Land use regulation in New Zealand

Improving the evidence base

NZIER report to the New Zealand Productivity Commission

May 2015

About NZIER

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Each year NZIER devotes resources to undertake and make freely available economic research and thinking aimed at promoting a better understanding of New Zealand's important economic challenges.

NZIER was established in 1958.

Authorship

This paper was prepared at NZIER by Dr Kirdan Lees.

The assistance of the time and effort of participating councils – Christchurch Council, Hamilton City Council, Queenstown-Lakes District Council, Selwyn District Council, Tauranga District Council, Waikato District Council, Waimakariri District Council, Wellington City Council and Whangarei District Council – is gratefully acknowledged.

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Context for this report

To assist with their *Using land for housing* inquiry, the NZ Productivity Commission contracted NZIER to survey land use regulation within New Zealand's 10 fastest-growing local authorities. The survey is intended to complement other information on land use regulation.

NZIER were asked to base the survey on the methodology used in the Wharton Residential Land Use Regulatory Index and alter the survey only where it was not relevant to New Zealand.

NZIER were asked to convert the survey results into an index and analyse and report on the extent to which regulations apply with similar force across New Zealand.

To promote transparency the results of the survey and the construction of the index are publicly available on request in a spreadsheet that complements this report.

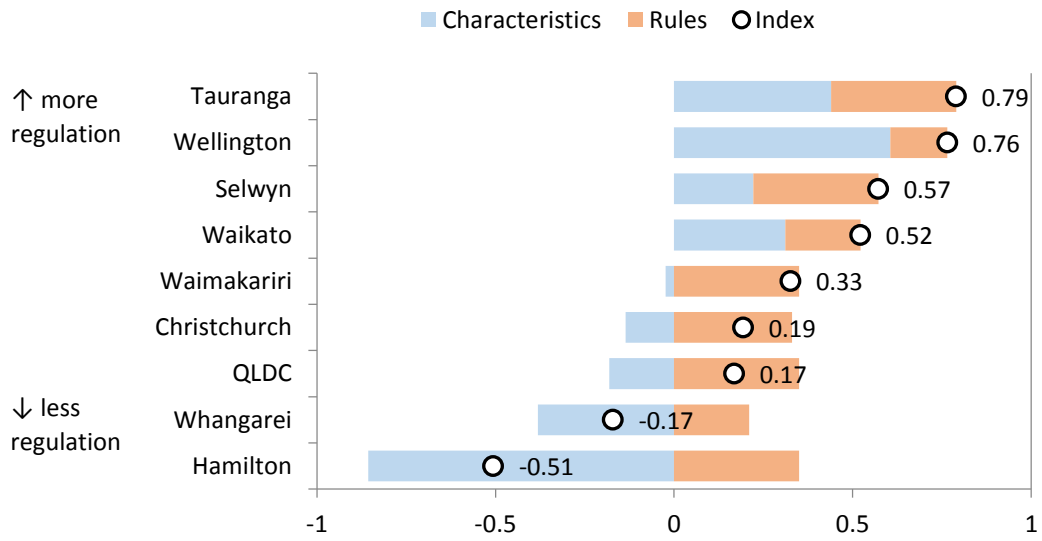
NZIER and the NZ Productivity Commission thank the participating councils and others that have submitted information to the inquiry.

Key points

- This report presents results from a survey aimed at gaining an understanding of the relative stringency of land use regulation across councils. This goes some way to filling a knowledge-gap in regard to local land use regulation in New Zealand
- We asked ten of New Zealand's fastest growing territorial authorities to participate in the survey, which follows an established methodology developed at the University of Pennsylvania's Wharton School
- We find land use regulation applies with different stringency across New Zealand (see figure below)
- The more regulated areas, at least as measured by our index, tend to have similar land use regulation process characteristics such as higher influence from local community groups. More regulated areas tend to have similar land use regulations such as rules for developers to provide open spaces

Land use regulation stringency varies across jurisdictions

Raw land use regulation index



Source: NZIER

- House prices are positively correlated with stringency of land use regulation but for our small sample, this is not statistically significant
- We do find our land use regulation index is positively associated with self-reported measures of the cost of new infrastructure and is positively associated with our measures of city budget constraints, suggesting access of finance may be important

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1. Why measure land use regulation?

1.1. Land use regulation can have large impacts

Rising house prices have focussed efforts to identify the drivers

The price of housing matters for a range of economic, social and financial outcomes for New Zealanders, not least, because home ownership serves as the main savings vehicle for many New Zealanders.

As house prices have soared across many parts of New Zealand over the past 15 years researchers and policymakers have sought to identify the factors that have caused rising prices.

Part of the house price puzzle has been the variation across New Zealand. A nationwide surge in housing prices in the early-to-mid 2000s has been closely followed by a period of stark regional differences: house prices continue to rise in Auckland and Christchurch but remain flat elsewhere. Relevant influences on housing supply include the constraints on the physical geography of particular regions, residential construction productivity and the impact of migration.

Land use regulation plays a role

But the responsiveness of housing supply depends on more than geography and physical constraints. Land use regulation also matters (see Grimes and Liang 2007, Grimes and Aitken 2010 and New Zealand Productivity Commission 2012).

Land regulations have benefits but can limit the availability of well-located land and how efficiently existing land is utilised thereby inhibiting supply and increasing house prices. The impacts can be material given that land value is a large chunk of the cost of a purchasing a home.

Other factors also come into play. On the supply side, prices are affected by geographical constraints on land use and productivity of the construction industry. On the demand side, migration can boost demand and hence prices and some geographical areas are inherently more attractive than others.

Nonetheless, regulation of land use will affect prices both directly, by limiting land supply, and it can affect house prices indirectly through administrative delays and uncertainty (see Grimes and Mitchell 2015, who look at the costs but not the benefits of the administrative aspects of land use regulation in New Zealand).

Many international researchers confirm that land use regulation contributes to rising housing costs in a number of different contexts (see for example, Glaeser et al 2003, Glaeser and Ward 2009, Sheppard and Cheshire 2002, Ihlanfeldt 2007 and Gurran 2009).

Gyourko (2009) goes further and argues that differences in housing supply responsiveness are critical to understanding the different behaviour in house prices:

> *"Heterogeneity in supply conditions across markets is shown to be essential to understanding the growing price dispersion across metropolitan areas, as well as to understanding whether positive growth shocks to a metropolitan area manifest themselves more in terms of expanding population and homebuilding or in terms of higher wages and house prices."*

Expect variation in the impact across regulations and across regions

But there exist differences in the impact of land use regulation from both the type of regulations used in different regions and the impact of the same land use regulation applied in different contexts. Locations with different geographies (Manhattan, for example) or demographics (population inflows are likely to be important) should expect different outcomes. Caldera and Johansson (2013) argue that the impacts of land use regulation vary in *combination* with other factors.

1.2. There is a knowledge gap

Detailed data on local housing market *outcomes* is available; including house prices and population densities, but no consistently collected data is available on land use regulation in New Zealand. Skidmore (2014) notes:

> *"While the regulatory environment can limit supply of new housing, little is known about the differences in regulations across New Zealand."*

This is partly because, like elsewhere in the world, land use regulation in New Zealand is controlled locally and can differ markedly across jurisdictions. This makes it difficult to evaluate the extent of regulation and the likely impact on housing markets.

There is some detailed local information available, for example the list of rules and regulations and where they apply in Wellington's District plan. But such plans contain only limited information on the stringency with which regulations are applied and are difficult to compare across jurisdictions.

Some information is also available on particular councils. For example, Balderston and Fredrickson (2014) provide some insight into the capacity for growth in Auckland based on detailed information on the incidence of land use regulation. But a comparative study requires similar information across other local councils to evaluate the impact of different policies.

Other councils do provide information, but comprehensive detail is required. Relying on only one or two types of land use regulation as benchmarks, such as height restrictions or minimum lot sizes, could be misinterpreted if different councils use different types of regulation to achieve the same objectives (see Gyourko, Saiz, and Summers 2008).

We follow the survey design behind the Wharton Land Use Regulation Index because the survey is internationally recognised and has been widely used (see for example, Saiz 2010, Turner, Haughwout and van der Klaauw 2014 and Titman et al 2014).

Second, sticking as closely as possible to an existing method, helps improve the independence of our analysis.

Third, adopting an existing approach reduces the time and resources required to compare land use regulations across localities.

We use self-reported data

The survey uses self-reported data that comes with opportunities and challenges. On the plus side, self-reported data is less costly to collect and allow us to access expert opinion relatively quickly.

But self-reported data can be subject to biases and different influences that can distort results (see Bound 1991, Daltroy et al 1999, Harrison 1997).

Using Likert scores to obtain quantitative measures can be helpful (see Likert 1932 for the original paper) and validating self-reported measures using the ratings of others is possible to help overcome bias (see Crandall 1976).

Even using multiple opinions to reach conclusions can reduce bias (see Surowiecki 2005) but to target expert-opinion within the planning function at our councils we use the self-reported measures. Examples of the specific titles of our respondents include: General Manager – Planning and Development, Manager – Planning and Strategy and General Manager – Strategy. These roles are our target respondents.

Although our target sample size is small – ten of the fastest growing territorial authorities – the response rate was high. Nine councils responded to the survey. Given the tight timeframes, scale of the area covered and complexity of some of the questions, Auckland Council declined to participate.

Tailoring the survey to New Zealand

A small amount of tailoring was required before implementing the survey for several reasons. Several of the questions in the Wharton survey are not relevant for New Zealand. For example, New Zealand does not have an equivalent to state courts. Nor do local authorities have responsibility for overcrowding of schools – a question asked in the US Wharton survey.

Some of the language is also unlikely to be appropriate to the New Zealand context. For example, family and multi-family units are not standard terminology with New

Zealand's urban planning community. So we tailored a small number of the survey questions to better match terms used in the New Zealand environment.[1]

In addition, when conducting the survey, we asked councils:

> "What is the current average length of time required to complete resource consents for residential developments in your community?"

Many councils reported 20 days – the legal maximum number of days for councils to respond. Combined with our small sample, the clustering of responses on 20 days distorts relative responses across councils when we normalise the responses – as per the Wharton index. Rather than include distorted responses that relate to delays in the consenting process we dropped this section of the survey when constructing our index of land use regulation stringency but also present the full set of responses.

There is certainly precedent for our approach – Pendall, Puentes and Martin (2006) do not include questions that relate to delays in the consent process. While such delays may not be directly associated with land use regulation stringency, complex and wide-ranging rules might be associated with delay. Gyourko, Saiz, and Summers (2008) discuss the issue as follows:

> *"…one important difference between our survey and Pendall, Puentes, and Martin (2006) is that we included questions on approval delays for hypothetical projects. As we document below, our index loads heavily on this information and believe it is an important local trait. However, it is for future research to determine conclusively whether this attribute is critical in defining the local regulatory environment and whether it can account for patterns in price differences and construction activity across places."*

In a similar vein, even though we omit questions on delay from our index we provide access to the full set of responses, including questions on delay. Box A provides more detail on how we conducted our survey and we provide the full survey in Appendix A.

[1] We employed a leading New Zealand academic to check the survey methodology is fit-for-purpose and used a consultant specialising in questionnaire (and form) design and evaluation to advise on survey design.

2. Our approach to measuring land use regulation

2.1. Existing approaches to measuring land use regulation

Researchers have not reached agreement on how best to measure the relative effects of land use regulations. This is in large part because the task is complex. The number and application of land use regulations varies extensively in spatial range both within and across countries – let alone any variation in application. Differences in land use regulation across locations are extensive and capturing the complexity of these differences can be extremely difficult (see Gyourko and Molloy 2014).

Deep and narrow vs broad and wide

Gyourko and Molloy (2014) characterise measurement efforts to date as operating along two lines (i) a "deep but narrow approach", with extremely detailed (deep) regulation information on a single (narrow) location; and (ii) a "shallow but wide approach" where general regulatory characteristics are captured across a wide range of locations, most typically, a census of locations.

One example of a deep but narrow study in the United States is Glaeser, Schuetz, and Ward (2006) who constructed detailed estimates of existing and potential housing supply within only a fraction of the city of Boston.

Gyourko and Molloy (2014) note that the Glaeser, Schuetz, and Ward (2006) research was conducted by a team and over a two-year period that included documenting land use regulation across 187 communities, supplemented with surveys and interviews of local officials. They concluded that replicating that "deep and narrow" methodology across several areas would be very costly.

The Wharton Land Use Regulation Index

Perhaps the best example of the shallow but wide approach is the work by Gyourko, Saiz, and Summers (2008) which produced the Wharton Land Use Regulation Index. Gyourko, Saiz, and Summers (2008) surveyed over 2,000 communities in the United States. The survey responses were used to construct an index of the stringency of land use regulation.

The index is based on the answers to three sets of questions on (i) general characteristics of the process of land use regulation, including who is involved in the process and who can approve or veto development; (ii) local rules that could set constraints on aspects of land use such as density, minimum lot sizes and the requirement to provide affordable housing for example; and (iii) changes or perceptions of changes in the cost of development over the past ten years.

Gyourko, Saiz, and Summers (2008) break down their index into eleven sub-indices that measure different aspects of land use regulation and go on to compare the stringency or restrictiveness of land use regulation – as measured with their index – to different features of local communities.

One of their key observations is that land use regulation tends to be highly correlated across the sub-indices, consistent with land use regulation originating from interest groups and the political process rather than using specific instruments to target to specific local features.

Gyourko, Saiz, and Summers (2008) find that Boston and parts of New England are the most heavily regulated locations while the Mid-West and the South are relatively less heavily regulated. Their land use index correlated strongly with wealth in local communities. They also report that median house prices in the most highly regulated places are nearly twice the median price in lightly-regulated locations. Median house prices are weakly correlated with their land use regulation index (0.33).

Other approaches

Gyourko, Saiz, and Summers (2008) stands within a history of survey-based approaches to measuring land use regulation. For example, Katz and Rosen 1987, augment regressions of house prices with surveyed measures of land use regulation stringency. Glickfeld and Levine (1992) used a survey similar in concept to Gyourko, Saiz and Summers (2008) to assess land use regulation across many Californian communities. Pendall, Puentes, and Martin (2006) find a wide variety of regulatory regimes from their survey of the 50 largest metropolitan areas in the United States.

Other methods combine land use surveys with GIS measures of the geographical constraints on housing supply – including steeply sloping land and bodies of water – to estimate the impact of land use regulation on housing (see Saiz 2010).

Glaeser, Gyourko and Saks (2006) use the gap between housing prices and marginal construction costs as a signal of the stringency of land use regulation. That method requires observations on the market price of land to infer the gap to the marginal cost of supplying housing. Typically, there are far fewer observations on sales of undeveloped land relative to sales of existing or new housing stock. That makes this approach difficult to implement within some regions.

2.2. How our approach works

Since land use regulation can be complex and can take different forms, it can be useful to work with an index that acts as a summary measure of stringency of land use regulation. Researchers in the United States have produced a range of different indices (see Gyourko, Saiz and Summers 2008 and Glickfeld and Levine 1992). Often these indices are then used in empirical research that relates land use regulation to house prices (see Katz and Rosen 1987, Wheaton, Chervachidze and Nechayev 2014 and Turner, Haughwout and van der Klaauw 2014, for example).

Our focus here is narrower and limited to extending the evidence base for the ten fastest growing territorial authorities. We document the individual responses to the survey questions but also construct a land use regulation index using the methodology in Gyourko, Saiz and Summers (2008).

Gyourko, Saiz and Summers (2008) also characterise the most regulated areas as jurisdictions with multiple community groups influencing decision making. That tends to be associated with high use of density restrictions, exactions, requirements for developers to provide open spaces, and long delays in the application and approval process.[2]

2.3. How we produce the index

To produce the index we first create nine sub-indices from particular parts of the survey (see Table 1). These indices span a number of dimensions of land use regulation.

Rather than combine all questions, Gyourko, Saiz and Summers (2008) construct 11 sub-indices designed to measure different aspects of land use regulation. We follow the same approach but drop one index that does apply in the New Zealand context (their state court involvement index that uses a dataset on court outcomes, see Fosters and Summer 2008) and drop the delay index where we found many too many responses clustered on a single outcome (20 days) to preserve relativities across councils.

Since we tailor the question in Gyourko, Saiz and Summers (2008) to the New Zealand context, we detail the questions that each sub-index draws on in Box A.

[2] Gyourko, Saiz and Summers (2008) also note that local communities that use direct democracy through voting mechanisms at local town hall meetings tend to have the most restrictive land use regulation.

Table 1 Our sub-indices

Index No.	Index name	Description	Wharton Index weights	Survey questions used
1	Local Political Pressure Index (LPPI)	Measures influence of local groups	0.22	Q1, Q4a, Q4b
2	Regional Political Involvement Index (RPII)	Measures influence of regional councils	0.22	Q1
3	Court Involvement Index (CII)	Measures the influence of courts	-0.03	Q1
4	Local Zoning Approval Index (LZAI)	Measures extent to which local organisations have influenced zoning	-0.04	Q2
5	Local Project Approval Index (LPAI)	Measures extent to which local organisations have influenced projects	0.15	Q3
6	Supply Restrictions Index (SRI)	Captures explicit constraints on the number of projects	0.09	Q5
7	Density Restrictions Index (DRI)	Captures density restrictions such as minimum lot sizes	0.19	Q6
8	Open Space Index (OSI)	Measures whether developers are required to develop open spaces	0.14	Q6
9	Exaction Index (EI)	Measures whether developers are required to pay for new infrastructure	0.02	Q6

Source: NZIER

Box A: The components of the land use index

1. The Local Political Pressure Index (LPPI)

This sub-index tracks the involvement of various local actors in the development process and is constructed by summing the response to:

Q1. How involved are the following groups and organisations in the planning, zoning and approval of housing developments by the council?

(i) Local Community Boards and Committees

(ii) Community pressure

(iii) City or District Councils

Q4a and Q4b: How important have the following things been in influencing the rate of residential development in the community?

(i) City budget constraints

(ii) City Council opposition to growth

(iii) Citizen opposition to growth

So the index is:

LPPI = Q1.Local Community Boards + Q1.Community pressure + Q1.City or District Councils + (4a.City budget constraints + 4b. City budget constraints)/2 + (4a.City council opposition to growth + 4b. City council opposition to growth)/2 + (4a.Citizen opposition to growth + 4b.Citizen opposition to growth y budget constraints)/2

2. The Regional Political Pressure Index (RPPI)

In Gyourko, Saiz and Summers (2008), this index relates to political involvement at the state level. We substitute regional council for state involvement using question:

Q1. How involved are the following groups and organisations in the planning, zoning and approval of housing developments by the council?

(iv) Regional councils

so the index is:

RPPI =Q1.Regional Councils

We normalise the variable.

3. The Court Involvement Index (CII)

In Gyourko, Saiz and Summers (2008), this index relates to political involvement at the state level. We substitute regional council for state involvement using question:

Q1. How involved are the following groups and organisations in the planning, zoning and approval of housing developments by the council?

(v) Special purpose courts (Environment Court etc.)

(vi) General courts

so the index is:

CII = Q1.Special purpose courts + Q1.General courts

Again, we normalise the variable.

4. Local Zoning Approval Index (LZAI)

The Local Zoning Approval Index (LZAI) measures to what extent organisations have influenced the approving zoning changes using the responses to the questions:

Q2. How influential have the following groups and organisations been in approving zoning changes? Please use this scale of 1-5 (where 1 is not at all influential and 5 is extremely influential).

(i) Local community boards

(ii) City/district councils

(iii) RMA Hearing Commissioners

(iv) Board of Inquiry (special purpose)

(v) Environment Court

(vi) Higher courts

So the index is:

LZAI = Q2(Local community boards + city/district councils + RMA Hearing Commissioners + Board of Inquiry + Environment Court + Higher courts)

We normalise the variable index by benchmarking at the average that we set equal to zero.

5. Local Project Approval Index

The intent of the Local Project Approval Index (LPAI) is to track how much organisations have influenced the approving of specific projects. We use the responses to the following questions to assist:

How influential have the following groups and organisations been in approving a new housing development? Please use this scale of 1-5 (where 1 is not at all influential and 5 is extremely influential).

(i) Local community boards

(ii) City/district councils

(iii) Board of Inquiry (special purpose)

(iv) Environment Court

(v) Higher courts

LPAI = Q3(Local community boards + city/district councils + Board of Inquiry + Environment Court + Higher courts)

We normalise the index.

6. Supply Restrictions Index

The goal of Gyourko, Saiz and Summers (2008) Supply Restrictions Index (SRI) is to measure any direct constraints, caps or limits on the supply of new housing.

The index uses the responses to the question:

Q5. Is there an annual limit imposed by the community on the total number of:

(i) stand-alone houses authorised for construction

(ii) number of apartments and townhouses authorised for construction

(iii) number of residential units authorised for construction

(iv) number of apartments and townhouse buildings

(v) number of units in apartments and townhouse buildings

SRI = Q5(stand-alone houses + number of apartments + number of residential units + number of apartments and townhouses + number of units in apartments and townhouses). The index is then normalised to have a mean of 0 and a standard deviation of 1.

7. Density Restrictions Index

This index tracks the degree to which local land use regulation cares about density using the minimum lot size question:

Q6: To build, do developers have to meet any of these requirements?

(vi) minimum lot size requirement

Gyourko, Saiz and Summers (2008) use a one-acre minimum that we also use here. The index is:

DRI = 1 if Q6 minimum lot size=”yes” and “lot size>one acre”, else 0.

8. Open Space Index

Often developers have to supply open spaces as part of new developments or pay fees that support the development of open spaces. We simply track this in our survey by using a dummy variable that takes a value of 1 in response to:

Q6. To build, do developers have to meet any of these requirements?

(ii) Supply mandatory dedication of space or open space (or fee in lieu of dedication)?

So the index is:

OSI = 1 if Q6 mandatory space dedication =”yes”, else 0.

9. Exactions Index

Developers often have to pay fees to help fund infrastructure. These development or exaction fees are measured using the following question in our survey:

Q6. To build, do developers have to meet any of these requirements?

(iii) Pay a share of costs of infrastructure improvement?

So the index is:

EI=1 if Q6 pay a share of costs=’’yes”, else 0.

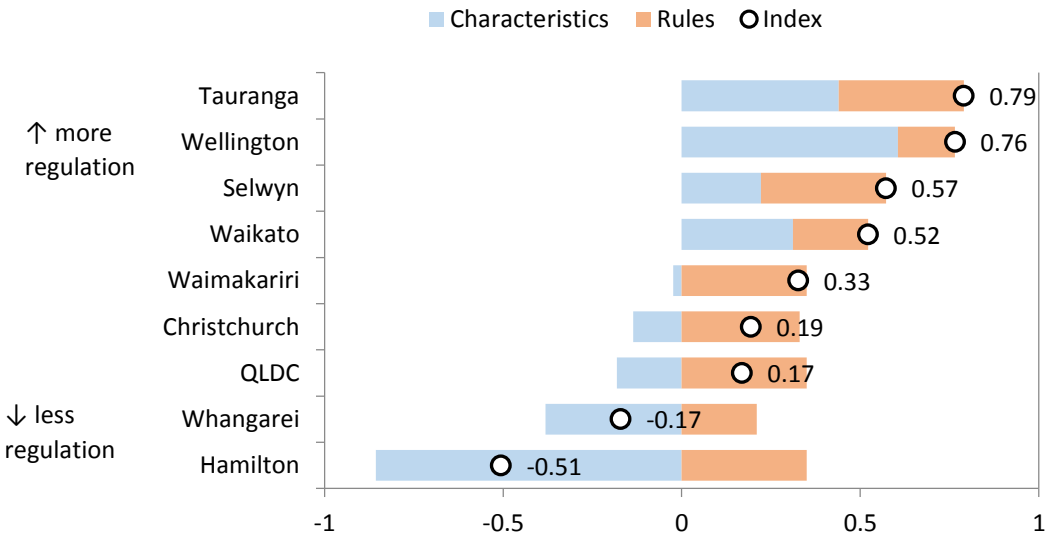
3. Results

3.1. Do land use regulations apply with the same stringency across New Zealand?

We find differences in stringency, as measured by our index, across New Zealand. High values of the index indicate more regulation and low values indicate less regulation. Tauranga posts the highest value in the index, closely followed by Wellington City Council. Waimakariri sits in the middle of the pack while Hamilton is considerably lower than its peers. Figure 1 shows the results.[3][4]

Figure 1 Land use regulation stringency varies across jurisdictions

Land use regulation index



Source: NZIER

To show the main drivers of our results we also decompose the index values for each participant into two components:

- land use regulation characteristics (sub-indices for Local Political Pressure (LPPI), Regional Political Involvement (RPII), Court Involvement (CII), Local Zoning Approval (LZAI), Local Project Approval (LPAI)
- rules (sub-indices for Supply (SRI), Density Restrictions (DRI), Open Space (OSI) and Exactions (EI).

Tauranga posts above-average results in the two sub-components, indicating more regulation, while the result for Hamilton is principally driven by characteristics.

[3] Since we have only a small number of observations, we report the raw index rather than normalising the index, the approach pursued in Gyourko, Saiz and Summers (2008).

[4] We test for normality of our data. The Jarque-Bera test rejects normality at the 5 percent level of significance (as is the case with the Wharton survey) but the Kolmogorov-Smirnov test and Lilliefors test do not reject normality.

3.2. Do highly regulated areas share characteristics?

Do local groups play a larger role in New Zealand's more-regulated jurisdictions?

To check the case for our fastest-growing territorial authorities we chart the responses to survey questions 1-4 in Figures 3-7. These questions primarily relate to the general characteristics of participation and influences in the regulatory process of land use regulation.

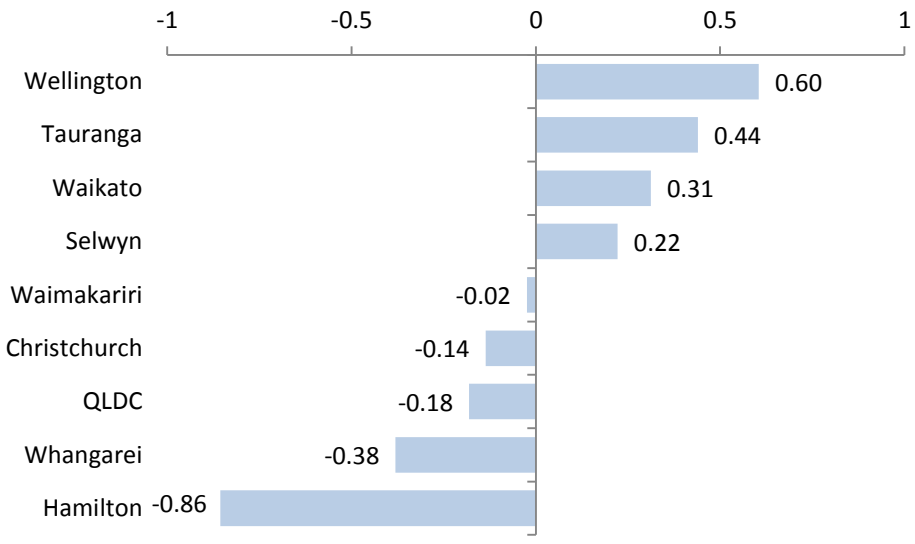
Figure 3 suggests that there are clear differences across the involvement of groups in the planning, zoning and approval of housing developments. Community pressure is highest in Wellington and Selwyn and there is strong regional council involvement in Selwyn, Tauranga and Wellington. Courts appear relatively involved with planning in Queenstown Lakes District Council (QLDC). Figure 4 and Figure 5 show similar differences across jurisdictions for the influence of the same local groups on the planning process and housing developments. Generally speaking, the more-regulated jurisdictions tend to have stronger influences from local groups.

Figure 6 reports the influences on the rate of development of stand-alone houses. Tauranga reports relatively high values for the cost of infrastructure and the city budget. Figure 7 shows what influences the rate of development of townhouses and apartments – Tauranga and QLDC note particularly strong citizen opposition to growth plays a role.

These questions help form our 'characteristics' sub-index that captures the regulatory environment rather than specific rules. Figure 2 below shows material differences in land use regulation characteristics across the jurisdictions we study.

Figure 2 Land use characteristics drive stringency in some jurisdictions

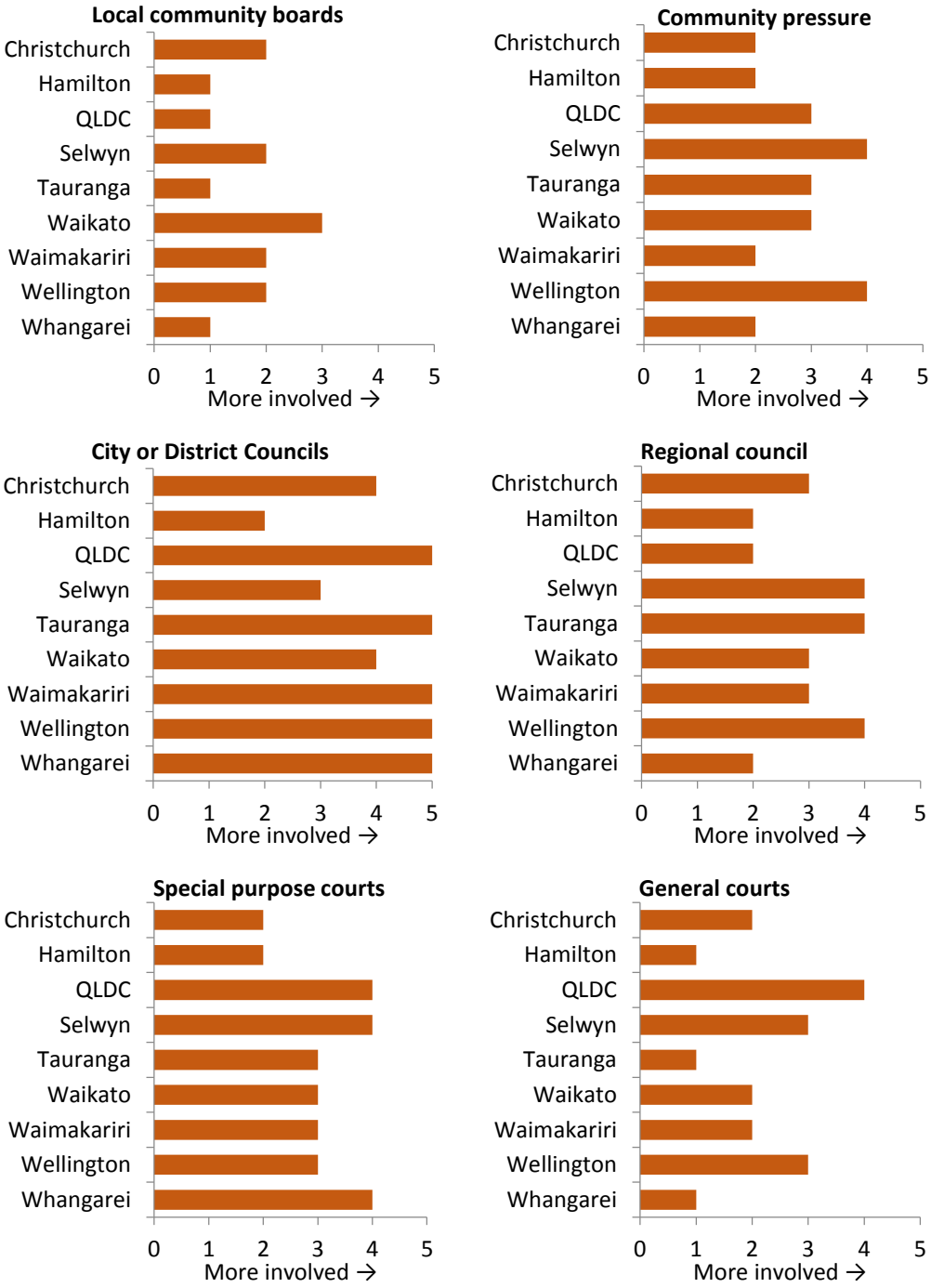
'Characteristics' sub-index



Source: NZIER

Figure 3 How involved are groups in planning and zoning?

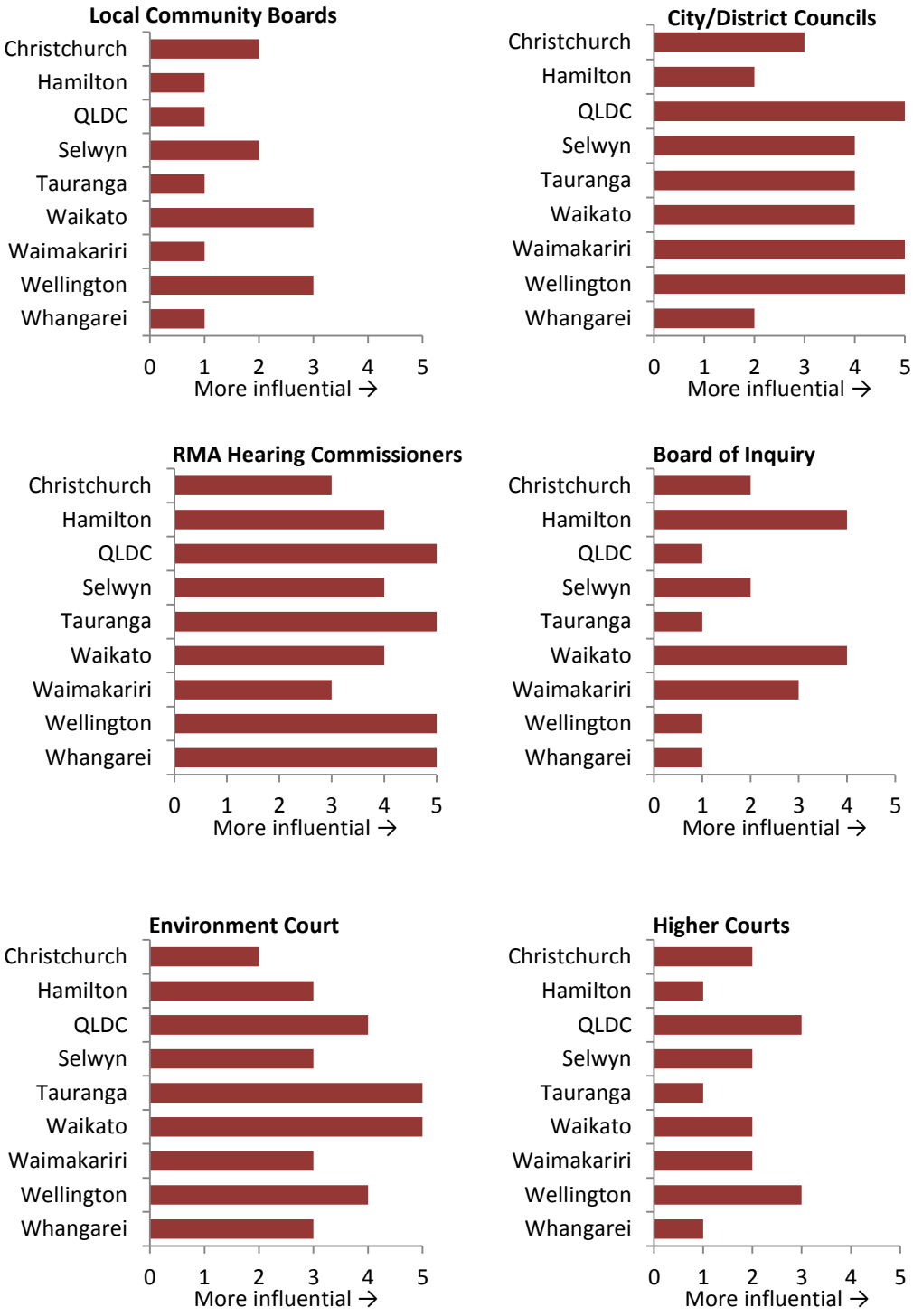
How involved are the following groups and organisations in the in the planning, zoning and approval of housing developments by the council? Please use this scale of 1-5 (where 1 is not at all involved and 5 is extremely involved)



Source: NZIER

Figure 4 How influential are groups in planning and zoning?

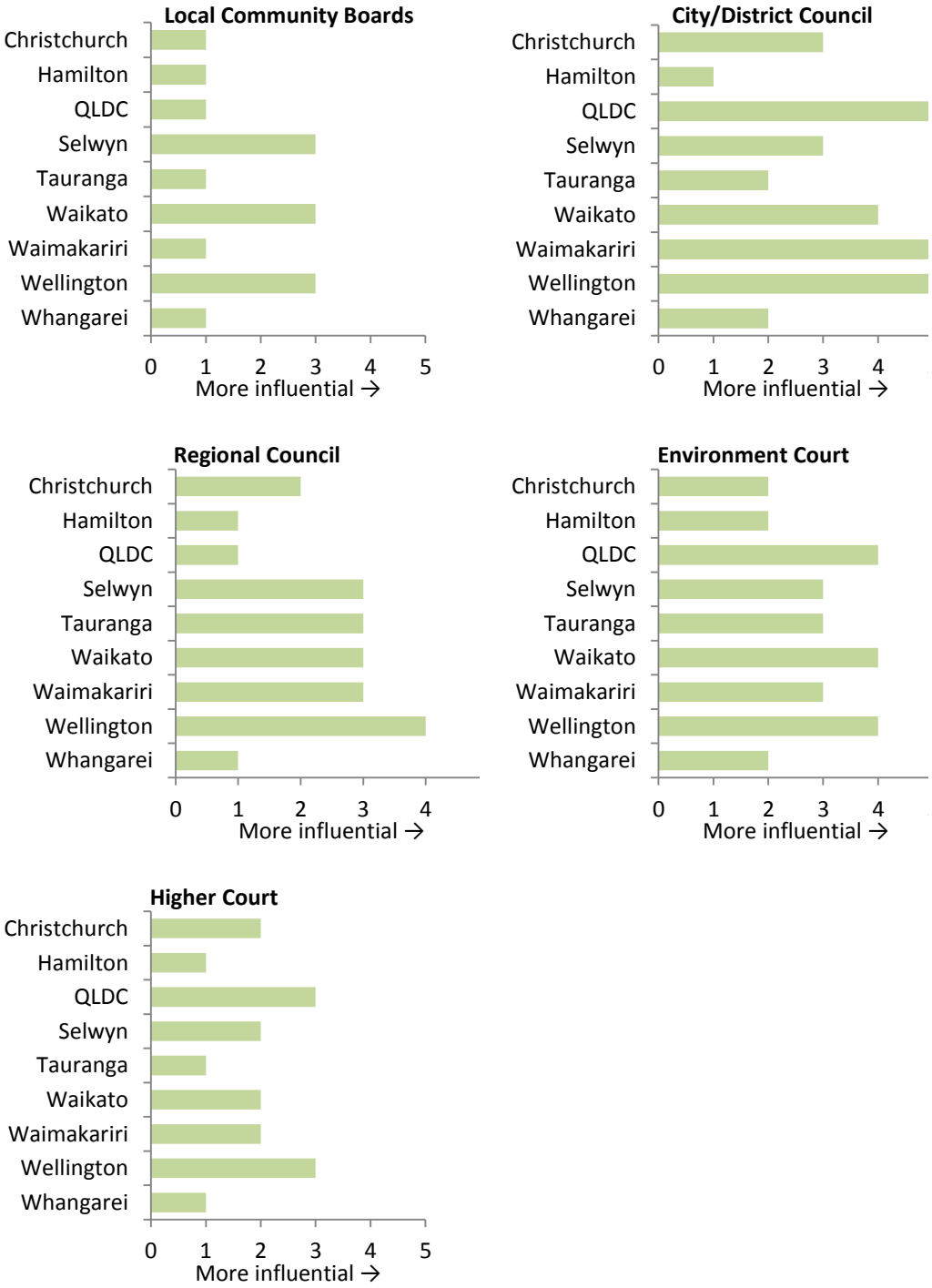
How influential have the following groups and organisations been in approving zoning changes? Please use this scale of 1-5 (where 1 is not at all influential and 5 is extremely influential



Source: NZIER

Figure 5 How influential are groups in approving development?

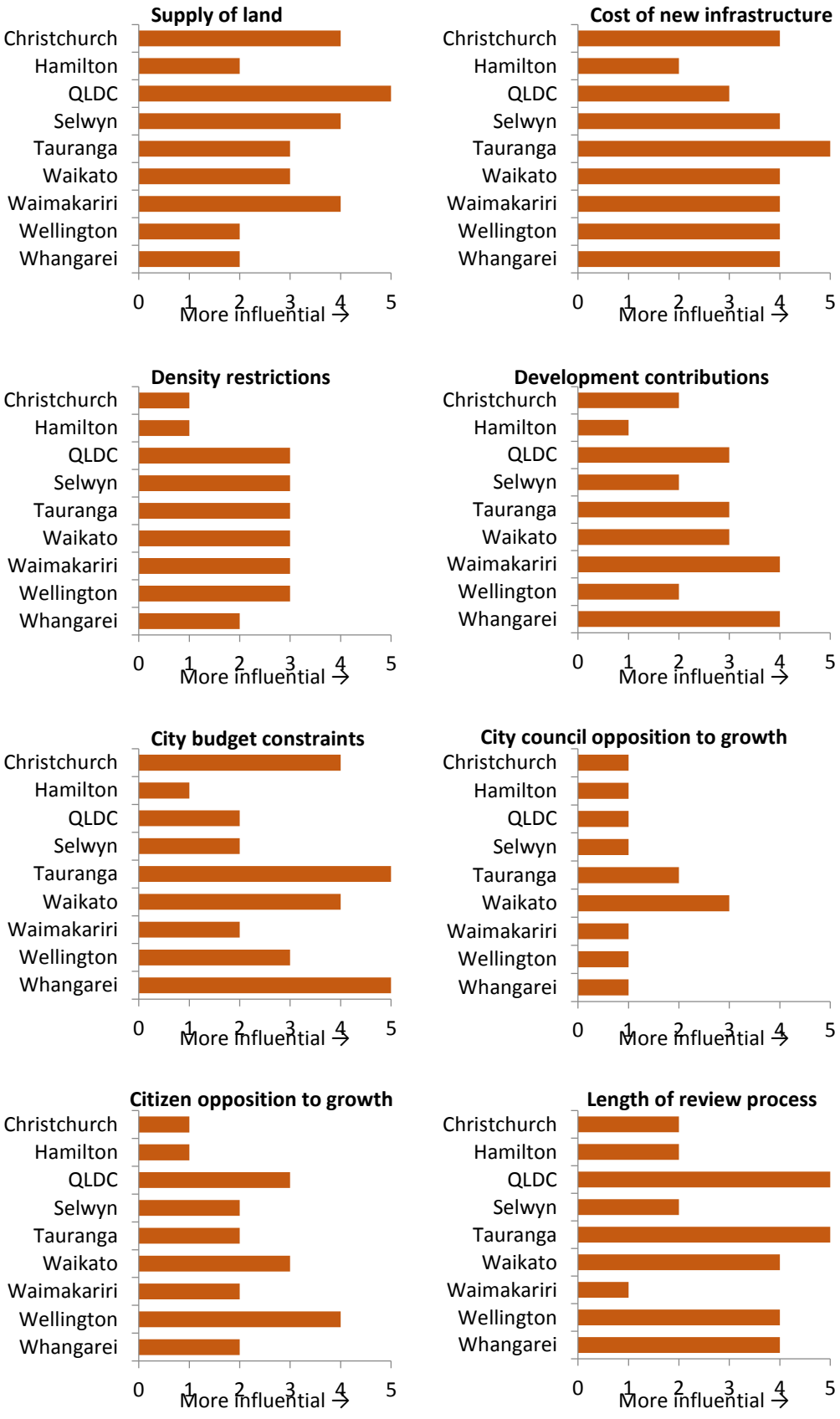
How influential have the following groups and organisations been in approving a new housing development? Please use this scale of 1-5 (where 1 is not at all influential and 5 is extremely influential).



Source: NZIER

Figure 6 What influences the rate of residential development?

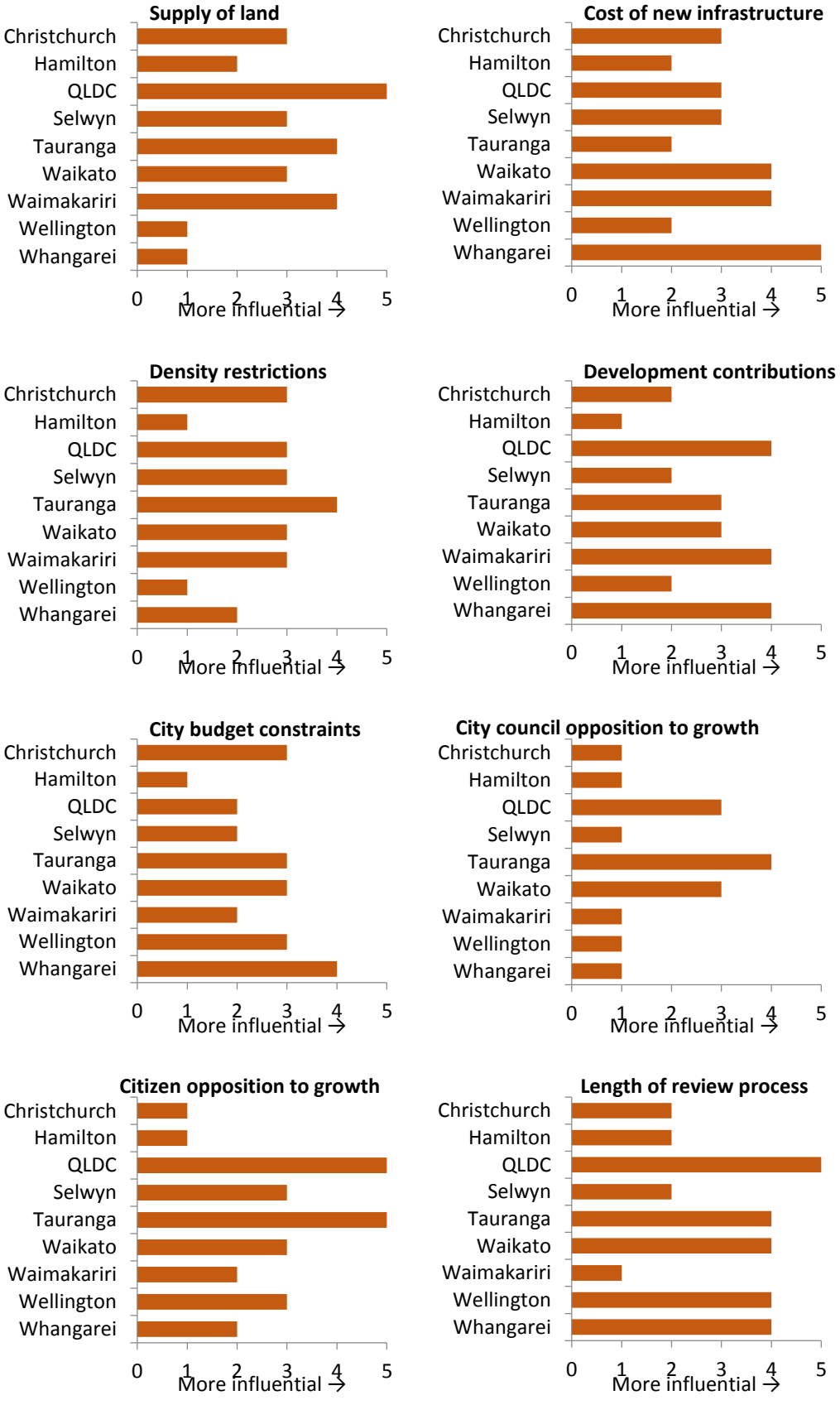
4a. Just thinking about stand-alone houses, how important have the following things been in influencing the rate of residential development in the community? Please use this scale of 1 to 5 (where 1 is not at all important and 5 is extremely important)



Source: NZIER

Figure 7 What influences developing townhouses and apartments?

4b Just thinking about townhouses and apartments, how important have the following things been in influencing the rate of residential development in the community? Please use this scale of 1-5 (where 1 is not at all important and 5 is extremely important).



Source:NZIER

Can we infer anything from the correlation of constraints on land use regulation?

Gyourko, Saiz and Summers (2008) make the point that for the US, most highly regulated areas tend to be highly regulated across most land use instruments with the converse true for lightly regulated areas. For the US, the stringency of regulation is correlated with the breadth and the number of regulations.

Understanding the correlations across land use regulation could shed light on the underlying drivers of land use regulation. For example, observing high correlation across the type of instruments used might be indicative of a local political process rather than the use of highly targeted land use instruments designed to solve issues specific to particular locations.

While there are some differences across the territorial authorities, such as the requirement to provide affordable housing in QLDC, questions 5 and 6 evoke similar responses across the fastest-growing territorial authorities we focus on.

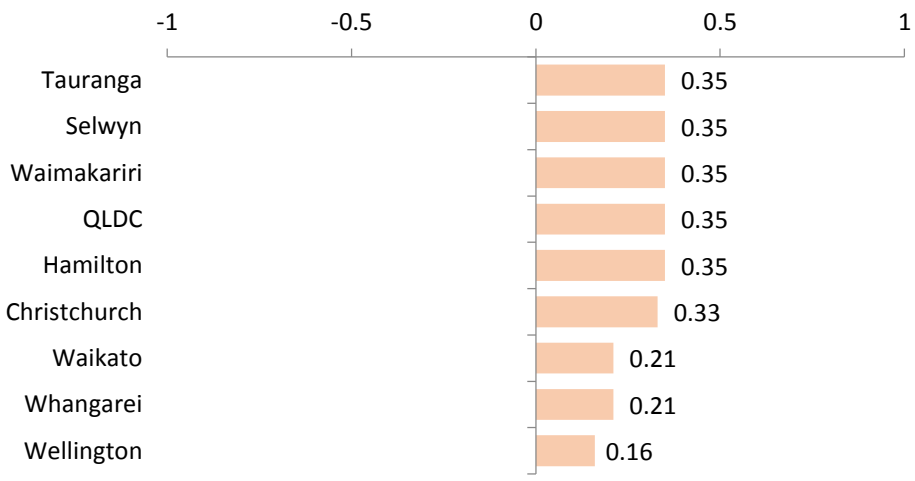
Figure 10 tabulates the incidence of specific land use restrictions. Question 5 refers to community specific quantity constraints on the number of dwellings, such as stand-alone houses, townhouses, apartments and units within apartments. Such regulations are prevalent in the US context but are not applied by any of our participating territorial authorities.

Question 6 asks a range of questions that relate to charges developers may incur for infrastructure development and charges in lieu of the provision of open space. Question 6 also asks about affordable housing provision and minimum lot sizes.

Figure 8 summarises these questions on the incidence of specific land use regulations into our 'rules' sub-index. While there are some similarities across the most-regulated regions, there are a range of experiences across New Zealand – Waikato, Whangarei and Wellington have less stringent rules according to our index.

Figure 8 Land use rules can be more stringent in some jurisdictions

'Rules' sub-index



Source: NZIER

What about delays in acquiring approval for development projects?

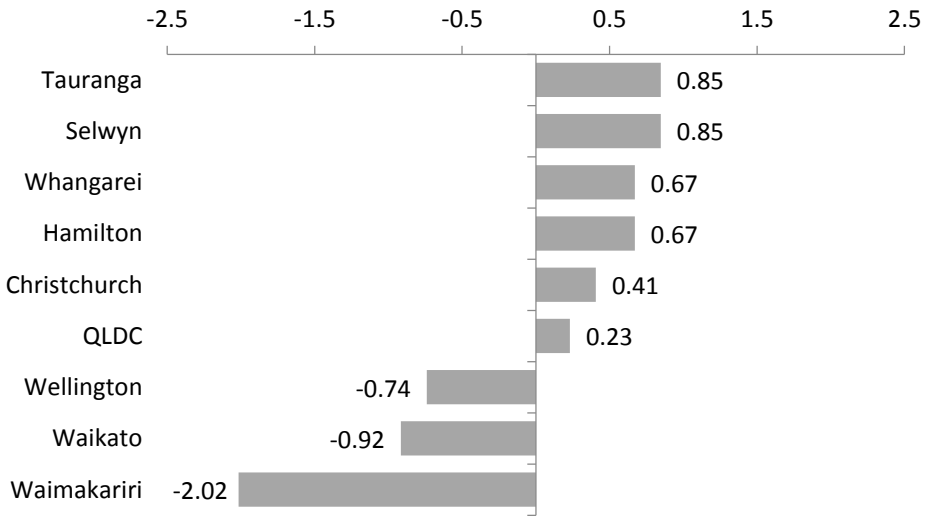
Our survey asks several questions about delays in the consenting and approval process and changes in the costs of new housing and new housing lots. Five of the nine reports the same length of time (20 days) but differences are large where they exist. This distorts the index when we follow the approach of the Wharton index and normalise the responses. The fastest two territorial authorities complete consents in less than a quarter of the time of the five slowest. This can be seen in Figure 11 (on page 25) which shows that Wellington and Waimakariri report much shorter time frames for attaining a consent than the other respondents.

We construct the delay index by taking the average number of days in question 10 ("What is the current average length of time required to complete resource consents for residential developments in your community?") and the average number of months for question 12 ("For apartments and townhouses, what is the typical amount of time between application for rezoning and issuance of a building permit for development?"). Then we normalise the index to have a mean of zero.

Many of the changes in costs are also materially different across territorial authorities and Selwyn report a relatively short time (less than 3 months) between the amount of time between application for subdivision approval and the issuance of a building permit across a range of housing types. These differences are manifest in the aggregate delay sub-index shows in Figure 9 that shows evidence of marked differences across New Zealand.

Figure 9 Differences in delay are considerable across jurisdictions

'Delay' raw sub-index



Source: NZIER

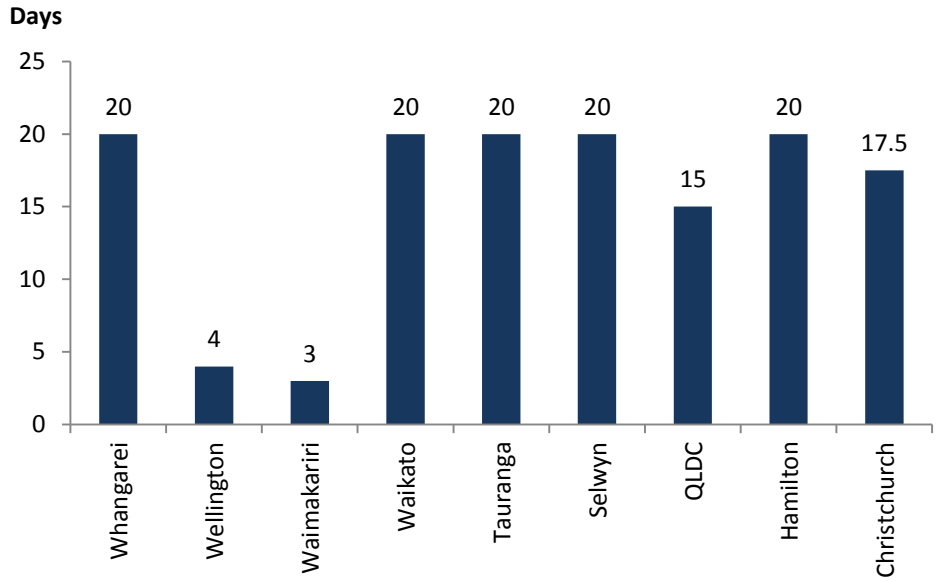
Figure 10 Incidence of residential land use regulation

	Christchurch	Hamilton	Wellington	QLDC	Selwyn	Tauranga	Waikato	Waimakariri	Whangarei
5. Is there an annual limit imposed by the community on the total number of:									
Number of stand-alone houses authorised for construction?	No	No	No	No	No	No	No	No	No
Number of apartments and townhouses authorised for construction?	No	No	No	No	No	No	No	No	No
Number of residential units authorised for construction?	No	No	No	No	No	No	No	No	No
Number of apartments and townhouse buildings?	No	No	No	No	No	No	No	No	No
Number of units in apartment and townhouse buildings?	No	No	No	No	No	No	No	No	No
6. To build, do developers have to meet any of these requirements?									
Include "affordable housing" (however defined)?	No	No	No	Yes	No	No	No	No	No
Supply mandatory dedication of space or open space (or fee)?	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No
Pay a share of costs of infrastructure improvement?	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Provide a certain mix of dwellings (eg stand-alone and high-density) within developments?	No	No	No	Yes	Yes	No	No	No	No
Provide a certain mix of units within a townhouse or apartment development	Yes	No	No	No	No	No	No	No	No
Meet the minimum lot size requirement?	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes
6b. If yes, what is the typical min. lot size?	Varies	400m2			350m2†	325m2	450m2	600m2	500m2

Source: NZIER

Figure 11 Wellington and Waimakariri report shorter consent times

What is the current average length of time (days) required to complete resource consents for residential developments in your community?



Source: NZIER

3.3. What might be associated with stringent land use regulation?

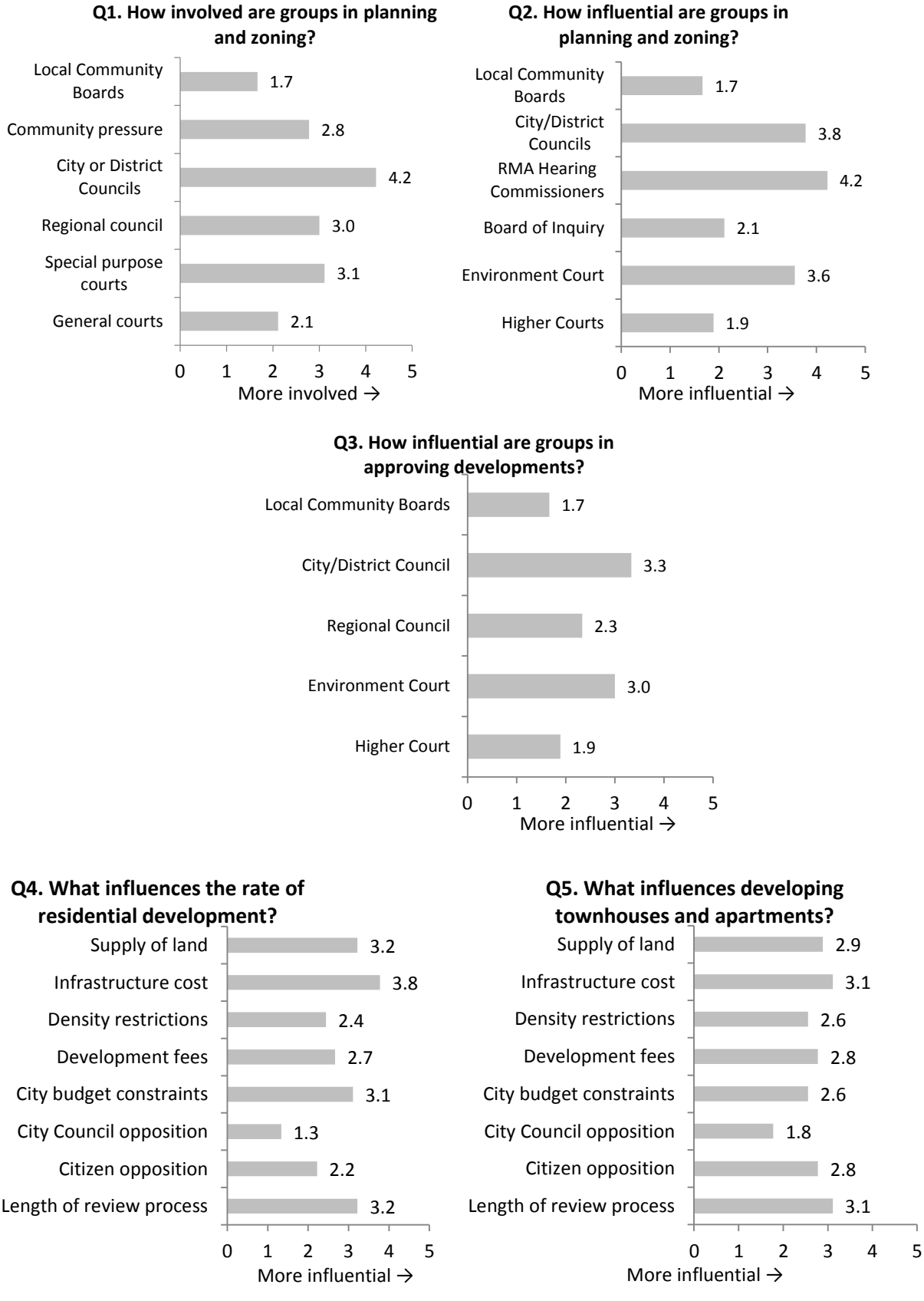
It is beyond the remit of this report to identify the complex structural drivers and impacts of land use regulation. Many researchers suggest that homeowners are at times responsible for slanting land use regulation towards outcomes that preserves the value in their property (see Fischel 2001, for example). We do not revisit these arguments. And we are aware that cities and their housing markets are notoriously path dependent (see Frost 1991, for example).

Instead we do two things. First, we present aggregate influences on planning, zoning, development approval and the rate of residential development, that is, the average responses across councils from survey questions 1-4b. These averaged responses – which we show in Figure 12 – help identify common factors across jurisdictions.

Second, we graph our index of land use regulation against house prices, the change in house prices since the 2007 peak prior to the GFC and debt per capita in each council to illustrate how the index could be used – albeit with a small sample in these examples. Our descriptive analysis helps to contextualise the index results.

Figure 12 How influential are groups in approving development?

How influential have the following groups and organisations been in approving a new housing development? Please use this scale of 1-5 (where 1 is not at all influential and 5 is extremely influential).



Source: NZIER

Figure 12 shows that on average some factors are more material on average than others. RMA hearing commissioners stand out as influencing planning and zoning (question 2) while the cost infrastructure cost, city budget constraints, the supply of land the length of the review process also appear to be key influences.

House prices

If land use regulation derives from homeowners that demand regulation to maximise the asset value of their homes, then we might expect the level of house prices to be closely associated with the level of land use regulation.

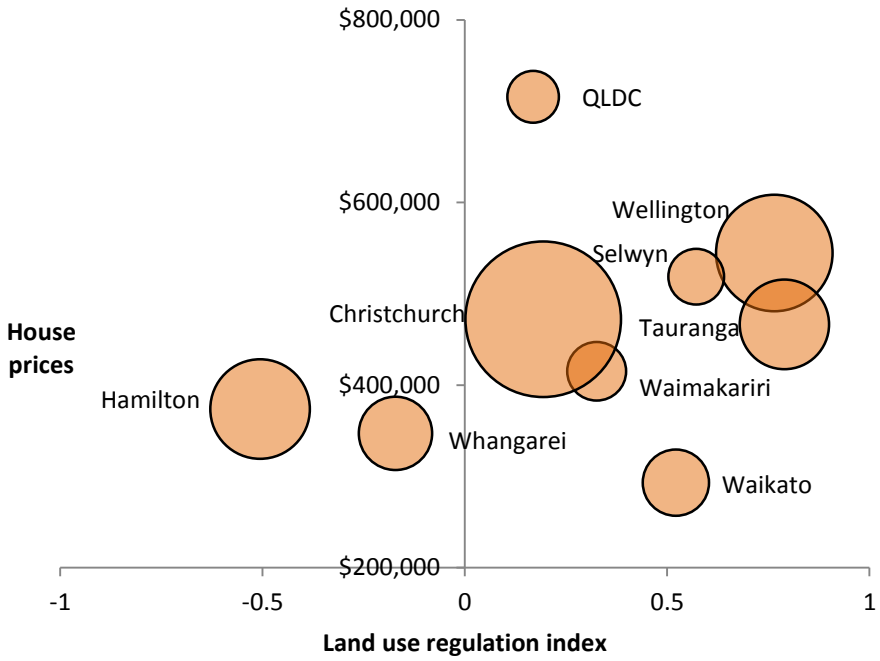
Figure 13 charts our land use regulation index against the median house price for each of the territorial authorities we study. While there is some mild evidence of correlation (statistically, the correlation between the two series is 0.25), the level of land use regulation for QLDC is not in keeping with the high level of house prices. Interestingly, our rules sub-index is more correlated with house prices than our characteristics sub-index.[5]

Of course, we are only examining a small subset of territorial authorities and furthermore, allowing for other influencing factors that we omit here, could imply a simple bivariate plot is not sufficient rich to draw any inference on the relationship between house prices and land use regulation.

[5] A one-sided test for positive correlations is significant at the ten percent level.

Figure 13 Our index is loosely correlated with house prices

Land use regulation against house prices, February 2015, correlation = 0.25



Source: NZIER, Statistics New Zealand

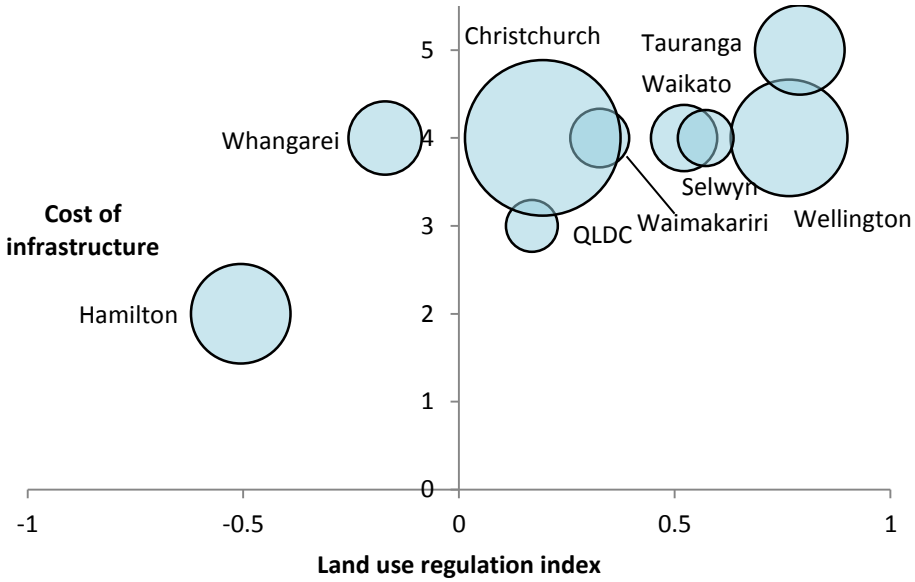
The cost of infrastructure and budget constraints

We test whether our land use regulation index is associated with a range of data that relates to the cost of infrastructure and city budget constraints at the council level. Stringent land use regulation may be symptomatic of local councils that are financially constrained in terms of meeting the new infrastructure needed by new development.

We find our land use regulation index is positively associated with city budget constraints (see Figure 15, page 29) and positively associated with the cost of new infrastructure (see Figure 14, page 29) in the self-reported answers to our survey questions (displayed in Figures 6 and 7 and aggregated in Figure 12). Although city budget constraints help inform the index the cost of new infrastructure is not used to construct the index (as per the Wharton index methodology) so the high degree of correlation is indicative of a role of finance in influencing development.

Figure 14 Our index is positively associated with infrastructure costs

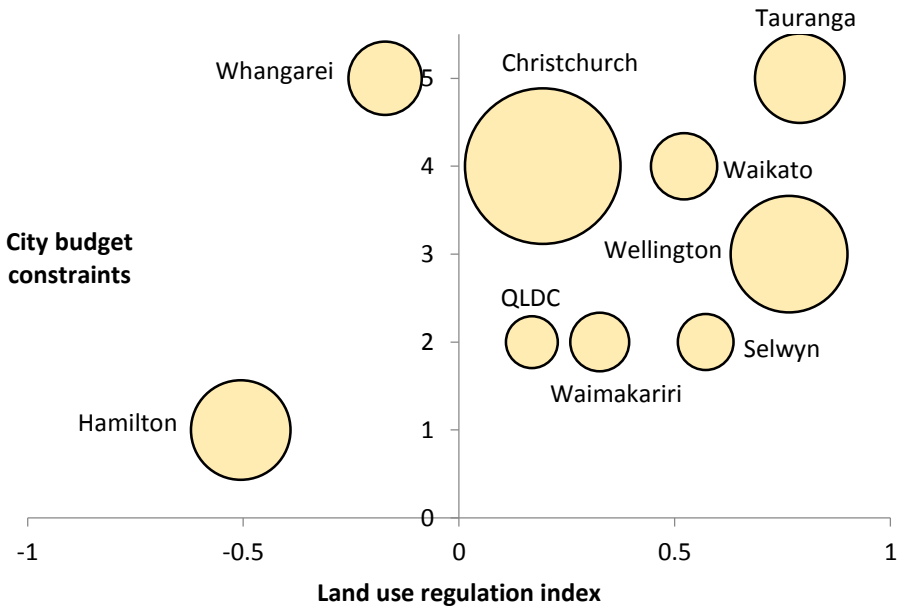
Land use regulation against the influence of the cost of infrastructure, correlation = 0.78



Source: NZIER

Figure 15 Our index is positively associated with city budget constraints

Land use regulation against the influence of city budget constraints, correlation = 0.32



Source: NZIER

3.4. Robustness

Our results are contingent on the component weights that apply to each sub-index that we obtain from the Wharton Land Use Regulation Index. Potentially using different weights to aggregate sub-indices would produce different results.

To test the materiality of using an alternative weighting scheme, we construct rankings of stringency of land use regulation using the Wharton weights (our preferred method) versus using a simple sum of the sub-indices.

Working with a simple sum of the sub-indices implies weighting each question equally whereas working with the Wharton weights means upweighting component elements that prove important for predicting the stringency of land use regulation across other sub-component series in the index. Thus working with a simple sum is a relatively stark choice.

Table 2 shows that some of the rankings are not preserved when using our alternative weighting scheme. For example, Tauranga falls to the fifth-most intensely regulated location out of our respondents while QLDC moves up to the fourth-most intensely regulated measure according to this weighting scheme.

However, while there are some movements in individual jurisdictions, the most-regulated locations tend to be the most-regulated locations under the alternative simple sum weighting scheme. This is perhaps not surprising – the indices under the Wharton and simple sum weighting schemes are highly correlated with a coefficient of 0.96. So we take some comfort in the robustness of our core findings to smaller changes in weighting schemes than in the large change in weights in table 2.

Table 2 Ranking: Wharton weights versus simple sum

Ranking according to different sub-index weights

Jurisdiction	Wharton	Simple sum
Tauranga	1	5
Wellington	2	1
Selwyn	3	3
Waikato	4	2
Waimakariri	5	6
Christchurch	6	7
QLDC	7	4
Whangarei	8	8
Hamilton	9	9

Source: NZIER

4. Concluding comments

Our approach

Knowing more about the relative stringency of land use regulation across New Zealand starts to fill a gap in the evidence base underpinning housing research in New Zealand.

Land use regulation tends to be applied through different mechanisms and with different stringency. That makes evaluating the impact potentially complex – we need to know much more about the application of land use regulation using common metrics across jurisdictions.

Our survey approach complements existing information sources by establishing a basis for comparison across jurisdictions. It is not a detailed analysis but has the advantage of being less resource intensive than deeply detailed case-by-case analysis. Extending the approach beyond the ten fastest-growing territorial authorities we target here is likely to be valuable and broaden our conclusions.

Land use regulation varies in stringency across New Zealand

We find that land use regulations apply with different stringency across New Zealand. However, focussing on individual rankings of stringency of land use regulation may not be particularly helpful given changes in the weighting of sub-components, albeit substantial changes can alter individual rankings of stringency.

More regulated areas share characteristics including the influence of local groups

The more regulated territorial authorities tend to be associated with higher levels of influence from local community groups and citizens that are actively influencing the approval process and shared characteristics and rules of land use regulation, such as the use of minimum lot sizes.

The more regulated authorities also tend to be associated with delays in the planning and construction process.

Land use regulation correlates with city budget constraints, the cost of infrastructure and house prices

At least in theory, land use regulation constrains residential development by limiting the size and number of dwellings that can be accommodated within a fixed area of land. Those regulations drive a wedge between the cost of purchasing a house and building a house on vacant land and suggest the stringency of land use regulation should be associated with house prices.

At least for our small sample, our land use regulation index is positively correlated with house prices. Moreover, our land use regulation index is associated with the cost of infrastructure and city wide budget constraints. This is consistent with a lack of financing inhibiting land use regulation at the local level.

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Appendix A The survey

NZIER Land Use Regulation Survey Thank you for participating in our land use regulation survey.

Name of council *

General Characteristics of Land Use Regulation

1. The first three questions are about the involvement and influence certain groups and organisations in your community have in the planning, zoning and approval of housing developments by the council.

How involved are the following groups and organisations in the in the planning, zoning and approval of housing developments by the council? Please use this scale of 1-5 (where 1 is not at all involved and 5 is extremely involved). *

	Not at all involved	Somewhat involved	Moderately involved	Very involved	Extremely involved
Local Community Boards and Committees	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Community pressure	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
City or District Councils	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Regional council	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Special purpose courts (Environment Court etc)	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
General courts (High Court, Court of Appeal etc)	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

2. How influential have the following groups and organisations been in approving zoning changes? Please use this scale of 1-5 (where 1 is not at all influential and 5 is extremely influential). *

	Not all influential	Somewhat influential	Moderately influential	Very influential	Extremely influential
Local Community Boards	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
City/District Councils	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
RMA Hearing Commissioners	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Board of Inquiry (special purpose)	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Environment Court	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Higher Courts	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

3. How influential have the following groups and organisations been in approving a new housing development? Please use this scale of 1-5 (where 1 is not at all influential and 5 is extremely influential). *

	Not all influential	Somewhat influential	Moderately influential	Very influential	Extremely influential
Local Community Boards	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
City/District Council	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Regional Council	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Environment Court	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Higher Court	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

4a. Just thinking about stand-alone houses, how important have the following things been in influencing the rate of residential development in the community? Please use this scale of 1 to 5 (where 1 is not at all important and 5 is extremely important). *

	Not all important	Somewhat important	Moderately important	Very important	Extremely important
Supply of land	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Cost of new infrastructure	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Density restrictions	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Development contributions	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
City budget constraints	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
City Council opposition to growth	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Citizen opposition to growth	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Length of review process for city and district planning	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

4b. Just thinking about townhouses and apartments, how important have the following things been in influencing the rate of residential development in the community? Please use this scale of 1-5 (where 1 is not at all important and 5 is extremely important). *

	Not all important	Somewhat important	Moderately important	Very important	Extremely important
Supply of land	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Cost of new infrastructure	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Density restrictions	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Development contributions	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
City budget constraints	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
City Council opposition to growth	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Citizen opposition to growth	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Length of review process for city and district planning	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

Rules of Residential Land Use Regulation

5.Please answer 'yes' or 'no' to each of the options. Is there an annual limit imposed by the community on the total number of: *

	Yes	No
Number of stand-alone houses authorised for construction?	☐	☐
Number of apartments and townhouses authorised for construction?	☐	☐
Number of residential units authorised for construction?	☐	☐
Number of apartments and townhouse buildings?	☐	☐
Number of units in apartment and townhouse buildings?	☐	☐

6. To build, do developers have to meet any of these requirements? *

	Yes	No
Include "affordable housing" (however defined)?	☐	☐
Supply mandatory dedication of space or open space (or fee in lieu of dedication)?	☐	☐
Pay a share of costs of infrastructure improvement?	☐	☐
Provide a certain mix of dwellings (eg stand-alone, medium density and high-density) within developments?	☐	☐
Provide a certain mix of units within a townhouse or apartment development (eg a number of 2 or 3 bedroom units)?	☐	☐
Meet the minimum lot size requirement?		

6b. If yes, what is the typical minimum lot size?

Specific characteristics

7. Thinking about the land zoned for the options below. How does the demand for land compare to the area that is allocated? *

	Far less than demanded	Less than demanded	About right	More than demanded	Far more than demanded
Residential - stand-alone houses	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Residential - townhouses and apartments	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Commercial	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Industrial	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

8. How much has the cost of a single, stand-alone housing lot increased in the last 10 years?*

○ 0-20% ○ 21-40% ○ 41-60% ○ 61-80% ○ 81-100% ○ >100%

9. How much has the cost of lot development, including subdivisions, increased in the last 10 years? *

○ 0-20% ○ 21-40% ○ 41-60% ○ 61-80% ○ 81-100% ○ >100%

10. What is the current average length of time required to complete resource consents for residential developments in your community? *

11. Over the last 10 years, has there been any change in the length of time required to complete resource consents for residential developments in the community? *

	Considerably shorter	Somewhat shorter	No change	Somewhat longer	Considerably longer
Stand-alone houses	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Apartments and townhouses	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

12. For these two types of dwellings, what is the typical amount of time between application for rezoning and issuance of a building permit for development? Is it:

	Less than 3 months	3-6 months	7-12 months	13-24 months	Longer than 24 months
Stand-alone houses	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Apartments and townhouses	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

If longer than 24 months, how long?

13. What is the typical amount of time between application for subdivision approval and the issuance of a building permit for the following? Assume proper zoning is already in place. *

	Less than 3 months	3-6 months	7-12 months	13-24 months	Longer than 24 months
Less than 50 single stand-alone houses	☐	☐	☐	☐	☐
50 or more single stand-alone houses	☐	☐	☐	☐	☐
Apartments and townhouses	☐	☐	☐	☐	☐

If longer than 24 months, how long?

14. How many applications for zoning changes were received in your community in the calendar year 2014? *

15. How many applications for zoning changes were approved in your community in the calendar year 2014? *