

STUDY REPORT

SR 290 (2013)

Building industry performance measures

Part two

IC Page



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Preface

This is the second in a series of reports on the measurement of performance in the construction industry. The Building and Construction Sector Productivity Partnership is concerned at the low growth of productivity in the industry and is examining potential means of improvement. It has a target of lifting productivity 20% by 2020 compared to the levels in 2012. In addition to national productivity, some trends are being measured at the sub-industry level. Related factors such as quality of work, business innovation and management expertise are also being measured. This report describes those measures.

Acknowledgments

This project was funded by the Building Research Levy and in conjunction with the Productivity Partnership programme of work.

Note

This report is intended for researchers and officials, particularly as a measure of progress in improving productivity in the industry.

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Abstract

The Building and Construction Sector Productivity Partnership is developing a number of programmes to improve productivity in the building and construction industries. The goal is to raise productivity 20% by the year 2020. The metric for this is the official productivity statistics produced by Statistics New Zealand (SNZ). Previous work has shown the programme needs to address many aspects of the industry including firm behaviour, skills, procurement and client knowledge. This project looks at how progress can be measured towards the goal. It looks at productivity at a sub-industry level, key performance indicators (KPIs) used by firms, new home owners' methods of procurement, their level of satisfaction, level of call-backs and use of prefabrication. Other official information related to the industry that is analysed includes business operations' survey data, capital works and building firm formation.

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1. INTRODUCTION

The main official measure of performance at the industry level is productivity. This is calculated from national accounts' data, and employment and capital stock data. The same method is used for all-industries enabling consistent comparisons to be made between them and over time. The main problem with this measure is it is incomplete as does not cover the views of end-users and their level of knowledge, nor the issue of the quality of the output.

Trends in the official measure of productivity are shown. Other measures such as work placed per worker, and profits and value added by segment are also examined. The results of two BRANZ surveys of owners and firms are reported; first, a measure of quality using new home owners' satisfaction levels; second, firms' use of performance indicators as a measure of commitment to improvement.

2. SUMMARY

The main findings are:

- The latest official productivity indexes are for the year ending March 2011. These show slight growth in the three main indexes for the year (i.e. labour, capital and multi-factor productivity [MFP]).
- Official productivity data has a delay of approximately two years. A more timely measure is the use of capital formation per industry worker and indicates a continuing rise in productivity after March 2011 through to the end of 2012. The latter approximately tracks the official measures but is not always a reliable proxy for the official indexes.
- Labour productivity is available for the 24 sub-industries in construction, though it also has a two-year lag. Two years of data are shown in this report and the charts indicate little change in the relative performance between sub-industries. It provides a measure of which sectors need improvement and the potential efficiency gains that are available. The latter could arise if under-performing sub-industries are eliminated or their contribution reduced by prefabrication and/or substitution by other sub-industries.
- A new home owners' satisfaction survey was undertaken by BRANZ and provides various measures of quality including overall satisfaction levels, call-backs and builder recommendations. Individual firms can apply to BRANZ on a confidential basis for data on their firm's results compared to industry averages.
- Another survey undertaken by BRANZ of building firms was on work types, use of performance indicators and where they get their business advice. This provides a measure of industry management expertise.
- A significant amount of the changes in productivity with time are explained in terms of the different levels of work in the three main segments of housing, other buildings and civil engineering. Regression analysis suggests over 67% of changes in MFP can be explained by changing workloads in the three segments.

3. MAIN RESULTS

3.1 Official productivity measures

Productivity is defined as outputs divided by inputs. The official measure uses value added as the output. The inputs are labour volumes or capital stock, or a combination of labour and capital. These inputs respectively provide labour productivity, capital productivity and MFP. The latter is a measure of technological, managerial and regulatory impacts, i.e. after accounting for labour and capital inputs it measures the effect of other factors that can influence performance of the economy or an industry.

Figure 1 shows the official indexes for construction. Labour productivity has declined slightly in recent years and the use of capital has been markedly inefficient, giving a fall in capital productivity. This has pulled down the MFP measure somewhat to below that for labour.

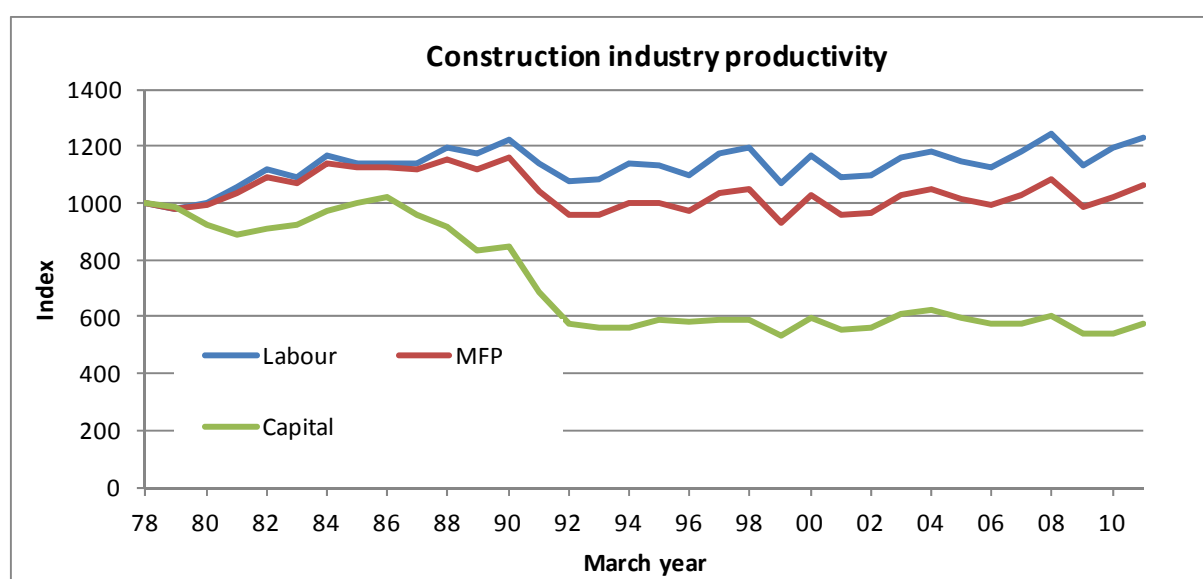


Figure 1 Productivity indexes – construction

The all-industry MFP is shown in Figure 2 as the purple dashed line. Much of the all-industry improvements come from the agricultural sector and in Figure 2 we have selected similar industries to construction for comparison. It shows that the construction industry has performed below most similar industries and below the all-industry average.

The target of the Building and Construction Sector Productivity Partnership (2010) is to lift the MFP index, namely a 20% improvement in productivity by 2020. The improvement is to be measured as a trend rather than using any particular year as the base point. So, for example, one approach is to establish the five-year MFP index average to 2010 as the base and target a 20% improvement for the five years centred on 2020.

The target is productivity improvement but the industry needs to improve quality, uptake of innovation including prefabrication and standardisation, and management expertise. These other measures are discussed later.

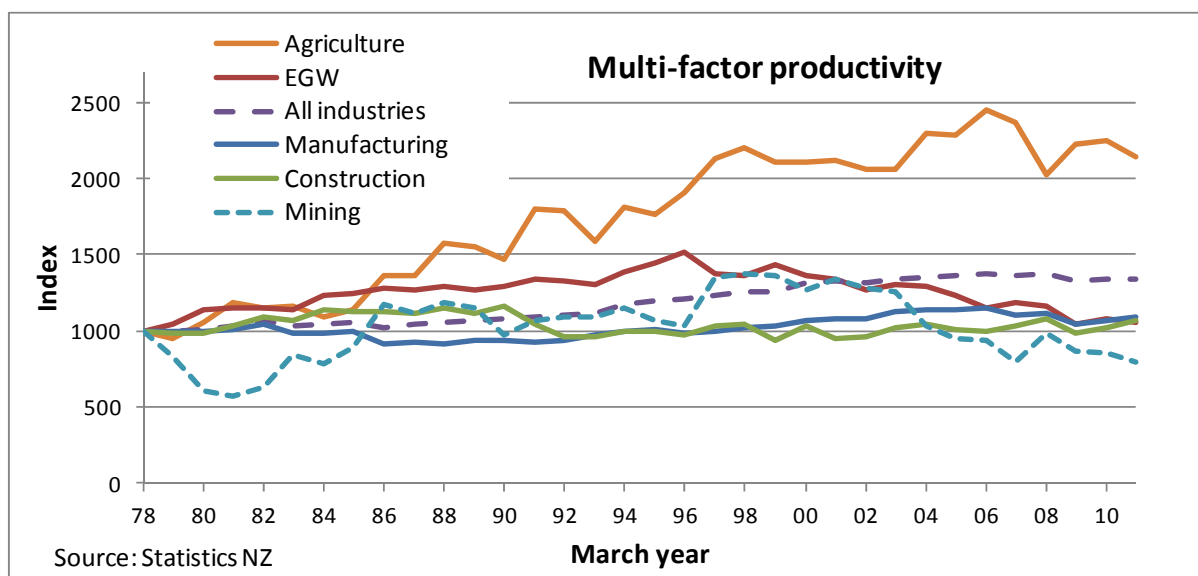


Figure 2 Multi-factor productivity for selected industries

Reasons for declining productivity are described elsewhere and remedial measures are being developed by the Productivity Partnership (see www.buildingvalue.co.nz). Part of the explanation for declining productivity is due to the boom-bust nature of the industry. Figure 3 shows total workloads, buildings and civil, plotted against MFP. There is some correlation, of about 0.40, but the relationship is not very close. It appears that in upturns productivity initially improves along with increased workloads. But after one or two years of workload growth productivity drops away and the index declines. This suggests that skills and management efficiency reduces as growth continues over an extended period. Note also that in workload downturns productivity usually, but not always, declines. This is consistent with firms hoarding labour in expectation of future recovery. Hence, the call to reduce the peaks and troughs through better staging of projects as far as is possible in an industry driven mainly by the private sector.

A more comprehensive examination of MFP and workloads by type of work is included within the Appendix, see Section 7.1. It shows that when workloads are broken into types of work the correlation between MFP and workloads by segment is quite close.

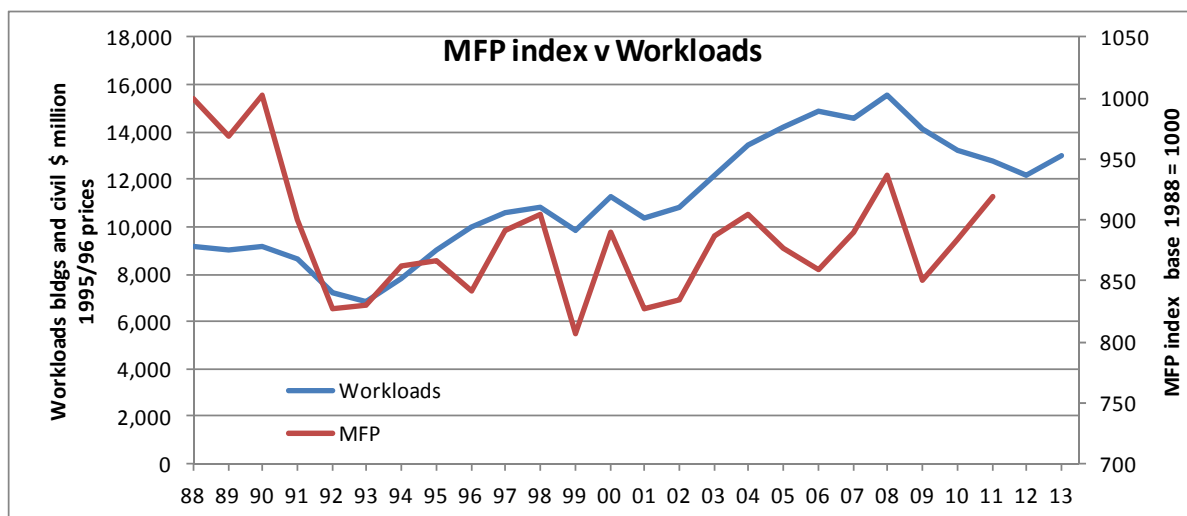


Figure 3 MFP index versus workloads

3.2 Capital formation per worker

One issue with the official measure of productivity is the time it takes for the data to be published, typically two years after the period being reported. An alternative measure of productivity in the construction industry is fixed capital formation (FCF) per worker, which is available by quarter and within six months from the end of the period. This measure is shown in Figure 4 where capital formation includes all buildings and other construction (i.e. civil engineering). The worker numbers are from the household labour force survey and are adjusted for average hours worked.

The chart indicates this alternative measure approximately lines up with the official labour and MFP indexes. Its use is suggested as a more timely indicator, though the correlation with the official numbers is not very close. It includes the output of other industries, in particular building material manufacturing, and any efficiency gains in these industries such as off-site prefabrication increases the FCF per on-site worker ratio. So it is a different means of measurement from the official productivity measure as it covers upstream inputs.

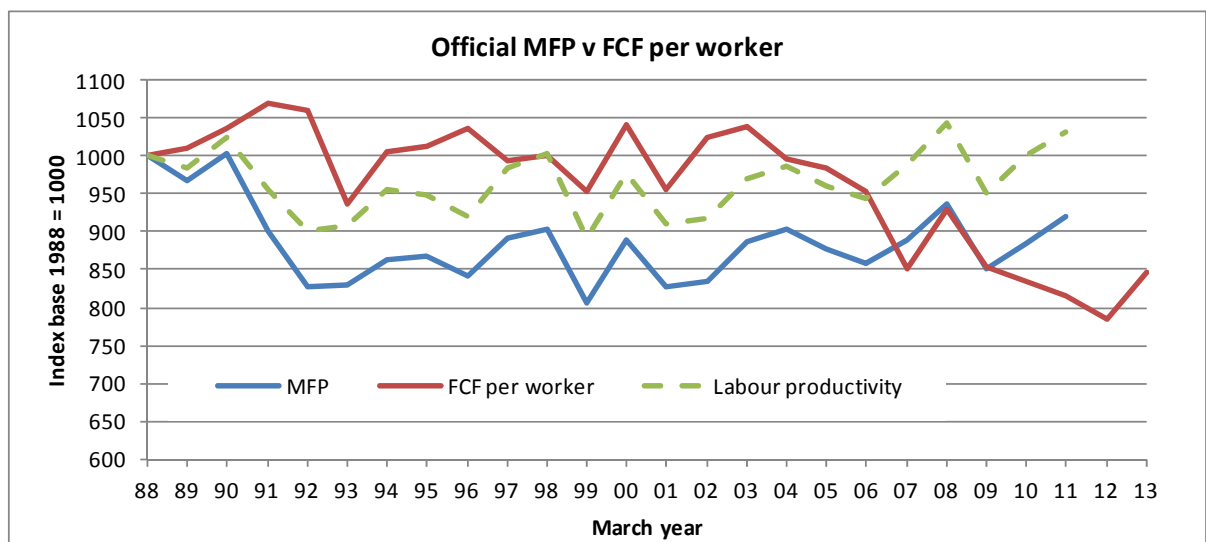


Figure 4 Alternative productivity measure using capital formation per worker

3.3 Sub-industry productivity

To supplement the official productivity data at industry level, tax information was used to calculate individual firm labour productivity. This data is aggregated by SNZ to preserve confidentiality and individual returns are not seen by non-SNZ persons. The data for 24 sub-industries in the construction group are displayed in Figure 5 and Figure 6.

Two years of data is shown and there is slight growth in labour productivity (or value added per person engaged) in almost all sub-groups for the most recent year, see Figure 5.

The level varies somewhat between sub-industries and we would not expect them to have the same productivity because some are more plant-intensive than others and they will have higher labour productivity as a result. For example, the chart indicates the finishing trades, which use mainly unskilled labour and have minor use of plant, have comparatively low productivity, namely the plastering, tiling, carpentry and

painting sectors. In contrast the plant-intensive sub-groups, such as civil and land development, have high labour productivity. A reduced requirement for the former trades by, for example, a change in materials or more prefabrication, would help improve overall productivity in the industry.

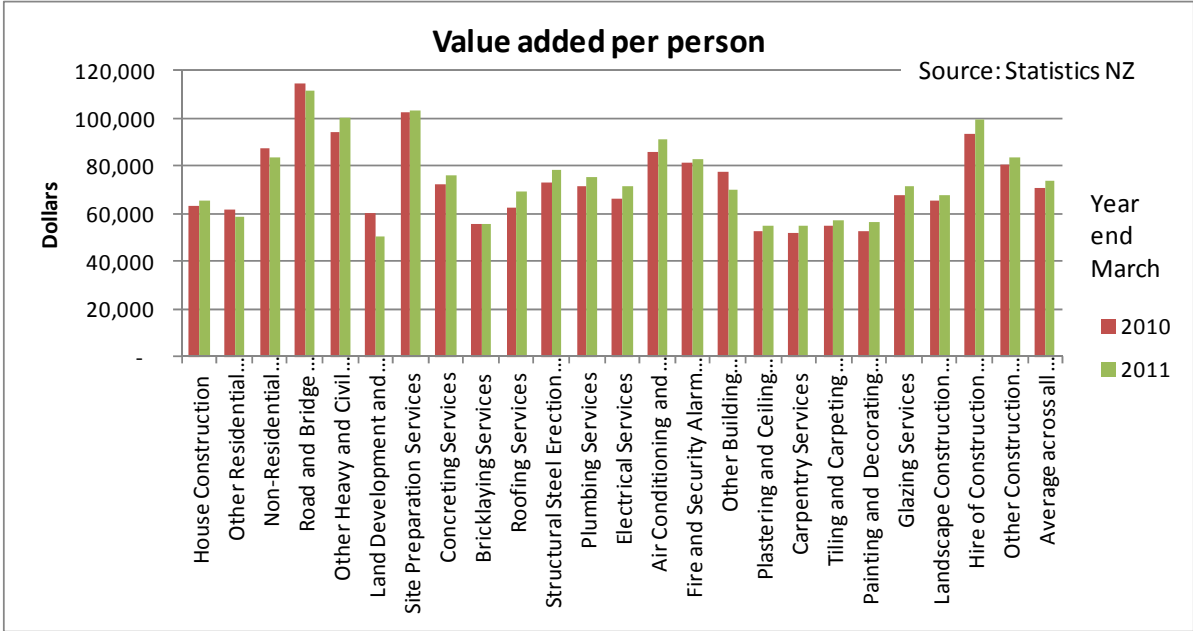


Figure 5 Sub-industries productivity

Figure 6 illustrates average profits before tax by sub-industry. It indicates falling profit percentages in many sub-industries in the year ending March 2011. This data is more useful to firms than the previous chart because they can compare their profit levels with the average in their sub-industry which may be an incentive to improve their own performance.

Unlike the previous chart, that shows increased productivity over two years, the profits chart indicates many sub-groups have not maintained profits as a percentage of sales over the two-year period. This suggests the return to labour has increased while the return to capital (or profits) has dropped slightly during the downturn.

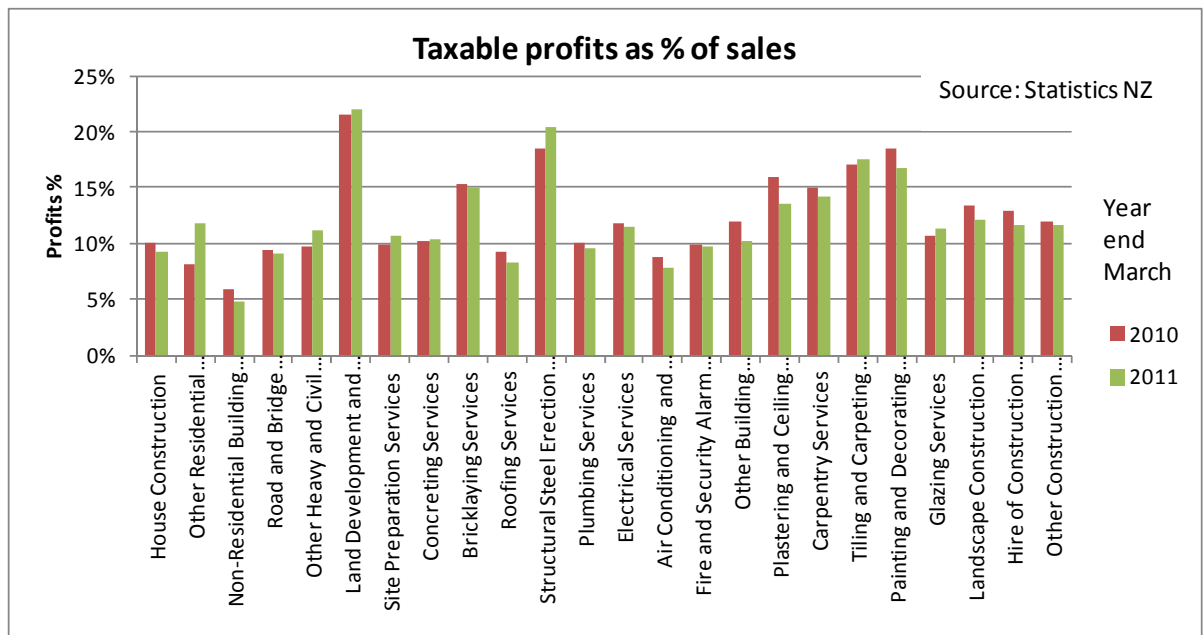


Figure 6 Sub-industries profit levels

Figure 5 and Figure 6 show average values for all firms in any particular sub-industry. Within each of these there is a wide distribution of results and this is shown in the Appendix.

3.4 BRANZ surveys for measuring industry performance

These surveys are:

- Firms' work types and resource use survey.
- New house owners' satisfaction survey.
- New non-residential buildings survey – includes prefabrication questions.

3.4.1 Firms' use of KPIs

This section reports on a survey of building firms. The survey is more fully reported in Page and Curtis (2013) and was mainly developed to assess work types by various characteristics of firms. However, there was a series of questions on how often firms monitor KPIs and where they get business advice. Other work has indicated that an improvement in business and management skills, particularly needed in small firms, could have a significant effect on industry productivity, as well as improving individual businesses (Dozzi, AbouRizk, 1993).

Figure 7 shows various KPIs that firms may be using. Rather than ascertain their view about how important they are, the survey asked how often the firm used the various measures. Not surprisingly, workloads and cashflow rated the highest as did client satisfaction. The smaller firms monitored these more frequently, probably reflecting the owners' hands-on and less formal approach to running the business, than the more structured approach used in larger firms.

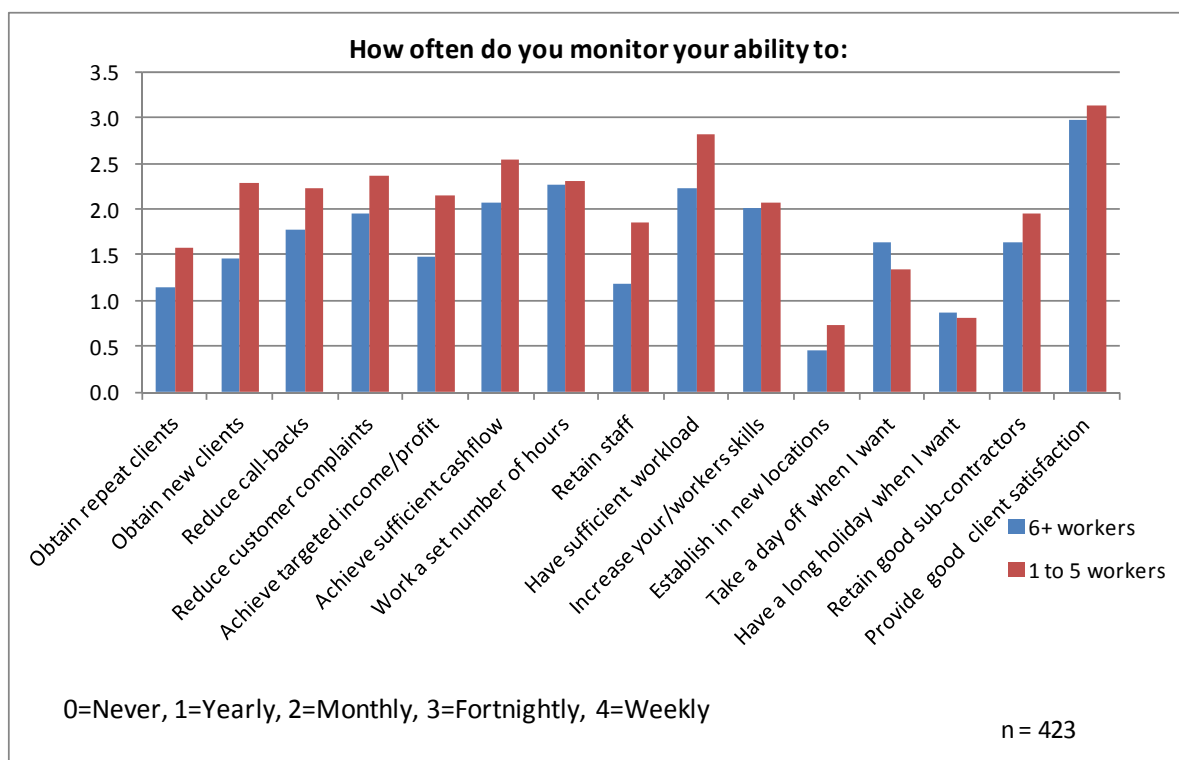


Figure 7 Frequency of measure of KPIs

Figure 8 shows survey results for sources of business advice. We would expect accountant and trade association advice to be reliable, but the other sources of advice in the chart may be suspect, i.e. almost half of the advice received in small firms could be uninformed as to what genuinely makes a successful business.

Medium and large enterprises are more likely than small firms to use accountants and lawyers. This is not surprising as for bigger firms, managing cashflow and tax returns becomes more onerous, and legal issues related to contracts and industry legislation assume greater importance, compared to small firms.

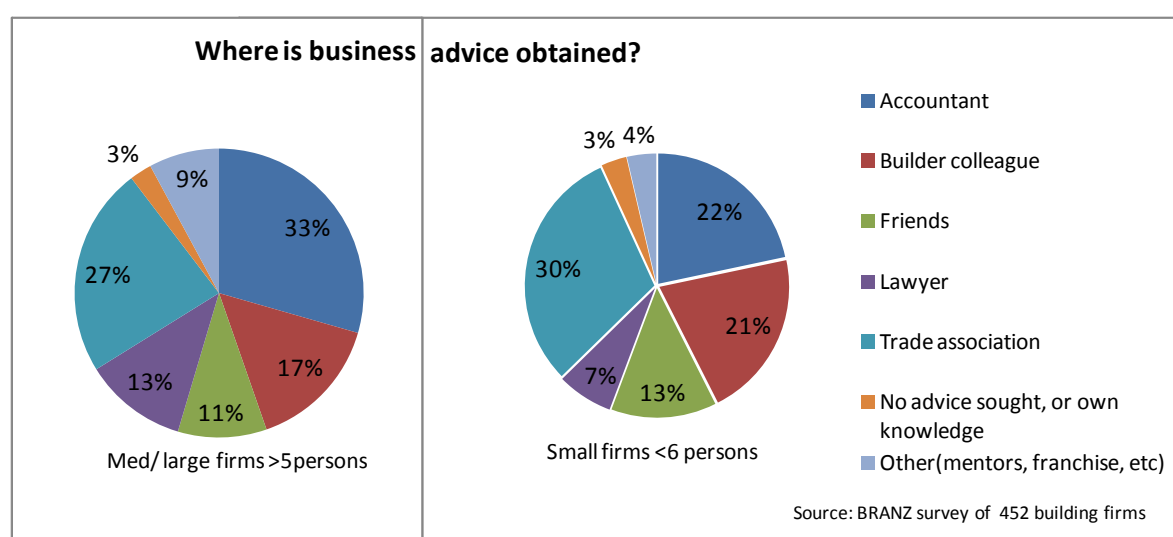


Figure 8 Builders' sources of business advice

Ongoing monitoring of sources of advice will show trends in the level of management expertise in firms and this is known to have a bearing on firm productivity.

3.4.2 New house owners' satisfaction survey

The new home owners' survey (Curtis 2013) asked questions on satisfaction, builder recommendation and call-backs. Table 1 illustrates satisfaction within the new housing sector. Different stages in the process were measured. The "All measures" score (the last column in the table) could be monitored as a measure of trends in satisfaction, as well as the proportions of respondents who are fairly dissatisfied and very dissatisfied. There has been a very slight improvement in most measures over the two-year period.

Table 1 Summary satisfaction scores for new house owners

New house owner satisfaction scores								
	Buying process	House condition at move-in	Service after move-in	Overall quality	Complete on time	Standard of finish	Fixing of defects	All measures (unweighted)
2012	4.52	4.44	4.11	4.56	4.30	4.49	4.00	4.35
2011	4.43	4.34	4.02	4.59	4.23	4.48	3.99	4.30
Score 5= Very satisfied, 4= Fairly satisfied, 3=Neither, 2= Fairly dissatisfied, 1 = Very dissatisfied								
Number of responses in 2012: 1280								

Figure 9 illustrates how owners talk about their builders. Overall the average is quite good but the responses at the bottom-end (i.e. "critical" with and without being asked) must be very damaging to the builders concerned. There is a slight improvement in critical responses from 15% last survey to 12% this survey.

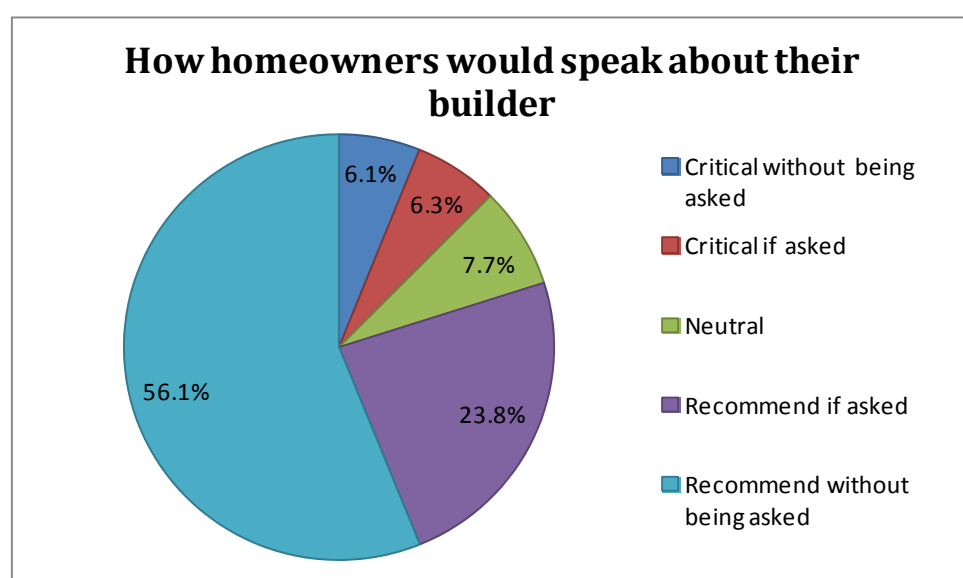


Figure 9 New house owners' recommendation of the builder

Figure 9 has been reinterpreted and included as the first panel in Figure 10. Other measures such as fixing defects, quality and time for completion are included in a

standard layout. This consists of the five-point scoring system on the vertical axis, where the higher the score the better. The horizontal axis shows the cumulated percentage of responses that have the performance score or less. Owners can use these charts to see where they lie compared to other new house buyers. For example, in the top-left chart if an owner scores 3 (i.e. neutral in recommending the builder) the benchmark score is 20% meaning 20% of new owners have equal or lower performance and 80% of owners have higher performance (i.e. owners more likely to recommend their builder).

From an industry-wide viewpoint we want to see the lines on the charts move up and to the left. In most panels there is a slight or nil improvement between the 2011 and 2012 survey. The exception is quality, which dropped slightly in 2012.

The overall results can be represented in a “radar” chart, see Figure 11. The values shown are the same as the averages in Table 1 and in subsequent years we are looking for an outward expansion in the radar chart. Another measure that could be included is satisfaction with the design process (cost and time predictability, value for money). This will bring the KPIs into line with those used by Constructing Excellence (apart from accidents/injury data which is available from MBIE and ACC) and enable comparisons between home builders and the large civil and non-residential building contractors.

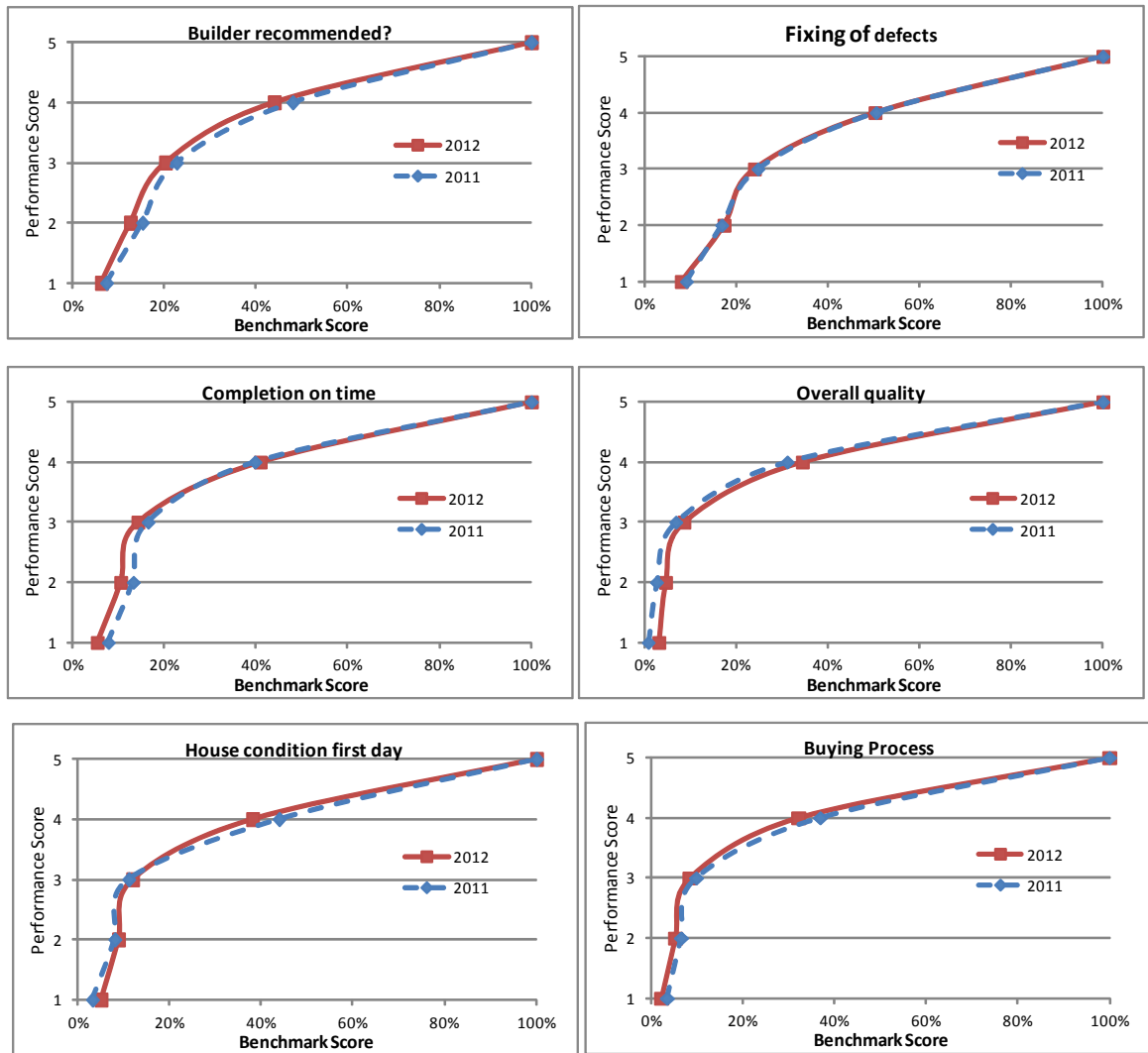


Figure 10 Performance measures in the standard benchmark charts

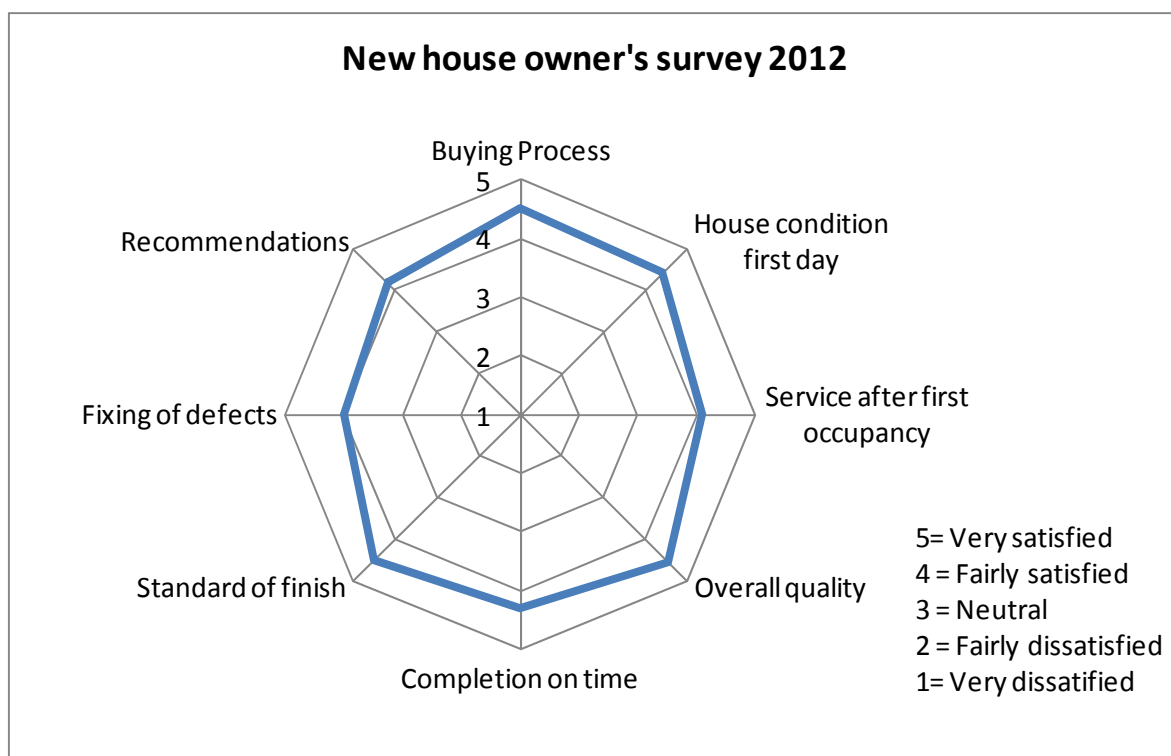


Figure 11 Radar chart of all new owners' satisfaction levels

The incidence of defects was measured by the number of call-backs. The "yes" responses in Table 2 shows a large percentage of owners needed to call-back the builder, but this is a slight reduction on the 72% rate in 2011. This percentage is a measure of quality and is another indicator which should be monitored over time.

Table 2 New house call-back rate

Call-back rate NHS 2012		
	Number	%
Yes	857	68%
No	405	32%
Total	1262	100%

3.4.3 Prefabrication

Prefabrication is known to improve on-site productivity and quality, and BRANZ is monitoring its uptake through surveys. The results are shown in Figure 12 and further details are in Buckett et al (2012). Initial indications are of a slow increase in uptake, but it will be several years before we have a reliable trend.

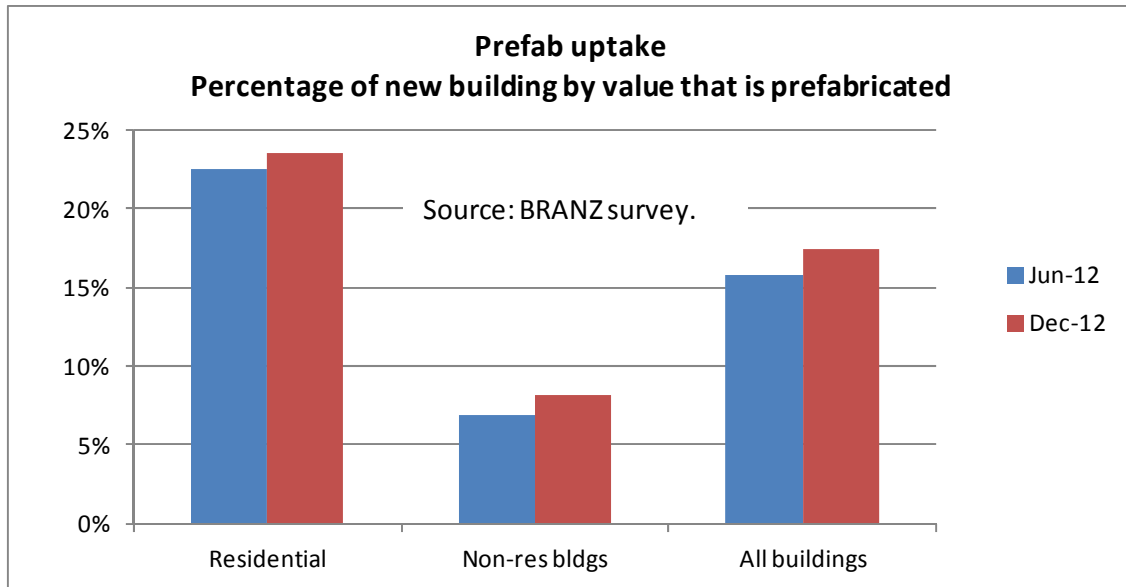


Figure 12 Prefabrication uptake in new buildings

3.5 Other official data for measuring industry performance

3.5.1 Business operations' survey

SNZ carries out this survey every year and every second year it asks about innovation, with Figure 13 illustrating trends in innovation activity within the industry. "Services" is the type of goods and services provided by the firm and is a measure of movement into new areas of work. "Operations" is the processes used to deliver services and may include new technology. "Management" includes people and may involve firm reorganisation. "Marketing" is the methods used to advertise services. The most significant change has been in the types of services undertaken and suggests firms are diversifying in order to survive and expand.

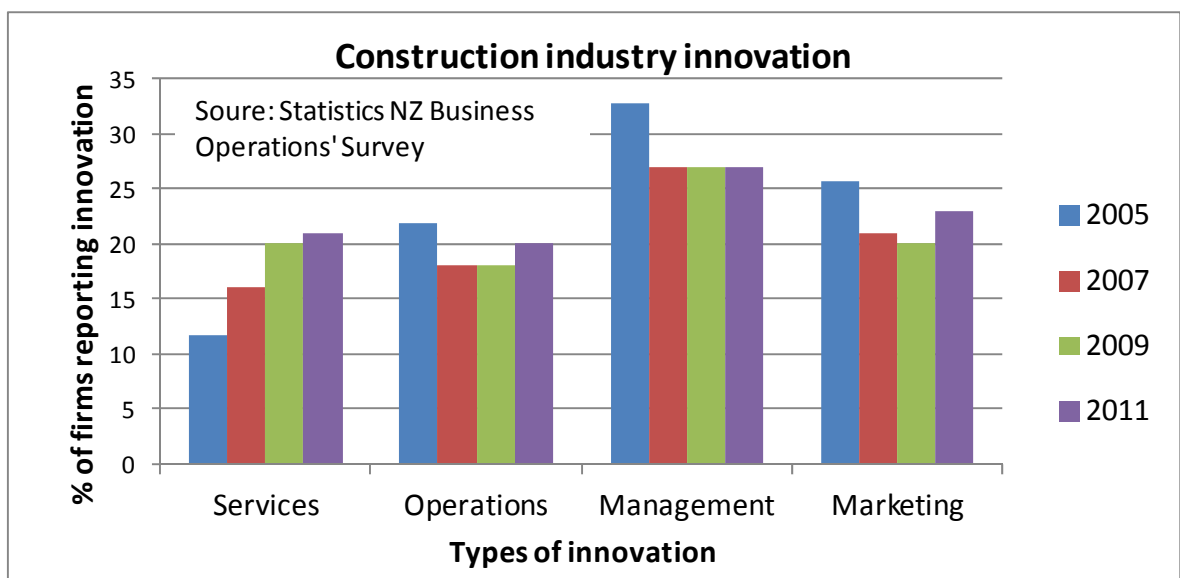


Figure 13 Types of innovation by firms

3.5.2 Firm formations and deaths

There is normally a quite high rate of births and deaths of enterprises in the private sector. The all-industries rate of net job creation (i.e. new jobs less job losses) is about 4% per year of total employment during periods of economic growth, but in downturns net job creation can reverse into negative numbers. These trends are accentuated in construction with net job creation swinging between +10% and -10% of the workforce, see Figure 14.

If job losses only are examined there is a surprising high level in any one year, both in the economy at large and in construction, see Figure 15. Typically, about 30% of jobs in construction are lost per year, i.e. workers shift firms or have a period of unemployment. In downturns the loss rate is higher, up to 38% of the workforce in construction.

Labour turnover has an adverse effect on productivity. Construction workers may be shifting to other industries, in which case their skills are lost to the industry. Even when they change firms but stay in the industry, there is some loss of efficiency as they get up to speed in the new job. So another measure of productivity is to look for a reduction in job losses.

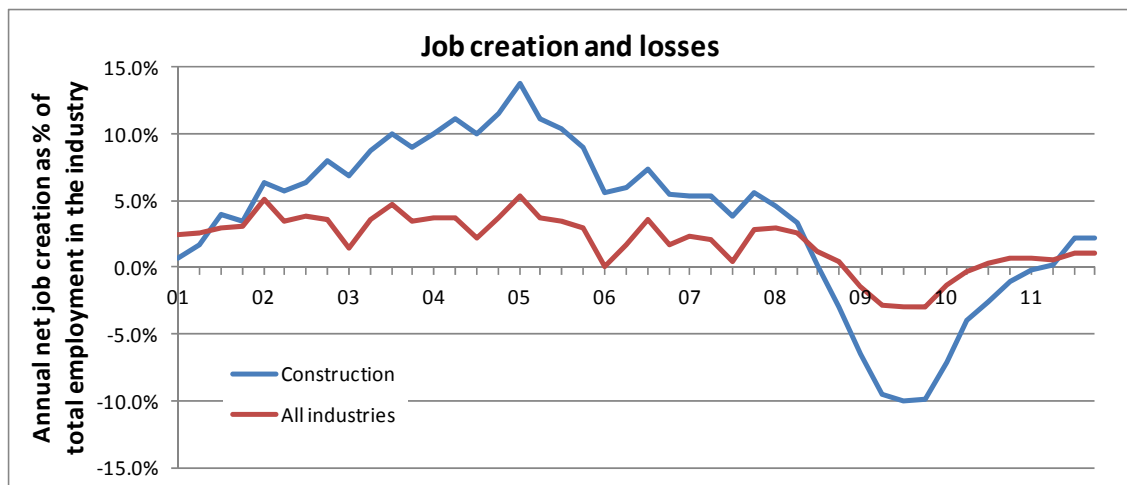


Figure 14 Annual net job creation numbers

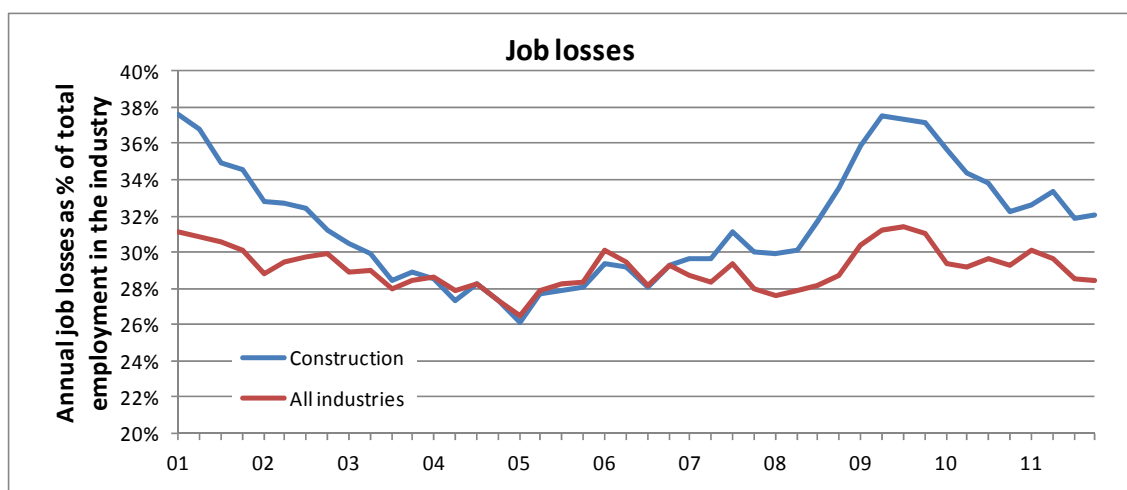


Figure 15 Annual job losses

4. DISCUSSION

The main measure for monitoring productivity performance is the official productivity data. Its advantage is having official status and it enables comparisons with other parts of the economy. The labour index and the MFP index are both of relevance in monitoring progress. The labour productivity proxy developed using tax data, by sub-industry is also useful as it is available slightly before the all-industry data indices and provides more detailed data.

A range of other data, both official and unofficial, is available to monitor progress. All measures are useful for monitoring performance and different observers will have different interests. This could be displayed as a radar diagram, similar to that in Figure 11, in which the arms are for example, official productivity, client knowledge, quality/satisfaction levels, benchmarking, adequate skills, innovation/building information modelling (BIM), standardisation/prefabrication, improved procurement, improved regulations. We would expect to see the radar plot move outward over time as productivity improves.

As an alternative to a radar chart it is possible to combine all measures into a single performance number. This would give an overall view of progress. The question is then how much weight should be placed on the various measures to arrive at a single number?

One approach is a weighted evaluation process (Saaty 1982). In this procedure a panel of experts decide what measures need to be included, the starting point for monitoring and what weight applies to each measure. A single composite index is derived as a measure of progress.

Most of the suggested measures do not have adequate metrics at present. Those that are available include:

- Official productivity measure.
- New house owners' average satisfaction score from the BRANZ survey.
- Prefabrication rates from the BRANZ survey.
- Industry innovation uptake from the business operations' survey.
- KPIs from Constructing Excellence and the BRANZ surveys.
- In addition, work is being done on BIM for the consenting processes, the Centre for Procurement Excellence is being established, Building and Construction Industry Training Organisation (BCITO) and others are researching skill needs, and regulation is continually being assessed. It should be possible to develop metrics for measuring progress in each of these areas.

The earlier report in this series, Part one, recommended that a range of measures be developed for the productivity drivers identified in the Research Action Plan (Construction Productivity Partnership 2012). There has been progress in developing metrics for some of the identified drivers, namely those bulleted above, but more remains to be done.

5. CONCLUSIONS AND RECOMMENDATIONS

It is recommended that measures reported in this research be continued in future years. The official productivity measures are the main indicators of progress but need to be supplemented by more timely measures and by other data. This includes the tax-based analysis of the sub-industry groups for profits and labour productivity, satisfaction surveys of owners, surveys of firm practices, uptake of prefabrication and the business opinion survey data.

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7. APPENDIX

This Appendix contains details of:

- A regression analysis explaining MFP changes in terms of workloads by type.
- Sub-industry distributions of productivity and profits.
- Two survey forms on new house owners and building firms' characteristics.

7.1 MFP index and workloads by type

Industry productivity is related to workloads but the relationship is not clear-cut. Figure 3 shows workloads (building work and civil engineering) and the MFP index plotted together. Rising workloads appear to increase productivity but after one to two years of rising workloads, productivity stalls or declines. During ongoing periods of growth the industry needs to gear up every so often as a new level of workload becomes the "norm" and during this adjustment process productivity appears to decline.

A regression analysis was undertaken in an attempt to explain changes in the MFP resulting from changes in the different types of work done by the industry. The MFP in a year is modelled by the separate value of work in residential (RB), non-residential buildings (NR) and other construction (OC). Lagged variables were included because we wish to capture the demand build-up effect whereby more than one year of growth in demand may cause inefficiencies in the industry due to lack of managerial and skill resources.

The results of the analysis are in Table 4. The coefficients in the first column indicate the relative effect the variables have on productivity. The largest positive coefficients are non-residential buildings and civil engineering, perhaps suggesting some under-utilised resources. Lagged residential has a large negative coefficient showing that with more than one year of housing growth it is difficult for the industry to remain efficient. The lagged non-residential coefficient is small and not statistically significant. The negative coefficient of the lagged other construction variable indicates that this work, like housing, has only a small capacity for expansion without loss of efficiency.

The equation has an R squared of 0.68 which means the workloads explain about 68% of the variation in the MFP index over time. So a significant part, but not all, of the changes of MFP are due to changing workloads.

Table 3 Explaining the MFP index trends by type of industry workload

MFP = c1 + c2*RB + c3*NR + c4*OC + c5NR₋₁ + c6RB₋₁ + c7OC₋₁									
SUMMARY OUTPUT									
<i>Regression Statistics</i>									
Multiple R	0.827489								
R Square	0.684738								
Adjusted R Squ	0.611985								
Standard Error	39.56761								
Observations	33								
ANOVA									
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>				
Regression	6	88410.76	14735.13	9.411835	1.6E-05				
Residual	26	40705.48	1565.596						
Total	32	129116.2							
	<i>Coefficients</i>	<i>Std Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>	
Coeff C1=	1024	33.1	30.929	0.000	955.531	1091.581	955.531	1091.581	
RB ₀	0.030	0.015	2.000	0.056	-0.001	0.062	-0.001	0.062	
NR ₀	0.067	0.023	2.901	0.007	0.020	0.115	0.020	0.115	
OC ₀	0.051	0.026	1.964	0.060	-0.002	0.105	-0.002	0.105	
RB ₋₁	-0.084	0.016	-5.264	0.000	-0.116	-0.051	-0.116	-0.051	
NR ₋₁	0.016	0.023	0.676	0.505	-0.032	0.063	-0.032	0.063	
OC ₋₁	-0.043	0.025	-1.726	0.096	-0.095	0.008	-0.095	0.008	

Figure 16 illustrates the regression equation plotted against the actual value of the MFP and visually shows a quite good fit. It suggests that the model could be used for forecasting MFP. This is possible because the capital formation data in the model is available at six months' delay and the chart shows a forecast of an increase in the MFP index for the March 2012 and 2013 years.

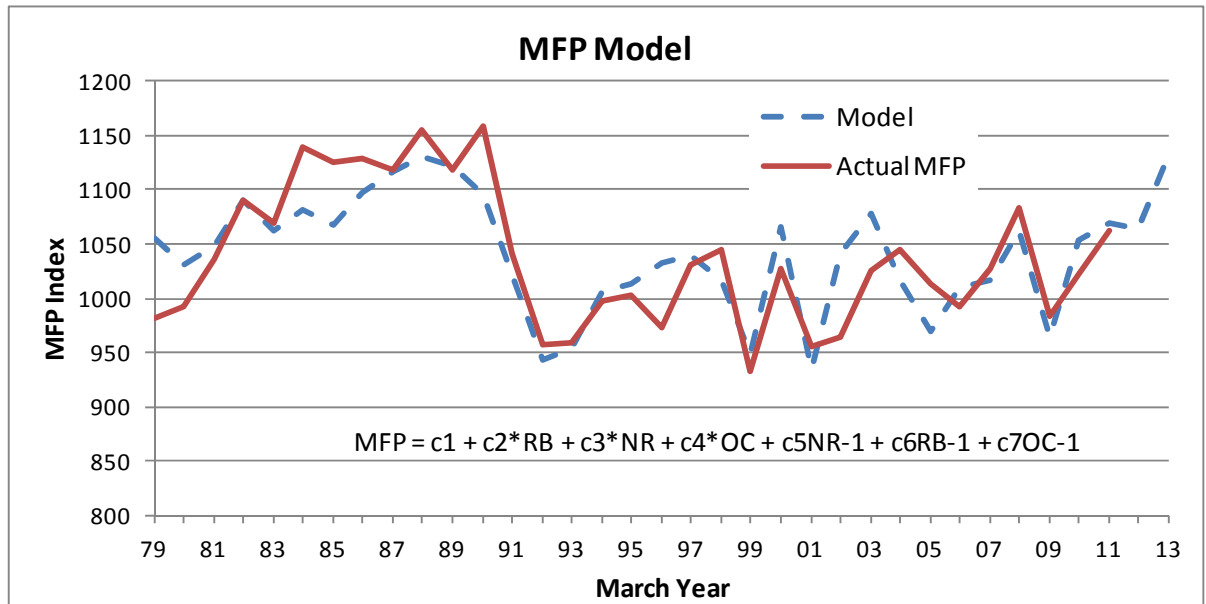


Figure 16 MFP as a function of residential, non-residential and civil workloads

7.2 Sub-industry productivity and profit percentage distributions by firm size

An earlier section showed average profit percentages and labour productivity by sub-industry group. This Appendix has the distributions for selected sub-industries.

The first two charts (Figure 17 and Figure 18) have profit percentages by firm size. Three years of data (2009 to 2011) was used to get sufficient sample sizes in each group. Most one-person firms lie in the 20% to 80% profit range and the wide distribution of results is notable. Large firms tend to have lower profit percentages.

As per the profit charts, the labour productivity charts (Figure 19 and Figure 20) have wide distributions. The non-residential building and civil engineering charts in particular have a wide distribution.

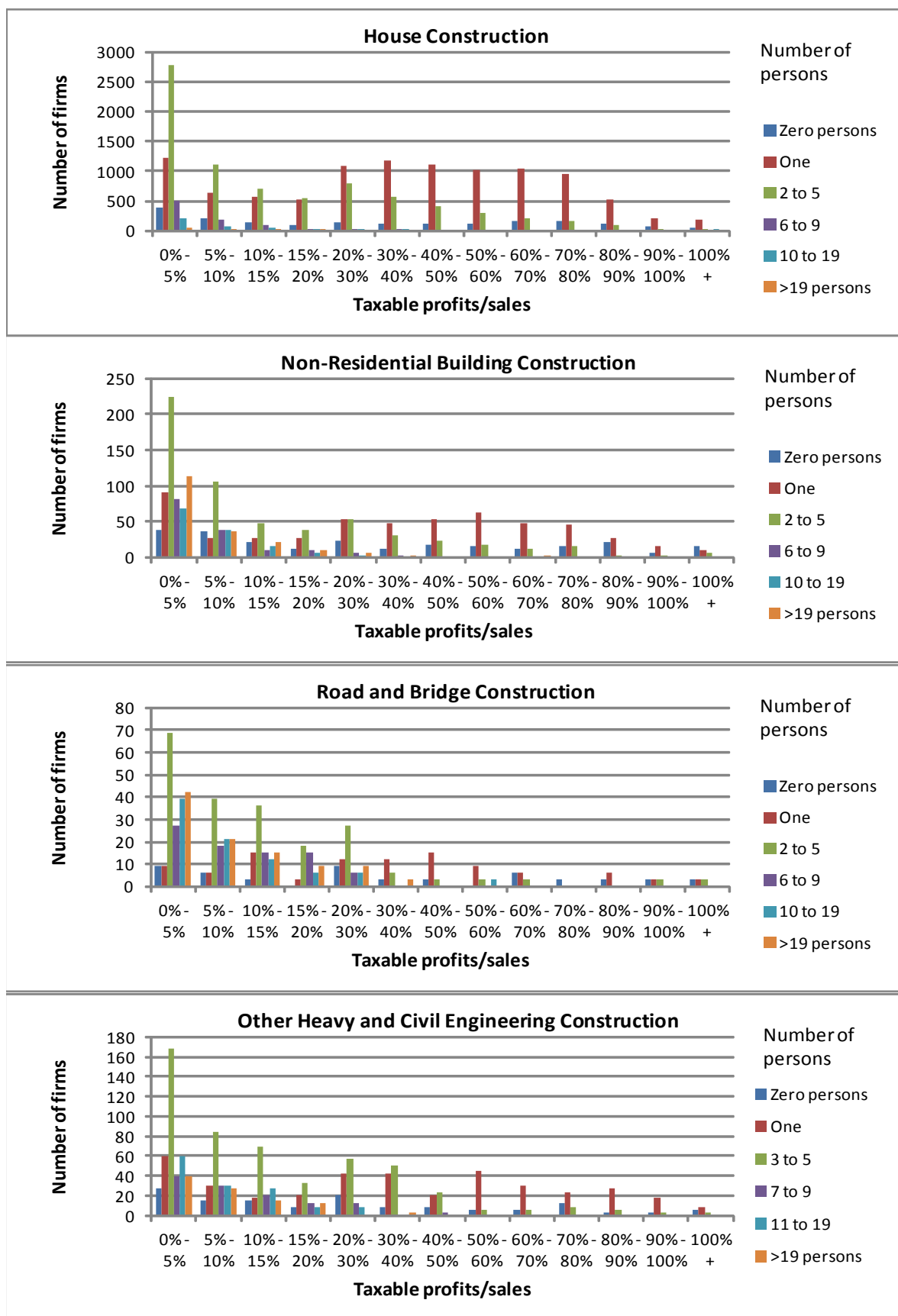


Figure 17 Profit distributions by firm size

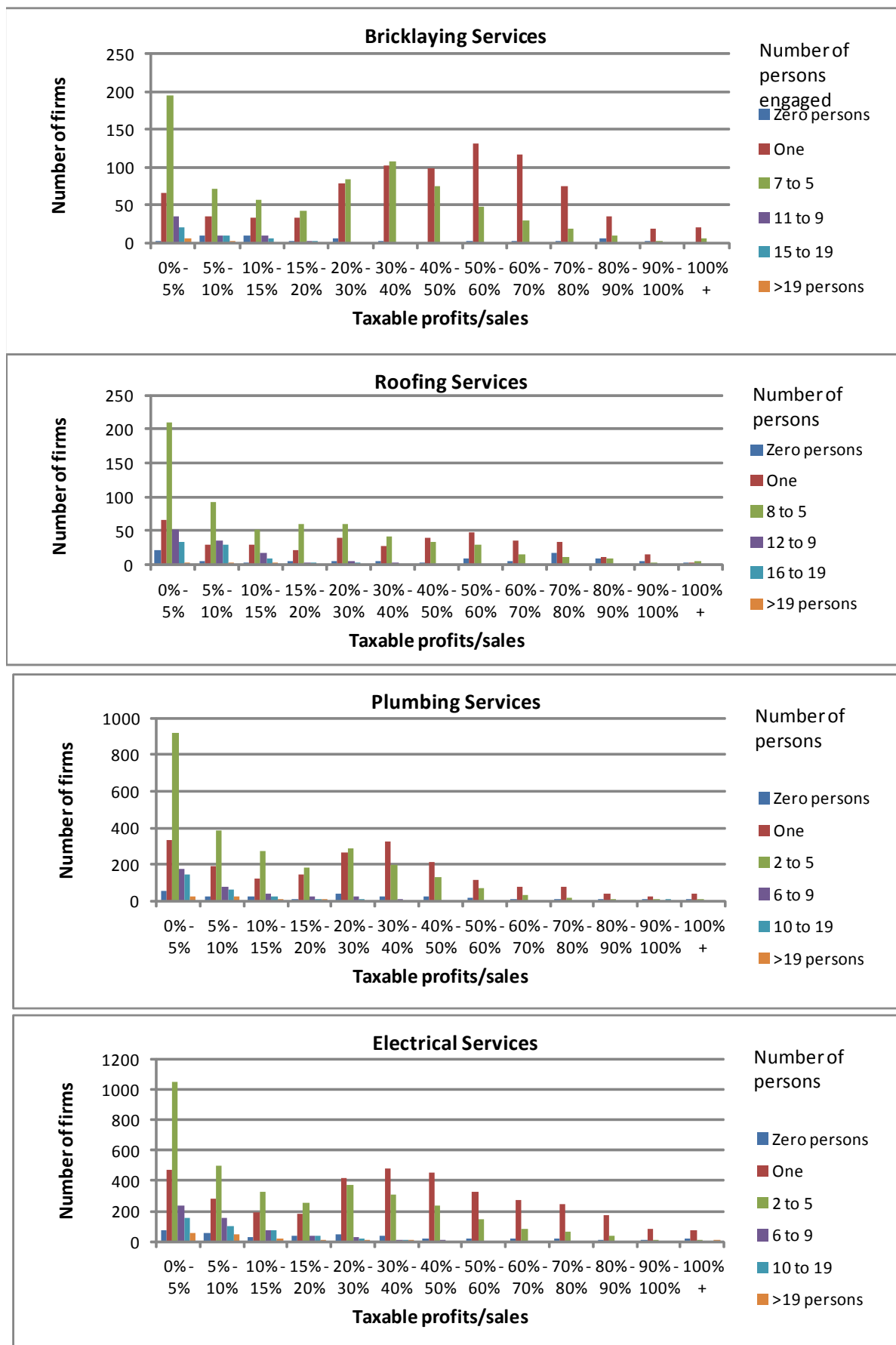


Figure 18 Profit distributions by firm size (continued)

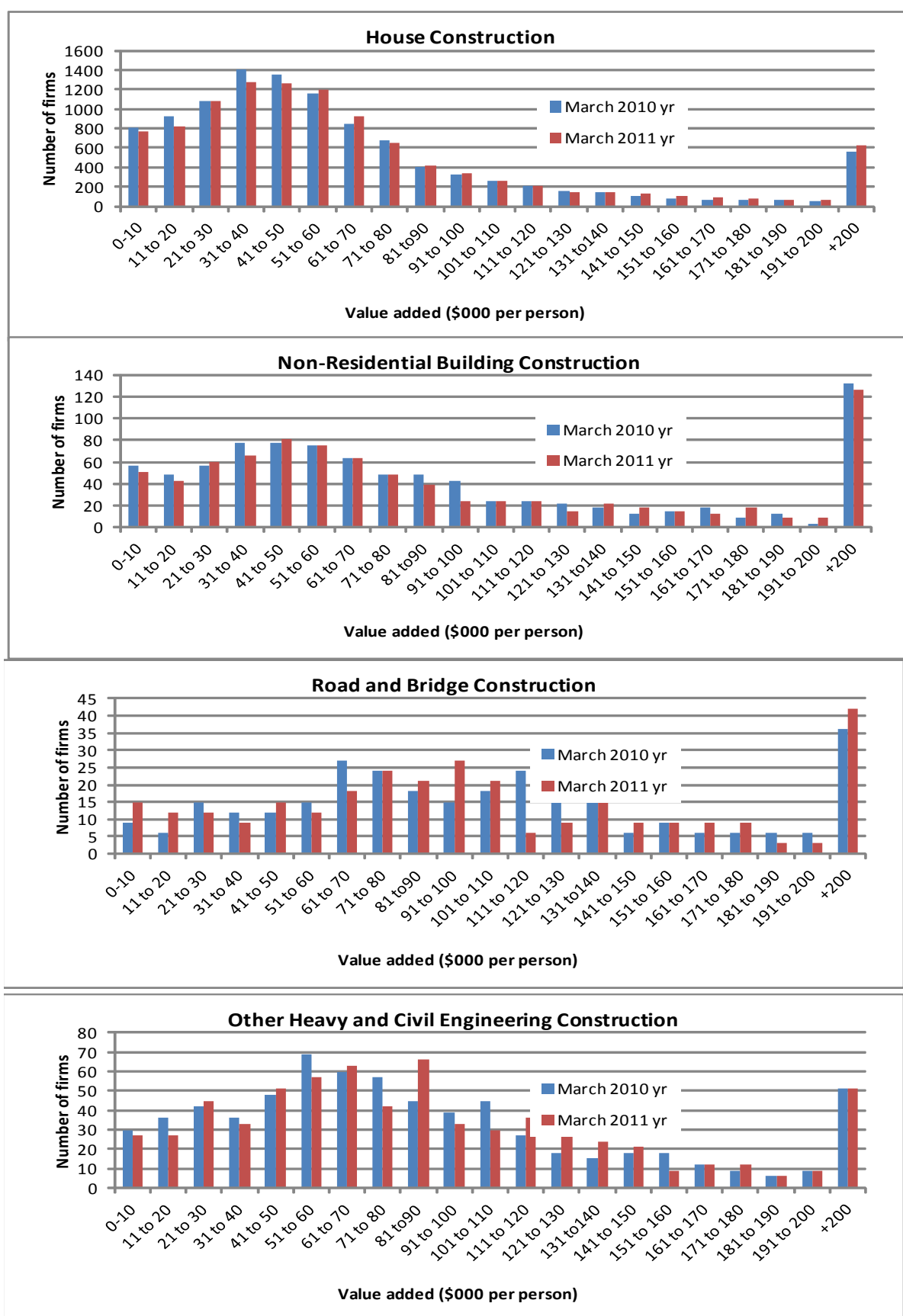


Figure 19 Labour productivity distributions for selected sub-industries

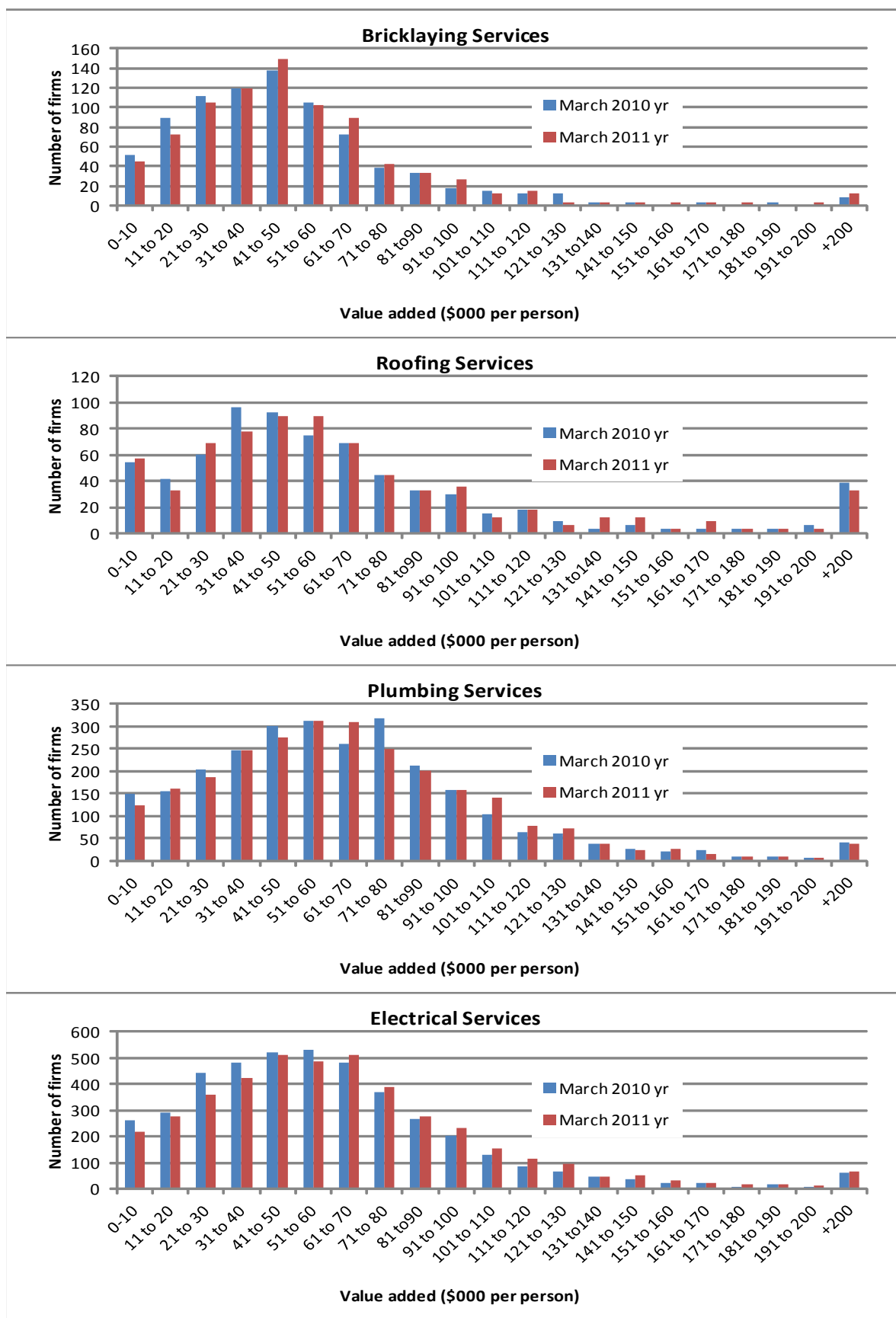


Figure 20 Labour productivity distributions for selected sub-industries (continued)

7.3 New house owners' survey

Over 1280 responses were received from new home owners from 31 territorial authorities in 2012. Some results from the survey were reported earlier and the full results are contained in Study Report No. 287 (Curtis 2013).

Table 4 New house owners' satisfaction survey

NEW HOUSE OWNERS' SATISFACTION SURVEY					
All responses are added together and no individual is identified in reports produced by BRANZ.					
1. Was your builder part of a franchise? Yes / No If YES, which franchise? _____					
2. Have you built a house before? Yes / No If YES, how many? _____					
3. Satisfaction: How satisfied are you with the:					
Service provided by your builder during the buying process?	Very Satisfied	Fairly satisfied	Neither	Fairly dissatisfied	Very dissatisfied
Condition of your home on the day you moved in?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Service provided by your builder after you moved in?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Value for money of your new home?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Final cost compared to expected cost at signing contract?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Overall quality of your home?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Rating: How would you rate:					
No defects or no designer	Very good	Fairly good	Neither	Fairly poor	Very poor
The fixing of defects after first occupancy?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The service provided by your designer?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Your builder in relation to completing your home in time?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The standard of finish of your new home?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Did you have input into the house design before it was built? Yes / No (circle one)					
If Yes, what type of input from the options below (tick one)					
Select design from the builder's standard plans with NO CHANGES <input type="checkbox"/>					
Select design from the builder's standard plans with SOME CHANGES BY OWNER <input type="checkbox"/>					
One-off design by an architect/architectural designer with MAJOR/TOTAL OWNER INPUT <input type="checkbox"/>					
One-off design by an architect/architectural designer with MINOR OWNER INPUT <input type="checkbox"/>					
Why did you want to build? value, investment, specific requirements, less maintenance, sustainability features, existing houses unsuitable (circle all that apply)					
Other (state) _____					
5. How did you choose the builder? (please tick all that apply)					
Not applicable	Recommended by friends/family	Recommended by designer	From adverts on TV/paper	Used previously	Got several quotes, chose best (how many quotes?)
House already built <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
					Show home <input type="checkbox"/>
					Incentive Scheme <input type="checkbox"/>
					Green Credentials <input type="checkbox"/>
					Other (state) _____
6. What features were important in choosing a builder? (please tick all that apply)					
Not applicable	Lowest Price	Quality/Reputation	Timely Completion	Fixed Price Certainty	Looked at builders previous houses
House already built <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
					Other (state) _____
7. Were there any disputes with the builder over final costs? Yes / No (circle one)					
If yes, what was the dispute about? _____					
8. Type of contract:					
Fixed price including all trades. No changes after signing contract	Fixed price including all trades but asked for changes after signing contract	Estimated total price. Builder invoices on hourly rate. Material and sub-contractors organised by builder and costs passed on	Estimated total price. Builder invoices on hourly rate and you paid for materials and sub-contractors directly		
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
9. Is there anything that you wish your builder knew to improve the build process?					

10. Did you call back the builder to repair defects after first occupancy? Yes / No (Circle one)					
If Yes what defects needed fixing? _____					

Was the number of defects: Expected no defects <input type="checkbox"/> More than expected <input type="checkbox"/> As expected <input type="checkbox"/> Less than expected <input type="checkbox"/>					
11. Which of these comes closest to describing how you would speak about your housebuilder?					
Recommend without being asked	Recommend if asked	Neutral	Critical if asked	Critical without being asked	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
12. Do you have any general comments on the overall performance of your builder?					

Thank you. Please fold this form and freepost it in the return envelope

Nov-12

7.4 Firms' characteristics' survey

A total of 460 responses were received from builders for the building firms' work types and processes survey in 2012. The survey form is in Table 5. A full report on the results is contained in Study Report No. 284 (Page, Curtis, 2013).

Table 5 Construction firms' survey

FIRM WORK TYPES AND PROCESSES SURVEY																																																												
1. How many people does your firm employ? (please put X in one box) <table border="0" style="width:100%;"> <tr> <td style="width:14.28%;">One person</td> <td style="width:14.28%;">Two persons</td> <td style="width:14.28%;">3 to 5 persons</td> <td style="width:14.28%;">6 to 10 persons</td> <td style="width:14.28%;">11 to 20 persons</td> <td style="width:14.28%;">21 to 50 persons</td> <td style="width:14.28%;">more than 50 persons</td> </tr> <tr> <td><input type="text"/></td> <td><input type="text"/></td> <td><input type="text"/></td> <td><input type="text"/></td> <td><input type="text"/></td> <td><input type="text"/></td> <td><input type="text"/></td> </tr> </table>							One person	Two persons	3 to 5 persons	6 to 10 persons	11 to 20 persons	21 to 50 persons	more than 50 persons	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>																																								
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<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>																																																						
2. What type of work does your firm do? (Enter the percentage for each work type. The total for all boxes is 100%.) <table border="0" style="width:100%;"> <tr> <td style="width:14.28%;">New housing</td> <td style="width:14.28%;">Housing additions & alterations</td> <td style="width:14.28%;">Housing repairs & maintenance</td> <td style="width:14.28%;">Garages & new sheds</td> <td style="width:14.28%;">New non-residential bldgs</td> <td style="width:14.28%;">Non-res additions & alterations</td> <td style="width:14.28%;">Non-res repairs & maintenance</td> </tr> <tr> <td><input type="text"/></td> <td><input type="text"/></td> <td><input type="text"/></td> <td><input type="text"/></td> <td><input type="text"/></td> <td><input type="text"/></td> <td><input type="text"/></td> </tr> </table>							New housing	Housing additions & alterations	Housing repairs & maintenance	Garages & new sheds	New non-residential bldgs	Non-res additions & alterations	Non-res repairs & maintenance	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>																																								
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3. Which methods do you use to procure clients and what percentage are procured by each method during a typical year? (please put X in one box in each row) <table border="0" style="width:100%;"> <tr> <td style="width:40%;"></td> <td style="width:10%;">Never</td> <td style="width:10%;">1-10%</td> <td style="width:10%;">11-25%</td> <td style="width:10%;">26-50%</td> <td style="width:10%;">51-100%</td> </tr> <tr> <td>Designer recommends me</td> <td><input type="text"/></td> <td><input type="text"/></td> <td><input type="text"/></td> <td><input type="text"/></td> <td><input type="text"/></td> </tr> <tr> <td>Repeat client</td> <td><input type="text"/></td> <td><input type="text"/></td> <td><input type="text"/></td> <td><input type="text"/></td> <td><input type="text"/></td> </tr> <tr> <td>Clients are friends/family</td> <td><input type="text"/></td> <td><input type="text"/></td> <td><input type="text"/></td> <td><input type="text"/></td> <td><input type="text"/></td> </tr> <tr> <td>My advertising</td> <td><input type="text"/></td> <td><input type="text"/></td> <td><input type="text"/></td> <td><input type="text"/></td> <td><input type="text"/></td> </tr> <tr> <td>Recommended by a previous client</td> <td><input type="text"/></td> <td><input type="text"/></td> <td><input type="text"/></td> <td><input type="text"/></td> <td><input type="text"/></td> </tr> <tr> <td>Respond to advertising (i.e. In newspapers, etc)</td> <td><input type="text"/></td> <td><input type="text"/></td> <td><input type="text"/></td> <td><input type="text"/></td> <td><input type="text"/></td> </tr> <tr> <td>On-going arrangement with main contractor</td> <td><input type="text"/></td> <td><input type="text"/></td> <td><input type="text"/></td> <td><input type="text"/></td> <td><input type="text"/></td> </tr> <tr> <td>Other (state)</td> <td><input type="text"/></td> <td><input type="text"/></td> <td><input type="text"/></td> <td><input type="text"/></td> <td><input type="text"/></td> </tr> </table>								Never	1-10%	11-25%	26-50%	51-100%	Designer recommends me	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	Repeat client	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	Clients are friends/family	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	My advertising	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	Recommended by a previous client	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	Respond to advertising (i.e. In newspapers, etc)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	On-going arrangement with main contractor	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	Other (state)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
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4. Types of contract and payment, and what percentage are used during a typical year. (please put X in one box in each row) <table border="0" style="width:100%;"> <tr> <td style="width:40%;"></td> <td style="width:10%;">Never</td> <td style="width:10%;">1-10%</td> <td style="width:10%;">11-25%</td> <td style="width:10%;">26-50%</td> <td style="width:10%;">51-100%</td> </tr> <tr> <td>Quoted price and progress payments.</td> <td><input type="text"/></td> <td><input type="text"/></td> <td><input type="text"/></td> <td><input type="text"/></td> <td><input type="text"/></td> </tr> <tr> <td>Quoted Price and one payment at the end.</td> <td><input type="text"/></td> <td><input type="text"/></td> <td><input type="text"/></td> <td><input type="text"/></td> <td><input type="text"/></td> </tr> <tr> <td>Spec Build.</td> <td><input type="text"/></td> <td><input type="text"/></td> <td><input type="text"/></td> <td><input type="text"/></td> <td><input type="text"/></td> </tr> <tr> <td>Hourly rate for project duration.</td> <td><input type="text"/></td> <td><input type="text"/></td> <td><input type="text"/></td> <td><input type="text"/></td> <td><input type="text"/></td> </tr> <tr> <td>Other (state)</td> <td><input type="text"/></td> <td><input type="text"/></td> <td><input type="text"/></td> <td><input type="text"/></td> <td><input type="text"/></td> </tr> </table>								Never	1-10%	11-25%	26-50%	51-100%	Quoted price and progress payments.	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	Quoted Price and one payment at the end.	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	Spec Build.	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	Hourly rate for project duration.	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	Other (state)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>																		
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5. Where do you get business advice and what percentage is obtained from each in a typical year? (please put X in one box in each row) <table border="0" style="width:100%;"> <tr> <td style="width:40%;"></td> <td style="width:10%;">Never</td> <td style="width:10%;">1-10%</td> <td style="width:10%;">11-25%</td> <td style="width:10%;">26-50%</td> <td style="width:10%;">51-100%</td> </tr> <tr> <td>Accountant</td> <td><input type="text"/></td> <td><input type="text"/></td> <td><input type="text"/></td> <td><input type="text"/></td> <td><input type="text"/></td> </tr> <tr> <td>Builder colleague</td> <td><input type="text"/></td> <td><input type="text"/></td> <td><input type="text"/></td> <td><input type="text"/></td> <td><input type="text"/></td> </tr> <tr> <td>Friends</td> <td><input type="text"/></td> <td><input type="text"/></td> <td><input type="text"/></td> <td><input type="text"/></td> <td><input type="text"/></td> </tr> <tr> <td>Lawyer</td> <td><input type="text"/></td> <td><input type="text"/></td> <td><input type="text"/></td> <td><input type="text"/></td> <td><input type="text"/></td> </tr> <tr> <td>Trade association</td> <td><input type="text"/></td> <td><input type="text"/></td> <td><input type="text"/></td> <td><input type="text"/></td> <td><input type="text"/></td> </tr> <tr> <td>Other (state)</td> <td><input type="text"/></td> <td><input type="text"/></td> <td><input type="text"/></td> <td><input type="text"/></td> <td><input type="text"/></td> </tr> </table>								Never	1-10%	11-25%	26-50%	51-100%	Accountant	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	Builder colleague	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	Friends	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	Lawyer	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	Trade association	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	Other (state)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>												
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6. Your opinion on opportunities to save time and cost in the building industry by better processes and management What percentage of the total cost on a typical project could be saved by improvements in: <table border="0" style="width:100%;"> <tr> <td style="width:45%;">Design details.</td> <td style="width:5%;">%</td> <td style="width:45%;">Clarifying owners/clients needs before start.</td> <td style="width:5%;">%</td> </tr> <tr> <td>Preparing the site before construction.</td> <td>%</td> <td>Designer/ builder knowledge of potential problems.</td> <td>%</td> </tr> <tr> <td>Material deliveries.</td> <td>%</td> <td>Arranging/ managing council inspections.</td> <td>%</td> </tr> <tr> <td>Foundations investigations.</td> <td>%</td> <td>Managing subbies (electricians, plumbers, etc).</td> <td>%</td> </tr> <tr> <td>Wall and roof framing.</td> <td>%</td> <td>Managing / instructing own labour.</td> <td>%</td> </tr> <tr> <td>Roof and wall claddings work.</td> <td>%</td> <td>Socialising, idle time.</td> <td>%</td> </tr> <tr> <td>Insulation and linings work.</td> <td>%</td> <td></td> <td>%</td> </tr> <tr> <td>Tools and equipment.</td> <td>%</td> <td></td> <td>%</td> </tr> <tr> <td>Reducing re-work due to client changes.</td> <td>%</td> <td>Other (state)</td> <td>%</td> </tr> <tr> <td>Reducing re-work due to design errors.</td> <td>%</td> <td></td> <td>%</td> </tr> <tr> <td>Reducing re-work due to builder errors.</td> <td>%</td> <td></td> <td>%</td> </tr> </table>							Design details.	%	Clarifying owners/clients needs before start.	%	Preparing the site before construction.	%	Designer/ builder knowledge of potential problems.	%	Material deliveries.	%	Arranging/ managing council inspections.	%	Foundations investigations.	%	Managing subbies (electricians, plumbers, etc).	%	Wall and roof framing.	%	Managing / instructing own labour.	%	Roof and wall claddings work.	%	Socialising, idle time.	%	Insulation and linings work.	%		%	Tools and equipment.	%		%	Reducing re-work due to client changes.	%	Other (state)	%	Reducing re-work due to design errors.	%		%	Reducing re-work due to builder errors.	%		%										
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