for a development can be modelled.

Taking account of the timing of cash flows produces a new Total Profit (€757,609)

		Cash flow development appraisal[13]								
Months	Period	Construction costs	Professional fees Construction	Professional fees sales/let	Income	Land cost (incl costs)	Net cash flow	Capital outstanding beginning	Interest at 3 per cent	Capital outstanding end
0	0					– €2,687,500	– €2,687,500			– €2,687,500
3	1	– €175,000	– €19,250				– €194,250	– €2,687,500	– €80,625	– €2,962,375
6	2	– €262,500	– €28,875				– €291,375	– €2,962,375	– €88,871	– €3,342,621
9	3	– €350,000	– €38,500				– €388,500	– €3,342,621	– €100,279	– €3,831,400
12	4	– €525,000	– €57,750				– €582,750	– €3,831,400	– €114,942	– €4,529,092
15	5	– €262,500	– €28,875				– €291,375	– €4,529,092	– €135,873	– €4,956,340
18	6	– €175,000	– €19,250				– €194,250	– €4,956,340	– €148,690	– €5,299,280
21	7						€0	– €5,299,280	– €158,978	– €5,458,258
24	8			– €197,308	€6,576,923		€6,379,615	– €5,458,258	– €163,748	€757,609
	Total	– €1,750,000	– €192,500	– €197,308	€6,576,923	– €2,687,500				
							IRR Project		4.97 per cent	
							IRR Project pa		21.43 per cent	
							Total Profit at end of Development		€757,609	
							NPV of profit at 4.0 per cent		€553,578	

Atherton et al (2008)

# Is it worth it?

Note: Just calculating a 'profit' – doesn't tell us if the project is worth doing

Calculate

- 1) Net Present Value (NPV)- Discount the profit figure at a rate reflecting risk
- 2) Calculate Internal Rate of Return (IRR) – profit expressed as a rate of return



## Despite dominance of residual valuation model- Perception that industry operates on a cost plus model persists



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### NZ Productivity Commission (2012) - Housing Affordability Inquiry

More generally, the costs of all the major inputs into housing construction have typically increased more quickly than both generalised inflation and the costs for other forms of construction (Briggs and Ng, 2009). The available evidence suggests that the construction industry is populated by a large number of small businesses that **predominantly operate on a cost-plus basis** (p35).

Compare Çalışkan & Michel Callon (2010, p 18)

"...Faulhaber's and Baumol's (1988) comment that agents frequently use the gold strategy of marking up underscores the fact that the good old formula 'sales cost = cost + margins' is the simplest pricing script or, more generally speaking, the commonest way of setting prices on the basis of existing prices or numbers (Hall & Hitch, 1939).

# Part 3- Residual Valuation, Affordability and Inclusionary Housing



# Affordability and Inclusionary Housing

The residual valuation model underpins the development process and has been mobilised to promote inclusionary housing policies (eg England Section 106).

Plugging in an affordability requirement into the calculation reduces the GDV (retains the required development profit margin) and reduces the land value (or land bid).

## Auckland Draft Unitary Plan

Auckland Council 2013-  
Addendum to the draft  
Unitary Plan

### Greenfield Developments

“developments of ten or more dwellings **would have to provide** a set percentage of the homes (e.g.10% to 20%) at an affordable price.

...affordability ...criteria could refer to homes being affordable where households on 80 to 120% of median household incomes pay no more than 30% of gross income on rent or mortgage payments (p 23).

**Proposal:** IZ Mandatory for Greenfield Sites and Incentivised for Brownfield Sites

<b>Inclusionary Zoning and Greenfield Residential Development: A Feasibility Study</b>	<b>Inclusionary Zoning and Brownfield Residential Development: A Feasibility Study</b>
Report prepared for Auckland Council	Report prepared for Auckland Council
June 2013	July 2013
Prepared on behalf of Auckland UniServices Limited by: Professor Laurence Murphy University of Auckland Dr Michael Rehm University of Auckland	Prepared on behalf of Auckland UniServices Limited by: Professor Laurence Murphy University of Auckland Dr Michael Rehm University of Auckland

**Brownfield Development** “In areas identified for urban redevelopment, it is suggested that the affordable housing requirement be voluntary, **based on a bonus scheme**. These would apply to larger developments in the proposed Mixed Housing, Terraced Housing and Apartment zone and in metro, town, and local centre zones” p24

## Modelling Development Feasibility: Greenfield

Figure 7: Development Viability by IZ Policy Requirements

Submarket	Business Model	Inclusionary Zoning Policy Requirement (% Affordable)										
		None	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%
Papakura	Sections	Not Viable										
	Houses	Viable				Not Viable						
Upper Harbour	Sections	Viable								Not Viable		
	Houses	Viable					Not Viable					

Development Margin = 20%

Submarket	Business Model	Inclusionary Zoning Policy Requirement (% Affordable)										
		None	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%
Papakura	Sections	Not Viable										
	Houses	Not Viable										
Upper Harbour	Sections	Viable						Not Viable				
	Houses	Viable				Not Viable						

Development Margin = 25%

Submarket	Business Model	Inclusionary Zoning Policy Requirement (% Affordable)										
		None	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%
Papakura	Sections	Not Viable										
	Houses	Not Viable										
Upper Harbour	Sections	Viable				Not Viable						
	Houses	V	Not Viable									

Development Margin = 30%

Development viability of AH varied by

-Value of proposed Houses (sub-markets)

-Sections Vs Houses

-Development Margin (perceived risk)

(Source: Murphy and Rehm 2013a)

Figure 6: Inclusionary Housing Viability by Development Quality and Planning Zone under a Range of Housing Market Conditions

Market Conditions						
Margin	Zone	Storeys	IZ Bonus	Bouyant	Steady	Depressed
20%	Metropolitan	20	2 Storeys	Viable	Viable	Viable
	Mixed Use	5	1 Storey	Viable	Viable	Viable
	Terraces & Apts	4	3% Bldg cover	Viable	Viable	Viable
		5		Viable	Viable	Viable
		6		Viable	Viable	Viable
25%	Metropolitan	20	2 Storeys	Viable	Viable	Not Viable
	Mixed Use	5	1 Storey	Viable	Viable	Viable
	Terraces & Apts	4	3% Bldg cover	Viable	Viable	Viable
		5		Viable	Viable	Viable
		6		Viable	Viable	Not Viable
30%	Metropolitan	20	2 Storeys	Viable	Viable	Not Viable
	Mixed Use	5	1 Storey	Viable	Viable	Viable
	Terraces & Apts	4	3% Bldg cover	Viable	Viable	Viable
		5		Viable	Viable	Viable
		6		Viable	Viable	Not Viable

Development Quality = High

Market Conditions						
Margin	Zone	Storeys	IZ Bonus	Bouyant	Steady	Depressed
20%	Metropolitan	20	2 Storeys	Not Viable	Not Viable	Not Viable
	Mixed Use	5	1 Storey	Viable	Viable	Viable
	Terraces & Apts	4	3% Bldg cover	Viable	Viable	Not Viable
		5		Viable	Viable	Viable
		6		Viable	Viable	Not Viable
25%	Metropolitan	20	2 Storeys	Not Viable	Not Viable	Not Viable
	Mixed Use	5	1 Storey	Viable	Viable	Not Viable
	Terraces & Apts	4	3% Bldg cover	Viable	Not Viable	Not Viable
		5		Viable	Viable	Not Viable
		6		Viable	Not Viable	Not Viable
30%	Metropolitan	20	2 Storeys	Not Viable	Not Viable	Not Viable
	Mixed Use	5	1 Storey	Viable	Viable	Not Viable
	Terraces & Apts	4	3% Bldg cover	Not Viable	Not Viable	Not Viable
		5		Viable	Viable	Not Viable
		6		Not Viable	Not Viable	Not Viable

Development Quality = Medium

## Modelling Development Feasibility: Brownfield

Viability of AH varied by  
-Quality of Development

-Market Conditions

(Source: Murphy and Rehm 2013b)

# Planning and Costs



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## Inclusionary housing (IH) provisions of the Proposed Auckland Unitary Plan Rejected by IHP

### Auckland Unitary Plan Independent Hearings Panel (22 July 2016)

For these reasons the Panel considers that housing affordability is best addressed in the Plan as primarily housing supply and housing choice issues and that consideration of housing affordability needs to permeate the provisions throughout the Plan. This is in contrast to the retained affordable housing provisions in the notified Plan that treat affordability separately from other land use provisions. Furthermore these provisions would effectively be **a tax on the supply of housing and therefore would tend to impede rather than assist an increase in that supply.** (p59)

(IH viewed as a tax/cost on developers adding to their cost-

This aligns with with cost plus logic but not residual valuation model)



## Part 4- Conclusion

Markets are calculative devices that are made/remade.

Calculations and calculative practices shape residential development processes (stable but subject to contestation).

The potential for affordable housing provision affected by understandings of calculative practices.

There exist competing understandings of calculative practices operating in the industry (everyday practice and heuristics Vs perceived practices).

Political mobilisation of 'price construction processes' has profound policy implications.