

Analysis of Local Government Cost Drivers

Ashley Milkop, Michael Young and David Moore
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1. Introduction and key findings

As part of understanding change in local government nominal expenditure for the types of goods and services local councils purchase, we explore the contributions of different factors: price growth (or inflation); change in quantity purchased due to change in population; and change in quantity due to change in type and quality of goods and services purchased.

Different councils serve the needs of different local populations. We investigate some of this complexity by looking at categories of council, using the four Local Government New Zealand (LGNZ) sector groups: metropolitan, provincial, rural and regional.

The core task of this report is to construct a price index¹ that measures changes in prices faced by local councils. This is like the familiar consumer price index (CPI), but for a “basket” of goods and services purchased by local government rather than consumers. This is a composite index, that is, it combines other price indices of subsets of goods and services as “inputs”, weighted by the relative proportions in which councils purchase those subsets as revealed by their historical expenditure.

The greater part of this report is focused on the construction of this price index and examining the inflationary pressures councils face. The last part investigates the characteristics of the change in quantity of goods and services councils fund for their communities after accounting for price and population growth (real per capita growth).

This analysis is inherently quantitative and technical. However, we attempt to draw out and summarise key issues and points of significance.

We identified a preferred method of index composition by assessment of four approaches against four criteria: ease of construction, conceptual soundness, usefulness, and the capacity to yield sub-indices for the four local government sector categories. This “Sapere index” produces several key findings:

- local government price inflation has risen faster than the CPI, reflecting that all relevant input indices have risen faster than the CPI over the same period
- salary and wage growth has been relatively restrained, prices have risen faster in capital expenditure (CAPEX) categories (due to more roading, transport, and community activities) than operational expenditure (OPEX) categories (with inflation primarily from water and environmental management work)
- price inflation for OPEX varies between council types: regional councils have faced the highest price pressures, while metropolitan councils have faced the lowest. This extends to real per capita growth; initial investigation suggests tourism may be a key factor
- price inflation for CAPEX is relatively similar across the council types.

¹ A price index measures the change (generally growth) in prices over time with reference to a base year where the value of the index is 1,000. Changes in prices between any two years are then related to the proportional change in the index values for those years.

1.1 Scope and approach

The Productivity Commission is undertaking an inquiry into local government funding and financing.² As part of this work, the Commission is seeking to understand the influence of prices on local government expenditure, exploring the prices faced by local government, the drivers of price growth, and the overall contribution of prices to total local government expenditure growth over the last ten years.

At the highest level, the change in local government expenditure over a period of time can be separated into three main components:

1. the change in prices local councils must pay to provide goods and services to their communities (inflation or price growth)
2. the change in the quantity of goods and services to be provided, due to changing community size (population growth)
3. the change in the quantity of goods and services to be provided, due to change in the types and quality of services required. We refer to this as real per capita growth (the residue identified after accounting for price and population growth).³

At this level there are two components to the analysis in this report.

The major component is an investigation of the growth of prices faced by local government, including identifying an appropriate inflationary index (Section 2), examining major price movements and their drivers (Section 3), and examining the distributional impact of changing prices on different types of local council (Section 4).

Finally, after adjusting for price and population growth, this report begins to explore movement and possible drivers in real per capita growth (Section 5). This is similar to the recent exercise undertaken by the Local Government Business Forum in a paper on local government funding.⁴

This analysis is inherently quantitative and technical, centred around the task of identifying and understanding an appropriate price index. In order to maintain focus on key issues and outcomes, some technical detail is deferred to Section 6. However, to be clear, we highlight some technical issues from the outset.

The first and central task is to identify an appropriate index to describe historical inflation in the prices of those goods and services facilitated by local councils, to convert nominal

² See <https://www.productivity.govt.nz/inquiry-content/3819?stage=1>

³ For example, local government may face changing community expectations for better resourced library services, substitution of services withdrawn by another provider, or improved regulatory enforcement through, for example, changed building code compliance.

⁴ Local Government Business Forum – Local Government Role and Funding – April 2018.

council expenditures into real expenditures (or equivalent current 'purchasing power' for such goods and services). Local councils do not purchase a "basket" of goods and services such as that measured by the consumer price index (CPI); other established indices, such as Labour Cost Index, Producer Price Index, or Capital Goods Price Index, are also inadequate.

Instead, an index linked to the specific goods and services that councils actually purchase is more appropriate, which may be a composite of other indices. When we refer to real components of expenditures, this means we have used our preferred price index to deflate nominal spending. It does not refer to the Consumer Price Index. As indicated above, the major part of this report is concerned with the characteristics of this price index.

A price index measures the change (generally increase) in prices over time, with reference to a base year where the value of the index is one thousand. Changes in prices between any two years are then related to the proportional change in the index values for those years ($Index_2/Index_1$).

A significant technical consideration is the treatment of depreciation and interest, which together comprise a substantial proportion of local council finances. Amortisation and depreciation are excluded from the operational expenditure (OPEX) as we are analysing capital expenditure (CAPEX) at the time that the expenditure takes place. Hence inclusion of amortisation and depreciation would result in double-counting of capital expenditure.

There are differing positions on the inclusion of interest in a price index. While in principle the purpose of the index is to reflect the cost of direct acquisitions of goods and services rather than their financing, we are interested in the total expenditures of councils, potentially including interest. Therefore, we have developed an analysis including interest to explore these effects, as well as an analysis excluding interest as the primary tool for inflation adjustments.

Unless indicated otherwise, our "period of analysis" is 2007 to 2017 (the latest data available consistent with the specified time frame). Total price changes over that period refer to the comparisons between June quarters of those years.

The report is structured as follows:

The remainder of this section summarises the key findings in this report.

- Section 2 describes the development of an inflationary index for use in this analysis.
- Section 3 considers major movements in prices.
- Section 4 examines the differential effects of these price movements on different types of councils.
- Section 5 looks at the major drivers of growth in local council expenditure as versus price growth.
- Section 6 provides further technical notes to these analyses.

1.2 Key findings

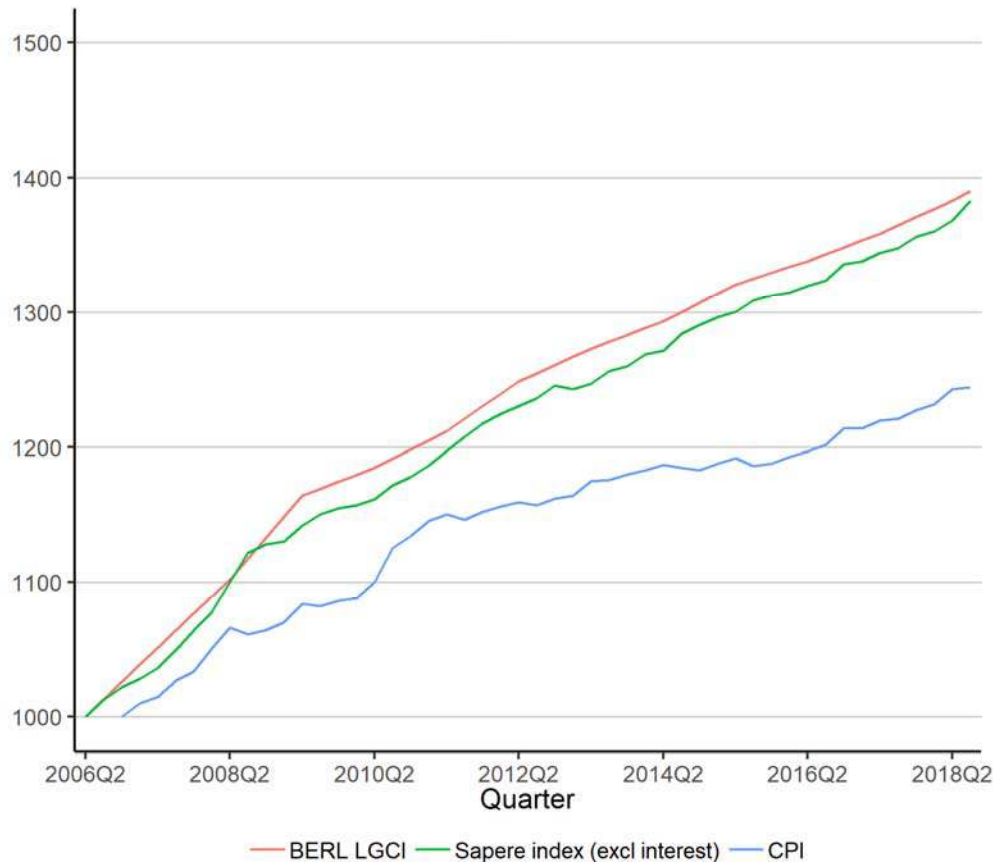
1.2.1 An index of local government price inflation

We have developed a chain-weighted Laspeyres index (hereafter referred to as the “Sapere index”) to measure the price inflation faced by local councils (see section 2). Using four criteria, we assessed the Sapere index more favourably than three other approaches (including the similar BERL-Laspeyres-approach Local Government Cost Index [LGCI] employed for forecasting). These assessment criteria are:

ease of construction and updating;

- conceptual soundness (in particular minimising the overstatement of “true” inflation owing to quality and substitution bias)
- usefulness – that the index is timely and is clear and understandable
- ability to be adapted to create sub-indices for individual councils or clusters of similar councils.

Figure 1 Sapere index compared with BERL LGCI and CPI



The Sapere index is compared with the similar BERL LGCI and the CPI in Figure 1 above. Figure 1 demonstrates how the Sapere index:

- produces a similar index to the BERL LGCI despite our changes, because of the mixed impact of the various factors that we changed
- has risen faster than the CPI over the same period, reflecting that all relevant input indices have risen faster than the CPI over the same period, with the sole exception of borrowing costs since the global financial crisis (GFC) of 2007–08 (which is not included in this chart).

1.2.2 Major price movements and drivers of change

Drivers of inflation can be “cost-push” (e.g. higher labour or capital costs) or “demand-pull” (consumer demographic or service provision change) and may be “domestic” (internalised to council sources) versus “imported” from external prices councils must accept from markets. The major movements include:

- inflation pressures relating to OPEX have come primarily from prices relating to water and environmental management work
- inflation has been relatively restrained in salaries and wages, which are a significant input into operating costs of councils
- price rises in CAPEX categories have been higher than those in OPEX categories
- price pressures relating to CAPEX for roading, transport, and community have been particularly high.

We note a number of particular issues underlying these cost drivers:

- capacity issues have caused inflation pressures (such as demand for construction services in the South Island following earthquakes)
- world prices for oil have affected the cost of bitumen
- prices for particular materials, such as aggregate, have increased.

Economic variables can explain 40 per cent of price changes

We found that we were able to statistically attribute about 40% of price movements by economic variables. The economic variables with the strongest explanatory value were:

- inflation expectations⁵
- demand pressures in the economy (as measured by the output gap)
- the world price of imported goods into New Zealand and the exchange rate.

The remaining 60% reflects, amongst other things, idiosyncratic movements in input prices such as the price of construction aggregate, as well as the change in the composition of overall council spending. More in-depth discussion of these factors can be found in Section 3.6.

1.2.3 Differential analysis by council type

One of the qualifications of the Sapere index identified above is its adaptability to create sub-indices for clusters of similar councils. We have developed four price indices, one for

⁵ Respondents' expectations of CPI growth in one year (Reserve Bank Survey). It could be argued that this variable might be endogenous. There are, by our guess, two sources of endogeneity: from simultaneity (reverse causality), and owing to omitted variables. Regarding simultaneity (reverse causality), even if the process for forming inflation expectations is solely adaptive (informed by past realisations of inflation, rather than forward looking), we are of the opinion that local government cost inflation will play a very minor role (if any) in informing people's expectations of inflation one year hence. Omitted variable bias is more of a potential issue but this is a problem for all our explanatory variables. We discuss this in further detail in section 2.5 under 'A qualification due to technical issues'.

each of Local Government New Zealand's (LGNZ) sector groups: metropolitan, provincial, rural, and regional.

Some councils are more rural than others and therefore have more activity in roading. Metropolitan councils have denser networks, particularly in drinking and waste water activities. Regional councils are more heavily focused on regulatory activities and therefore face cost growth in provision of services, rather than maintenance and construction. Each council is at a different stage in its asset replacement and many have different balance sheet structures.

Variable spending between council types impacts price indices

Section 4 examines differential effects on councils and the impact on price indices by council type. It is difficult to make simplifying observations of CAPEX due to large variations in expenditure across most cost categories, but with regard to OPEX metropolitan councils spend relatively more on community, whereas rural councils spend relatively more on roading and regional councils spend relatively more on water and environmental management and transport activity categories.

These activity variations result in different weightings in the index calculation, which in turn impact the price indices for each council type. Rural and regional councils have faced the highest price rises for operational expenditure and rural councils highest price rises for capital expenditure.

Price changes have had a differential effect on councils

Table 1 shows the differential price inflation calculated by the Sapere index for different types of councils. This reflects the varying proportions of goods and services delivered by these council types. That in turn means that they are exposed to different drivers of price inflation.

Over the ten-year period since 2007, price inflation has been between 28% and 31% across these four types, or between 2.51% and 2.75% on a compound annual growth rate (CAGR) basis. Regional councils have faced the highest price pressures, while metropolitan councils have faced the lowest.

1.2.4 Exploring causes of differential expenditure growth exclusive of price growth

The Sapere price indices can be used to compare the impacts of price inflation and real expenditure growth on nominal operating expenditure. Real expenditure growth can be further explored by adjusting for population changes to calculate real per capita expenditure growth. The indices of these changes to 2007 levels by council type are shown in Table 1 below (and by council in Section 6.4).

Table 1 shows a large variation in the change in total spending in nominal terms over the decade, with a 15-point spread between metropolitan and regional council types. Rural and regional councils have experienced higher growth in nominal, real and real per capita operating expenditure when compared to metropolitan and provincial councils.

Table 1 Changes in OPEX expenditure and the drivers of growth (2007 to 2017)

	National aggregate	Metro	Provincial	Rural	Regional
Average change in expenditure (nominal)	64%	57%	62%	69%	72%
<i>Price inflation (Sapere index)</i>	29%	28%	30%	30%	31%
Average change in expenditure (real)	27%	22%	25%	30%	31%
<i>Average change in population</i>	12%	11%	13%	5%	9%
Average change in real per capita expenditure	13%	10%	10%	24%	20%

Increases in council activity explain around half of the changes in nominal operating expenditure

After deflating expenditure to account for price inflation, the real change in total spending can be examined in terms of changes in quantity. This is related to both the changes in the population size the local council serves and the “real” changes in quantity/quality of services provided by councils (real per capita expenditure).

Population growth is variable across the country, and has been higher in metropolitan and provincial than rural and regional councils. Nationally, the contributions of population and real changes in quantity/quality of services provided are approximately equal. However, this high-level view does not reveal nuances by council type.

In particular Table 1 shows increases in council activity have contributed approximately five times more to real OPEX growth than population change for rural councils and more than double for regional councils. Conversely, for metropolitan and provincial councils, population growth has contributed more than real per capita expenditure growth to real expenditure growth

Local government managers gave us some insight into areas of real (adjusted for inflation) expenditure growth. Causes of this include changed service levels (e.g. increased

testing and treatment of drinking water), expanding council activity in regulation (e.g. building construction inspection), increasing expectations of delivery of community services and, finally, deferred maintenance, particularly in network assets.

Per capita expenditure growth has been highest in rural councils – tourism numbers appear to be a factor

Table 1 shows the range of real per capita expenditure increases for different types of councils has been between 10% and 24% over our period of analysis. Rural and regional councils have experienced approximately double the increase in real per capita expenditure than metropolitan and provincial councils.

We cannot be definitive about reasons for the differences in real per capita spending, but we can observe some patterns in the data:

- The main area of expenditure increase (in absolute and relative terms) for rural and regional councils is in planning and regulation. This spending category includes emergency management, economic development, governance and council support services.
- A rudimentary analysis indicates that councils with higher tourism numbers or with above average tourism growth have faced greater expenditure demands.
- There is some evidence that councils with larger roading networks or with higher economic growth have also seen higher spending growth, although these observations are only tentative at this stage.
- The combined effects of inflation pressures and real per capita growth in expenditure among rural councils have meant that those councils have experienced the highest levels of pressure on council rates.

2. Development of an inflationary index

The general purpose of a price index⁶ is to convert nominal historical expenditure into real expenditure. Alternatively, this can be thought of as the equivalent purchasing power of expenditure - what quantity of equivalent goods can be purchased today compared to some other year in the past?

This section describes the development of a preferred price index that measures changes in prices faced by local councils - this is similar to the familiar consumer price index (CPI), but for the goods and services purchased by local government rather than consumers.

At its core this index is a composite index, that is, it combines the price indices of subsets of goods and services as "inputs", weighted by the relative proportions in which councils purchase those subsets as revealed by their historical expenditure. The analysis here is based on actual expenditure compiled by Statistics New Zealand and the Department of Internal Affairs.

The choice of index method involves trade-offs. We identified a preferred method by assessing four approaches against four criteria: ease of construction, conceptual soundness, usefulness, and the capacity to yield sub-indices for the four local government sector categories. Our preferred index is similar to the Local Government Cost Index (LGCI) produced by Business and Economic Research Limited (BERL) for the New Zealand Society of Local Government Managers – our changes include weighting by prior period expenditure rather than fixed expenditure weights, and annual rather than five-yearly updates.

Although a significant component of council expenditure, depreciation costs are excluded to avoid double-counting, and interest is excluded from the deflationary index because we are interested in purchasing power. However, we do also investigate the impact of interest in the post-GFC environment. Other technical issues reviewed include the exclusion of direct costs of land acquisition and the use of output rather than input price indices for activities where councils outsource work rather than perform work.

The LGCI is a useful reference point for comparisons, given it is embedded in local government budgeting. The Sapere index produces a similar index to the LGCI despite our changes, because of the mixed impact of the various factors that we changed. Both are significantly higher than the consumer price index (CPI).

When interest is included, the decreasing interest rates post-GFC have had a significant effect on the level of the index. When debt levels rise correspondingly, observed inflation pressures are reduced significantly.

⁶ A price index measures the change (generally growth) in prices over time with reference to a base year where the value of the index is one. Changes in prices between any two years are then related to the proportional change in the index values for those years.

2.1 Analysis of actual data

We observe price and expenditure patterns by analysing actual spending information from councils. This data is compiled by Statistics New Zealand and the Department of Internal Affairs (DIA).⁷ We study the pattern of operating cost (OPEX) since 2007 and capital expenditure (CAPEX) since 2009 (using the available series).

Generally, the use of actual spending information is advantageous as it improves accuracy when constructing an index. However, it can also be a hindrance to timely production of that index. For instance, Statistics New Zealand produces quarterly results for its consumer price index (CPI) but updates the actual spending weights approximately once every three years. Our annual reweighting has the effect of reducing the price index (under normal circumstances) because it will reduce substitution bias.⁸

2.2 Assessment of index options

The development of an index requires a number of trade-offs, including: timeliness and accuracy; ease of explaining to audiences; and theoretical adequacy. Each of these trade-offs needs to be well understood in the context of the work being delivered.

We settled on four approaches which we considered plausible:

1. BERL index (Laspeyres,⁹ fixed expenditure weights, updated every five years) – already developed and well understood by key stakeholders.
2. Sapere alternative – *chain-weighted Laspeyres index* (prior period expenditure weights updated annually, current and prior period prices) using same references to Statistics New Zealand series as BERL but decomposed by council type; and use of Producer Price Index (PPI) output series for water.
3. Sapere alternative (as per 2.) using *Paasche index* (uses current expenditure weights and past and present prices) – thought to underestimate inflation and requires more up-to-date quantity information, which limits usefulness.

⁷ See Section 6.2 for more detail on the data sources.

⁸ Substitution bias occurs in an index that is infrequently reweighted. When relative prices change, this leads to consumers making different purchasing decisions, thereby mitigating the effect of price increases. For example, councils might decide to use insourced labour instead of an external provider for the same service. Where possible, the approach to indexing should allow for these substitutions.

⁹ We describe the BERL index as a Laspeyres, because it reweights periodically, albeit at infrequent intervals. Most indices described as Laspeyres will have been reweighted if in use for a sufficient period of time.

4. Sapere alternative (as per 2.) using “*ideal index*” (for example Tornqvist) – can be difficult to explain, and requires up-to-date quantity information; results will not differ much from the chain-linked Laspeyres.

2.2.1 Four assessment criteria

Following a series of discussions, we adopted a set of criteria for assessing our choice of index:

- **Best practice methodology and conceptual soundness** – we consider here whether a fixed weight, chained, or ideal index would be most suitable, and consider the choice of other agencies in similar situations.
- **Practical to implement** – we consider availability of data. Our approach to the calculation will make it a straightforward exercise to add new data when updates become available. Reweighting will take place automatically. We will document each step of the index construction to ensure its replicability.
- **Usefulness** – that the index is timely and is clear and understandable. Also, we consider the alignment of spending categories and council typology with how local government thinks about its expenditure and operations. We consider whether the methodology for constructing the index is intuitive and understandable to senior management in local government.
- **Analytical adequacy** – this means the makeup of the index is such (in terms of subcomponents, weighting methodology) that it aids an analyst in understanding the drivers of cost inflation for local government (e.g. you can dig into various subcomponents and understand which one is driving inflation at a given time and then relate this to some macroeconomic or other variable). Further, the index aids in understanding how differences in types of councils translates into different cost pressures.

2.2.2 Our preference is the chained Laspeyres

While the chained Laspeyres is not perfect, it is our preferred option, and is the index utilised in subsequent analyses. Its main advantages when measured against other approaches are:

- unlike other indices such as the Paasche (which relies on current volumes to calculate the weights), the Laspeyres uses prior year weights, meaning it can be produced in a more timely manner
- a chain-weighted Laspeyres reduces substitution bias similarly to an ideal index as it uses frequently updated expenditure weights
- a Laspeyres index can be explained in an intuitive way to interested parties.

The results of our subjective assessment of the four approaches to the index are shown in the following table.

Table 2 Evaluation of price index construction approaches

Indices are ranked from 1 (best) to 4

	BERL LGCI	Sapere chained Laspeyres	Sapere Paasche	Sapere ideal
Best practice	3	2	4	1
Practical	1	2	3=	3=
Usefulness	2	1	4	3
Analytical adequacy	3	1=	4	1=
Geometric mean¹⁰	2.1	1.4	3.7	1.7

2.3 Some issues common to all indices

We identified four major methodological issues common to all index calculations. These issues range from perspective, i.e. whether from an input or output perspective, through to what expenditure categories should be included. We discuss each of them in turn.

2.3.1 Choosing input or output indices depends on activity

An issue that we came across was whether to use the input indices or output indices of the producer price index (PPI):

- an input index would generally be used if the affected party (e.g. council) is a purchaser of the inputs and then transforms those inputs to produce another intermediate or final good or service; on the other hand
- an output index is used if the affected party is a purchaser of the goods and services that have been transformed by another party.

We consider an input series is appropriate where the council is performing the work itself, but an output series is better suited to where the council has outsourced the work. We

¹⁰ A geometric mean calculation can be used to order number series according to their product (rather than their sum). When rankings are being determined, a geometric mean will place disadvantage on options that have been ranked at the bottom of at least one category and advantage those options that are consistently near the top of rankings. In this case, an arithmetic mean would have produced the same result.

have used a combination of input and output indices to better link the appropriate index to activity. For example, the input producer price index for water, sewerage, drainage and waste services has risen 40% between 2007 and 2017, but the corresponding output index has risen by 55% in the same time, an indicator that margins may have increased in providing the services associated with this activity.

2.3.2 Depreciation and interest

Depreciation

Note that we have excluded amortisation and depreciation from OPEX spending as we are analysing CAPEX spending at the time that the spending takes place. Inclusion of amortisation and depreciation would result in double-counting of capital expenditure.

Interest

A major question is whether to include the interest rate as a price. Interest was included in the 2010 iteration of the LGCI but since then – we have come to understand – is no longer included.

There are differing views on the inclusion of interest in a price index, and answers as to whether or how it should be included depend on the purpose of the work. Interest is no longer included in the CPI. Inclusion of interest can create a “chasing the tail” type situation for the Reserve Bank whereby the interest rate is raised to battle inflation, which itself then contributes to a rise in inflation. Nor is interest included in the New South Wales or South Australian versions of the LGCI. Indeed, IPART notes: *“Borrowing costs are excluded because the LGCI is intended to reflect the cost of direct acquisitions of goods and services rather than their financing.”*¹¹

In this analysis we illustrate the effect of including interest costs as we are interested not only in the acquisition of goods and services, but in the contribution of interest to total expenditures of councils. We also produce a series where spending on borrowings represents a fixed amount of debt. This is to illustrate the effect of changes in interest rates without the distortion of an increase in debt levels. The effect of this is highlighted in Table 3 for OPEX inflation using the preferred Sapere index. It is noteworthy that post-GFC the cost of debt has been extraordinarily low, below the growth in price of goods and services (see for example Figure 4) so that when included in the index, the decreasing interest rates over our period of analysis have had a significant effect, reducing the change in OPEX by 8.4% based on actual debt or 6% based on constant debt.

¹¹ IPART Local Government Cost Index Local Government — Information Paper, December 2010, p24.

Table 3 Comparison of interest treatment on OPEX inflation (2007 to 2017)

Method	Excluding interest	Including interest (based on actual debt)	Including interest (based on constant debt)
Total OPEX price	29.1%	20.7%	23.1%
Compound annual growth rate	2.6%	1.9%	2.1%

2.3.3 Cost of land

The Statistics New Zealand price indices exclude direct references to the cost of land acquisition. There are indirect references, similar to those for interest (i.e. rents and leases). We have chosen not to model these explicitly, as there is limited information available to try to assess the contribution of land prices to the expenditure of councils delivering services. Feedback from SOLGM indicated that councils also benefited from the sale of land and that the net effect on councils was not necessarily obvious. Further, land was not advanced as a significant factor in driving expenditure in submissions or discussions with local government managers.

2.3.4 Price references

Table 4 below shows the references to the relevant indices we have chosen. In most cases these are the same as for the BERL LGCI, with two exceptions: we have added the PPI output series for the water and environmental management category; and, where used for illustrative purposes, we have referenced the 2 year Government bond rate, which shows a better correlation to the actual interest payments of councils than the CPI mortgage index, which was used in an earlier version of BERL's LGCI.

Table 4 Input price indices employed in Sapere index construction

	Planning and regulation	Roading	Transport	Community activities	Water and Environmental Management
CAPEX (single category)					
CAPEX	CGPI 33%Earthmoving 33% Pipelines 33% Reclamation	CGPI Earthmoving	CGPI Earthmoving	CGPI Earthmoving	CGPI 33%Earth-moving 33% Pipelines 33% Reclamation

	Planning and regulation	Roading	Transport	Community activities	Water and Environmental Management
OPEX categories					
Employee costs	LCI local government wages and salaries	LCI all wages and salaries	LCI local government wages and salaries	LCI local government wages and salaries	LCI local government wages and salaries
Interest	2 year government bond	2 year government bond	2 year government bond	2 year government bond	2 year government bond
Other OPEX	PPI inputs local Govt	PPI inputs local Govt	PPI inputs local Govt	PPI inputs Arts and Rec	50% PPI Inputs Water, Sewer 50% PPI Outputs Water Sewer

1. LCI – Labour Cost Index; PPI – Producer Price Index; CGPI - Capital Goods Price Index

2.3.5 Treatment of issues to the preferred index

Our review led us to consider a number of factors as detailed below:

- Inclusion of interest (not included in BERL LGCI):** Interest is a material cost for councils. Interest has an impact on the costs of maintaining working capital for everyday operations. On the other hand, inclusion of interest reflects financing decisions rather than work undertaken by councils. *Treatment:* The effect of including interest is demonstrated, including both actual and constant amount of debt, but interest is excluded when analysing council cost pressures.
- Reweighting of expenditure and selection of index:** BERL updates the index weights every five years and then forecasts using fixed expenditure weights. This can overstate inflation as it does not account for council decisions to optimize expenditure based on changing prices (quality and substitution bias¹²). *Treatment:* We have used annually updated weights given the availability of data for our period of analysis.
- Output versus input series:** When referring to the producer price index, BERL makes use only of input indices and not output indices. This may not capture the notion of councils outsourcing work. *Treatment:* We have introduced output series to the index.

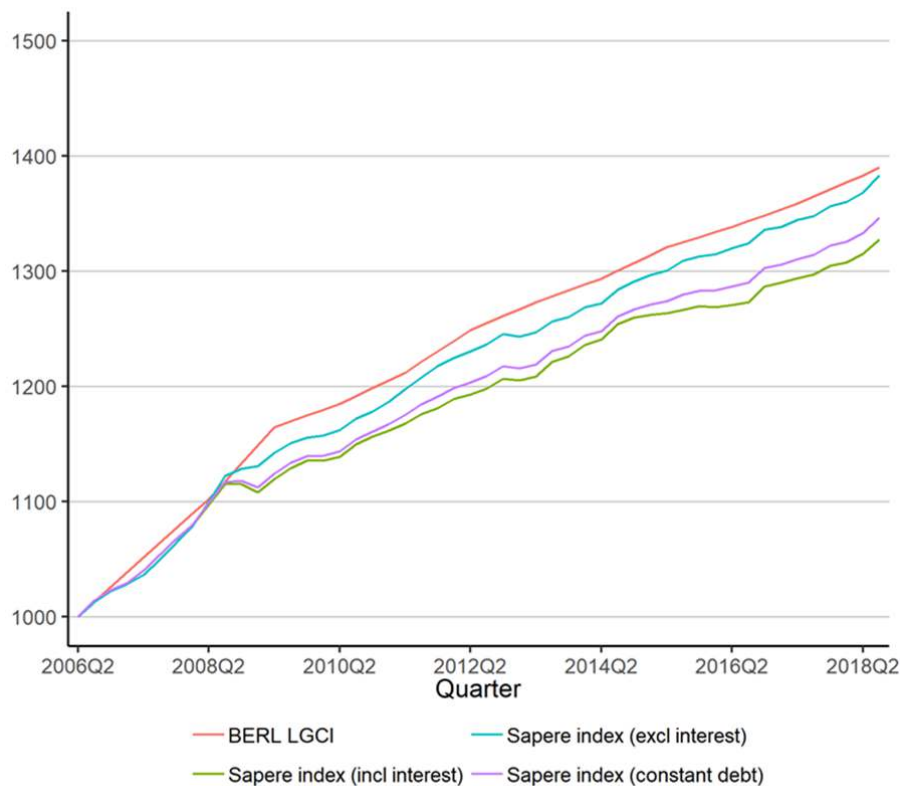
¹² An infrequently updated fixed weight index will overstate true inflation as in reality when relative prices change there might be substitution towards cheaper activities meaning more expensive activities are overweighed in the index. Quality bias refers to when a good or service's price increases owing to being of improved quality, but because the improved attributes of the good or service aren't adjusted for, the price increase is recorded as inflation.

- **Effect on different councils:** BERL produces a single series, although it does report on the subcomponents of those series. *Treatment:* We have developed distinct series for different types of councils (e.g. rural versus metropolitan).

2.4 The proposed indices for analysis

The resulting aggregated indices are presented below in Figure 2, comparing BERL with three chained Laspeyres indices examined by Sapere, (a) excluding interest (“Sapere index”), (b) including interest based on actual debt, and (c) including interest based on constant debt.

Figure 2 High level Sapere index (inc/ex interest) compared with BERL LGCI



Source: Sapere analysis

At first glance, our revised aggregated series does not appear to differ substantially from the BERL LGCI. However, beneath the surface, the story is slightly more complex. Our changes have moved the index in opposing directions, which is why our revised aggregated series looks similar to the BERL LGI. The two largest changes that differ from BERL's index are:

- Around a 3.5% decrease in observed inflation, due to the more frequent reweighting, over the period of analysis (or 0.34% on an annual basis).
- Around a 1.3% increase in inflation, due to the inclusion of the output series for producer prices, over the period of analysis (or 0.12% on an annual basis).
- Notably, there is more variation when looking at types of councils.

When included, the decreasing interest rates over our period of analysis have had a significant effect on the level of the index. When debt levels rise correspondingly, observed inflation pressures are reduced significantly.

2.5 A note on how the index should be used

An obvious question is: What implications are there for councils looking at forecasting price growth?

Interest: As noted above, for the retrospective analysis we have included interest costs as we are interested in the total expenditure of councils, not just the acquisition of goods and services. We understand that councils forecast interest costs separately. In that case, including interest in projecting this index for the forecast cost of goods and services would be double-counting. However, there could still be some small direct effect of interest on operating expenditure of other items, particularly in regard to current liabilities, which is why the effect of interest should not be ignored completely.

Reweighting: We believe there is merit in reweighting more frequently. It would be hard, but not impossible, to forecast changes in weights, and consideration could be given to that action if it would result in material changes.

Locality: Importantly, individual councils should look carefully at how their expenditure diverges from the standard model. They should look to use disaggregated indices where it would result in material differences, ensuring also that those indices are matched to changes in expenditure patterns.

3. Major movements in prices

This section examines the inflationary pressures in CAPEX and OPEX that are revealed by the Sapere price index and generated by the underlying patterns of local government expenditure.

Drivers of inflation can be “cost-push” (e.g. higher labour or capital costs) or “demand-pull” (consumer demographic or service provision change). They may also be “domestic” (internalised to council sources, e.g. wages and salaries), versus “imported” from external prices councils must accept from markets (e.g. bitumen for roads, costs of contractors).

The most significant drivers of price inflation for OPEX have come in both the input and output producer price indices for water, sewerage, drainage and waste services. Most other input indices have risen at rates slightly higher than CPI – the very large exception is the cost of debt that has significantly fallen since 2008.

All the Capital Goods Price Indices (CGPI) contributing to CAPEX have been rising faster than CPI, and price pressures relating to CAPEX for roading, transport, and community have been particularly high.

Overall, the 41% growth in prices of inputs to CAPEX spending is a faster rise than the 37% price growth of the inputs to OPEX spending, contributing to the total combined price index growing by 38%. This is compared to the growth in the CPI for ordinary consumers of 24% over the same period.

We employed a statistical model to consider the degree to which these price movements may be attributable to general economic factors. Statistically about 40% of the price changes may be attributed to these factors, with the strongest correlation to price inflation arising from:

- inflation expectations¹³
- demand pressures in the economy (as measured by the output gap, which measures the difference between the potential output of an economy and the actual output – an indication of how close to capacity an economy is)
- world price of imported goods into New Zealand and the exchange rate.

Through interviews with local government managers and submissions to the Productivity Commission, we noted a number of particular issues underlying these cost drivers:

- capacity issues have caused inflation pressures (such as demand for construction services in the South Island following earthquakes)
- world prices for oil have affected the cost of bitumen
- prices for particular materials, such as aggregate, have increased.

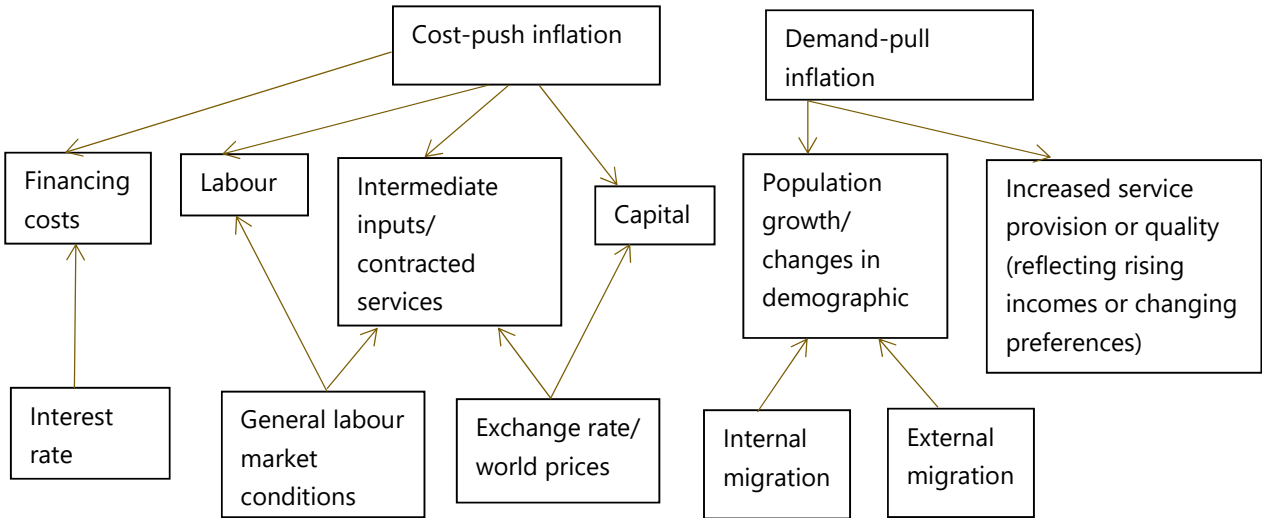
¹³ Firms who provide goods and services to local government are more likely to increase their prices if they think inflation will be higher (as they expect higher input costs).

3.1 Price drivers and movements

The schematic in Figure 3 illustrates the relationships of a range of possible drivers of price growth. There are a number of components of price growth that we want to examine:

- Inflation can be cost-push or demand-pull in nature, and identifying this helps at a basic level to identify the discretionary versus non-discretionary areas of expenditure. An example of cost-push is an increase in labour costs. An example of demand-pull is growth in the number of people living in Auckland (i.e. more people needing council services).
- Inflation can be "domestic" versus "imported". We want to be able to see whether the drivers of increases in the price level come from internal council sources (e.g. wages and salaries) or externally from rises in prices that a council has to accept as part of its contracting processes (e.g. bitumen for roads, labour costs of contractors, etc.).

Figure 3 Schema of inflation sources

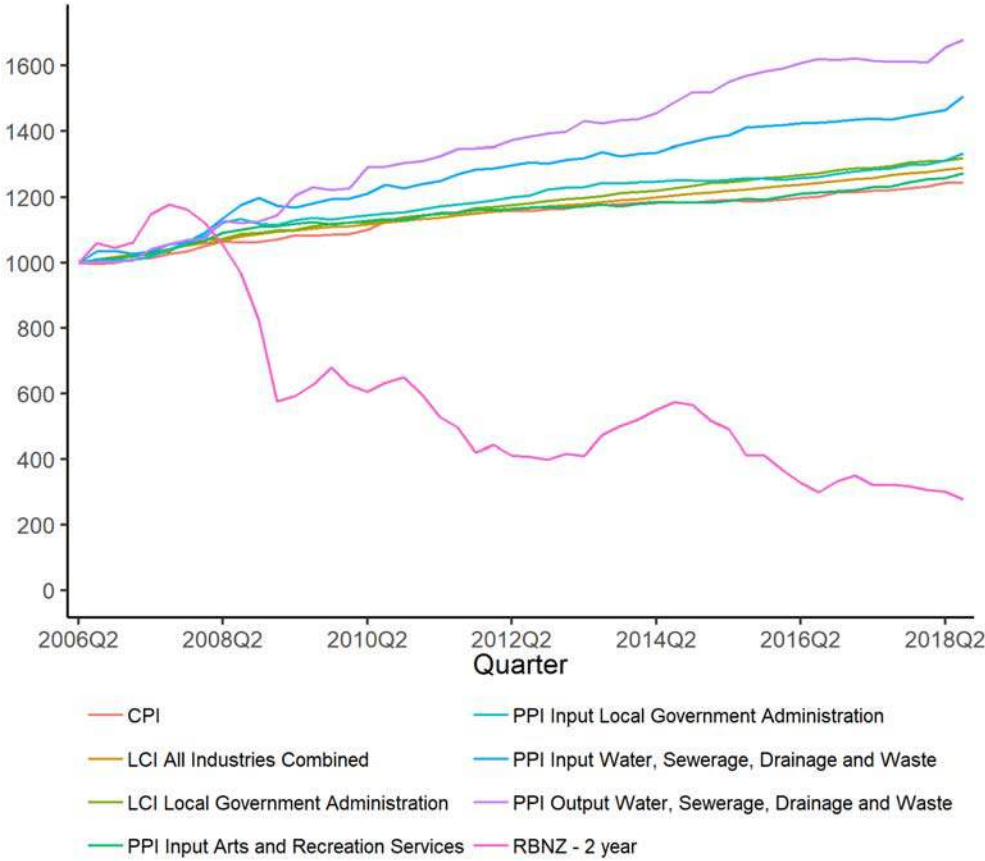


3.2 OPEX price movements

Since 2007 there have been some significant movements in inflation that councils have had to manage. Inflation has been a factor in total growth in OPEX spending, which has risen by just under 60% (4.8% on an annual average compounding growth basis).

Table 4 above detailed the composition of local council OPEX indices from a range of Labour Cost and Producer Price indices.¹⁴ Figure 5 shows the changes in these indices from June 2006 compared with CPI.

Figure 4 Movement of indices underlying OPEX



Source: Statistics New Zealand, Reserve Bank

The most significant drivers of price inflation have come in both the input and output producer price indices for water, sewerage, drainage and waste services. We have used these expenditure categories as a proxy of the services that councils procure for operating and maintaining infrastructure associated with the 3 Waters, but also with flood protection and other environmental management spending.

We speculate that the faster growth of the output series compared to the input series is possibly explained by increasing margins of businesses that supply services in this area. It

¹⁴ See Table 12 in Section 6.2 for the categorisation of council spending into five high-level activity classes (consistent with the BERL index).

has not been possible to infer the exact proportion of outsourcing and insourcing of these services and thus adjust our weights. However, the outsourcing effect will be picked up to a certain extent through the relative changes in spending on salaries and wages and other OPEX.

Borrowing costs have fallen considerably over the 2007 to 2017 period of analysis and have a material impact when included in the Sapere index, reducing aggregate growth in prices from 29.1 (no interest) to 20.7% (interest on actual debt) or from 2.6% to 1.9% on a CAGR basis (see Table 3 above). Caution should be exercised when interpreting the effects of this on council spending pressures for a number of reasons:

- Councils will require a certain amount of working capital for their day-to-day operations and may use debt to bridge the gap between receipt of rates revenue and payment for goods and services. In this instance, a fall in the cost of borrowing is a genuine saving to councils in relation to operating expenditure.
- More frequently, councils will take on additional borrowing particularly for the funding of large capital projects. While this CAPEX underpins a significant part of council OPEX for depreciation and interest and the fall in cost of debt represents a real fall in this component of council finances, it does not reflect a fall in the cost of direct acquisitions of goods and services.

Finally, we note that, with the exception of borrowing costs, all the relevant indices have risen faster than the CPI over the same period. There will be a number of reasons for this; the New Zealand dollar exchange rate remained strong over the period of analysis, which reduced imported inflation. Annual average price inflation on tradables rose by only 0.6% in the CPI, whereas the corresponding figure for non-tradables was 2.8%, compared to an overall CPI rise of 2.4%.

Inputs to local government work are affected by a combination of tradable and non-tradable prices. It was calculated in 2013 that tradables account for 44% of the CPI, and non-tradables 56%.¹⁵ We assume that the proportion of tradables affecting local government cost pressures is less. This is because of the share of our cost index that is made up of employee costs, which are not measured directly in the CPI.

Taking these movements in the reference indices into consideration, we expect that councils with a greater share of spending in water and environmental management will see greater cost pressures than other councils.

¹⁵ Nikki Kergozou and Satish Ranchhod – *Why has inflation in New Zealand been low?* – Reserve Bank of New Zealand: Bulletin, Vol. 76, No. 3, September 2013 (see <https://www.rbnz.govt.nz/-/media/ReserveBank/Files/Publications/Bulletins/2013/2013sep76-3kergozouranchhod.pdf>)

3.3 CAPEX price movements

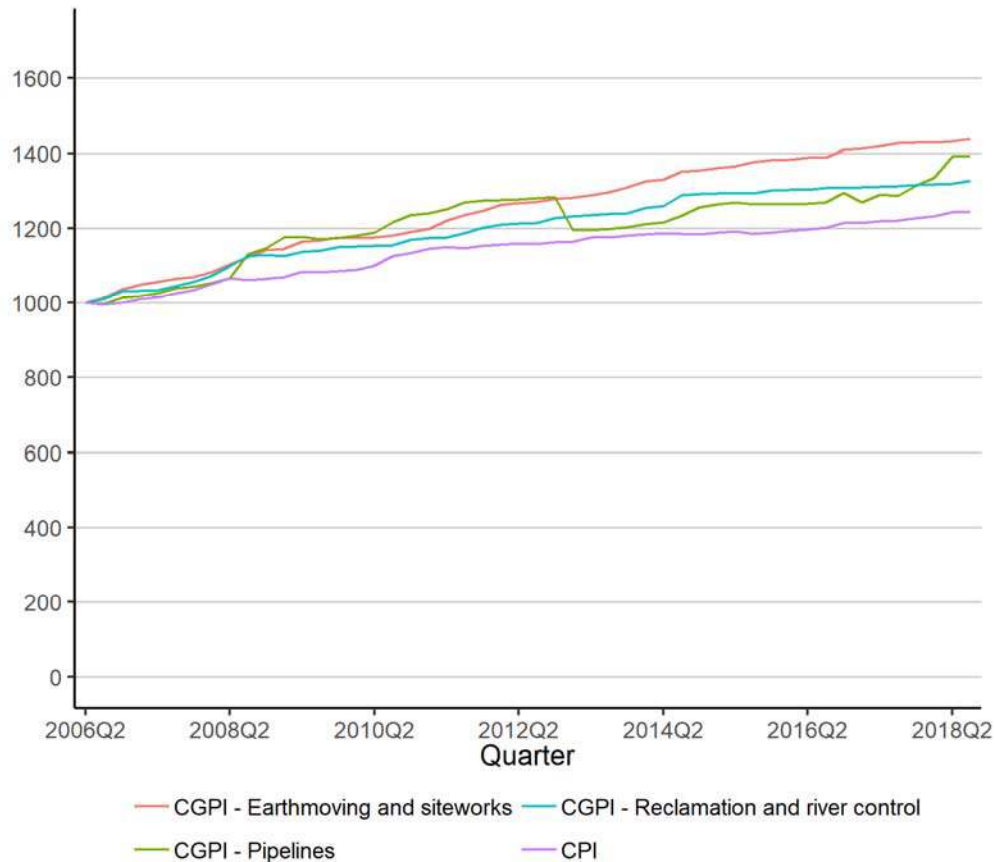
Table 4 above detailed the composition of local council CAPEX indices from the Capital Goods Price Indices (CGPI) for earthmoving and siteworks, reclamation and river control, and pipelines.¹⁶ Figure 5 shows the changes in the CGPIs over the period of analysis compared with CPI.

Prices of inputs to CAPEX spending have risen faster than the CPI, and faster than the inputs to OPEX spending. The most significant movement was in the index for earthmoving and siteworks, which rose by almost 36% (or 3.1% on a CAGR basis) over the period of analysis.¹⁷ As indicated by Table 4 above, the indices for pipelines and reclamation and river control are combined with that for earthmoving and siteworks to form (equal) derived price indices for water and environmental management CAPEX and planning and regulation CAPEX. This derived index has increased 30% over the period of analysis (or 2.7% on a CAGR basis) – that is, at a lower rate than the earthmoving and siteworks alone (employed for the roading, transport and community activities CAPEX categories).

¹⁶ See Table 12 in Section 6.2 for the categorisation of council spending into five high-level activity classes (consistent with the BERL index).

¹⁷ Estimated using the quarters ending December (the midpoint of councils' financial year) 2006 and 2016.

Figure 5 Movement of indices underlying CAPEX spending



Source: Statistics New Zealand, Productivity Commission

The net result of these price increases is that the councils who spend more on roading, transport and community activities are likely to face bigger price pressures than councils who do not.¹⁸

The capital goods price index from Statistics New Zealand does not include the cost of land acquisition.¹⁹ It is possible that, over the period of analysis, if land has been acquired for particular projects, then it will show through as a cost pressure to councils. We have

¹⁸ See also Table 12 in Section 6.2 for the categorisation of council spending into five high-level activity classes (consistent with the BERL index).

¹⁹ According to Statistics New Zealand, the purpose of the CGPI is to provide a price deflator for national accounts statistics (e.g. GDP). Escalation in the cost of land is not an addition to the economy.

not attempted to model this effect of the price of land, as feedback indicates that this has not been a material issue.

3.4 Combined index – price pressures on CAPEX higher than for OPEX

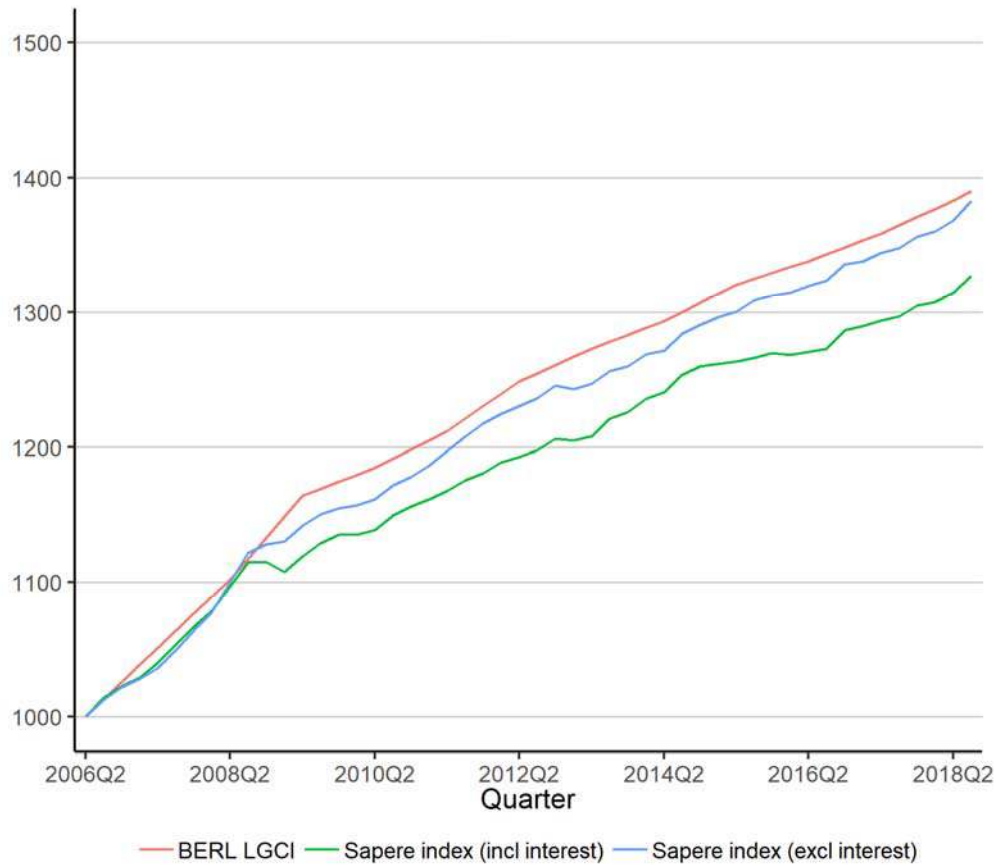
We show the results for all councils combined in Figure 6 below.

A number of observations can be made from a review of this chart:

- The effect of the chaining can be seen when comparing the Laspeyres (BERL) index with the chained Laspeyres. As might be expected, the chained index sees slower price growth than the unchained index.
- In recent periods however, as prices in indices relating to water and environmental management have increased quickly, the expenditure shares have resulted in higher price growth (whereas the available BERL 2017 LGCI index is based on a forecast of inflation in this area).
- The index including the effect of interest removes around 6 percentage points of price growth compared to the index excluding interest.

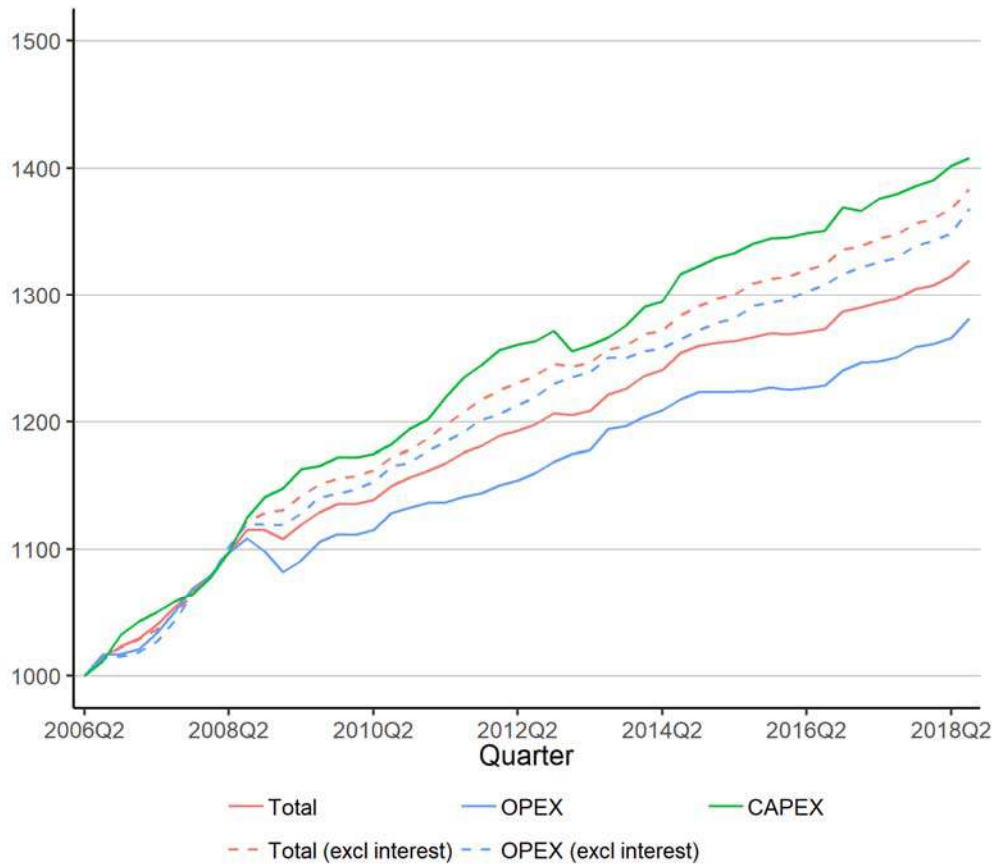
We compare the indices for OPEX and CAPEX on the same chart in Figure 7. This chart shows that price pressures for capital spending projects have risen faster than for operating expenditure.

Figure 6 High level indices for all councils combined



Source: Data from Department of Internal Affairs, Reserve Bank of New Zealand, Statistics New Zealand

Figure 7 Comparison of OPEX and CAPEX indices



Source: Data from Department of Internal Affairs, Reserve Bank of New Zealand, Statistics New Zealand

3.5 A statistical model of local government cost inflation

We considered a number of potential variables that could “explain” movements in our local government cost index. These are set out in Table 5 below.

There are conceivably a lot of other potential explanatory variables, but we are restricted by data availability. Even some of the variables we do have are imperfect. The variable for *World prices for New Zealand imports* will include the prices for imported consumption goods, as well as imported intermediates and capital goods. The price of consumption goods is less relevant to local government.

Table 5 Potential explanatory variables

Variable	Short name	Source
The employment gap – the unemployment rate less the non-accelerating inflation rate of unemployment (NAIRU)	EMPLOYMENTGAP	Unemployment rate (STATISTICS NEW ZEALAND); NAIRU estimates (RBNZ Data for the February 2019 MPS)
Real Trade Weighted Index exchange rate (change)	RTWI_QPC	RBNZ Statistics B1
World price of imported goods into New Zealand	PMF_QPC	RBNZ Data for the February 2019 MPS
Business Investment/Residential Investment/gov't investment as a percent of GDP	BI_GDP/RI_GDP/GT_GDP	STATISTICS NEW ZEALAND (business investment constructed by the residual of total investment less residential and government investment) ²⁰
90 day rate	R90	RBNZ Statistics B2
Migration (permanent and long-term)	MIG	STATISTICS NEW ZEALAND
Inflation expectations – one year ahead	INF_EXP	RBNZ Data for the February 2019 MPS
Dummy for 2010Q3 GST changes	Dummy GST	Sapere constructed
Dummy for GFC	Dummy GFC	Sapere constructed (2008Q2 to 2009Q2)
Output gap defined as actual demand less potential output ²¹	YGAP	RBNZ Data for the February 2019 MPS

Source: Sapere

²⁰ We note there is a small overlap (government residential investment).

²¹ A positive output gap represents excess demand pressures.

Multicollinearity is an issue that has implications for our confidence in our results

The statistical model has a number of issues that need to be considered when assessing the results. The potential explanatory variables we examined are highly correlated (interest rates and demand pressures for example); this correlation between explanatory variables is called multicollinearity and leads to two issues.

- In a model such as ours that is measured by using a procedure called ordinary least squared, determining if an explanatory variable has a statistically significant effect on local government cost inflation is difficult.²²
- We only have a limited number of data observations on which to estimate our model, but many possible explanatory variables. Therefore, decisions need to be made about which variables to include and exclude in the final model; multicollinearity makes it harder to make this choice as we may incorrectly dismiss an explanatory variable that is important, or include one that is not.

The presence of multicollinearity means final model selection is difficult, so we rely on judgment (informed in part by economic theory) for our final model specification.²³

A final issue is unrelated to multicollinearity. To have more certainty that the results from our statistical modelling are measuring the true effect of an explanatory variable on local government cost inflation, we need to be able to assume we have controlled for all other potential explanatory factors. A lack of data for some potential explanatory variables (e.g. detailed capacity measures for specific sub-industries such as roading), and imperfect measurement of other variables we do have data for, means we cannot be sure this assumption holds.

Scaling the variables by their average movement helps order their relative impact on cost inflation

Table 6 shows our estimates of coefficients for each variable. Different explanatory variables display different amounts of variation through time, making it hard to compare the coefficient estimates between explanatory variables. The fourth column (*Effect of a std dev change*) scales an explanatory variable's coefficient estimate by the explanatory

²² Concretely, if an explanatory variable does "truly" have a statistically significant effect on local government inflation, the presence of multicollinearity means we are less likely to "detect" it.

²³ Relative to the number of data observations, we have a lot of potential explanatory variables; therefore, we would like to eliminate some so that we have sufficient degrees of freedom to give us confidence in our results. Multicollinearity means the p-values (an indicator of statistical significance of the null hypothesis) are inflated, making it hard to tell if a variable is "truly" not statistically significant and therefore can be eliminated. Multicollinearity does not bias the estimated impact of a given explanatory variable on cost inflation.

variable's average variability since 2010 (as measured by the standard deviation of the variable, see column three) to give a sense of the relative magnitude of the explanatory variable's effect on local government cost inflation for "normal" or average changes in that variable.

Table 6 Coefficient estimates from statistical model

Variable	Coefficient estimates ²⁴	Std dev change of the variable since 2010 (measured quarterly)	Effect of std dev change on local government inflation (per quarter)
Constant	0.36		
Dummy GST	-0.19		
PMF_QPC	0.18**	1.87	0.33
INF_EXP	0.43*	0.63	0.27
R90	-0.09	0.47	-0.04
YGAP(lagged)	0.26**	0.89	0.23
RTWI_QPC	-0.09*	2.72	-0.25
R-squared	0.38	Durbin-Watson Statistic	2.05

Source: Sapere analysis

Once this scaling occurs, we see that foreign import prices, the change in the real trade weighted index, inflation expectations and the output gap (a measure of demand pressures) all have more-or-less an equivalent effect on local government cost inflation. The numbers in the fourth column might seem small but, as context, on average in the sample period the cost inflation index varies 0.65 percent points per quarter.

Forty per cent of price changes in the index can be explained

A natural question is how much of local government price inflation can our model "explain"? The explanatory power is measured by a model's R-squared statistic; a basic

²⁴ An asterisk (double asterisk) indicates the coefficient on the variable is statistically different from zero at a 5 per cent (1 per cent) significance level. Intuitively, the presence of an asterisk indicates that it is very unlikely that the variable has no effect on the growth in our local government cost index. Variables such as R90 (the 90-day interest rate) that do not have asterisks associated with them could also be very unlikely to have no impact on the growth in our local government cost index, but owing to multicollinearity we will struggle to detect this (see footnote 22).

measure of the explanatory relationship between the data and model. The model has an R-squared value of around 0.4; so the variables we have in the model (inflation expectations, the output gap, interest rate, exchange rate and the world price of imported goods) “explain” about 40% of the variation in our cost inflation index; 60% is left “unexplained” in a statistical sense; however, we do explore some potential reasons in the next section.²⁵

A qualification due to two technical issues

As noted, there are two technical issues:

- the potential explanatory variables we examined are highly correlated (for example, interest rates and demand pressures); this correlation between explanatory variables is called multicollinearity;
- the other issue is not being able to control for all possible explanatory variables.

Owing to these issues our findings are suggestive only. For instance, we interpret our finding that inflation expectations, demand pressures in the economy, the world price of imported goods and the exchange rate are correlated with (and therefore *may* influence) local government cost inflation as suggestive; we cannot be conclusive. These statistical findings need to be considered with the observations from other sources, such as the perceptions of councils themselves.

3.6 Observations and feedback on price movements

In order to investigate the reasons for price increases, we met with several members of the Business Performance Working Party (BPP) of the New Zealand Society of Local Government Managers (SOLGM). We also reviewed some of the relevant submissions to the Productivity Commission’s inquiry on local government funding and finance.²⁶

3.6.1 Capacity issues in key areas of supply

Feedback indicated some capacity effects. Particularly in recent times, the Kaikoura earthquake and the necessary rebuild of State Highway One have soaked up a significant amount of capacity in the roading construction sector. In some cases, we have been told, responses to RFQs have not been forthcoming, which indicates that capacity was likely committed elsewhere.

²⁵ The term “explain” and its relations are in quotes because the R-squared measures association rather than causation.

²⁶ Productivity Commission – Local government funding and financing – November 2018
<https://productivity.govt.nz/view/submissions/3819>

The effect of insufficient construction capacity would normally be associated with a rise in prices for delivery of capital projects, which is what we observe in the CGPI indices that we illustrated earlier.

Smaller councils attributed price differences to locality factors and to the availability and supply of local capability. A key driver of rising prices is the lack of competition due to a low number of providers, leading to prices increasing well above CGPI levels. In one instance, an interviewee reported this contracting environment resulted in a quote that was \$100–\$300k above the engineering estimate.

Scarcity of certain skilled personnel such as water scientists and consent planners drives up the price of specialist labour. Compounding this is the difficulty smaller councils have in attracting skilled workers to more rural areas. Lack of capacity often results in councils being a price-taker when contracting out projects.

Insufficient capacity might result in some capital projects being deferred as some councils choose to maintain certain pieces of infrastructure for longer rather than replace them, or wait to commission new projects until funding has been obtained or the capacity issues have been resolved.

SOLGM, in its submission to the Productivity Commission report, noted that changes in overall demand for civil construction services (from other areas such as broadband) had affected capacity available for council projects.²⁷

3.6.2 Other New Zealand specific price effects

We understand that there is scarcity of supply of aggregate. Aggregate is rock and mineral fragments used to provide a bed for other materials and is used in construction and roading.

With rising prices comes rising uncertainty about whether a project may be delivered within its budget, which may skew the timeline of delivery. This raises concerns for potential economies of scale and jeopardizes savings that are made from efficient procurement. Uncertainty gets passed on to contractors who charge higher rates to compensate.

Local authorities, especially those in the Wellington region, have to manage risk by transferring their risk against natural catastrophes to third party insurers. With New Zealand insurers leaving the Wellington market, local authorities have had to seek foreign underwriters who require additional technical expertise, so premiums have increased.

²⁷ SOLGM – Contribution to the Productivity Commission Inquiry – February 2019.

3.6.3 International influence on prices

SOLGM noted that the international price for oil adversely affected the price of bitumen – though we note that this was mitigated by a higher New Zealand dollar, which moderated the price paid in New Zealand dollars.

We would also note:

- the exchange rate affects other imported goods such as machinery
- global interest rates have been low since the GFC, which has reduced the cost of borrowing for councils (relevant to the index that includes interest).

It was also noted in discussions with a high-growth council that competition in Australia can affect the market when tendering work. Strong activity in Australia might be evidenced through skilled labour being attracted to Australia, or by firms that can operate in both countries accepting work in Australia.

4. Differential effects on councils

Each council provides a mixture of goods and services that meet the requirements of their local community. Some councils are more rural than others and therefore have more activity in roading. Metropolitan councils have denser networks, particularly in drinking and waste water activities. Regional councils are more heavily focused on regulatory activities, and therefore face cost growth in provision of services, rather than maintenance and construction. Each council is at a different stage in its asset replacement and many have different balance sheet structures.

These differences change each council's exposure to different components of price inflation. Conversely, the choice of different spending profiles produces different weightings in the index calculation that impact the price indices for each council type.²⁸ One of the advantages of the Sapere index is its adaptability for creating sub-indices, in this case four sub-indices corresponding to the four LGNZ sector groups (metropolitan, provincial, rural and regional).

It is difficult to make simplifying observations about CAPEX due to large variations in expenditure across most cost categories, but with regard to OPEX:

- metropolitan councils spend relatively more on community (e.g. libraries, gardens and playgrounds, social housing);
- rural councils spend relatively more on roading (e.g. road construction); and
- regional councils spend relatively more on water and environmental management (e.g. water supply and sewerage networks, waste collection and disposal, land/soil/flood/pest management) and transport activity categories (e.g. transport planning, parking).

These activity variations result in different weightings in the index calculation, which in turn impact the price indices for each council type. Rural and regional councils have faced the highest price rises for operational expenditure and rural councils highest price rises for capital expenditure.

²⁸ Statistics New Zealand goes to considerable effort to make sure that like is compared with like when developing its indices. Therefore, we can be reasonably confident we are observing genuine price effects when using their indices.

4.1 Councils procure different goods and services

This section examines the spending profiles in local government OPEX and CAPEX according to LGNZ sector groups (metropolitan, provincial, rural and regional).²⁹ The following section examines the impact of these differences in spending profiles on price inflation over time.

4.1.1 Diversity of spending profiles

Figure 8 shows the latest 2017 spending profiles for each council type for the five high-level activity categories:³⁰

- roading (e.g. road construction)
- transport (e.g. transport planning, parking)
- water and environmental management (e.g. water supply and sewerage networks, waste collection and disposal, land/soil/flood/pest management)
- community activities (e.g. libraries, gardens and playgrounds, social housing)
- planning and regulation (e.g. health/liquor licensing, building regulation, tourism promotion, governance).

In this figure we show the ranges for each council type using box and whisker plots³¹ to impart an idea of where profiles are similar across council groupings and where they diverge significantly. For comparability, the activity category share of each council's OPEX and CAPEX in 2017 has been expressed as a percentage of total spending for that council. The box and whisker plots then demonstrate the profile of spending in each category by the councils in each council type. While OPEX and CAPEX shares each add to 100% across the five categories of spending for each individual council, this will not be clearly evident in these plots – however, it may be observed that the sum of median values is approximately 100%.

We note from Figure 8 the following in relation to OPEX spending:

- Metropolitan councils spend relatively more on community and relatively less on roading than other types of councils.

²⁹ See allocation of council types in Section 6.1.

³⁰ See Table 12 in Section 6.2 for the categorisation of council spending into five high-level activity classes (consistent with the BERL index).

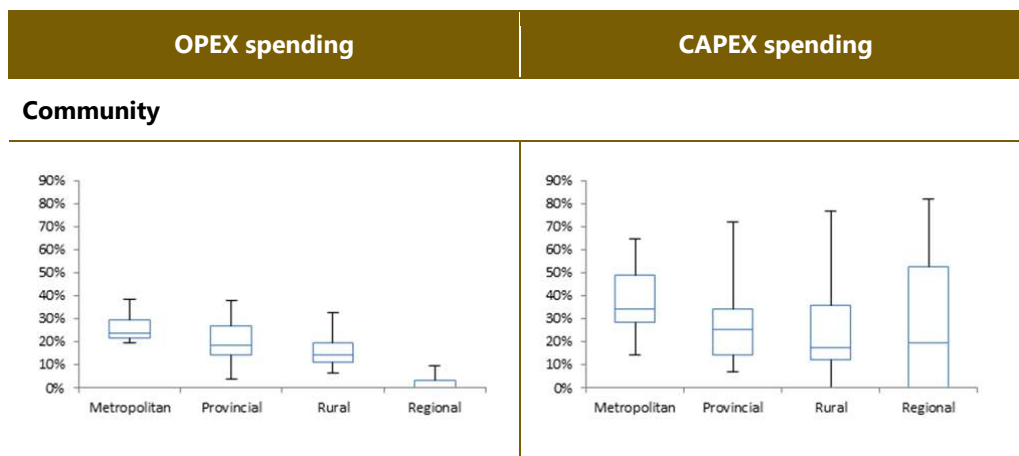
³¹ A box and whiskers chart is a way of showing the distribution of a number series. The "box" in the centre shows the interquartile range (that is, the middle 50% of observations will lie in this group with 25% of the highest and lowest observations falling outside this range). The line in the middle of the box shows the median observation: 50% of observations will be higher and 50% will be lower. The extremities (whiskers) show the highest and lowest observations.

- Rural councils spend relatively more on roading than other councils and less on community than all but regional councils; there is a considerable range of spending on roading by rural councils, indicating that it represents a particularly large burden for some individual councils, but less for others.
- Spending on planning and regulation and on water and environmental management is similar across all councils (except regional councils, which spend considerably more on water and environmental management).
- Transport spending is negligible for all councils other than regional councils for whom it can be a significant expense (median 15%, maximum 60%)

And in relation to CAPEX:

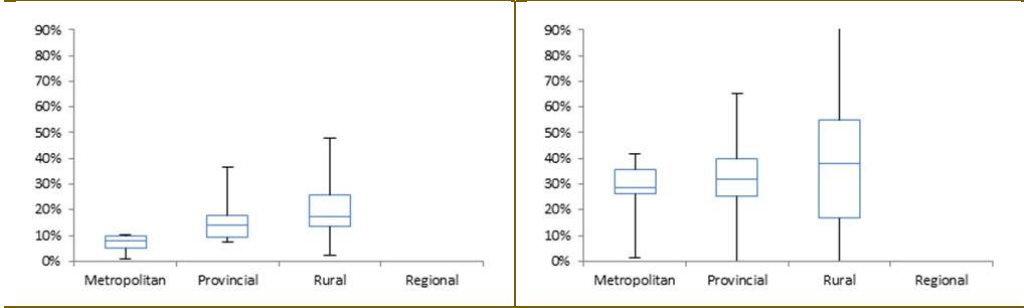
- Spending by regional councils on CAPEX projects is insignificant in absolute terms and we do not come to any conclusions about it.
- Across most areas of spending there are large ranges and it is difficult to identify simplifying observations.
- The median spend of metropolitan councils on community projects is higher than for other types of councils (similar to OPEX).
- The median spend of rural councils on water and environmental management is lower than for other types of councils.

Figure 8 Expenditure by local government activity and council type (2017)

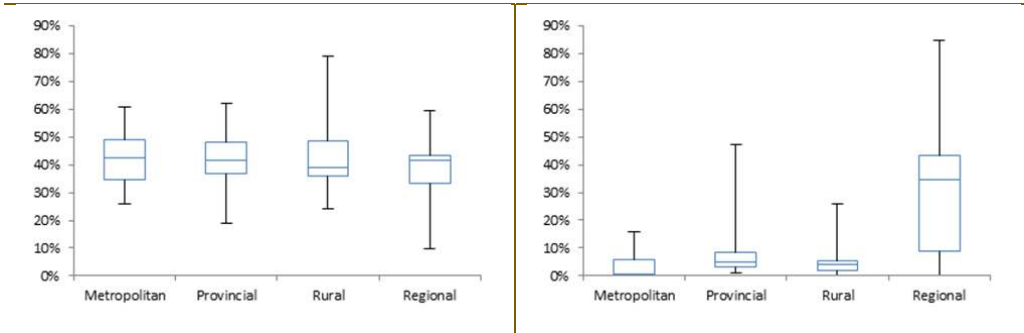


OPEX spending	CAPEX spending
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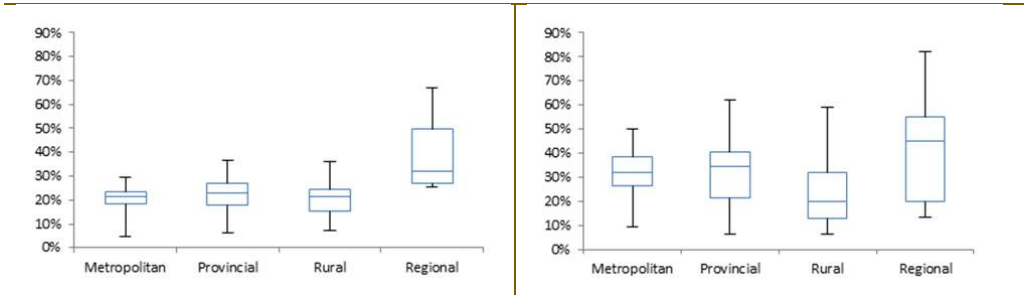
Roading



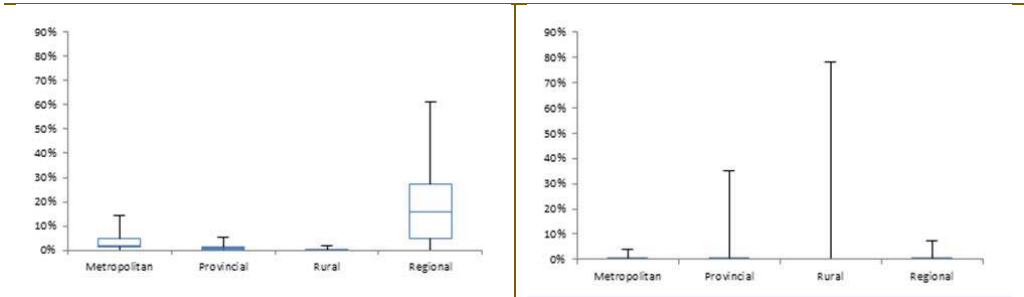
Planning and regulation



Water and environmental management



Transport

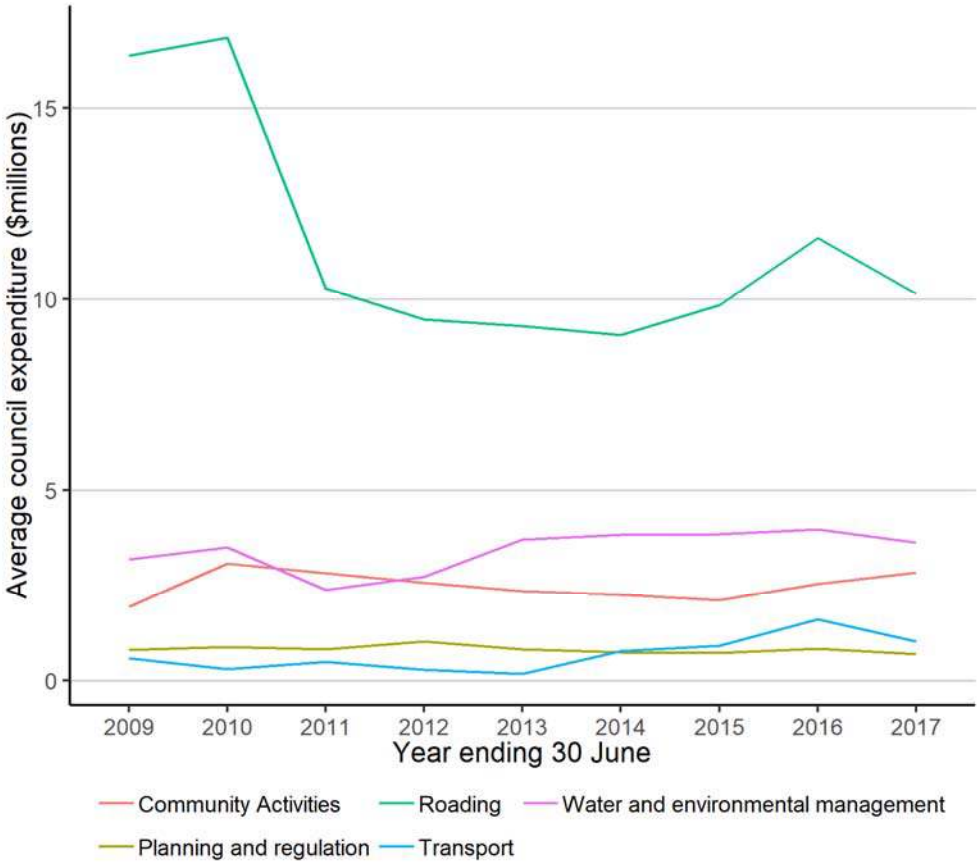


Source: Data from Statistics New Zealand and Department of Internal Affairs

4.1.2 CAPEX change over time

As noted above, spending on capital projects moves around from year to year and it is difficult to discern clear trends. Figure 9 shows movements in average capital spending since 2009 for each class of expenditure. Most notably the level of roading capital expenditure significantly reduced in 2011.

Figure 9 Average nominal CAPEX by council activity



Source: Department of Internal Affairs

4.1.3 OPEX change over time

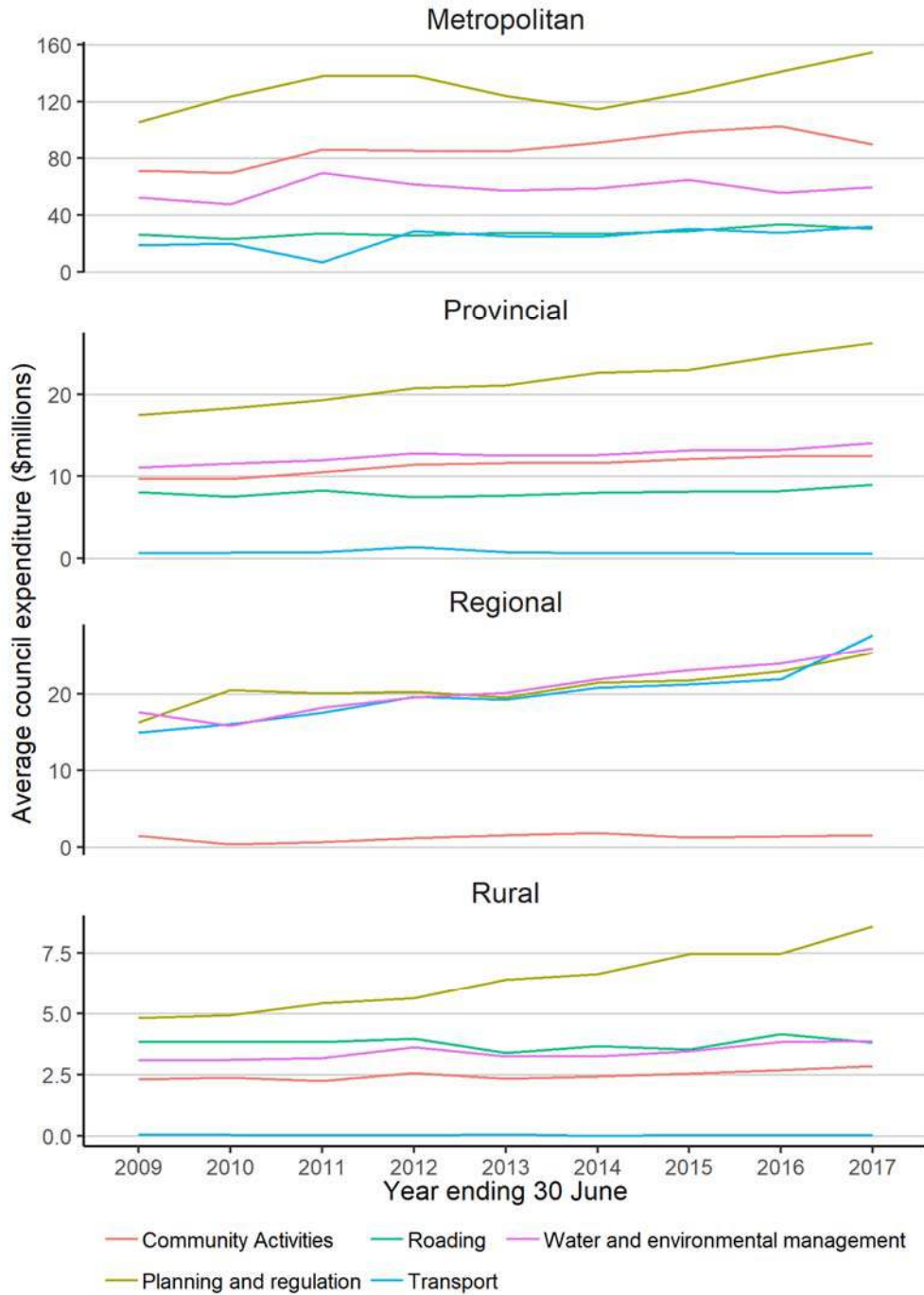
In Figure 10 we show the evolution of OPEX since 2009 for each type of council and class of expenditure, excluding depreciation and interest.³² Most categories have been relatively stable or gradually increasing.

The main observation is that spending on planning and regulation has increased faster than any other spending area for each type of council, with the exception of regional councils. Since 2010, there have been significant rises (in excess of 6% per annum in nominal terms) in economic development, governance, and "other activities", which comprises some facilities such as public conveniences and logging activity.

The second fastest increase for provincial and rural councils was in community activities; for urban councils it was transport, albeit off a low base. See Figure 8 for actual shares in 2017.

³² The data on OPEX in this section commences in 2009 (whereas the price indices have been calculated from 2007 onwards). This is because Statistics New Zealand in 2009 changed the categories used by councils to report their expenditure and so a consistent series is only available from 2009.

Figure 10 Average nominal OPEX by council type and activity

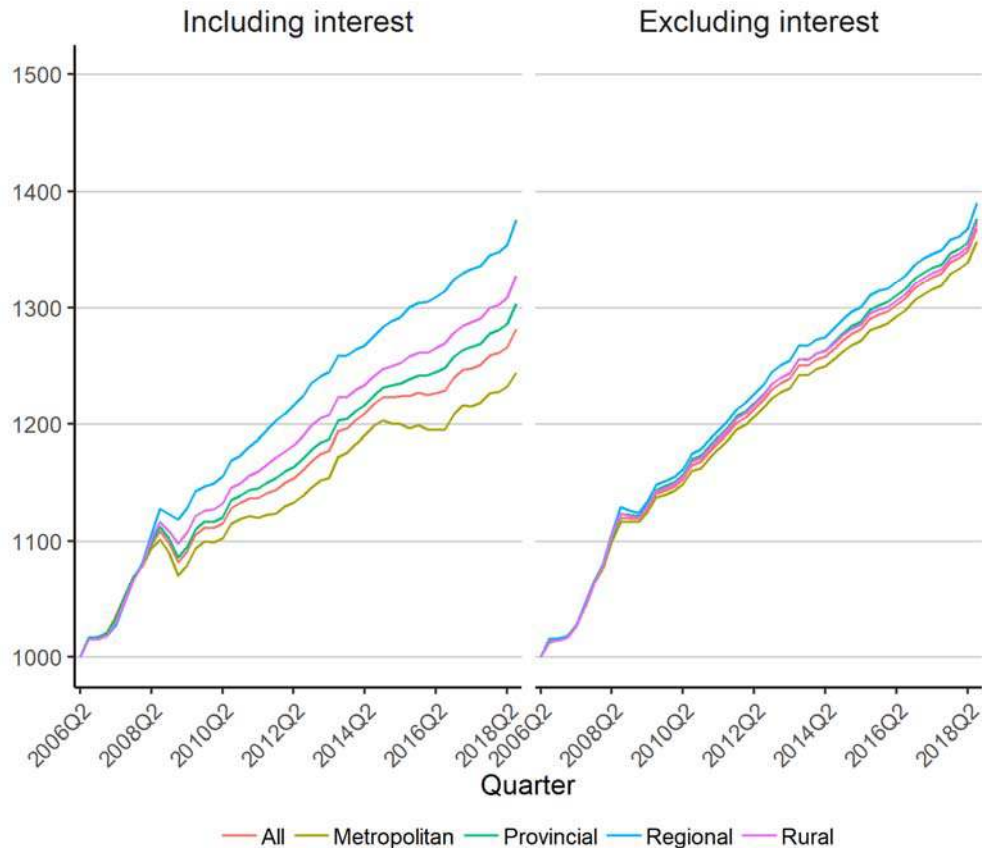


Source: Statistics New Zealand

4.2 Diversity impact on exposure to inflation

The diversity in local government spending means that councils are exposed to varying price pressures. Figure 11 and Figure 12 show the OPEX and CAPEX indices by type of council. The results show that regional councils have faced the greatest price pressures for OPEX. This is largely due to their greater level of spending on water and environmental management. Metropolitan councils have faced lower price pressures – significantly lower if interest is taken into account.

Figure 11 OPEX indices by type of council



Source: Data from Reserve Bank of New Zealand, Statistics New Zealand

The effect of interest is significant when included in the OPEX index – the difference in growth between the highest (regional) and the lowest (metropolitan) increases from 3.3% without interest to 13.1% with interest (to September 2018). In particular, metropolitan councils now operate with much higher levels of debt than they did at the commencement of our period of analysis. Debt levels have risen highest in absolute terms among metropolitan councils, from \$1.7 billion in term debt in 2007 to \$9.9 billion in

2017. Metropolitan councils have the highest relative debt level when measured against total assets, as shown in Table 7 below.

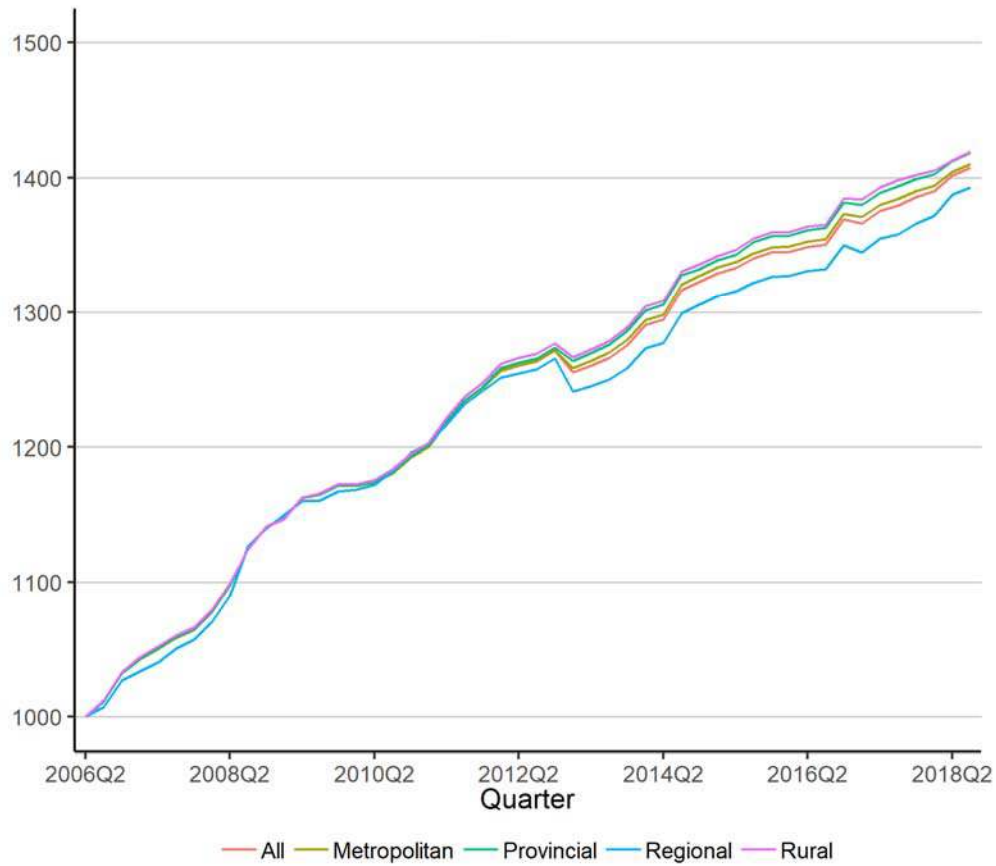
Table 7 Debt to total assets by type of council – change over time

Council type	Metropolitan	Provincial	Rural	Regional
2007	3.6%	2.7%	1.5%	1.3%
2017	13.2%	4.7%	2.6%	5.5%

Source: Statistics New Zealand

Figure 12 shows the CAPEX indices by type of council. Overall the indices are relatively close – over the shown period the difference is just 2.6% between regional councils (who faced the lowest price pressures) and rural councils (who faced the highest). The main reason for the disparity is the amount of money that rural councils have spent on roading, where the underlying index has risen faster than other indices.

Figure 12 CAPEX indices by type of council



Source: Data from Department of Internal Affairs, Statistics New Zealand

5. What causes expenditure (versus price) growth

In Section 1 we distinguished between three components contributing to the change in local government expenditure over a period of time: price inflation; the “coarse” change in the quantity of goods and services due to changes in the population of the communities; and the “fine” change in the quantity of goods and services based on changing types and quality of services. The preceding sections examined the development and properties of the price index to describe inflation.

This section explores the change in quantity, employing the Sapere price index and population data to explore the relative contributions to total nominal expenditure growth from changes in the price, changes in quantity due to population changes, and changes in quantity due to other factors (real per capita expenditure). An advantage of the Sapere index is that this can be done separately for each LGNZ local government sector group.

Nominal OPEX growth between 2007 and 2017 averaged by council type has been lowest for metropolitan and provincial councils and highest for rural and regional councils. The difference reduces after adjusting for price inflation. However, the gap widens beyond that seen in nominal OPEX growth once adjusted for population increases.

Rural and regional councils have experienced approximately double the increase in real per capita expenditure experienced by metropolitan and provincial councils. Increases in real per capita expenditure have contributed approximately five times more to real OPEX growth than population change for rural councils and more than double for regional councils. Conversely, for metropolitan and provincial councils, population growth has contributed more than real per capita expenditure growth to real expenditure growth.

Having removed price inflation, we have conducted some preliminary analysis of the relative contributions of population change and other factors to the change in quantity of local government services. Our approach was to compare the real expenditure change for the top quartile of councils for each measure, compared to the remaining 75 percent:

- the councils with the top quartile for population growth have experienced more than double the rate of total real expenditure growth than all the remaining councils
- the councils with the top quartile of growth in visitor numbers have experienced a faster rise in real per capita expenditure, at nearly double the rate of those in the low group
- the councils with the top quartile for significant roading networks and per capita economic growth have experienced distinctively higher growth in real per capita expenditure by about two thirds and one third respectively.

The combined effects of inflation pressures and real per capita growth in expenditure among rural councils have meant that those councils have experienced the highest levels of pressure on council rates.

5.1 Contributors to nominal OPEX growth

After accounting for price inflation, we are left with real local government expenditure. Overall, the level of a local council's real expenditure will scale with the size of the population it provides with goods and services. In addition, councils face a number of expenditure pressures that may impact real per capita expenditure:

- They may face community expectations of better services (e.g. an improved library with greater resources). These should be described as a volume or quality effect rather than a price effect when looking at a change in expenditure patterns.
- They may face growth in service provision, possibly as trusts or government or other funders withdraw from local community service provision.
- They may face growth in regulatory cost due to changing regulatory requirements, e.g. building codes of compliance.

Table 8 shows the change in real per capita expenditure between 2007 and 2017 by national and by council category. This is calculated by adjusting nominal expenditure for price inflation and population change. The compound annual growth rate in real expenditure per capita is also provided.

Table 8 Changes in OPEX expenditure and the drivers of growth (2007 to 2017)

	National aggregate	Metro	Provincial	Rural	Regional
Average change in expenditure (nominal)	64%	57%	62%	69%	72%
Price inflation (<i>Sapere index</i>)	29%	28%	30%	30%	31%
Average change in expenditure (real)	27%	22%	25%	30%	31%
Average change in population	12%	11%	13%	5%	9%
Average change in real per capita expenditure	13%	10%	10%	24%	20%
Compound annual growth rate in real expenditure per capita	1.2%	1.0%	1.0%	2.2%	1.8%

The national values are calculated based on the aggregation of all councils; price inflation is measured using the "All" Sapere index. The council type values take the average changes in nominal expenditure between 2007 and 2017 for the different types of

councils and adjust them for price inflation and for population change using the corresponding price indices and population growth.³³

At the national level, the contributions of price inflation and real expenditure growth to nominal expenditure growth are approximately equal. The changes in population and real per capita expenditure also contribute similarly to the change in real expenditure. However, this high-level view does not reveal nuances by council type.

Table 8 above shows a large variation in the change in nominal OPEX over the decade, with a 15-point spread between metropolitan and regional council types. Regional councils have faced the highest price pressures. However, this is insufficient to explain the difference in nominal expenditure growth; with regional councils also experiencing the largest change in real expenditure.

Population growth has been variable across the categories and has been higher in metropolitan and provincial than rural and regional councils. Adjusting for this, we calculate the change in real per capita expenditure. This adjustment creates a stark contrast between the council categories:

- Changes in real per capita expenditure are roughly double for rural and regional councils compared to metropolitan and provincial councils.
- Changes in real per capita expenditure have contributed almost five times more than population to real OPEX growth for rural councils, and more than double for regional councils. This is in contrast with metropolitan and provincial councils where population growth contributes more than the increases in council activity.

It is difficult to discern trends in capital spending due to distortions caused by large projects. For example, the Dunedin stadium project required large disbursements between 2010 and 2012, and the Christchurch rebuild has seen CAPEX spending ramp up considerably. There is, therefore, much more variation in the CAPEX spends. This means that trying to compare CAPEX spending in the same manner as OPEX would have limited meaning.

5.2 Real expenditure growth

It is not within the scope of this project to seek out the reasons for variations in real (total or per capita) expenditure. However, we have made some preliminary analyses and identified some relevant statistics that indicate potential topics for future research.

³³ Using the average change gives an equal weighting for each council within a category so that the values are not driven by the largest council(s). Further discussion regarding the use of an average is discussed in Section 6.3. We also provide the same calculations, but aggregated by council type in this section. The results for individual councils are included in Section 6.4.

Once price inflation has been removed, analysis can begin to consider the relative importance of changes in the quantity of OPEX for the goods and services provided by local councils – whether these are “coarse” changes in real expenditure due to population change, or “fine” changes in real per capita expenditure based on types and quality of services.

The possible reasons that have been proposed for growth in real per capita expenditure include:

- the extent of road network maintained by councils (excluding state highways);
- growth in tourist numbers
- tourism numbers relative to local population
- high economic growth per capita.

We have tested these hypotheses by comparing the average increase in real (total or per capita) operating expenditure between two groups of council. The high group consists of the councils that were in the upper quartile (top 25%) of a particular characteristic, such as population growth or tourism growth. The low group consists of the remaining councils (i.e. bottom 75% or central and bottom quartiles). A positive difference between the two groups signals that there may be a definite effect that merits deeper investigation.

We exclude the Kaikoura and Hurunui District Councils and Christchurch City Council from the analysis in this section. This is due to the confounding effect that the earthquakes and subsequent activities have had on the results for these councils.

5.2.1 Effect of population growth

The impact of population growth on councils will not always be obvious. Councils will plan in advance for population growth which means that some expenditure growth will precede the accompanying population growth. Also, it is possible that larger councils may develop economies of scale that smaller councils do not, so that a small council may have to increase spending more quickly for a given percentage population increase than a large council. Table 9 shows the difference in growth of total real expenditure between the high and low groups based on population growth. In this case total real expenditure rather than per capita real expenditure is used to explore the primary impact of population change as a driver for differences in quantities of goods and services provided to communities. The councils with the top quartile for population growth have experienced more than double the rate of real expenditure growth than all the remaining councils.

Table 9 Possible impact of population growth

	High group	Low group
Average increase in total real expenditure, CAGR in brackets	38% (3.3%)	16% (1.5%)

Source: Sapere workings, excludes Kaikoura, Hurunui and Christchurch

5.2.2 Councils with a significant tourism burden

In its submission, SOLGM noted that there are smaller local councils attracting a high number of visitors which means they require “big city” amenities, but paid for from the local ratings base.³⁴ SOLGM argues the need to maintain a standard of amenities for tourist destinations and key tourism corridors places increasing cost pressures on these councils. SOLGM cites the instance of Queenstown, that experiences 39 visitors for each ratepayer. It recommends general and local increases in the taxation of tourism.

The Tourism Infrastructure Fund was introduced to help meet some of the costs of rest stop picnic areas and toilets.³⁵ However, bigger amenities did not meet the eligibility criteria and were funded by councils. Increasing numbers of tourists means increasing cost pressures on biodiversity preservation, waste management and drinking water infrastructure to make sure they are all compliant and monitored.

While tourism numbers relative to population are indicative of different burdens on ratepayers, if this proportion is relatively constant then it is unlikely to be a primary driver of real per capita expenditure growth. For this reason we focus on the growth of visitor numbers, shown in Table 10.³⁶

Table 10 indicates that councils with high growth in visitor numbers have experienced a faster rise in real per capita expenditure, at nearly double the rate of those in the low group.

³⁴ See page 39 and 72ff, <https://productivity.govt.nz/sites/default/files/sub-local-govt-funding-and-financing-24-society-of-local-government-managers.pdf>

³⁵ See <https://www.mbie.govt.nz/immigration-and-tourism/tourism/tourism-funding/tourism-infrastructure-fund/>

³⁶ Visitor data sourced from the Ministry of Business, Innovation and Employment.

Table 10 Possible impact of high growth in visitor numbers

	High group	Low group
Average increase in real per capita expenditure, CAGR in brackets	15.3% (1.4%)	8.1% (0.8%)

Source: Sapere workings, excludes Kaikoura, Hurunui and Christchurch

5.2.3 There are further possibilities to investigate

Table 11 shows the results for two other possibilities: significant roading network excluding state highways (kms per capita)³⁷ and high per capita economic growth. A significant roading network might stand in as a proxy for a large infrastructure portfolio to manage. Higher economic growth per person could signify that a particular population might develop higher expectations of its council.

We are tentative in our conclusions from this analysis. To be conclusive requires further work to establish causality or to allow for collinearity (e.g. where high per capita economic growth has been the result of higher tourism numbers).

Table 11 Possible impact of other hypotheses tested
Average increase in real per capita expenditure, CAGR in brackets

	High group	Low group
Significant roading network	14.2% (1.3%)	8.6% (0.8%)
High per capita economic growth	12.2% (1.2%)	9.3% (0.9%)

Source: Sapere workings, excluding Kaikoura, Hurunui, Christchurch

5.3 Feedback from councils points to a range of spending drivers

Our discussions with the SOLGM Business Performance Working Party (BPP) group suggested some reasons for growth in spending:

- higher expectations of ratepayers and engagement with iwi (e.g. sewerage to land rather than to sea)

³⁷ Data sourced from the New Zealand Transport Agency.

- occupational health and management plans for work require additional measures such as use of cones, scaffolding, etc.
- libraries have expanded the services they provide
- some councils are acting to ensure continuation of local health services
- when schools expect to use council playing facilities instead of their own, work that schools used to undertake becomes the responsibility of councils (e.g. a new school that is built with limited room for sports will now look to use council facilities)
- private certifiers for building have given way to council certification
- some councils are picking up community funding and social support previously provided by central government.

Regulatory changes that expanded council responsibilities corresponded with higher costs on councils. Councils indicated a number of areas which partially explain the 60% of price increases that cannot be explained by economic variables (inflation expectations, demand, and world price/exchange rate):

- Multiple councils indicated, while acknowledging wider community benefit, that mandatory drinking water regulations introduced by central government contribute to additional spending. In the SOLGM submission, an additional capital cost of up to \$570 million was expected for the drinking water standards, while GHD and Boffa Miskell identified up to \$2.4 billion in capital costs to comply with Freshwater National Policy Statement. We assume some of this cost is being incurred now, post the Havelock North waterborne disease outbreak, and the remainder will be spent in future years.
- Other regulatory standards or legislative changes such as earthquake-prone-building assessments or implementing planning standards required an increase in staff numbers or consultant resources, adding costs with often no new funding source. Changes in regulations can mean prior work becomes irrelevant or requires a review, leading to added consultation costs. Wellington City Council noted in its submission to the Productivity Commission Local Government Funding and Financing Issues Paper that:

The Council has, through our regulatory function and in the interests of public safety, had 3 recent instances where we have been directed by the Ministry of Business, Innovation and Employment to obtain information about aspects of buildings: non-ductile columns, targeted building assessments following the November 2016 earthquakes and the investigation into the use of aluminium-composite panels (ACP).³⁸

³⁸ See <https://productivity.govt.nz/sites/default/files/Sub%20061%20-%20Wellington%20City%20Council.pdf>

- Private certifiers for building have left the market with liability issues and council certification has filled the gap. As councils were jointly and legally liable alongside these certifiers, many councils were left footing the bill for these legal battles.
- There are increased levels of service required to meet the higher expectations of ratepayers and engagement with iwi. One example is a growing need for sewerage to be disposed of to land rather than to sea. As another example, expectations of flood protection have grown to ensure that not only is flood protection achieved, but biodiversity and habitat are conserved and recreational opportunities are enhanced.
- A sentiment expressed by the SOLGM Business Performance Working Party (BPP) and several councils in their submissions was that community expectations of public facilities such as swimming pools and libraries have expanded. What used to be considered a box with books is now a destination, a shared community space, as a result of community expectations evolving.
- There is an element of deferred maintenance. Previous councils deferred maintenance or renewals in the interest of minimising rate increases in the past, but have had to increase spending to carry out works. Assets built with a lifespan of, say, 30 years, have been subjected to technological or regulatory changes, shortening their lifespan and requiring additional capital.

6. Technical Notes

In order to provide some additional information, we have set out some detail on council classifications, expenditure categories, and a table of expenditure growth by council.

6.1 Council types

In classifying councils, we have deferred to the Local Government New Zealand sector groups:

- Metropolitan
 - Auckland Council, Christchurch City Council, Dunedin City Council, Hamilton City Council, Hutt City Council, Palmerston North City Council, Porirua City Council, Queenstown Lakes District Council, Tauranga City Council, Upper Hutt City Council, Wellington City Council
- Provincial
 - Ashburton District Council, Far North District Council, Gisborne District Council, Hastings District Council, Horowhenua District Council, Invercargill City Council, Kapiti Coast District Council, Manawatu District Council, Marlborough District Council, Masterton District Council, Matamata-Piako District Council, Napier City Council, Nelson City Council, New Plymouth District Council, Queenstown-Lakes District Council, Rotorua Lakes Council, Selwyn District Council, South Taranaki District Council, Southland District Council, Tasman District Council, Taupo District Council, Thames-Coromandel District Council, Timaru District Council, Waikato District Council, Waimakariri District Council, Waipa District Council, Waitaki District Council, Wanganui District Council, Western Bay of Plenty District Council, Whangarei District Council, Whakatane District Council
- Rural
 - Buller District Council, Carterton District Council, Central Hawke's Bay District Council, Central Otago District Council, Chatham Islands Council, Clutha District Council, Gore District Council, Grey District Council, Hauraki District Council, Hurunui District Council, Kaikoura District Council, Kaipara District Council, Kawerau District Council, Mackenzie District Council, Opotiki District Council, Otorohanga District Council, Rangitikei District Council, Ruapehu District Council, South Wairarapa District Council, South Waikato District Council, Stratford District Council, Tararua District Council, Waimate District Council, Wairoa District Council, Waitomo District Council, Westland District Council

- Regional
 - Auckland Council (Unitary), Bay of Plenty Regional Council , Environment Canterbury, Environment Southland, Gisborne District Council (Unitary), Greater Wellington Regional Council, Hawke’s Bay Regional Council, Horizons Regional Council, Marlborough District Council (Unitary), Nelson City Council (Unitary), Northland Regional Council, Otago Regional Council, Taranaki Regional Council, Tasman District Council (Unitary), Waikato Regional Council, West Coast Regional Council

These groups are determined, broadly, by population in their area of responsibility. There are some instances where councils are represented in multiple groups. In these cases, we have placed those councils in one group only in the order or priority that is listed above. E.g. Auckland features in our metropolitan group rather than in the regional group.

Note that we have not included Auckland Transport and Auckland Tourism, Events & Economic Development in our analysis.

6.2 Data sources and expenditure categories

The data from Statistics New Zealand and Department of Internal Affairs (DIA) is collected by Statistics New Zealand through two sources: *The Local Authority Financial Statistics* and the *Local Authority Statistics Survey*. The annual *Local Authority Financial Statistics* are drawn from the annual Local Authority Census questionnaire and from audited Annual Reports by Statistics New Zealand. As of March 2014, the quarterly *Local Authority Financial Statistics* survey is sent to 38 local authorities and the rest are modelled. The time-series of the components of capital expenditure is not publicly available but was supplied to us by DIA, who in turn receive it from Statistics New Zealand (on an “un-validated basis”).

Table 12 Expenditure categories

Statistics New Zealand Activity	Description (from Statistics New Zealand)	High-level category
01 Roothing	Include: Roads and bridges – gravel and sealed roads, cycle lanes, verges, and footpaths.	Roothing

Statistics New Zealand Activity	Description (from Statistics New Zealand)	High-level category
02 Transport	<p><i>Transport planning</i></p> <p>Include: Programmes to encourage promotion of cycling and walking.</p> <p>Passenger transport (rail)</p> <p>Include: All rail.</p> <p>Exclude: All other types of passenger transport.</p> <p><i>Passenger transport (all other)</i></p> <p>Include: Bus, tram, ferries.</p> <p>Exclude: Rail.</p> <p><i>Parking</i></p> <p>Include: On-road parking and council-managed carparks and abandoned vehicles.</p> <p>Exclude: Parking buildings that are leased to third parties.</p>	Transport
03 Water supply	<p>Include: Potable water supply/network – any potable water (drinking water), bulk supply and reservoirs; potable water treatment – treatment of any potable water (drinking water), and non-potable water – water races or irrigation.</p>	Water and environmental management
04 Waste water	<p>Include: sewerage network (including mains) – reticulation of sewage; sewage treatment – include oxidation ponds and on-land disposal; stormwater – water that runs off surfaces such as roads, driveways, footpaths, and rooftops. It travels down gutters, into sumps, and enters the stormwater network.</p> <p>Exclude: Land drainage in non-urban areas. This should be included in land and soil management.</p>	Water and environmental management
05 Solid waste/refuse	<p>Include: collection and disposal – aftercare, landfill operations, street and roadside rubbish bins; and recycling collection and recovery – recycling centres, reusable materials depots and roadside recycling.</p>	Water and environmental management

Statistics New Zealand Activity	Description (from Statistics New Zealand)	High-level category
06 Environmental protection	<p><i>Air and water quality</i></p> <p>Include: Any measurement and analysis of air and water quality, and education. Also includes dairy effluent.</p> <p><i>Land and soil management, and flood protection and river control</i></p> <p>Include: Shelter belts, management of contaminated sites, soil conservation to reduce erosion. For non-urban areas, include any drainage of the land, run-off, etc.; flood protection schemes and river control functions, maintenance, works and monitoring.</p> <p>Exclude: Stormwater – this is included under wastewater.</p> <p><i>Pest management</i></p> <p>Include: Both animal and plant.</p> <p>Pests: Organisms that are capable of causing, at some time, a serious adverse and unintended effect on people and/or the environment – can include rabbits, stoats, birds, possums, feral goats, wasps, and invasive weeds and pest plants.</p>	Water and environmental management
07 Culture	<p><i>Libraries</i></p> <p>Include: Rooms or sets of rooms where books and other literary materials, films, CDs, DVDs, etc, are kept for borrowing or reference.</p> <p><i>Museums and galleries</i></p> <p>Include: Buildings where objects of historical, artistic, or scientific interest are exhibited and preserved.</p>	Community activities

Statistics New Zealand Activity	Description (from Statistics New Zealand)	High-level category
08 Recreation and sport	<p><i>Zoological and botanical gardens</i></p> <p>Include: Any management of zoological and botanical gardens.</p> <p><i>Parks, reserves, playgrounds, etc.</i></p> <p>Include: Off-road mountain bike tracks, walking tracks, walkways, reserves, domains, esplanades, parks and trails.</p> <p>Exclude: Sports facilities that are used primarily for sporting events.</p> <p><i>Other recreation and sports facilities</i></p> <p>Include: Aquatic facilities – aquatic and swim centres and pools; sports facilities (e.g. stadiums) – places primarily used for sporting events; and marine recreational facilities – berths, moorings, ramps, safety, and provision of facilities for people to access water for recreation and sport.</p> <p>Exclude: Parks, playgrounds, ferries – these are included in passenger transport – all other.</p>	Community activities
09 Property	<p><i>Social housing</i></p> <p>Include: Not-for-profit housing programmes that are supported but not necessarily delivered by council to help low and modest income households and other disadvantaged groups to access appropriate, secure, and affordable housing.</p> <p><i>Cemeteries and crematoriums</i></p> <p>Include: Any cemetery and or crematorium that is administered, operated and/or maintained by the council.</p> <p><i>Other property</i></p> <p>Include: council and community property – community, heritage and village halls, community centres, camping grounds; and commercial property – parking buildings that are leased. All non-sporting stadiums (e.g. Vector arena in Auckland), or facilities that are used only for concerts or cultural events.</p>	Community activities
10 Emergency management	<p>Include: emergency and disaster management, rural fire service, Civil Defence, etc.</p>	Planning and regulation

Statistics New Zealand Activity	Description (from Statistics New Zealand)	High-level category
11 Planning and regulation	<p><i>Environmental health and liquor licensing</i></p> <p>Include: Regulation and licensing of food premises, hairdressers, offensive trades, camping grounds and funeral homes. Complaints about health nuisances, advice on water supply and testing, infectious disease/food poisoning investigations, and administration and enforcement of council bylaws.</p> <p><i>Marine safety</i></p> <p>Include: Harbour master.</p> <p>Exclude: Facilities people use to access sport and recreation – this should be included under sport and recreation.</p> <p><i>Other planning and regulation</i></p> <p>Include: Building control – all building consents, building consent processing, code compliance certification, LIMs (land information memoranda) and PIMs (project information memoranda); resource planning and consents – development of regional, district, and coastal policies and plans, city/town planning, and processing and hearings; and animal control – dog registration, adoption and control, stock control, and traps.</p>	Planning and regulation
12 Community development	<p>Include: community development, support, and other – funding of community organisations and projects, such as community advocacy, iwi liaison, social and recreational grants, positive aging, etc.; and community safety – graffiti control, Closed Circuit Television (CCTV), street lights, city safety officers, emergency and transitional housing, etc.</p>	Community activities
13 Economic development	<p>Include: business and tourism promotion.</p>	Planning and regulation
14 Governance	<p>Include: Council, committees, and financial matters related to the elected Council and community boards.</p>	Planning and regulation
15 Council support services	<p>Include: Overheads for local authority administration, finance, IT, and HR functions as well as report preparation (such as annual reports and long-term council community plans).</p>	Planning and regulation

Statistics New Zealand Activity	Description (from Statistics New Zealand)	High-level category
16 Other activities	Include: Activities not included elsewhere such as forestry and logging, and public conveniences.	Community activities

Source: Statistics New Zealand – Local Authority Financial Statistics methodology

6.3 Further discussion on comparing OPEX growth between council categories

In Section 5.1 we discussed the drivers of growth in OPEX. We compared the council categories using the average of the values for each council within a category. An alternative method for comparison would be to aggregate the values for the councils within a category and calculate the relevant figures from there. The results of these calculations are in Table 13 below.

Using the averaging approach means an equal weighting is assigned to each council within a category. Using an aggregate approach would give councils with higher expenditures and larger populations a higher weighting.

For instance, the combined nominal expenditure for Auckland Council and Christchurch City Council, the two largest metropolitan councils, for the year ended 30 June 2017 equates to 72% of the metropolitan category. These two councils experienced the highest nominal expenditure growth within this group (71% and 90% respectively), and therefore the growth in expenditure is weighted toward the higher end. On the other hand, Upper Hutt City Council, the smallest of the metropolitan councils, accounted for less than 1% of expenditure, but experienced the third lowest nominal expenditure growth of 49% (of metropolitan councils).

Comparing the values for metropolitan councils in Table 8 and Table 13 you can see that the change in nominal expenditure for metropolitan councils is clearly weighted toward the two large councils, and has increased from 57% to 67%.

Table 13 Changes in OPEX expenditure and the drivers of growth (2007 to 2017) – aggregated

	National aggregate	Metro	Provincial	Rural	Regional
Change in expenditure (nominal)	64%	67%	56%	58%	71%
<i>Price inflation (Sapere index)</i>	29%	28%	30%	30%	31%
Change in expenditure (real)	27%	30%	20%	22%	31%
<i>Change in population</i>	12%	15%	13%	5%	11%
Change in real per capita expenditure	13%	13%	7%	16%	18%
Compound annual growth rate in real expenditure per capita	1.2%	1.3%	0.7%	1.7%	1.5%

On the other hand, the impacts of large “shocks” on smaller councils are given less weight under the aggregate approach. For instance, under this approach, the impacts of the earthquakes on expenditure for Kaikoura District Council are given less weight. While nominal operating expenditure grew 267% over the period, Kaikoura District Council is also one of the smallest councils. Comparing Table 8 and Table 13 shows a lower increase in nominal expenditure for rural councils under this approach; decreasing to 58% from 69%. A substantial driver of this change is the lower weighting assigned to Kaikoura District Council under this approach.

In the main body of this report, we have chosen to use the average approach to avoid the “drowning” out of smaller councils by larger ones. In addition, the breakdown by council category already groups councils roughly by size, therefore, there is potentially less need for an aggregate approach to detail the differences.

6.4 Results by council

Section 5 examined the decomposition of nominal expenditure into price inflation, population growth and the residual real per capita expenditure by council type, and explored four possible explanatory variables driving real per capita expenditure growth: tourism growth; total roading length; road km per 1000 population; and change in real gross domestic product (GDP) per person. Table 14 provides the individual data for each local council.

- Total growth in OPEX (nominal) – the percentage growth in operating expenditure (OPEX) to deliver goods and services.
- Price growth – inflation as calculated by Sapere index (excluding interest).
- Population growth – the percentage growth in population, reflecting the “coarse” change in quantity of goods and services.
- Real per capita expenditure growth – the residue, reflecting the “fine” changes in quantity of goods and services.

Table 14 Contributors to growth in nominal operating expenditure by council 2007 to 2017

Council name	Total growth in OPEX (nominal)	Price growth	Population growth	Real per capita expenditure growth	Tourism growth	Total roading length	Km/1000 Population	Change in real GDP per person
Auckland	71%	28%	19%	12%	67%	7753	5	32%
Christchurch City	90%	28%	4%	42%	42%	2393	6	44%
Wellington City	52%	28%	12%	5%	61%	696	3	27%
Hamilton City	50%	28%	21%	-3%	187%	677	4	25%
Tauranga City	63%	28%	20%	6%	43%	564	4	36%
Dunedin City	42%	28%	6%	5%	63%	1764	13	27%
Lower Hutt City	53%	28%	3%	16%	-60%	485	5	26%

Council name	Total growth in OPEX (nominal)	Price growth	Population growth	Real per capita expenditure growth	Tourism growth	Total roading length	Km/1000 Population	Change in real GDP per person
Palmerston North City	32%	28%	8%	-5%	22%	567	6	29%
Porirua City	66%	28%	10%	17%	n.a.	256	5	16%
Upper Hutt City	49%	28%	8%	7%	n.a.	245	6	13%
Whangarei District	18%	30%	15%	-21%	62%	1731	19	24%
New Plymouth District	41%	30%	13%	-3%	42%	1288	16	-13%
Hastings District	62%	30%	8%	15%	17%	1640	20	30%
Waikato District	154%	30%	21%	61%	82%	2454	33	17%
Rotorua District	38%	30%	6%	1%	81%	1003	14	27%
Far North District	24%	30%	9%	-12%	33%	2507	39	18%
Napier City	40%	30%	8%	0%	61%	367	6	26%
Selwyn District	194%	30%	62%	40%	13%	2586	42	25%
Waimakariri District	96%	30%	31%	14%	-27%	1566	26	48%
Invercargill City	42%	30%	6%	3%	19%	584	11	29%
Waipa District	38%	30%	19%	-11%	59%	1096	20	29%
Kapiti Coast District	72%	30%	10%	21%	16%	412	8	18%

Council name	Total growth in OPEX (nominal)	Price growth	Population growth	Real per capita expenditure growth	Tourism growth	Total roading length	Km/1000 Population	Change in real GDP per person
Tasman District	60%	30%	11%	11%	33%	1751	34	33%
Nelson City	82%	30%	15%	22%	76%	312	6	21%
Western Bay of Plenty District	78%	30%	12%	22%	-34%	1054	21	27%
Gisborne District	38%	30%	6%	1%	2%	1889	38	30%
Timaru District	35%	30%	7%	-3%	19%	1723	36	39%
Marlborough District	54%	30%	5%	12%	-10%	1547	33	36%
Whanganui District	38%	30%	2%	4%	7%	843	19	20%
Queenstown-Lakes District	89%	30%	46%	-1%	108%	845	22	33%
Taupo District	27%	30%	10%	-11%	118%	783	21	37%
Whakatane District	74%	30%	3%	29%	46%	907	25	44%
Matamata-Piako District	87%	30%	11%	30%	297%	1008	29	10%
Ashburton District	107%	30%	19%	34%	-5%	2620	76	31%
Horowhenua District	72%	30%	6%	24%	28%	577	17	30%
Southland District	52%	30%	7%	10%	90%	4970	158	11%
Manawatu District	39%	30%	13%	-5%	-38%	1370	44	17%

Council name	Total growth in OPEX (nominal)	Price growth	Population growth	Real per capita expenditure growth	Tourism growth	Total roading length	Km/1000 Population	Change in real GDP per person
Thames-Coromandel District	50%	30%	8%	7%	67%	697	23	2%
South Taranaki District	42%	30%	4%	5%	-31%	1631	58	-3%
Masterton District	44%	30%	9%	2%	33%	805	31	23%
Waitaki District	50%	30%	7%	8%	26%	1802	81	28%
South Waikato District	49%	30%	5%	9%	18%	508	21	13%
Kaipara District	48%	30%	20%	-4%	10%	1564	67	30%
Central Otago District	48%	30%	17%	-2%	84%	1897	90	30%
Hauraki District	26%	30%	8%	-10%	50%	635	32	4%
Taranua District	16%	30%	-1%	-10%	-39%	1958	109	40%
Clutha District	61%	30%	2%	22%	20%	2898	164	28%
Rangitikei District	34%	30%	0%	3%	-2%	1226	81	27%
Central Hawke's Bay District	50%	30%	5%	11%	-18%	1253	89	15%
Grey District	34%	30%	-1%	4%	-15%	609	45	9%
Hurunui District	197%	30%	19%	94%	16%	1460	114	27%

Council name	Total growth in OPEX (nominal)	Price growth	Population growth	Real per capita expenditure growth	Tourism growth	Total roading length	Km/1000 Population	Change in real GDP per person
Ruapehu District	40%	30%	-7%	17%	38%	1339	105	7%
Gore District	73%	30%	1%	32%	20%	904	72	24%
South Wairarapa District	18%	30%	12%	-18%	69%	669	64	28%
Otorohanga District	28%	30%	9%	-9%	35%	806	79	9%
Buller District	48%	30%	1%	13%	-7%	605	60	-4%
Waitomo District	46%	30%	2%	11%	22%	1015	105	21%
Stratford District	65%	30%	4%	23%	83%	613	64	-7%
Carterton District	41%	30%	22%	-11%	-37%	447	48	32%
Opotiki District	84%	30%	-2%	44%	74%	337	37	40%
Westland District	89%	30%	2%	43%	35%	673	76	44%
Wairoa District	24%	30%	-5%	0%	-24%	898	109	27%
Waimate District	60%	30%	6%	16%	24%	1337	168	30%
Kawerau District	76%	30%	-2%	38%	204%	40	6	14%
Mackenzie District	117%	30%	16%	44%	135%	732	157	27%
Kaikoura District	267%	30%	0%	184%	-53%	212	55	28%

Council name	Total growth in OPEX (nominal)	Price growth	Population growth	Real per capita expenditure growth	Tourism growth	Total roading length	Km/1000 Population	Change in real GDP per person
Chatham Islands Territory	147%	30%	0%	91%	n.a.	179	n.a.	n.a.
Bay of Plenty Regional	120%	31%	12%	50%	n.a.	n.a.	n.a.	n.a.
Canterbury Regional	82%	31%	12%	24%	n.a.	n.a.	n.a.	n.a.
Hawke's Bay Regional	70%	31%	7%	21%	n.a.	n.a.	n.a.	n.a.
Manawatu-Wanganui Regional	57%	31%	5%	14%	n.a.	n.a.	n.a.	n.a.
Northland Regional	88%	31%	13%	26%	n.a.	n.a.	n.a.	n.a.
Otago Regional	82%	31%	12%	24%	n.a.	n.a.	n.a.	n.a.
Southland Regional	81%	31%	6%	31%	n.a.	n.a.	n.a.	n.a.
Taranaki Regional	109%	31%	10%	45%	n.a.	n.a.	n.a.	n.a.
Waikato Regional	43%	31%	16%	-6%	n.a.	n.a.	n.a.	n.a.
Wellington Regional	69%	31%	10%	18%	n.a.	n.a.	n.a.	n.a.
West Coast Regional	-5%	31%	1%	-28%	n.a.	n.a.	n.a.	n.a.

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For more information, please contact:

David Moore

Phone: +64 4 915 5355

Mobile: +64 21 518 002

Email: dmoore@thinkSapere.com

Wellington

Level 9
1 Willeston Street
PO Box 587
Wellington 6140

P +64 4 915 7590

F +64 4 915 7596

Auckland

Level 8
203 Queen Street
PO Box 2475
Shortland Street
Auckland 1140

P +64 9 909 5810

F +64 9 909 5828

Sydney

Level 18
135 King Street
Sydney
NSW 2000

P +61 2 9234 0200

F +61 2 9234 0201

Melbourne

Level 2
161 Collins Street
GPO Box 3179
Melbourne 3001

P +61 3 9005 1454

F +61 2 9234 0201 (Syd)

Canberra

PO Box 252
Canberra City
ACT 2601

P +61 2 6100 6363

F +61 2 9234 0201 (Syd)

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