Forecasts of Price Level Change Adjustors – 2017 Update

Note to Society of Local Government Managers

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Making sense of the numbers

This report contains forecasts for price level change adjustors for local authorities (LAs) to use in their budget processes consistent with their Long Term Plans (LTPs). It incorporates the latest actual data to June 2017 and forecasts the adjustors to June 2028. It continues the work undertaken over previous years.

Using the adjustors

As previously, differences in classifications of activities between councils lead to a degree of subjectivity in terms of how to apply the adjustors to council expenditures. Last year's report outlined suggested council activities and how they might map across to the five adjustors. Using this information, councils can map their expenditure items (or categories) to appropriate 'category' adjustors, and apply the relevant forecast change.

Alternatively, councils can (should they wish) directly use the forecasts for the eight individual price indices, applying them to relevant expenditure items.

Forecasts

Similar to last year's picture, the overall forecasts across the five adjustors remain relatively muted when compared to those of earlier periods.

This is a reflection of a subdued inflationary picture both globally and domestically. It is broadly agreed that the global economy is in a significant low inflationary period; with the US and Europe in particular close to deflation. Faltering growth in China, and slow growth in the Eurozone have made for a subdued year; however, growth in the United States economy is modestly more promising and may offset this somewhat.

With the Christchurch rebuild continuing to slow, and the difficult global picture, there are few sources of sustained inflationary pressures ahead. In line with this context for the New Zealand economy, these forecasts for price level adjustors present a subdued inflationary outlook for the local government sector.

Quality check

The cost adjustor equations were revised and reviewed last year, after an overhaul of the structure of the cost adjustors themselves. Periodically, the performance of the equations and forecasts are checked against outcome. Such a comparison is provided in section 6.1. In summary, the forecasts produced in 2006

- successfully predicted to within 3 percentage points the long-term movements in local government costs from 2006 to 2017 for 5 of the adjustors/indices. Over an 11-year horizon this suggests an error of less than 0.27% per annum.
- underestimated the costs in two of the indices (roading and property) by about 0.5% per annum – attributable to the unforeseen[1] investment boost from the recent government infrastructure programme, as well as construction cost inflation associated with the Christchurch rebuild.
- overestimated the rise in private sector labour costs by about 0.5% per annum – attributable to the surge in inward migration over the latter half of the period dampening wage growth in the private sector.
- contained one large error – with pipeline costs considerably overestimating the actual outcome. However, the robustness of this series has been influenced by a small number of low-value transactions. Statistics NZ has been considering revising this price index. Consequently, we advise caution when using the forecasts for the CGI pipelines price index.

[1] That is, unforeseen from the perspective of 2006 when the forecasts were produced.

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1 Introduction

These notes have been prepared for the Society of Local Government Managers (SOLGM). This document contains provisional updates of forecasts for price level change adjustors for local authorities (LAs) to use in their budget processes consistent with their Long-term Plans (LTP). It incorporates the latest actual data to June 2016 and forecasts the adjustors to June 2026.

Our earlier reports (2005 to 2014) outlined the approach and methodology and discussed alternative adjustors and reasons why the particular adjustors were chosen for forecasting. Last year a full review of the LGCI and its subcomponents (i.e. the cost adjustor categories and their associated price indices) was undertaken. This resulted in some revisions to the adjustors used and the relevant weighting distributions of the LGCI. This review was undertaken by analysing the Annual Reports for the year ended June 2014 for a sample selection of 12 councils representing a cross-section of the local government sector. A breakdown of this review is provided in Section 2 of the BERL report titled Forecasts of Price Level Change Adjustors – 2015 Update #5597.

The forecasts provide a medium-term view of the likely movement of the adjustors, rather than the movement over the next year or two. There will always be unexpected reasons why individual costs might rise faster or slower in a particular year. However, this does not necessarily mean that the medium-term forecast will, or should, be adjusted. There will always be regional differences in the rate of change for a particular adjustor.

These adjustors are therefore forecasts at the national level and councils may need to consider if they have further information to show why a difference might occur at the regional level.

1.1 Category adjustors and related price indices

BERL has forecast a total of eight unique adjustors against five categories for the period to 2026.

This differs from previous editions of the LGCI to reflect the revision of the cost adjustor categories and their associated price indices, and the subsequent weight redistributions within the LGCI. Some of these category adjustors are used applied against multiple categories, e.g. local government administration PPI.

Table 1.1: Category adjustors and related price indices

Category adjustor	Related price indices
1. Planning and Regulation	Local government sector salaries and wages Local government administration PPI Earthmoving and site work CGI Pipelines CGI Reclamation and river control CGI
2. Roading	Private sector salaries and wages Earthmoving and site work CGI Local government administration PPI
3. Transport	Local government sector salaries and wages Earthmoving and site work CGI Local government administration PPI

4. Community Activities	Local government sector salaries and wages Earthmoving and site work CGI Arts and recreation services PPI
5. Water and Environmental Management	Local government sector salaries and wages Earthmoving and site work CGI Pipelines CGI Reclamation and river control CGI Water, sewer, drainage, and waste services PPI

1.2 Overall Local Government Cost Index

These notes also contain forecasts for an overall cost index for local authorities (LGCI). This index has been developed by BERL and is reported in 'A Local Government Cost Index for New Zealand', BERL reference #4877. The LGCI is based on the cost structures of local authorities and includes operating expenditure (Opex) and capital expenditure (Capex) variables.

The operating expenditure of the LGCI includes:

- purchases of goods and services, grants and donations, and all other expenditure;
- employee costs, which includes wages and salaries; and
- interest paid, which includes interest paid on local government debts and is covered by the mortgage interest component of the CPI.

The capital expenditure of the LGCI includes:

- transport, which includes spending on transport projects and in particular roading;
- infrastructure spending associated with the three waters; including water supply, wastewater, and stormwater;
- capital expenditure on community facilities such as pools, parks and reserves; and
- other, which is capital expenditure not captured elsewhere.

1.3 LGCI vs CPI

An important point to note is the distinction between the LGCI and the Consumers Price Index (CPI). The main distinction is in the composition of the basket of goods and services that each measures. The basket of goods and services in the CPI represents the overall expenditure pattern of New Zealand households. These include items such as food, health, clothing and footwear, and health. Such items are not directly relevant to, and do not reflect the expenditure of LAs; hence the construction of the LGCI.

The LGCI is intended to reflect the selection and relative importance of the goods and services which represent broadly the expenditure pattern of LAs in New Zealand. This basket thus includes more directly relevant items including capital expenditure on pipelines, and earthmoving and site works, and operating expenditure such as local government sector salary and wage rates.

1.4 Individual price indices

We have maintained and updated a separate local government wage indicator as per previous LGCI reports. These are provided in section 5, along with forecasts for each of the individual price indices that together make up the set of adjustors.

2 The economic context for the adjustor forecasts

Relationships between the eight economy-wide price indices and a range of economic variables were established through standard econometric techniques. Summary details are contained in the appendix.

These updated relationships are then used to forecast the changes in each cost adjustor over the coming 10 years, based on BERL's forecasts for the set of national economic driver variables e.g. GDP, employment, investment and interest rates.

Forecasts for the national economic driver variables are from:

- BERL's short-term forecasts of prospects for the national economy from BERL's quarterly publication Birds Eye View and
- The medium-term projections from BERL's multi-industry model of the New Zealand economy.

This section outlines the underlying assumptions used in the updated forecasts and our assessment of the New Zealand economy. Table 2.1 summarises the path of key economic variables used in the generation of the forecasts for the adjustors.

Table 2.1: Forecast of economic driver variables

Year ending	Real GDP %pa	Non-hsg invtmt %pa	Employment %pa	Interest rates (90-days) %	Construction prices %pa	CPI %pa
Jun 11	0.2	1.9	1.5	3.0	3.5	3.8
Jun 12	3.3	7.8	0.9	2.7	3.0	2.2
Jun 13	2.3	2.5	-0.3	2.6	1.0	0.8
Jun 14	2.1	6.1	3.6	2.9	1.1	1.5
Jun 15	3.2	6.6	3.2	3.6	0.1	0.6
Jun 16	3.6	2.8	2.3	2.7	0.8	0.3
Jun 17	2.7	3.3	5.2	2.1	1.7	1.4
Jun 18	*3.0*	*5.5*	*4.7*	*1.9*	*1.7*	*1.8*
Jun 19	*2.4*	*3.4*	*3.6*	*1.9*	*2.2*	*1.8*
Jun 20	*2.2*	*2.8*	*2.4*	*1.9*	*2.8*	*1.6*
Jun 21	*2.3*	*3.0*	*2.3*	*1.9*	*2.8*	*1.6*
Jun 22	*2.4*	*3.2*	*2.2*	*2.0*	*2.8*	*1.7*
Jun 23	*2.5*	*3.4*	*2.0*	*2.1*	*2.8*	*1.7*
Jun 24	*2.7*	*3.6*	*1.9*	*2.4*	*2.8*	*1.8*
Jun 25	*2.8*	*3.8*	*1.8*	*2.6*	*2.8*	*1.8*
Jun 26	*2.9*	*4.0*	*1.7*	*3.0*	*2.8*	*1.9*
Jun 27	*3.0*	*4.2*	*1.5*	*3.6*	*2.8*	*1.9*
Jun 28	*3.1*	*4.4*	*1.4*	*4.3*	*2.8*	*2.0*

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2.1 General price inflation

For comparative purposes, the average level of price inflation over the forecast period is expected to remain consistent with the current Policy Targets Agreement between the Minister of Finance and the Governor of the Reserve Bank.

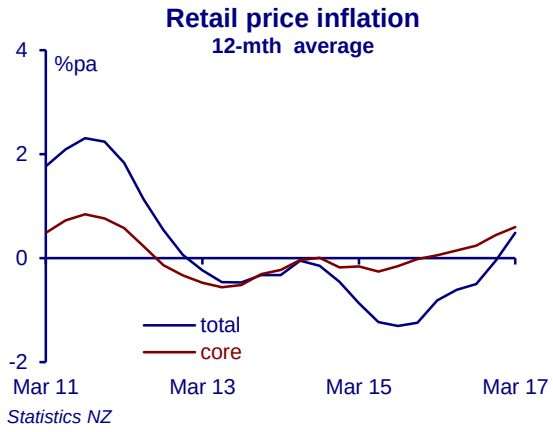
The Reserve Bank of New Zealand's current target is to keep the future annual CPI inflation at between 1 percent and 3 percent on average over the medium term, with a focus on keeping future average inflation near

the 2 percent target midpoint. Figures for 2017 imply that inflation has been almost at the midpoint of 2 percent for the June year.

We should note that the current Policy Targets Agreement is set to be re-negotiated in the coming months on the appointment of a new Governor for the Reserve Bank. While a new Agreement could potentially influence the short-term stance of the Reserve Bank and, potentially, its mode of operation; we are of the view that such changes will not alter the foundation rationale and goal for monetary policy – that is, to keep close control of inflation and inflationary expectations over the medium term.

The Reserve Bank's August 2017 Monetary Policy Statement indicated that it expects inflation to remain subdued due to the exchange rate (and Trade Weighted Index) remaining relatively high. This contrasts with last year when The Bank expects the main driver of higher inflation to be the lower exchange rate, which is likely to push up the price of imports.

Figure 1: Average price inflation in New Zealand retail sector



Globally, growth is still sluggish and storm clouds gather on China, Japan, the EU, and the USA. The Reserve Bank expects this muted growth to dampen inflation expectations.

Interestingly, data from retailers is showing that inflation in retail prices has turned positive this year. After almost four years of negative average inflation. This helps paint the picture that inflation is never uniform, which lends weight to the rationale of forecasting specific price indices for things like local government costs.

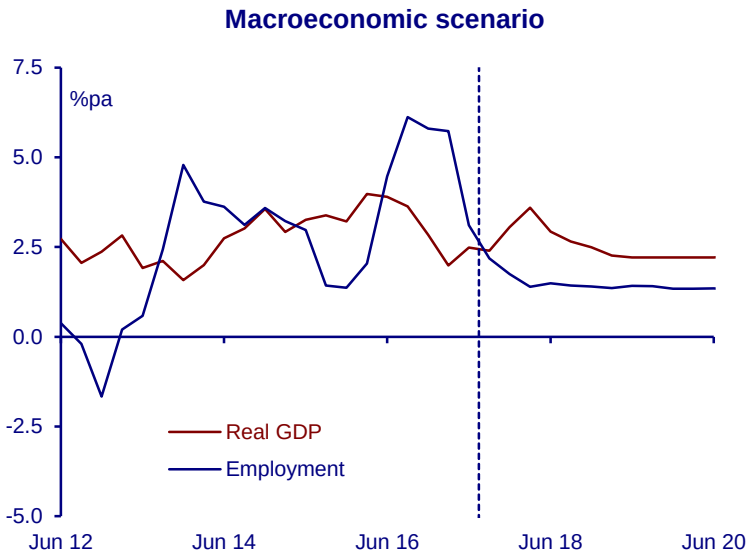
2.2 NZ macroeconomic picture

New Zealand's macroeconomic picture is really a mixed bag. Of relevance is the Reserve Bank's decision to hold the OCR at 1.75 percent in August 2017. This decision reflects The Bank's subdued inflation expectations. However, The Bank notes that increased demand from immigration could spur inflation and is signalling that it won't hesitate to raise the OCR in response.

BERL expects CPI inflation to pick up in 2017 and into 2018 as rising oil prices start to push up the cost of transport and logistics. We also expect the high New Zealand dollar to drop further as the Reserve Bank continues a low OCR policy.

In Budget 2017 we saw that again the fiscal accounts are in good order. We also saw signals toward more expansionary fiscal policy, with decreases in tax rates and increases in transfer payments. These fiscal factors have been cited by the Reserve Bank as sources of inflation in the coming year. Borrowing costs are still at historic lows, and will continue to be so for some time given the turmoil of the global money markets. We note that this brings the opportunity for increased infrastructure spending.

Figure 2: Annual GDP and employment growth



Statistics NZ; BERL

Dairy prices are a non-issue right now, returning to levels somewhere near what they were in 2011. And, for the time being, our main trading partners (China and Australia) seem to be continued sources of sustainable demand. We do expect some correction this year in employment growth. Though with no noticeable effect on the unemployment rate.

Our pick for economic growth in the medium term is more of the same. Immigration flows will probably taper off slightly but should help the New Zealand economy grow. We note that the rebuild in Christchurch can no longer be cited as a primary driver of economic growth – with immigration and tourism taking its place.

2.3 Global macroeconomic situation

In its July 2017 world outlook report the IMF continues to toe the line of a pickup in global growth. With global output projected to grow at 3.5 percent for 2017 and 3.6 percent in 2018. This growth is cited to stem mainly from China, which continues to be supported by fiscal stimulus. The IMF is rosy on Europe's macro picture, noting that growth has been above expectations.

We've seen Brexit now and negotiations are still underway as to how exactly Brexit works. Apart from this effect the EU faces significant challenges stemming from the political sphere of influence over trade, immigration, and welfare. These data are baked into GDP growth expectations and so flow in to inflation expectations.

The European Central Bank continues its aggressive monetary policy in an effort to stimulate the economy of the region. This largely appears to be unsuccessful, as cheap money is being used to shore up asset prices rather than economic growth. Consequently, we could expect expansionary fiscal policy to be on the agenda in efforts to rekindle GDP growth.

US GDP growth is looking healthier than last year, with annual GDP growth for the June 2017 year sitting at 2.1 percent (up from 1.2 percent for June 2016 year). US unemployment is down to 4.3 percent and the number of jobs added per month still around 200,000. These labour market data point to inflation reaching targets in the medium term. This is contrasted by the fiscal situation in the US - the IMF notes that fiscal policy in the US is expected to be less expansionary.

Forecasts suggest that the US economy will continue steady growth at 2.1 percent for 2018. This, combined with unemployment predicted to remain below 5 percent, will see the US buying more goods and services from the rest of the world.

Growth in China has been steady at 6.7% for the year ended Jun 2017. With forecasts of a very modest decline to 6.4 percent for 2018. China still remains officially hell-bent on a GDP growth figure of 7 percent annually. And, being such a large productive nation there is plenty of room to continue the current fiscal stimulus and achieve this growth.

The EU, particularly the main members, has continued their slow but sure growth out of the last recession, with an increase of 1.8 percent for the year, forecast to slow slightly to 1.7 percent. The UK has experienced significant slowing in the wake of Brexit, down to 1.7 percent, projected to decrease to 1.5 percent GDP growth in 2018.

German GDP growth is up to 1.8 percent for 2017 and forecast to fall slightly to 1.6 percent in 2018. The unemployment rate in EU remains high, and probably will forever be so. Official unemployment figures over the EU vary widely, with Germany recording the lowest rate, at 3.8 percent for June 2017. The last record of Greece's official unemployment rate is March 2017 at 22.5 percent.

Australian GDP growth slumped to 2.8 percent in 2018, and the Australian Treasury is projecting it to grow to 3 percent going in to 2018. Employment and wage growth in Australia remains weak but Australian headline CPI inflation is projected to be within the 2 – 3 percent band moving in to the December quarter of 2017 and on to 2018.

3 Forecast for adjustors

Table 3.1 lists the forecast indices for each of the category adjustors for the period from the year ended June 2015 to the year ended June 2028. The shaded portion of the table (i.e. up to, and including, June 2017) is based on actual data up to the June quarter 2017.

Table 3.2 lists the annual percentage change for each of the adjustors.

Table 3.3 lists the total (or cumulative) percentage change from the year ended June 2015 for each of the adjustors. This table can be used to calculate the increase of future year expenses based on 2015 costs.

Note that Statistics New Zealand recorded a sharp drop in the capital goods price index for pipeline costs in the first two quarters of 2013. The decline was the highest ever recorded. We understand the price decline was caused by a small number of low-price purchases of concrete pipes in the March quarter. Concrete pipes are a large weight in the current pipelines index (around 40%-50%). Statistics NZ is considering revising the capital goods index (e.g. to include PVC pipe costs as well) next year but there is no confirmed timeframe yet.

Consequently, this affected the pipeline and associated water cost adjustors. Our forecasts note this as a one-off impact. We retain the model forecasts of higher pipeline and water cost adjustors over the future. This is in line with higher construction-related inflation associated with heightened infrastructure demand driven (in the main) out of Christchurch and Auckland activity.

3.1 Forecasted category adjustors

Table 3.1: Adjustors: Index Jun 2017 = 1000

	Adjustors				
Label	Planning and regulation	Roading	Transport	Community activities	Water and Environmental
	PR	*RD*	*TR*	*CA*	*WE*
Year ending	*Index value Jun 2017=1000*				
Jun 15	978	970	973	967	968
Jun 16	986	984	984	982	988
Jun 17	1000	1000	1000	1000	1000
Jun 18	1018	1019	1019	1017	1018
Jun 19	1038	1040	1040	1034	1042
Jun 20	1060	1063	1061	1055	1068
Jun 21	1082	1086	1083	1077	1092
Jun 22	1105	1111	1107	1100	1118
Jun 23	1129	1137	1132	1124	1145
Jun 24	1155	1165	1158	1149	1174
Jun 25	1182	1194	1185	1176	1204
Jun 26	1210	1225	1215	1204	1236
Jun 27	1239	1258	1246	1233	1270
Jun 28	1270	1293	1279	1265	1306

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Table 3.2: Adjustors: % per annum change

	Adjustors				
Label	Planning and regulation	Roading	Transport	Community activities	Water and Environmental
	PR	*RD*	*TR*	*CA*	*WE*
Year ending	*% change (on year earlier)*				
Jun 15	1.5	2.3	1.6	1.8	3.2
Jun 16	0.8	1.4	1.1	1.6	2.1
Jun 17	1.4	1.6	1.6	1.8	1.2
Jun 18	1.8	1.9	1.9	1.7	1.8
Jun 19	2.0	2.0	2.0	1.7	2.3
Jun 20	2.1	2.2	2.0	2.0	2.5
Jun 21	2.1	2.2	2.1	2.1	2.3
Jun 22	2.1	2.3	2.2	2.1	2.4
Jun 23	2.2	2.4	2.2	2.2	2.4
Jun 24	2.3	2.4	2.3	2.3	2.5
Jun 25	2.3	2.5	2.4	2.3	2.6
Jun 26	2.4	2.6	2.5	2.4	2.6
Jun 27	2.4	2.7	2.5	2.4	2.7
Jun 28	2.5	2.8	2.7	2.6	2.8
20-year avge %pa	2.3	2.5	2.4	2.3	2.6

20-year average calculated using 2007 to 2027 actuals and forecasts

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Table 3.3: Adjustors: Cumulative % change from Jun 2017

	Adjustors				
Label	Planning and regulation	Roading	Transport	Community activities	Water and Environmental
	PR	*RD*	*TR*	*CA*	*WE*
Year ending	*% change (cummulative from 2017)*				
Jun 15					
Jun 16					
Jun 17					
Jun 18	1.8	1.9	1.9	1.7	1.8
Jun 19	3.8	4.0	4.0	3.4	4.2
Jun 20	6.0	6.3	6.1	5.5	6.8
Jun 21	8.2	8.6	8.3	7.7	9.2
Jun 22	10.5	11.1	10.7	10.0	11.8
Jun 23	12.9	13.7	13.2	12.4	14.5
Jun 24	15.5	16.5	15.8	14.9	17.4
Jun 25	18.2	19.4	18.5	17.6	20.4
Jun 26	21.0	22.5	21.5	20.4	23.6
Jun 27	23.9	25.8	24.6	23.3	27.0
Jun 28	27.0	29.3	27.9	26.5	30.6

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4 Forecast for overall LGCI

Table 4.1 to Table 5.3 show the forecast annual average percentage change for the overall Local Government Cost Index (LGCI), as well as the OPEX and CAPEX sub-components of the LGCI.

The LGCI has two sub-components – the operating cost index (OPEX LGCI) and the capital expenditure cost index (CAPEX LGCI). Throughout the entire dataset the forecast cumulative percent change for the CAPEX cost index is higher than that for the OPEX cost index.

Table 4.1: LGCI, Index value (Jun 2017 = 1000)

	LGCI		
Label	OPEX	CAPEX	Total LGCI
Year ending	*Index value Jun 2017=1000*		
Jun 07	776	770	774
Jun 08	814	806	811
Jun 09	858	852	857
Jun 10	873	868	872
Jun 11	893	888	892
Jun 12	921	917	919
Jun 13	938	933	937
Jun 14	953	949	952
Jun 15	973	971	972
Jun 16	985	985	985
Jun 17	1000	1000	1000
Jun 18	1018	1018	1018
Jun 19	1039	1039	1039
Jun 20	1061	1062	1061
Jun 21	1084	1085	1084
Jun 22	1108	1109	1108
Jun 23	1133	1135	1134
Jun 24	1159	1162	1160
Jun 25	1187	1191	1188
Jun 26	1216	1220	1218
Jun 27	1247	1252	1249
Jun 28	1280	1286	1282

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Table 4.2: LGCI, annual average % change

	LGCI		
Label	OPEX	CAPEX	Total
Year ending	*% change (on year earlier)*		
Jun 07	4.1	4.3	4.2
Jun 08	4.9	4.7	4.9
Jun 09	5.5	5.7	5.6
Jun 10	1.7	1.8	1.8
Jun 11	2.3	2.3	2.3
Jun 12	3.1	3.3	3.1
Jun 13	1.9	1.8	1.9
Jun 14	1.6	1.7	1.7
Jun 15	2.0	2.3	2.1
Jun 16	1.3	1.5	1.4
Jun 17	1.5	1.5	1.5
Jun 18	1.8	1.8	1.8
Jun 19	2.0	2.0	2.0
Jun 20	2.2	2.2	2.2
Jun 21	2.2	2.2	2.2
Jun 22	2.2	2.2	2.2
Jun 23	2.3	2.3	2.3
Jun 24	2.3	2.4	2.3
Jun 25	2.4	2.4	2.4
Jun 26	2.5	2.5	2.5
Jun 27	2.5	2.6	2.6
Jun 28	2.6	2.7	2.7
20-year avge %pa	2.4	2.5	2.4

20-year average calculated using 2007 to 2027 actuals and forecasts

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Table 4.3: LGCI, cumulative % change from Jun 2017

	LGCI		
Label	OPEX	CAPEX	Total LGCI
Year ending	*% change (cummulative from 2017)*		
Jun 17			
Jun 18	1.8	1.8	1.8
Jun 19	3.9	3.9	3.9
Jun 20	6.1	6.2	6.1
Jun 21	8.4	8.5	8.4
Jun 22	10.8	10.9	10.8
Jun 23	13.3	13.5	13.4
Jun 24	15.9	16.2	16.0
Jun 25	18.7	19.1	18.8
Jun 26	21.6	22.0	21.8
Jun 27	24.7	25.2	24.9
Jun 28	28.0	28.6	28.2

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5 Forecasts for eight price indices

Table 5.1: Forecasts for eight price indices, index value Jun 2017 = 1000

	Price indices							
Label	PPI inputs - Local government administration	PPI inputs - Arts and recreation services	PPI inputs - Water, sewer, drainage, and waste services	CGI - Earthmoving and site work	CGI - Pipelines	CGI-Reclamation and River Control	All salary and wage rates - Local govt sector	All Salary and Wage Rates - Private Sector
Year ending	*Index value Jun 2017=1000*							
Jun 07	794	833	722	738	791	785	792	814
Jun 08	845	871	759	768	820	816	826	842
Jun 09	882	909	824	813	904	863	853	868
Jun 10	893	920	835	834	920	878	872	882
Jun 11	910	933	865	851	965	893	889	898
Jun 12	932	950	897	890	994	919	909	917
Jun 13	959	957	915	909	967	938	928	935
Jun 14	977	965	930	934	942	954	946	951
Jun 15	982	970	958	965	980	987	965	968
Jun 16	986	982	990	983	987	993	982	984
Jun 17	1000	1000	1000	1000	1000	1000	1000	1000
Jun 18	1021	1015	1023	1019	1015	1008	1016	1015
Jun 19	1042	1029	1053	1039	1037	1023	1033	1035
Jun 20	1063	1048	1083	1063	1065	1045	1049	1054
Jun 21	1085	1068	1109	1088	1091	1069	1067	1074
Jun 22	1108	1089	1137	1114	1118	1094	1086	1091
Jun 23	1132	1110	1166	1142	1144	1120	1106	1110
Jun 24	1157	1133	1198	1172	1171	1146	1127	1129
Jun 25	1184	1156	1232	1203	1199	1173	1149	1150
Jun 26	1213	1180	1268	1237	1228	1201	1171	1172
Jun 27	1242	1205	1307	1272	1257	1229	1195	1194
Jun 28	1274	1231	1349	1311	1287	1259	1221	1218

Table 5.2: Forecasts for eight price indices, annual average % change

	Price indices							
Label	PPI inputs - Local government administration	PPI inputs - Arts and recreation services	PPI inputs - Water, sewer, drainage, and waste services	CGI - Earthmoving and site work	CGI - Pipelines	CGI - Reclamation and River Control	LCI - All salary and wage rates - Local govt sector	LCI - All Salary and Wage Rates - Private Sector
Year ending	*% change (on year earlier)*							
Jun 15	0.5	0.5	3.0	3.2	4.0	3.4	2.0	1.8
Jun 16	0.4	1.3	3.3	1.8	0.7	0.6	1.8	1.7
Jun 17	1.4	1.8	1.1	1.8	1.3	0.7	1.9	1.6
Jun 18	2.1	1.5	2.3	1.9	1.5	0.8	1.6	1.5
Jun 19	2.1	1.3	3.0	2.0	2.2	1.4	1.6	1.9
Jun 20	2.0	1.9	2.8	2.3	2.7	2.2	1.6	1.9
Jun 21	2.0	1.9	2.4	2.4	2.5	2.3	1.7	1.8
Jun 22	2.1	1.9	2.5	2.4	2.4	2.3	1.8	1.6
Jun 23	2.2	2.0	2.6	2.5	2.4	2.3	1.8	1.7
Jun 24	2.3	2.0	2.7	2.6	2.4	2.3	1.9	1.8
Jun 25	2.3	2.1	2.8	2.7	2.4	2.4	1.9	1.8
Jun 26	2.4	2.1	2.9	2.8	2.4	2.4	2.0	1.9
Jun 27	2.5	2.1	3.0	2.9	2.4	2.4	2.0	1.9
Jun 28	2.5	2.2	3.2	3.1	2.4	2.4	2.1	2.0
20-year avge %pa	2.3	1.9	3.0	2.8	2.3	2.3	2.1	1.9

20-year average calculated using 2007 to 2027 actuals and forecasts

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Table 5.3: Forecasts for eight price indices, cumulative % change from Jun 2017

	Price indices							
Label	PPI inputs - Local government administration	PPI inputs - Arts and recreation services	PPI inputs - Water, sewer, drainage, and waste services	CGI - Earthmoving and site work	CGI - Pipelines	CGI-Reclamation and River Control	LCI - All salary and wage rates - Local govt sector	LCI - All Salary and Wage Rates - Private Sector
Year ending	*% change (cummulative from 2017)*							
Jun 17								
Jun 18	2.1	1.5	2.3	1.9	1.5	0.8	1.6	1.5
Jun 19	4.2	2.9	5.3	3.9	3.7	2.3	3.3	3.5
Jun 20	6.3	4.8	8.3	6.3	6.5	4.5	4.9	5.4
Jun 21	8.5	6.8	10.9	8.8	9.1	6.9	6.7	7.4
Jun 22	10.8	8.9	13.7	11.4	11.8	9.4	8.6	9.1
Jun 23	13.2	11.0	16.6	14.2	14.4	12.0	10.6	11.0
Jun 24	15.7	13.3	19.8	17.2	17.1	14.6	12.7	12.9
Jun 25	18.4	15.6	23.2	20.3	19.9	17.3	14.9	15.0
Jun 26	21.3	18.0	26.8	23.7	22.8	20.1	17.1	17.2
Jun 27	24.2	20.5	30.7	27.2	25.7	22.9	19.5	19.4
Jun 28	27.4	23.1	34.9	31.1	28.7	25.9	22.1	21.8

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6 Checks and comparing history with forecast

The charts and tables in Appendix A provide information on how our equations have tracked (or modelled) the actual outcome for the eight price indicators. These indicate a more than satisfactory 'fit' by the equations when attempting to replicate the actual movement of the indices from 1998 to 2017.

The inflation story of the past 11 years compared to the coming 11 years is depicted below.

Figure 3 shows the change in cost adjustors over the 2006 to 2017 period. This reveals increases in roading and water and environmental costs of close to 40%. These are balanced, to a degree, by smaller increases in community activities and planning and regulation costs. Consequently, overall local government costs (as measured by the LGCI) rising on average by just under 35%.

In contrast, the picture for the 2017 to 2028 period (Figure 4) covered by our forecasts is of a more subdued inflation story. While costs in roading and water and environmental are still expected to increase the fastest, overall local government costs (as measured by the LGCI) are expected to rise by just over 28% over this period.

A comparison for each of the eight price indices is also illustrated (Figure 5).

These comparisons reinforce the message that the post-GFC period remains one of a struggling global economy with significant financial challenges. This context spills over into the economic world through subdued consumer demand, with accompanying uncertainty holding back business investment demand.

These factors combine to provide subdued global inflationary pressures.

Some have pointed to ongoing low interest rates (and the considerable quantitative easing that has occurred across the globe) that should in theory have fed an inflationary surge. However, much of this looser monetary conditions have flowed directly through to asset price inflation (share prices, land prices, and residential property prices), with little effect on prices of goods and services.

Indicatively, the world price of oil has remained sluggishly low after retreating from highs over US$100 per barrel in 2014, to be now around or under US$50 per barrel.

Figure 3 LGCI and cost adjustors - % change 2006 to 2017

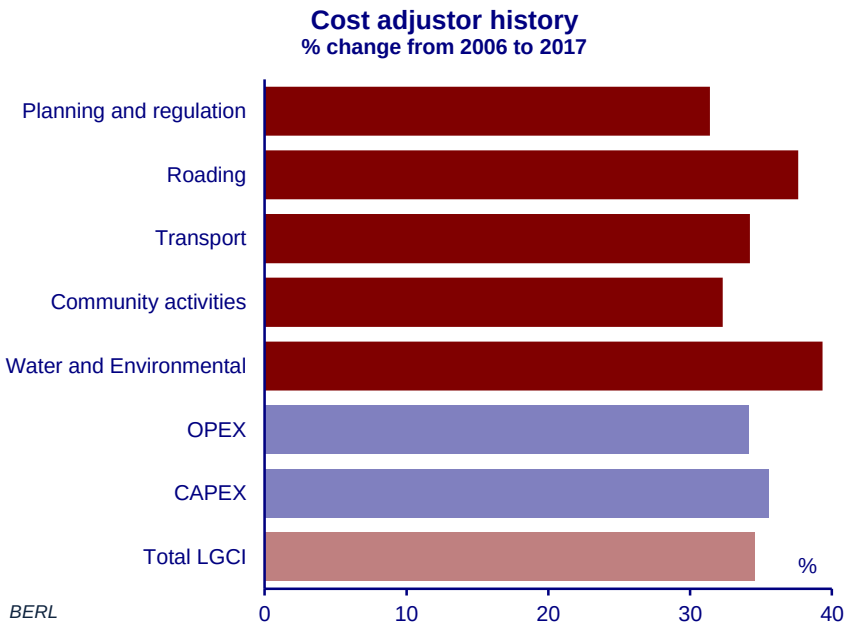


Figure 4 LGCI and cost adjustors - % change 2017 to 2028

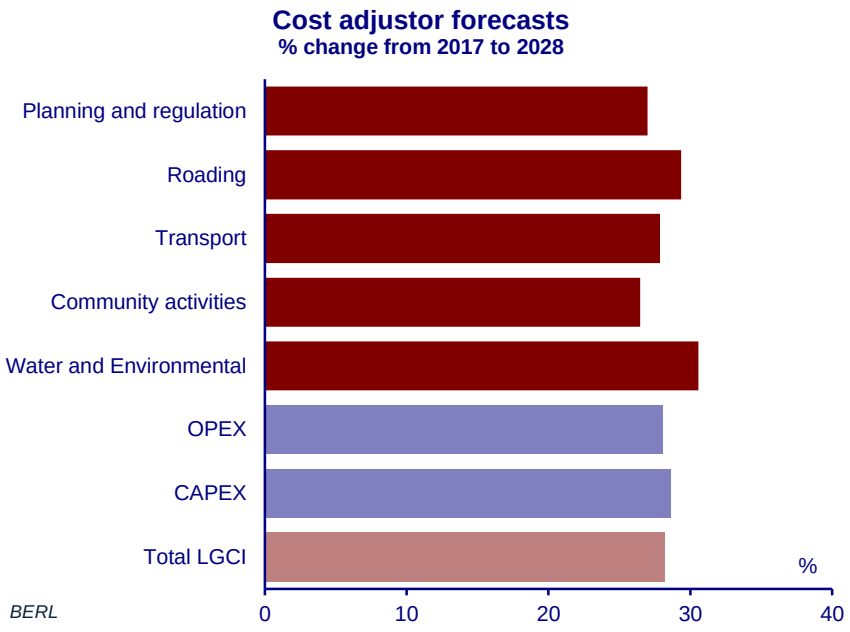
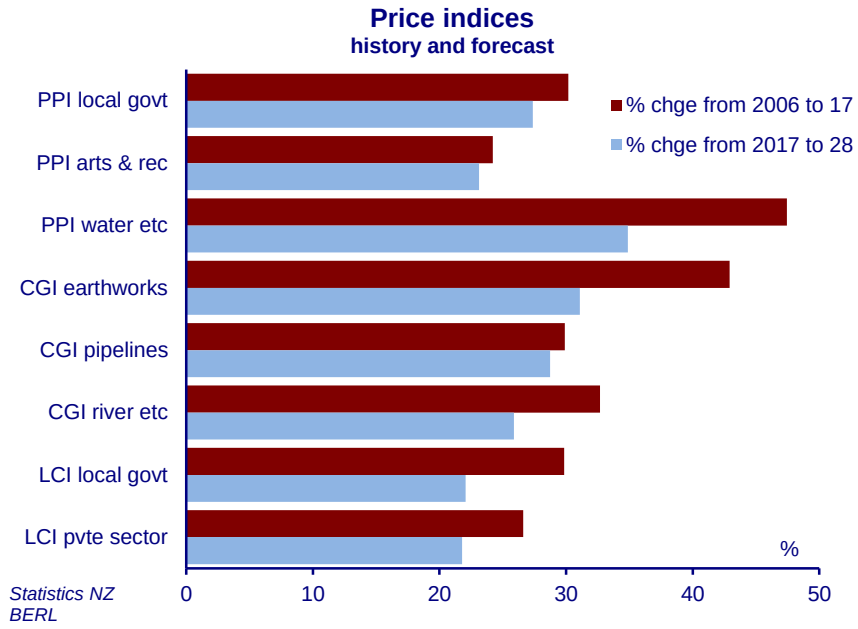


Figure 5 Price indices – history and forecast



6.1 Previous forecast accuracy

Table 6.1 provides a comparison of the actual cost adjustor outcomes for the period 2006 to 2017 to the forecasts published in 2006.

While the structure of our cost adjustors were modified and revised last year, we can compare the outcomes to forecasts for most of the categories to provide an 'after the event' check on the accuracy of our forecasts.

We reinforce that the objective of the cost adjustor forecasts are to provide indicators of long-term movements in costs facing the local government sector. They are not designed to provide information on short-term movements, owing to the difficulty in assessing the at times erratic short-term movements of some inflation measures. This is why we provide this view of the accuracy of our forecasts for the long-term movements in these cost adjustors.

Table 6.1 Adjustor changes 2006 to 2017 forecast compared to actual

2006 forecasts of adjustors % change from 2006 to 2017		Actual % change in adjustors 2006 to 2017	
Road	31.7	37.6 34.2	Roading Transport
Property	31.2	35.6	LGCI Capex
Water	41.5	39.3 38.6	Water and Environmental PPI water, sewer, drainage, and waste services
Staff	28	26.2	LCI local govt sector wages
Other	35.2	34.2	LGCI Opex
Pipelines	50.5	26.3	CGI pipelines
Earthmoving	36.5	35.4	CGE earthmoving and site works
Pvte sector labour	28.5	22.8	LCI pvte sector wages

In general, we are reassured by the comparisons listed in Table 6.1; especially noting that the forecasts were made in mid-2006 after which the country was subject to the GFC and the two Canterbury earthquakes.

In particular, forecasts for water, local government staff/wages, other local government costs, transport, and earthmoving were more than satisfactory in terms of their closeness to the actual outcomes. Forecasts for these adjustors/indices were within 3 percentage points of the actual outcome, an error over the 11-year horizon of less than 0.3% per annum.

Disappointingly, our forecasts underestimated the cost increases in roading as well as property by about 5.9 and 4.4 percentage points. However, we believe these underestimates are attributable to the unforeseen[2] investment boost occurring as a result of the recent government infrastructure programme, as well as construction cost inflation associated with the Christchurch rebuild.

In contrast, the overestimate of private sector labour costs can be attributed to the surge in inward migration over the latter half of the period that has dampened wage growth in the private sector.

However, there was one large error, with our forecasts of pipeline costs considerably overestimating the actual outcome. As noted in Appendix A (page 23), this series has been significantly influenced by a few low-price purchases of concrete pipes in the March 2013 quarter. Statistics NZ has been considering revising the capital good indices (e.g. including selling prices of PVC pipes) but there is no confirmed timeframe yet. Consequently, we advise caution when using the forecasts for the CGI pipelines price index.

[2] That is, unforeseen from the perspective of 2006 when the forecasts were produced.

Appendix A Equations to explain and forecast eight price indices

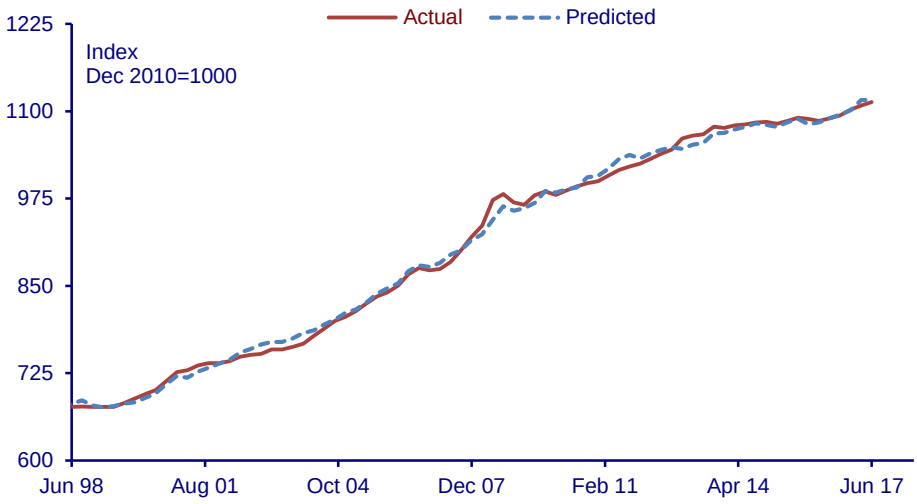
The charts in this appendix illustrate the performance of our estimated equations, for each of the adjustors, when compared to the actual data over the period June 1997 to June 2016.

The estimation process is used to develop and then confirm a robust equation that can be used to generate forecasts. The confirmation process tests the fit of the estimated equation with the actual path of the adjustor over a period of time.

In each of the figures below, the dashed line (labelled predicted) indicates the estimated path of the adjustor as calculated by our estimated equation. The solid line (labelled actual) indicates the actual path of the adjustor as derived from the relevant official Statistics New Zealand data series.

The equations for each of the price indices are given below each chart

PPI for Local Government Administration Sector



The predicted equation for this price index is:

LnLocGovAdm = -2.65 + 1.36 LnCPI – 0.03 DummyGST

	Coefficients	*Standard Error*	*t Stat*
Intercept	-2.65283741	0.086244145	-30.75962
LnCPI	1.364063412	0.012610751	108.1667
Dummy GST	-0.03000805	0.003744466	-8.013972

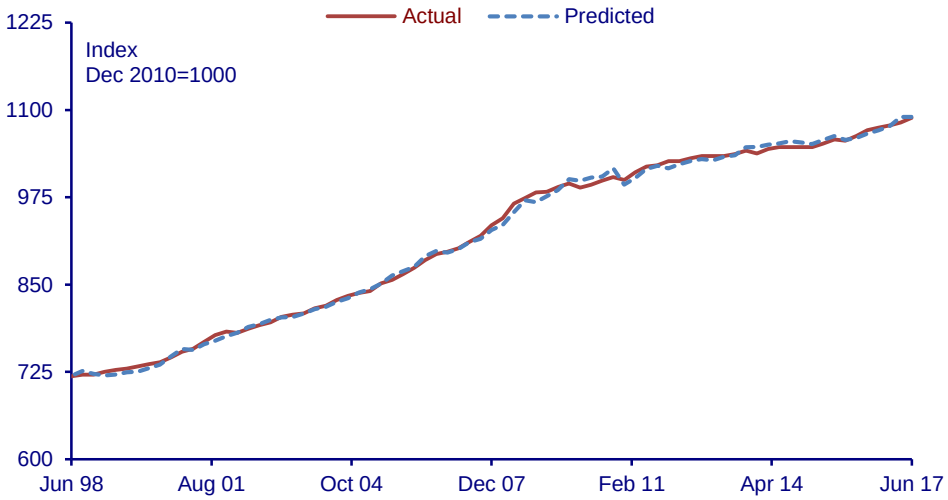
Where LocGovAdm = Producer price index for inputs to Local Government Administration sector

CPI = Consumer Price Index

DummyGST = variable to allow for October 2010 increase in GST rate to 15%

Ln =logarithm of stated variable

PPI for Arts and Recreation Services Sector



The predicted equation for this price index is:

LnArtsrec = -1.29 + 1.17 LnCPI – 0.01 LnIRT – 0.05 DummyGST

	Coefficients	*Standard Error*	*t Stat*
Intercept	-1.291736468	0.063161415	-20.45135412
LnCPI	1.173166947	0.008987417	130.5343827
LnIRT	-0.009919656	0.002566624	-3.864864635
Dummy GST	-0.050442288	0.002823102	-17.86768469

Where Artsrec = Producer price index for inputs to Arts and Recreation Services sector

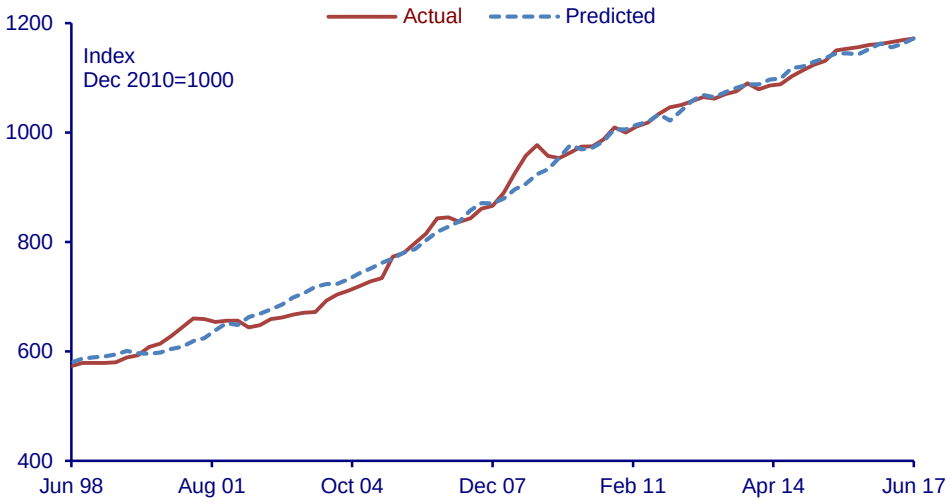
CPI = Consumer Price Index

IRT = 90-day interest rate

DummyGST = variable to allow for October 2010 increase in GST rate to 15%

Ln =logarithm of stated variable

PPI for Water, Sewer, Drainage and Waste Services Sector



The predicted equation for this price index is:

LnWtrWst = -7.13 + 1.60 LnCPI(lag4) + 0.26 LnGDP(lag4) – 0.05 DummyGST

	Coefficients	*Standard Error*	*t Stat*
Intercept	-7.13376	0.234859432	-30.374587
LnCPI (lag 4)	1.60481	0.108206671	14.830968
LnGDP (lag4)	0.26114	0.07691895	3.39500829
GST dummy	-0.04571	0.010769357	-4.2440404

Where WtrWst = Producer price index for inputs to Water, Sewer, Drainage and Waste Services sector

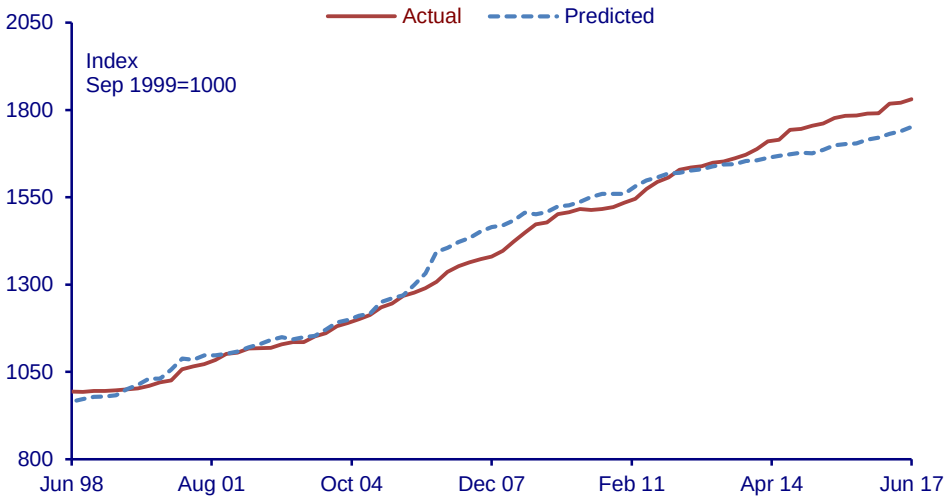
CPI (lag4) = Consumer Price Index from 4 quarters previous

GDP (lag4) = Real (i.e. inflation-adjusted constant price) Gross Domestic Product from 4 quarters previous

DummyGST = variable to allow for October 2010 increase in GST rate to 15%

Ln =logarithm of stated variable

CGI for Earthmoving and Site Works



The predicted equation for this price index is:

LnEarth = 0.56 LnCon + 0.32 LnGDP

	Coefficients	*Standard Error*	*t Stat*
LnCon	0.564410443	0.017963365	31.42008
LnRGDP	0.320178165	0.011179016	28.641

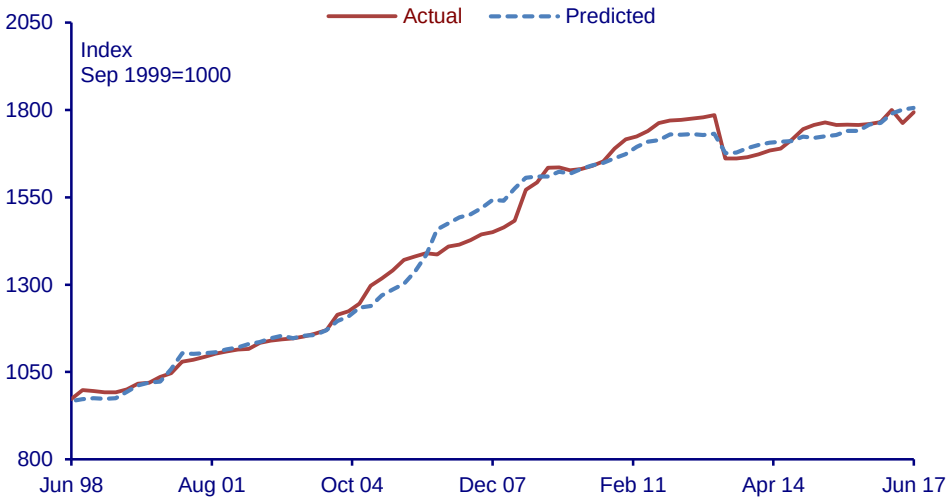
Where Earth = Capital goods price index for earthmoving and site work

Con = Producer price index for inputs to Construction Services sector

RGDP = Real (i.e. inflation-adjusted constant price) Gross Domestic Product

Ln =logarithm of stated variable

CGI for Pipelines



The predicted equation for this price index is:

LnPipes = 0.74 LnCon + 0.3 LnEmp – 0.04 DummyPipes

	Coefficients	*Standard Error*	*t Stat*
LnCON	0.735343971	0.016054842	45.80201
LnEMP	0.304902878	0.013916028	21.91019
LnDummy Pipes	-0.03993811	0.007516261	-5.313561

Where Pipes = Capital goods price index for pipelines

CON = Producer price index for inputs to Construction Services sector

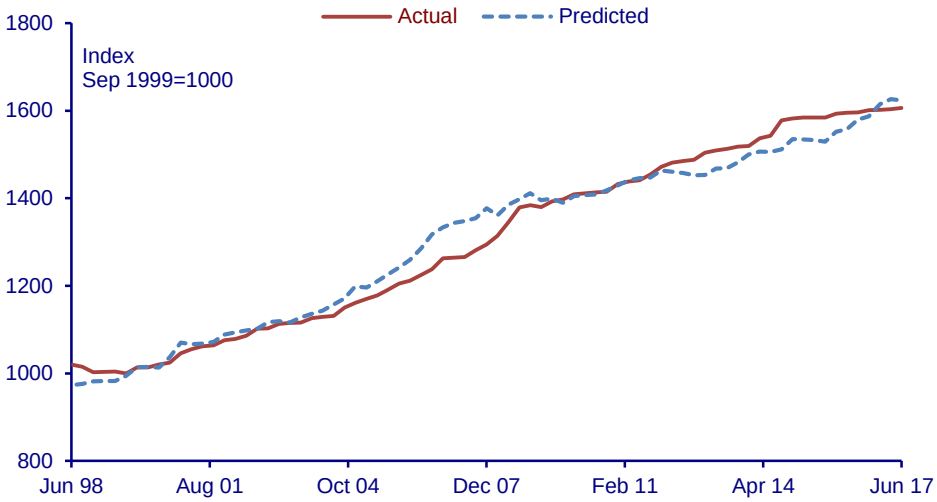
EMP = total number of people employed

DummyPipes = variable to capture one-off drop in March 2011 quarter

Ln =logarithm of stated variable

Note: The first two quarters of 2013 has seen a sharp drop in the pipeline and associated water adjustors. This has been caused by a few low-price purchases of concrete pipes in the March quarter. The June quarter has remained low as a result of this. The drop has been the highest ever recorded. Selling prices of concrete pipes are heavily weighted in the current index (around 40-50%). Statistics NZ is considering revising the capital good indices (e.g. including selling prices of PVC pipes) but there is no confirmed timeframe yet.

CGI for Reclamation and River Control



The predicted equation for this price index is:

LnRiv = 0.38 LnCon + 0.61 LnEmp

	Coefficients	*Standard Error*	*t Stat*
LnCon	0.37539997	0.01603205	23.41559
LnEmp	0.607877366	0.014009233	43.39119

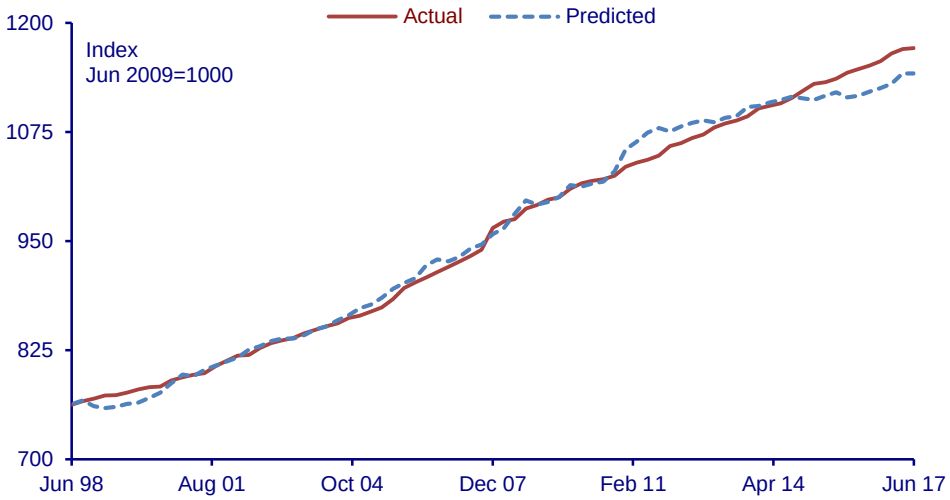
Where Riv = Capital goods price index for reclamation and river control

Con = Producer price index for inputs to Construction Services sector

Emp = total number of people employed

Ln =logarithm of stated variable

LCI for Salary and Wage Rates in Local Government Sector



The predicted equation for this price index is:

LnLocGovWage = -0.43 + 1.05 LnCPI

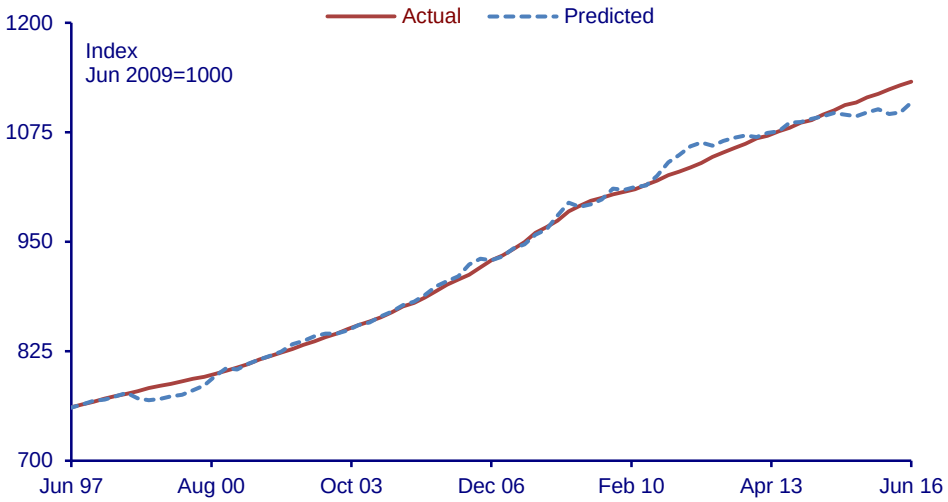
	Coefficients	*Standard Error*	*t Stat*
Intercept	-0.427159643	0.068866599	-6.20271
LnCPI	1.050073546	0.009956597	105.4651

Where LocGovWage = Labour cost index for all salary and wage rates in local government sector

CPI = Consumer Price Index

Ln =logarithm of stated variable

LCI for Salary and Wage Rates in Private Sector



The predicted equation for this price index is:

LnPrivWage = 0.99 LnCPI – 0.00 DummyGST

	Coefficients	*Standard Error*	*t Stat*
LnCPI	0.988580369	0.000218825	4517.6674
Dummy GST	-0.004003969	0.002669643	-1.4998144

Where LocPrivWage = Labour cost index for all salary and wage rates in private sector

CPI = Consumer Price Index

DummyGST = variable to allow for October 2010 increase in GST rate to 15%

Ln =logarithm of stated variable