

Is zoning the reason for the lack of supply of housing in Auckland and the resulting high prices?

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Introduction

I have given myself the task of looking at Auckland's population and housing density; where it has come from and where it might go. So far I've prepared two papers that have looked at how to measure urban housing density and how housing density patterns might be explained, setting aside planning principles.



To date, what I think the big issue for Auckland is that urban density will inevitably increase as the city's population increases. No surprises there. Land prices will continue to rise in response to population growth, with prices in areas with good accessibility and amenity rising the most. Urban density needs to adjust continually to these price increases so as to keep housing costs reasonable. The inner city areas of Auckland have seen and will likely see the highest rises in land prices, but have adjusted least in terms of increased density. This is the basic dilemma.

Based on that work, I was going to look at the implications for planning for density changes, but haven't got very far on that topic. I have found the need to first look more closely at the links between housing demand, housing supply and house prices before thinking about planning and urban density. This is because the current drivers for considering density changes are so closely linked to housing supply and house prices.

Housing Demand and Supply

The meteoric rise in median house prices in the Auckland Region is often ascribed to a lack of supply of new housing. Lack of land zoned for more housing (whether that be greenfields or brownfields) is generally seen to be the proximate cause of this lack of supply. High house prices should stimulate more supply of housing, but the supply of new housing is slow. So something must be holding back that supply response, and a lack of land zoned for housing looks like the best candidate for the prime cause.

Is this a reasonable conclusion?

Certainly at the national level (as I don't have the same figures for the Auckland Region), there looks like a limited relationship between house prices and supply of new dwellings. Figure 1 sets out the number of new dwellings authorised via building permits and the combined value of

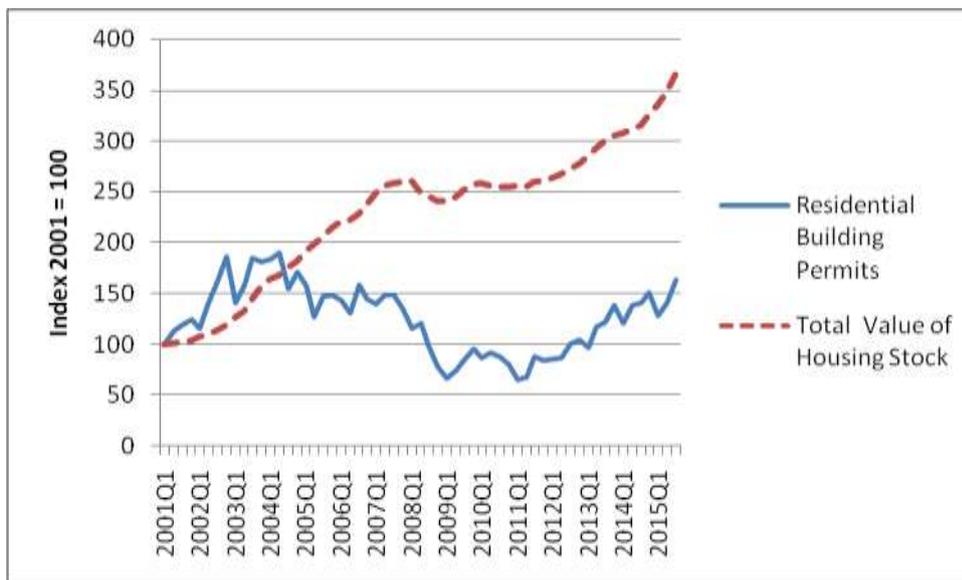


residential housing in New Zealand. The graph is based on data from the Reserve Bank of New Zealand.

Of course two different sets of numbers are being compared. Building permits are counted in the thousands ranging between 3,000 and 8,000 per annum, while house values are in the billions, climbing from \$235 billion in 2001 to over \$862 billion in 2015.

If we start at 2001 at a common base of 100 for the two sets of data, then we see the pattern in Figure 1. The total value of the housing stock heads skywards, while residential building permits go sideways, and if anything dip in the late 2000s years.

Figure 1: Total house value of housing stock and residential building permits index: 2001 to 2015



Source: Reserve Bank NZ (House values), Statistics NZ (Building Permits)

So presented in this light, the data does suggest that building permits have been slow to respond to the increased price signals of ever more expensive housing.

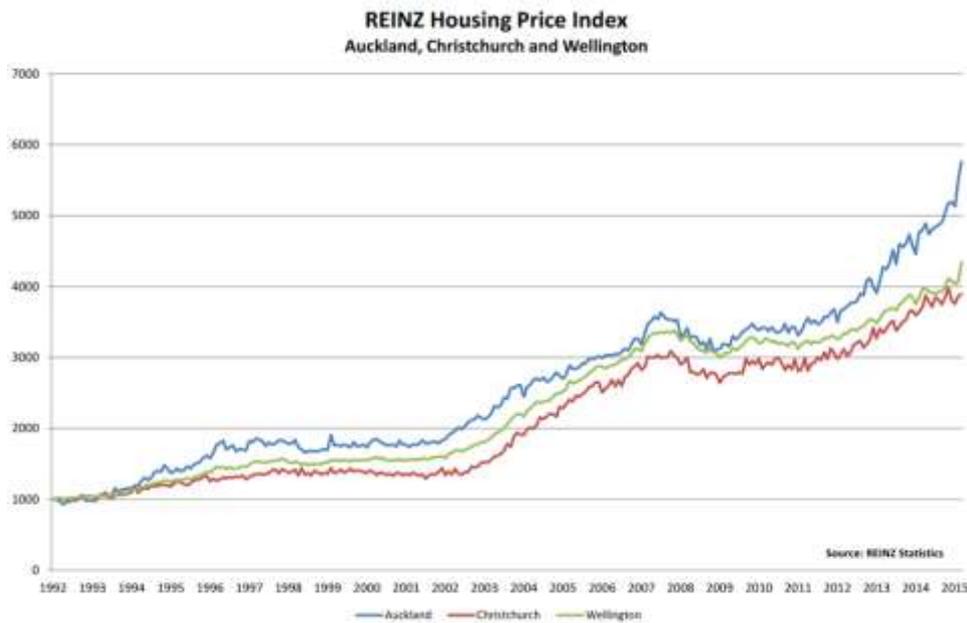
The data begs the question as to what drives house prices and what drives building permits? There may be two different sets of drivers going on. The question for me is whether zoning plays a part, and whether there is a particular Auckland supply issue?

First we need to look at housing demand in Auckland.

Auckland's Population and Housing

Let's start with a basic look at estimated population growth in the Auckland Region from 1996. Let's assume that in 1996, there was a reasonable balance between supply of housing and demand for housing in the Region. Certainly when you look at median house price data for Auckland compared to the other two main metro areas, median house values in Auckland only really started to significantly depart from the other regions post 2000, and really got going post 2013. See Figure 2.

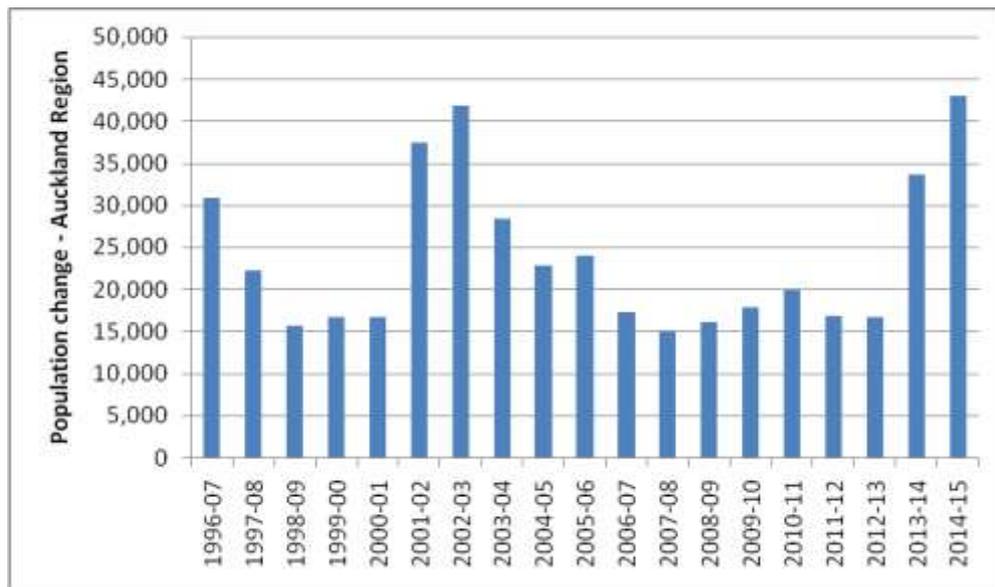
Figure 2: House price changes: Auckland, Christchurch and Wellington



Year-by-year population change is estimated by Stats NZ. Data is available from June 1996 to June 2015. Estimated resident population growth for the Auckland Region, as calculated by Statistics NZ, is set out in Figure 2. This is for June 30 years.

The five yearly census count of usually resident population is slightly different to that of the annual estimate of usually resident population used in the graph below. The census undercounts people (by about 5%). Having said that the population estimate is only an estimate based on births, deaths and migration patterns. The latter is tricky. Do we actually know how many migrants end up living in Auckland?

Figure 3: Estimated annual population growth: Auckland Region



Source: Stats NZ

The interesting feature is the cyclical pattern. In particular is the extended down turn over the mid to late 2000s, and then a strong upswing since 2013, but that upswing is not out of the ordinary if compared to 2001 to 2003.

Population growth means the need for more housing, but how much housing? What is the demand for housing from this growth?

To begin with, we have to assume that population growth is not being influenced by house prices (as we have to start somewhere), but we can assume that the demand for housing generated by this population growth may be influenced by house prices. High house prices may mean that there is less ability to for new households to form who can afford to rent or own their own home. Kids may stay at home longer; couples may stay together rather than split; extended family members may combine into one household, rather than be in separate dwellings.

If we take the usually resident population estimate for the last four census years and the number of houses (occupied and unoccupied) recorded by the census, then we get the following average figures of people per dwelling.

Table 1: Average people per dwelling, Auckland Region

Census Year	1996	2001	2006	2013
Total dwellings (occupied and unoccupied)	381,648	424,848	473,031	506,808
Estimated usual residents	1,115,800	1,218,300	1,373,000	1,493,200
Estimated usual residents per dwelling	2.92	2.87	2.90	2.95

Fewer people per dwelling implies a housing demand that is growing faster than the population. The demand for housing has increased a bit over time, relative to population - the average number of people per dwelling has decreased between 1996 and 2006. But then it increased between 2006 and 2013, the period of steeper rises in house prices. But 'demand' in 2013 of one dwelling per 2.95 residents is not that different from 1996. However you could say that over that time, the demographics have changed, and with that housing demand.

So part of the trend towards more residents per dwelling evident in Table 1, particularly in the period 2006 to 2013, could be the impact of higher prices and/or lower housing production. We need to untangle that bit of the demand. So what to do?

We could compare the average number of people per dwelling in Auckland with the rest of New Zealand, but that is dangerous as Auckland's population profile is quite different from the rest of NZ, so housing demands will be different. The median age is 35 years for people in the Auckland Region. For New Zealand as a whole, the median age is 38 years. Auckland has a more youthful population and so the number of people per dwelling is likely to be higher.

Another way to tackle the issue is to look at the relationship between population, households and dwellings. Table 2 sets out that data from 1996 to 2013, for the Auckland Region.

Table 2: Population, households and dwellings

Census year	1996	2001	2006	2013
Population (estimated usual residents)	1,115,800	1,218,300	1,373,000	1,493,200
Households	355,362	389,664	434,268	469,500
People per household	3.14	3.13	3.16	3.18
Total dwellings	381,648	424,848	473,031	506,808
Dwellings per household	1.07	1.09	1.09	1.08

This is really just cutting the cake in a different way, but at least it breaks down the issue of how many dwellings into two steps. How many households, then how many dwellings to house those households.

Table 3 takes the data for people per household for 1996 to 2006 and applies that data to the population estimates set out in Figure 1, but for 2006 onwards assumes a downward trend, rather than an upward trend. This is an attempt to set aside any price effect on rates of household formation.

To that number is then applied a ratio of dwellings per household. The number of dwellings is always a bit more than the number of households.

Table 3: People per household 1996 to 2015

	Population change	People per household	Dwellings @ 1.08 dwellings per household
1996-07	30,900	3.14	10,628
1997-08	22,300	3.14	7,670
1998-09	15,800	3.14	5,434
1999-00	16,700	3.14	5,744
2000-01	16,800	3.14	5,778
2001-02	37,500	3.13	12,939
2002-03	41,800	3.13	14,423
2003-04	28,400	3.13	9,799
2004-05	22,900	3.13	7,902
2005-06	24,100	3.13	8,316
2006-07	17,400	3.12	6,023
2007-08	15,100	3.12	5,227
2008-09	16,200	3.12	5,608
2009-10	17,900	3.12	6,196
2010-11	20,000	3.12	6,923
2011-12	16,900	3.11	5,869

	Population change	People per household	Dwellings @ 1.08 dwellings per household
2012-13	16,700	3.11	5,799
2013-14	33,700	3.11	11,703
2014-15	43,000	3.11	14,932

Now let's compare that picture to housing production, as recorded by the number of new dwelling units consented by way of building permits over the corresponding period. In making that comparison, we have to decide if we take the same time period as the population estimate (June to June) or we 'lag' the building permit data so that it responds to population movements. It seems sensible to me to lag the building permit data by 6 months. That is we take a January to January period, so for the June 2006 to May 2007 population estimate period we look at the building permits issued over the period January 2007 to December 2007. I think it is reasonable to assume that developers and builders will want to first see population growth before starting to build houses.

Of course a building permit issued does not mean a house built. Some permits will be for replacement dwellings.

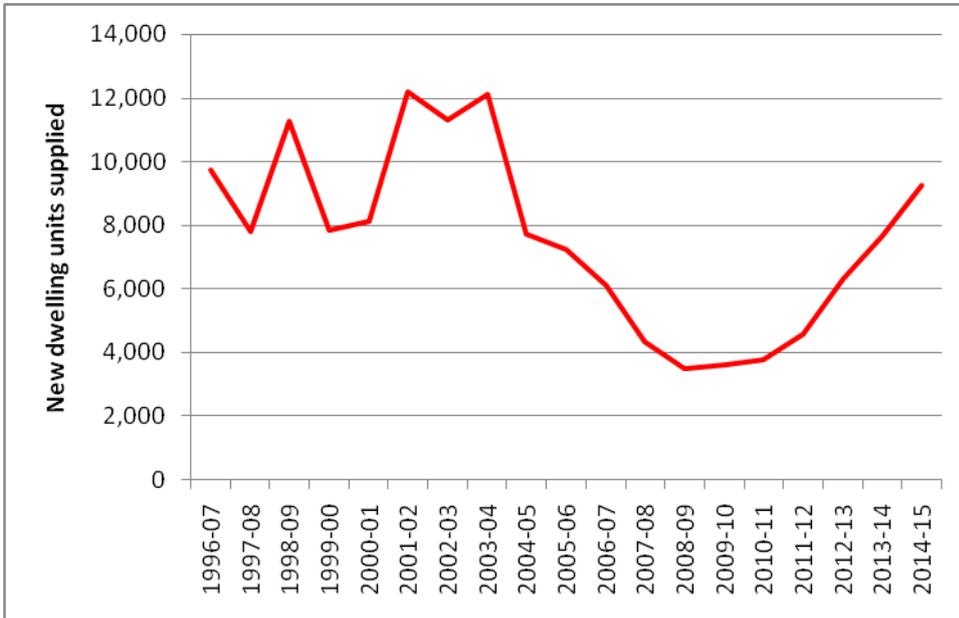
Looking at the period between March 2006 and March 2013, the census recorded a growth of 33,777 (occupied and unoccupied) dwellings in the region. If we go back 12 months from these dates (i.e. March 2005 to March 2012) - on the basis it takes 12 months to build a house - then total residential units authorised by building consents were 35,839. Not a bad match. Table 1 sets out the comparison for 2001 to 2006, and then from 2006 to 2013.

Table 4: Dwelling permits issued versus dwellings built 2001 to 2013

Census Years	2001-06	2006-13	2001-13
Census - Additional dwellings	48,183	33,777	81,960
Building permits - new dwelling units authorised	51,809	35,839	87,648
% census versus building permits	93.0%	94.2%	93.5%

If we take the average of a 93% 'conversion rate' of building permits issued to dwellings actually constructed, then we get the following graph of housing actually produced.

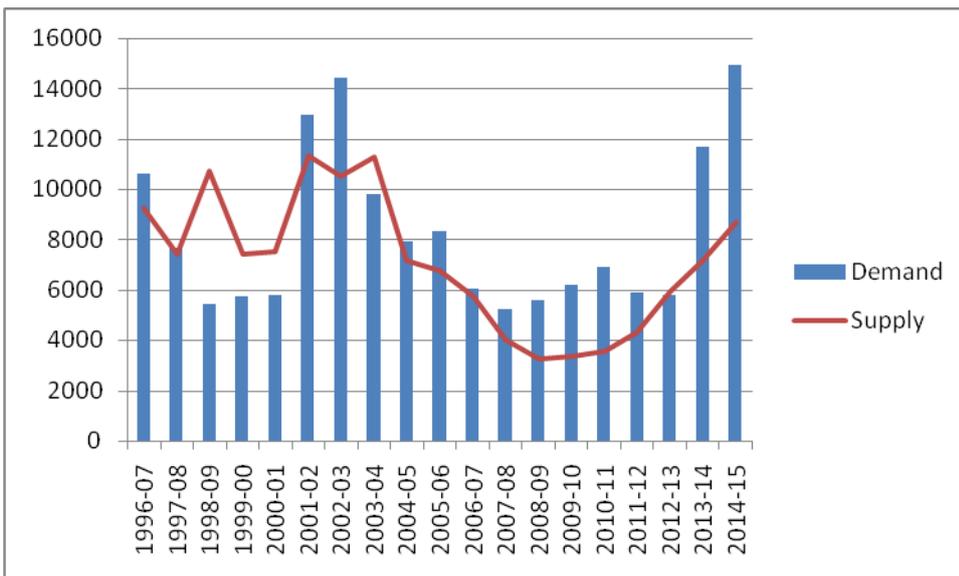
Figure 4: New dwelling units supplied, Auckland Region 1996 to 2015



The interesting pattern in this graph is the extended "U" shaped profile for the period 2004/5 onwards. The eagle eyed amongst you will see that the low point was 2009 to 2010 during the height of the global financial crisis.

Comparing the two sets of information (housing demand and housing supply) gives us the following graph.

Figure 5: Estimated housing demand and supply in Auckland, 1996 to 2015



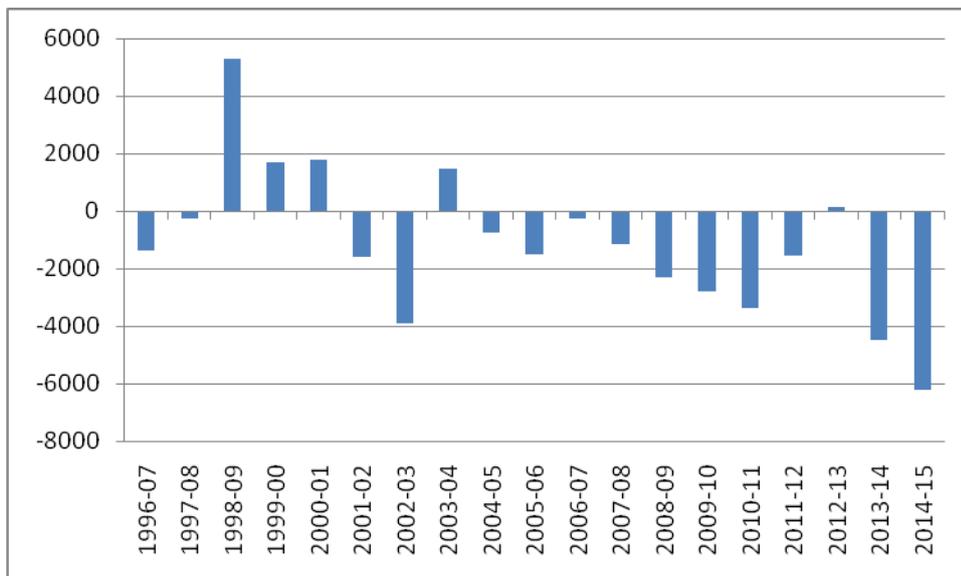
So what can we take from this graph? Clearly there has been a period of under supply during the period 2008 to 2015. This first part of this period generally coincides with the global financial crash. Then that period has been compounded by the population spike since 2013. An extended down turn, then a strong upswing are hardly easy conditions for the housing market to adapt to.

As seen in the demand spike in 2002 to 2003, supply did not match demand during that period and it is unrealistic for supply to quickly and rapidly meet a demand shock. What you would expect would be a period of oversupply after a peak when things catch up. We will have to wait and see what happens after the current surge of people subsidies. What is also interesting is the extent to which there was no real period of catch up in supply post the 2001 to 2003 migration spike. It may be that the 2001 to 2003 spike soaked up some excess supply that appears to have been provided over the late 1990s.

The real issue seems to be in the period 2006 to 2012 - why did the supply dry up so much?

Comparing demand and supply shows the following 'unders and overs'.

Figure 6 : Estimate of housing under and oversupply in the Auckland Region, by year



The accumulated 'deficit' over the period 1996 to 2015 is 20,000 dwellings, but if we discount the last 2 years of the migration spike (when you would expect undersupply), then the deficit is more like 10,000.

In 2014 MBIE estimated a 20,000 deficit in a briefing to Ministers. Figure 1 shows their analysis from the briefing, sourced from: <http://www.treasury.govt.nz/statesector/socialhousing/pdfs/sh-3133095.pdf>. Their pattern is not too different from my pattern, although they have assumed a different housing generation rate, off the same population increases and hence a larger deficit.

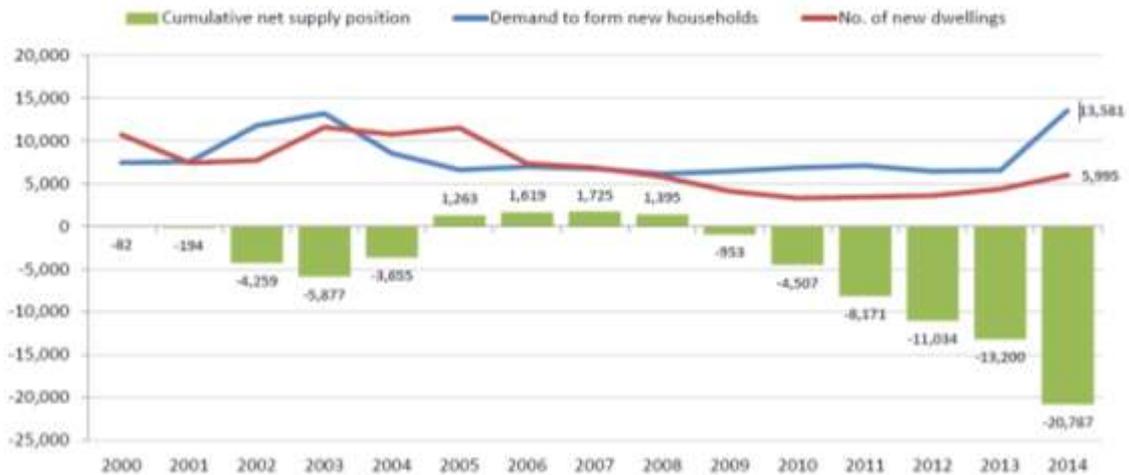
Figure 7: MBIE Estimate of Housing Deficit

There is an estimated shortfall of ~20,000 dwellings in Auckland

Despite high growth in the number of new dwellings receiving building consent in Auckland (+33% p.a.), the estimated dwelling shortfall continues to increase.

Demand vs supply in Auckland

2000-2014; annual to June; actual population divided by expected occupancy rate vs estimated number of dwellings actually built



Source: Statistics New Zealand – building consent data and sub-national population figures

The question of a deficit of housing and the size of this deficit is quite important, as a lack of housing being built relative to demand suggests that prices will increase. So here we have a possible explanation of high house prices - lack of supply. But is that pattern unusual or out of the ordinary?

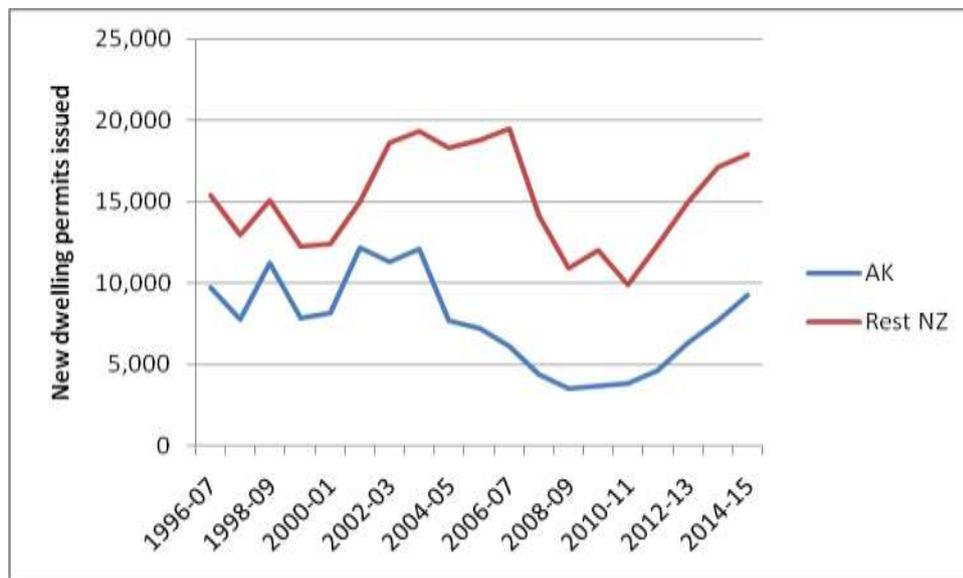
In terms of supply, the interesting period is that between 2008 to 2012. Any housing market is likely to struggle to keep up with a population spike, so it's confusing to lump in the last couple of years with what happened during the years of moderate population growth between 2003 and 2013.

What caused the under supply?

During this period, is the undersupply of housing due to zoning issues? Well it's actually hard to say without a 'control' to compare it to.

We can compare Auckland with New Zealand as a whole, or Auckland and the rest of NZ. The latter is probably a better control, as any Auckland figures skew the total NZ figures. Figure 8 presents the data.

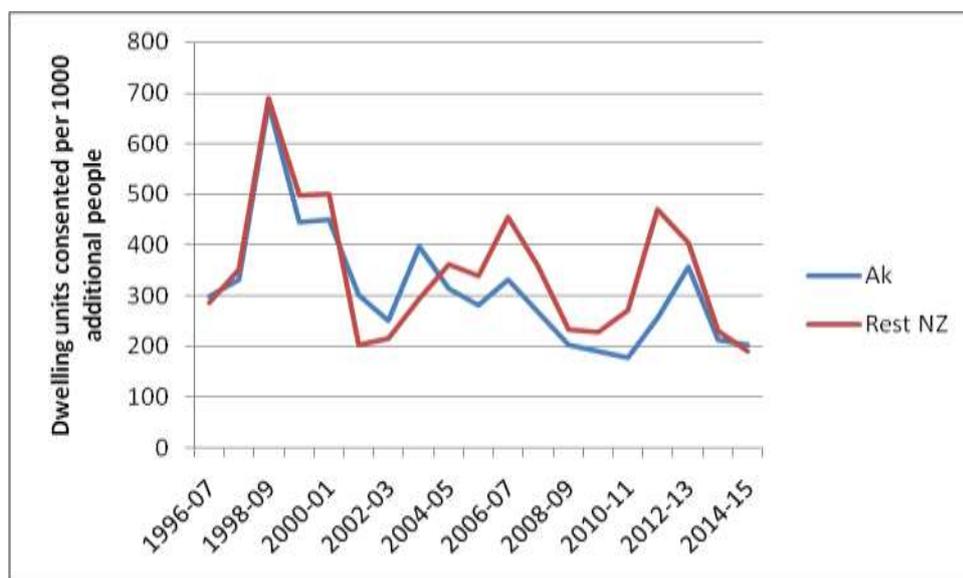
Figure 8: Housing supply (new dwelling building permits) in Auckland and the rest of NZ



While the graphs look similar, there is actually quite a difference in the period 2005 to 2009. During this period housing production in Auckland falls away, but in the rest of NZ it seemed to have kept up.

This pattern can be better seen if we regularise the data so that it has a common base. If we take the number of new dwellings built per 1000 new residents, then we get the following graph. Pretty similar trend, but with a difference 2006 to 2011. Part of the difference post 2011 could be the Christchurch rebuild. Both Auckland and the rest of NZ have struggled to keep up with the migration boom in the last couple of years.

Figure 9: New residential building permits per 1000 people: Auckland and rest of NZ



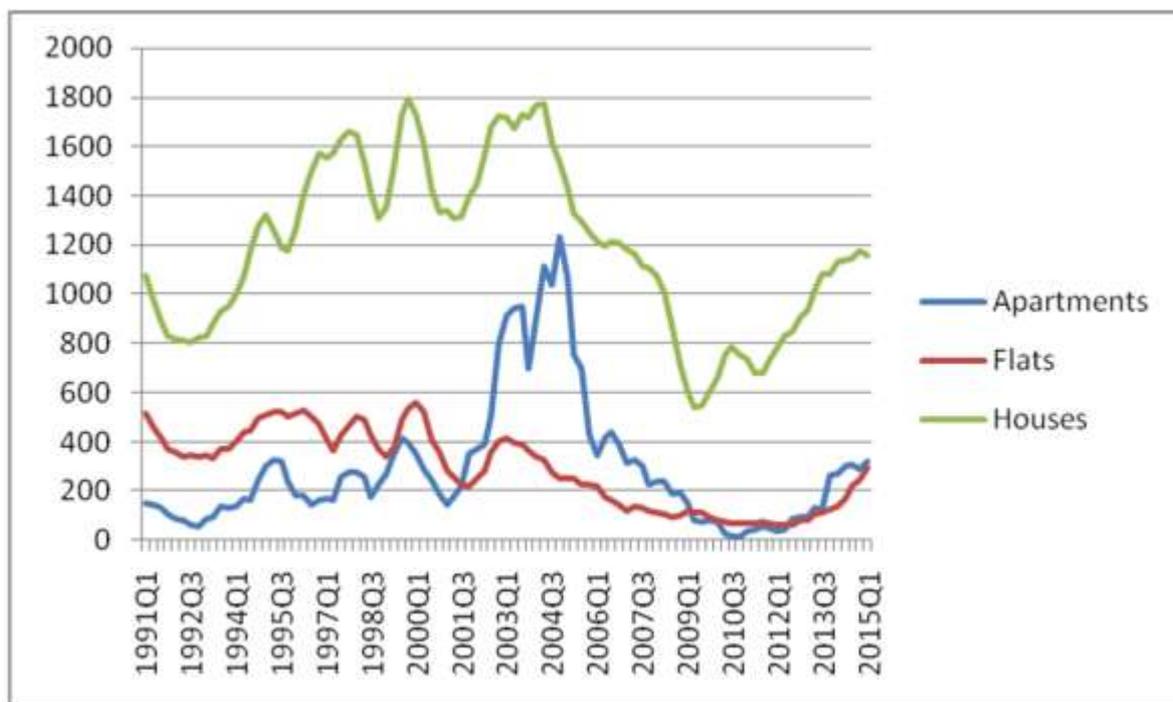
So maybe Auckland did underperform and why would that be? Auckland has an urban growth boundary when the rest of NZ doesn't.

So it must be planning?

Well let's take a closer look before jumping to that conclusion.

In terms of the types of dwellings consented over the period 2001 to 2015, in the Auckland Region, Figure 10 shows the pattern of stand alone houses versus apartments and flats and townhouses. The number of apartments dropped off substantially during the period of 'undersupply'.

Figure 10: Types of new residential dwellings consented in the Auckland Region 1991 to 2015



Was there really a lack of zoning for apartments, flats and town houses during this period?

The story usually told is that people really want stand alone houses, but the urban growth boundary limits the ability to meet that demand, and so people have to look at apartments, flats and town houses as the only available alternative. But they really don't like those options, so nothing happens.

The other narrative is that the apartment, flats and townhouse developments were largely investor driven, and once the finance sector collapsed, supply dried up. The leaky building crisis added to the 'turn off' factor.

So what to make of all this?

First it is easy to use a short term issue - a cyclical upturn in migration - to paint a bleak picture of supply and say that there is a structural issue with zoning that needs to be addressed. Looking through the cyclical issue of the current migration boom - is there a zoning issue?

Here it gets interesting. Over the period of undersupply from 2008 to 2013, building permits in the Auckland Region averaged around 4,000 per year. An average rate of about 6,000 per year would not have seen a shortage develop. Over the last couple of years, the region has seen building permit levels of over 7,000 per year, above that rate.

As the latest 2015 Auckland Region Housing Accord monitoring report¹ has noted, most new dwelling consents continue to be issued in areas already under development such as Flat Bush, Northern Tamaki and Hobsonville. The new supply areas identified in the last couple of years - the Special Housing Areas - have contributed a bit to the upswing in consents issued. Since the start of the Accord on 1 October 2013, 1,226 dwellings have been given building consents in the SHAs and approximately 500 dwellings have been completed.

So existing zoning is supplying the bulk of the building opportunities that are being taken up over the past couple of years. These opportunities were mostly there over the period 2008 to 2013. So was a lack of available zoning really the reason for the deficit to build up over the later part of the 2000s and to cause the increase in median house prices? Or was it more a lack of finance during and after the GFC that slowed the production of apartments and flats and townhouses? Did the leaky building crisis also have an effect on the demand for these types of products? Then the population grew quickly, much more quickly than the housing market could respond.

There is a deficit (or shortage) of housing. Does that deficit explain the massive increase in house prices?

Population spikes and credit squeezes

The impact of a credit squeeze and a population spike on housing markets has been modelled in NZ. Housing markets are 'inelastic' in the short term. It takes time for housing markets to adjust to changes in demand as signalled by higher prices, particularly sudden changes.

The results of modelling of population and credit shocks show that these two occurrences have a big impact on prices and supply.

"One over-arching conclusion across the two simulations is that housing markets are slow to adjust to shocks causing disequilibria, so that exogenous shocks have very long lasting effects. Specifically, we find that an increase in population leads to a prolonged period of upward pressure on prices (houses, land and rents). Full adjustment takes nine years for the modelled population shock. Similarly, tighter credit restrictions following a GFC-sized shock lead to a very prolonged and highly cyclical adjustment in house construction and prices, reflecting both the demand and supply effects emanating from the credit market"².

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<http://www.aucklandcouncil.govt.nz/EN/ratesbuildingproperty/housingsupply/Documents/aucklandhousingaccordmonitoringreport201511.pdf>

² Housing Market Dynamics and the GFC: The Complex Dynamics of a Credit Shock. Arthur Grimes and Sean Hyland Motu Working Paper 13-12 Motu Economic and Public Policy Research October 2013

In the case of the population spike, short run inelasticity of supply means that it takes a while for the housing market to 'catch up' with demand. As noted in the research, the population spike puts upward pressure on house prices which stimulates new supply. But the "increased housing investment causes the housing stock to increase gradually throughout the first nine years of the simulation. The fact that the stock is increasing materially for a further four years beyond the end of the migration surge indicates the lags involved in meeting the residential needs of an abnormal increase in the population".

Does that mean if population shocks get more frequent, the housing market will never catch up between the peaks?

Interestingly, the outcome of the population spike is that "after fifteen years, the housing stock in the model has increased by 9.2% compared with the 11.2% increase in population. Thus there is a permanent increase in the number of people per dwelling following the migration surge as a result of pressure on residential land prices".

The credit crunch affects both buyers and builders. "As expected, the credit shock causes a reduction in house prices and construction activity." An effect similar to a population spike is felt. The reduced housing construction flow through the system.

How much do the population shock and credit crunch affect house prices? The modelling suggested that "the peak house price rise relative to baseline with the population shock is 24% whereas the peak change following the credit shock is 7.5%". These are modelled figures.

The shortage of housing caused by a credit shock and a population spike will drive up house prices, but that shortage is not necessarily the result of a lack of zoning. Having said that, the amount of development capacity available via zoning may influence the speed at which the regional housing market can respond to the housing shortage.

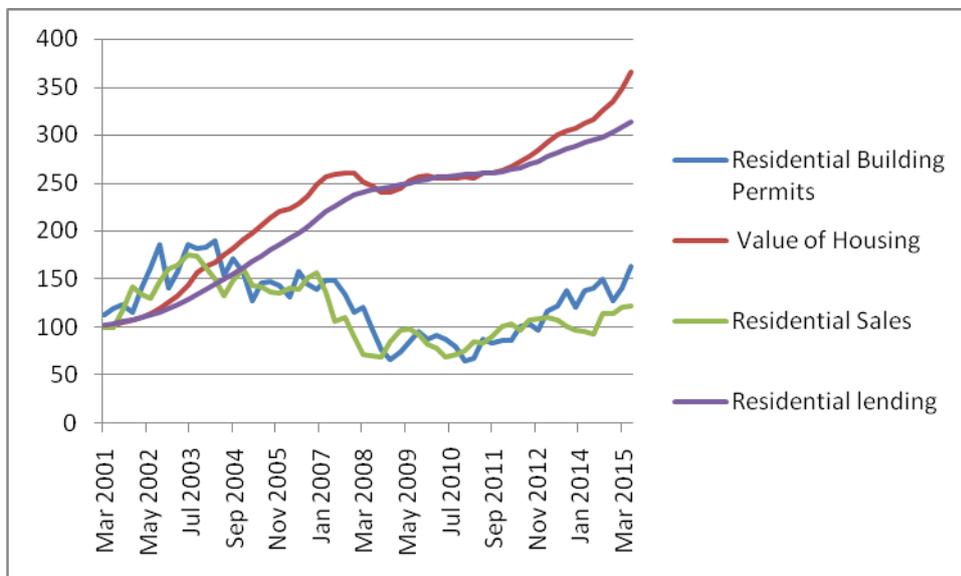
What might drive house prices and housing supply?

The question left unanswered by the above is what drives building permits and what drives house prices. These are big questions that aren't clear to me. And I don't have the answer.

If we go back to the national picture, it is useful to graph four things:

1. House values
2. Money supply (residential lending)
3. Building permits
4. House sales.

Figure 11: Housing prices, money supply, building permits and residential sales



Source: Reserve Bank NZ

Here there are some relationships to contemplate. It makes sense that building permits and house sales follow each other. The demand for new housing is really set by population growth, not house prices as such. There is no benefit in oversupplying houses - demand for housing does not increase beyond that generated by population growth. If car prices drop we may buy two cars, but very few people will buy two houses for use by themselves. Expectations over the ability to sell new houses and whether the overall housing market is busy or slow are also obviously important factors in whether someone is going to build a new house to sell.

As for house prices, the increase in money supply may be the result of the increase in house prices, but it may also be a factor in their growth. The boom in credit that has continued post the GFC needs to find a home. Clearly house prices are no longer related to median incomes, so the prices being asked have to find support from some other factor.

Land prices in urban areas have risen substantially over the past 10 years. Land is a residual value after the cost of building a house. The costs of physically building a house are well known. So the difference between the cost of the house and property price is the land value. That land value reflects locational and amenity factors, but they also must reflect what people are prepared to pay, which links back to what credit they have available. As people like Lovell Manning³ have pointed out "The aggregate "value" of the land portion of the property is determined by the pool of investment money available to purchase and exchange it, not by the land itself or government policy".

³ <http://www.interest.co.nz/opinion/64724/lowell-manning-says-problem-housing-stems-current-account-deficits-and-foreign>

Land values may rise due to future expectations about zoning and supply of housing. Some people may be betting that the supply of housing is fixed by zoning, and so as demand rises, then prices can only go up. This is a big assumption that zoning will not change. On the other hand they may be betting that the zoning will change and as a result there is more development potential which will get reflected in land values. Again another big assumption. I don't think either of these scenarios really explain what is going on.

Looking at it a different way, can a deficit (or over supply of housing) really explain such a change in house prices? House prices are often thought of as a stock and flow. The stock of existing houses tends to set the price for new houses over the short term, but over the long term, if the flow of houses is strong enough, then the stock increases faster than value and the average value of the stock does not increase so much, or may go down. On the other hand, if the flow is too slow, then presumably the value of the stock will go up. With a stock of 500,000 dwellings, does a deficit of 10,000 to 20,000 drive up prices as much as we have seen in Auckland?

The hope is that additional supply of housing will moderate, then hopefully see a decline relative to incomes, in house prices. How much supply is needed is not clear and whether there needs to be a level of supply above demand generated by population growth to suppress house prices is an unanswered question.

If the supply of money grows faster than the supply of housing generated by the base population, then there is a more fundamental problem to grapple with. The pool of investment money may go elsewhere if housing values do not increase as much as alternatives (like the stock market), but again house prices are dependent upon other things than just supply and zoning.

In a globalised world, there is the prospect of pools of investment much in excess of that supported by local incomes and migration spikes larger and more frequent than in the past. Both circumstances pose significant issues for future housing markets.

What have I learned?

Is it a reasonable proposition to say that the lack of supply of housing over the period 2006 to 2015 is a zoning issue? My view is that the zoning issue is overstated in explaining the rise to date in house prices, given the context of a GFC followed by a population spike. We could also refer to the Christchurch earthquake recovery which has drawn off many building resources to the Canterbury area in the period 2011 to 2015, adding to labour and material costs. Supply has been slow, but that's not all the fault of zoning.

Having said all that, planning always needs to think about future housing demand and appropriate zoning and so the current push to increase supply through more zoning is not necessarily wrong or bad. More supply of housing opportunities is needed to meet future demands and more supply opportunities may help to speed up the adjustment process to future population and credit shocks.

This may be a reasonable proposition, but it's a different context to the story of planning trying to solve a problem of its own creation. Rather you could say that planning and zoning has been given the job of trying to fix up a stuff up in the financial sector (credit boom, GFC, then another boom), followed by excessively fast inward migration.

But what and how much of other values and resources needs to be traded off to increase supply options to address these problems? Planning gets blamed for creating high house prices by over protecting resources. But if high house prices are not all the cause of bad planning, then why do we need to trade off these other resources? At some point is it a better outcome to control credit growth and more closely manage immigration spikes?

The consideration of future supply doesn't need to be rushed or panicked, but it is time for a step change in supply opportunities in Auckland. Partly that step change is needed because for the past seven or so years, much planning in terms of new zoning (whether that be up or out) has been on hold in the Auckland Region. In 2008, the Government announced a Royal Commission on the future governance of Auckland. Once that was announced, much planning work slowed down while waiting for the Commission's answer. Then when the answer was provided it has taken time for the new Council to get going. All during the period of the down turn then the upswing. So it is time for some planning.

The bigger issue is that there is the prospect that in response to persistently high land prices caused by more frequent credit booms and busts and population spikes, urban density will need to increase significantly. But who is likely to cop the blame for the need for this significant adjustment?