

The experience and future of businesses displaced by earthquake from central Christchurch, New Zealand.

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Abstract

A large number of businesses that used to be in the centre of Christchurch relocated after the earthquakes. Are they satisfied with their new locations and do they intend to return to the central city? We questioned 209 relocated businesses about their relocation history, present circumstances and future intentions. Many businesses were content with their new premises, despite having encountered a range of problems; those businesses that were questioned later in our survey period were more content. The average business in our sample rated the chances of moving back to the central city as around 50 %, but this varies with the type of business. Building height did not emerge as a major issue, but rents may be. The mix of types of business is likely to be different in the new city centre.

Keywords: Business decisions, Earthquake, Relocation

Disasters have a vast variety of effects on people. There are the obvious immediate physical effects: People die and are injured; property is destroyed; people may need rescue, food, shelter and water. A good deal of research has gone into such effects and into effective ways to prepare for them and mitigate them (e.g. Lindell, Prater, & Perry, 2007; Spittal, McClure, Siegert, & Walkey, 2008). There has also been considerable research into longer-term effects, such as the effects of relocation on individuals and families who flee or are removed from the devastated area (e.g. Najarian, Goenjian,

Pelcovitz, Mandel, & Najarian, 2001; Blaze & Shwalb, 2009), the development of psychological disorders such as post-traumatic stress disorder in the survivors (e.g. Neria, Nandi, & Galea, 2008), and the difficulties of managing the reconstruction or repair of housing (e.g. Chang, Wilkinson, Brunsdon, Seville, and Potangaroa, 2011). One such longer-term effect is on the business community, and one aspect of this effect was the subject of the present study. Businesses have been forced to relocate following an earthquake. Some have survived this relocation and the attendant disruptions. What plans for the future do they now have?

Zhang, Lindell and Prater (2009, p. 38) comment that “in the disaster literature, research on business impacts has been less developed compared to the extensive literature on community impacts of environmental disasters”. Yet, clearly, these impacts are also of critical importance, both for the business world and for the rest of the community. Much reconstruction is undertaken by businesses; community recovery depends in part on the ability of businesses to employ people; the decisions that businesses make about where to locate or relocate themselves are important in determining where communities will be relocated. If all business were to forsake a devastated area, the community would be forced to leave it too.

Petak and Elahi (2001) estimate losses suffered by business in the Northridge Earthquake as about US \$6.4 billion (excluding damage to buildings). About 15-30% of businesses closed immediately, and small business closures continued for at least 2 years afterwards. Studies of Indian (Amirthalingam & Laksham, 2009) and Sri Lankan (Ray-Bennett, 2009) disasters point up the importance of short-term finance, via gold jewelry or microcredit, for households adapting to disasters. Wasileski, Rodrihuez, and Diaz (2010) surveyed businesses that had survived either the Loma Prieta earthquake (1989) or Hurricane Andrew (1992). Many reported infrastructure damage and business disruption and temporary closure of the business. Few of the Loma Prieta businesses (6.2 %) relocated after the earthquake, but 29% of those affected by Hurricane Andrew relocated. However, more than half of these had returned to their original location at the time of the

survey six years later. In neither case did the disaster lead to a shut-down of a large central business district, so it is not easy to compare these situations with that of businesses following the Christchurch earthquake.

The relocation of businesses is a normal phenomenon in the absence of any disaster, and business decisions to relocate have received some previous attention, although most of this has been directed at rather larger firms than were affected by the Christchurch earthquakes (Greenhalgh, 2008; Mazzarol & Choo, 2003). In general larger and older firms are less willing to relocate (Nguyen, Sano, Tran & Doan, 2013). Greenhalgh (2008) suggests that small businesses are less likely to make fully considered relocation decisions larger ones, and that small business owners often look to locate their businesses near their own homes. Sletjes and Völker (2012) point out that usually businesses are reluctant to move at all, and that factors in a decision to move include not only business costs and the size and suitability of new premises but also the desirability of the neighbourhood. Some of these previous findings might apply to the present study, but it is important to note that the questions asked are different. In particular, all of the businesses we studied had already been forced to relocate and the question they now face is whether to stay in their new locations or to move back.

This paper focuses on businesses forced to relocate after earthquakes in Christchurch, New Zealand in 2010 and 2011. The sequence of earthquakes was initiated on September 4, 2010 by a magnitude 7.1 event. A further earthquake on 22 February, 2011 was smaller in magnitude (6.3) than the September one, but its shallow epicentre was within the Christchurch city limits. In consequence, 185 people died; many were injured; the central city was devastated; and there was enormous property damage in the suburbs. In addition to these major events there were a number of aftershocks: As at 11 November, 2013, there had been 12774 recorded quakes in the area (<http://www.christchurchquakemap.co.nz/>). Although many of these were unnoticeable, others were substantial enough to produce further property damage.

After the February 22 earthquake, most of the centre of Christchurch, the area that lies within the "Four Avenues", was closed down. Some buildings were obviously ruined, many were later discovered to be ruined, and almost all seemed dangerous. Before the September 4 earthquake, over 6,000 businesses

employed over 50,000 people in the central city (The Field Connection, 2012). The vast majority of these businesses were forced out of the central city. There are no good statistics concerning the immediate fate of these businesses, but certainly some have not reopened since their enforced closure. It is likely, in line with findings from Alesch, Holly, Mittler and Nagy (2001), that small businesses were particularly likely to close permanently. On the other hand, others relocated quite quickly outside the central city.

The period since the February earthquake saw a slow transfer of focus from day-to-day survival to the more medium-term future. Plans to rebuild the central city have been developed (e.g. Christchurch City Council, 2012). Firms that relocated might look either to move back to the city or consolidate their businesses in new locations. Our aim in the present survey was to shed some light on how the relocated firms are faring (see, also, The Field Connection, 2012) and what they might do next. In particular, are they likely to return to the central city?

It is not difficult to think of reasons why business owners and managers might either favour returning to a location in the central city or prefer to remain at a location outside of it. The central city might offer a more identifiable location for customers, easier access to complementary businesses (for example, lawyers would often be closer to the central courts), and a more varied range of facilities for the workers. During the piloting of the survey, one business manager commented that everyone in his organisation disliked their new suburban location because there was no one to talk to except for each other. On the other hand, central city rents are likely to be more expensive, and parking for workers and customers more difficult.

Workers and owners alike might be reluctant to return to medium or high rise buildings within the city because of the perceived continuing danger. Moreover, once a business has been forced to move to the suburbs and necessary adjustments to the new premises have taken place, the owner might be reluctant to move back. Finally, as already remarked, business locations are never static in any city. For example, shopping malls, dentists, restaurants and bars were already proliferating in the suburbs of Christchurch before any of the earthquakes (Christchurch City Council, 2011). The earthquakes drove many businesses out of the central city, but some may have gone anyway.

Method

Respondents and recruitment

The respondents were 209 people responsible for businesses that had moved from the centre of Christchurch City and set up business again in other areas of Christchurch. Seventy-six respondents said that they owned the business, 39 were managers, 76 were directors (76); and the remaining 18 had some other relationship to the concern. We found no single, reliable register of such businesses, and recruitment was lengthy and drawn-out.

Some respondents completed questionnaires online in response to our request or that of another organisation (for example, the Canterbury Employers' Chamber of Commerce). Some respondents completed paper questionnaires available through the Westpac Hub; some completed paper or online questionnaires in response to door-knocking in areas such as Riccarton, Addington, or Harewood.

Fifty questionnaires were completed in December, 2011; 26 in January, 2012; 12 in February; 27 in March; 8 in April; 35 in May; 37 in June; and 14 in July. The lengthy recruitment period creates difficulties of interpretation but does provide an opportunity to examine change over time, and in some subsequent analyses results for the 115 early (December 2011 until the end of March 2012) and 94 late (beginning of April 2012 until July 15) questionnaires are compared. The businesses were companies (146), partnerships (21), not-for-profit organisations (14) and other, mostly sole traders (28). One hundred and four businesses had 5 or fewer employees, 37 had between 6 and 9 employees, 37 between 10 and 24, 15 between 25 and 49, 7 between 50 and 99, and 9 had 100 or more. Note that these numbers refer to the particular workplace (e.g. a branch of a bank) rather than the organisation as a whole.

Figure 1 shows the principal activities of the different businesses in the sample. The coding scheme was devised after we had read through the descriptions given by our informants and two independent coders achieved 82% initial agreement and resolved discrepancies after discussion. It turned out that whether a business responded early or late varied with the principal activity. For example, all the legal businesses were in the early sample.¹

1 The analyses that follow do not make use of the principal activity of the business in consequence of this relationship.

Of the 181 businesses who gave us information about the suburb they had relocated to, 15 had already moved back to the CBD. Of the rest, 116 had relocated to suburbs that were relatively near to the central city (Defined as Riccarton (incl. Church Corner, Addington, Blenheim Rd, Merivale, St. Albans, Bryndwyr, Strowan, Sydenhamd, Spreydon, and Beckenham), while 50 had moved further out. Ninety-two had relocated to the west of the city, and 644 had gone south or north, and 10 had gone east. Thus, our businesses tended to have moved west of the city, but not very far west. As the effects of the earthquakes were generally milder in the west of the city, this pattern is unsurprising.

The majority of the businesses (129) had made only one move at the time of surveying, but 57 had made two moves, 13 had made three, 7 had made four, and 3 an unknown number. Twenty-six businesses owned their land and building within the city, and 33 owned the land and buildings of their current premises.

Questionnaire

The same standardised questionnaire was used for all surveys. The online version of the questionnaire was written in Qualtrics, hosted on a University of Canterbury web-site, and used the same ordering and wording as the paper one. The questionnaire was divided into sections with different themes.

The first part of the questionnaire asked for details about the business, such as the type of business, number of employees, etc. The second set of questions concerned the relocation history, and the "most important component for the survival of your business to this point". The third section asked about changes to the business. Respondents were asked whether electronic transactions, the proportion of business conducted online, home delivery, staff working from home, breadth of customer base, storage space, overall profitability

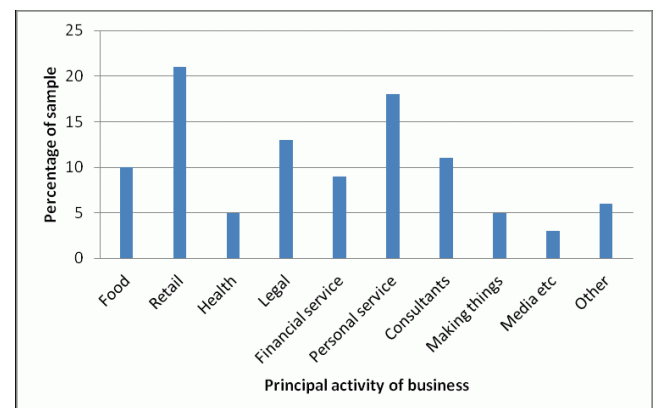


Figure 1. Principal activities of the businesses sampled.

and size of staff had decreased, stayed the same or increased. They were also asked whether customers finding the new premises, transport to the new premises and parking, were easier, the same, or more difficult at the new premises. Questions were included about alterations to the new premises, and, finally, overall satisfaction with the new premises rated on a scale from 1 (very unhappy) to 5 (very happy).

The next set of questions, called “general issues facing your organisation”, asked respondents to rate the importance using a five-point scale (1 = no importance to 5 = utterly necessary) of being near organisations similar to your own, being near organisations complementary to your own (e.g. courts for law firms), having customers come to your workplace, and being near facilities for staff welfare.

The final section concerned issues “you might consider when the central city is open again”. We asked whether, if the business moved back to the central city, some of it might remain in the present premises, and the amount of rent or lease that the business might pay in the central city compared with previous and present rentals. We asked about the maximum height of building that businesses would move back to and the maximum height they would like their own offices to be. We also asked whether moving elsewhere but not within the Four Avenues was under consideration. Finally, respondents were asked whether they would move back to the city.

Results

Respondents were asked to give the principal reason for their business’s survival to date. The question was open-ended and subsequently categorised by two coders who reached 82 % initial agreement and then resolved the discrepancies after discussion. Results are shown in Figure 2. Maintaining customer support

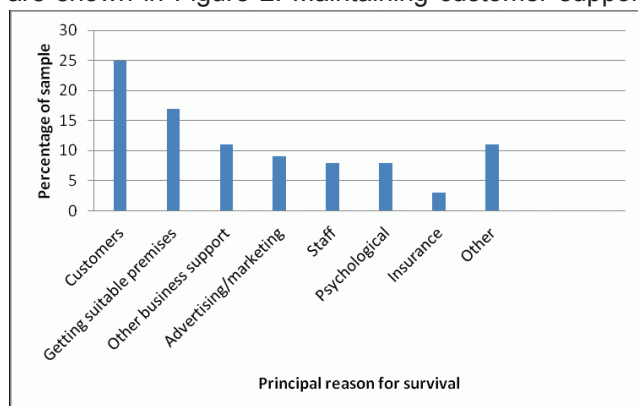


Figure 2. Different principal reasons given by respondents for the survival of their business.

was the most important factor respondents identified for the survival of their business to date. The results, incidentally, are generally in line with those previously reported after both the Christchurch earthquake (The Field Connection, 2012) and the Northridge, California earthquake (Petak & Elahi, 2001).

The relocated businesses have often changed the way they do things and Table 1 summarises these changes. All the variables show a mixed pattern. So, for example, some businesses reported increased profitability, some decreased profitability. Overall, however, the general pattern is that businesses have found it tougher. In particular, the tendency is to report smaller customer bases (and more difficulty for customers in locating the business), reduced storage space, reduced profitability and staff shrinkage.

Table 1
Percentages of Sample Reporting Changes in Different Aspects of the Business since the Move

	Decrease	No change	Increase
Electronic transactions	18	49	33
Proportion of business online	8	63	29
Home delivery	5	75	18
Staff working from home	3	52	44
Breadth of customer base	37	35	27
Storage space	59	18	22
Overall profitability since pre-earthquake	53	23	23
Workforce size since pre-earthquake	44	40	15

	Easier	No change	More difficult
Customers finding you at new premises	28	26	46
Transport to new premises	37	22	39
Parking at new premises	66	12	21

Businesses have not only experienced change in their new surroundings, they have often initiated it, in particular by altering their new surroundings. While just over a third of the businesses (38 %) had made little or no change to the new premises at the time of the survey, 21 % had made or at least begun changes that require a building permit, 4 % had subleased part of the premises to some other organisation, and 35 % had initiated major changes that did not require a building permit.

Table 2 shows the overall satisfaction levels with the new premises. As the table suggests, there is a significant difference between early and later respondents (Mann-

Whitney U, $z = 3.71$, $p < .001$): Respondents later in the survey period were more satisfied than earlier ones. Statistical tests (Mann-Whitney U, $\alpha = .05$) were also performed to see if there were differences in satisfaction level between small (1 - 5 workers) and larger (6 or more workers) businesses, between businesses relocating in the west or elsewhere, and between businesses relocating near to the city or further out, but no differences were found. Pearson correlations were calculated between satisfaction levels (1 = very unhappy to 5 = very happy) and all the change variables shown in Table 1 (1 = decrease or easier to 3 = increase or more difficult). Respondents were significantly ($p < .05$) more satisfied if they had increased storage space ($r = .33$), reported less difficulty in being found by customers ($r = -.31$), less difficulty with transport to the new premises ($r = -.28$), had increased profitability ($r = .19$), found parking easier ($r = -.17$), and where there was a lower tendency for staff to work from home ($r = -.15$).

Table 2
Percentages of Early and Late Respondents Choosing Different Categories of Overall Satisfaction with new Premises

	Early %	Late %
Very unhappy	15	6
A little unhappy	22	15
Neutral	25	10
A little happy	14	27
Very happy	25	43

Taken over all the businesses, customer access ($M = 3.6$, $SD = 1.3$) was rated the most important of four location issues, followed by the ability of staff to access facilities ($M = 2.8$, $SD = 1.1$), being near complementary businesses ($M = 2.6$, $SD = 1.2$) and being near similar businesses ($M = 2.3$, $SD = 1.3$).

An important practical concern in Christchurch is whether relocated businesses are likely to want to move back to the central city. However, a currently relocated business might want to move from its present location but not back to the central city. At the time of the survey, 27 % of the businesses indicated they had already given "a little consideration" to another location outside the central city and 17 % were "taking this possibility very seriously". Moreover, if suitable premises were available in the central city, 19 % of the sample would still wish to retain part of the business at the present location.

Two issues that have emerged as possible concerns for businesses that might relocate back to the city centre are the prices of the rents or leases in a central city building and the height of the central city building. Table 3 shows

the results relevant to the pricing issue. The general result is that the average business is currently paying less for its present location than it paid in the previous inner city location. Respondents generally say they would be prepared to pay more than at present to move back, but not more than they previously paid in the central city.

Table 3
Percentages of Businesses either Paying or Prepared to Pay less, the same, or more Money to Rent or Lease in Comparisons of the Present Premises and Past and Future Central City Premises

	Present and past city	Future city and present	Future and past city
Less	42 %	12 %	18 %
About the same	22 %	39 %	50 %
More	21 %	30 %	20 %
Not applicable	14 %	16 %	11 %

Note. Recall that businesses may own either the land and buildings (or both) on their present premises (16 %) or in the city (12 %)

Table 4 shows results related to the height of buildings that businesses are prepared to move back to. There were two pairs of questions. The first pair asked the maximum *height* of building that the business would be prepared to move back into and the height of the building it was housed in previously. The second pair of questions asked the highest *level* in a building that the business would now be willing to occupy, and the level in the building previous occupied (taking the highest when the business occupied more than one level). Note that the two pairs deal with related but not identical issues: A business may, for example, be located on level four of a twelve-storey building.

Table 4
Maximum Height of Building Overall and Maximum Level in a Building that Businesses would be Prepared to Move back to in the Central City. Level of Previous Building and Highest Level of Previous Occupancy are also Shown

Level	Max height of future building	Height of previous building	Max level of future occupancy	Previous level of occupancy
1	14 %	13 %	21 %	38 %
2	23 %	35 %	25 %	28 %
3-4	22 %	22 %	18 %	14 %
5-22	14 %	19 %	14 %	19 %
Not concerned	25 %		20 %	

The results shown in the table are at first sight surprising. On average, businesses are prepared to move back to buildings or levels in a building that are similar in height to those they occupied previously. Initially, these results imply that from the point of view of finding tenants the

height of future buildings is unimportant. However, the matter is not quite so simple. As the table also shows, most businesses that moved out of the central city did not previously occupy medium or high rise. If the future city were to have a similar height profile to the previous city, that is, a mixture of high, medium and low rise, then willing tenants could probably be found for all levels. But willing tenants may be harder to find if the buildings in the new city were mostly medium or high rise.

The final question asked about the overall chance of returning to a site within the Four Avenues. Twenty-six percent of the businesses rated their chance of return as "about zero", 14 % as "about 25 %", 20 % as "50/50", 13 % as "about 75 %" and 24 % as "nearly 100 %". In order to facilitate analysis of the chances of return an average chance was calculated by taking the different ratings as a percentage estimate ("about 0 %" = 0 %; "about 25 %" = 25 %; and so on). The average estimated chance of return was then 48 % (SD = 38 %).

A number of variables affected the estimated chance to return. Businesses with five or fewer workers have a lower average chance of return (42 %) than larger ones (55 %; $t(201) = 2.63$, $p < .01$). Businesses that have moved west estimated a higher average chance of return (55 %) than the rest (38 %; $t(159) = 2.77$, $p < .01$). Unsurprisingly, businesses that owned land within the central city were estimated more likely to return (72 %) than those that did not (45 %; $t(199) = 4.43$, $p < .001$). Early respondents estimated a higher average chance of return (55 %) than those responding later (41 %; $t(201) = 2.63$, $p < .01$). There was no significant relationship between the estimated chance of return and whether the business had relocated near or further away to the central city or whether the business owned the land of their current premises.

Correlations were calculated between the estimated chance of return and all the variables listed in Tables 1 to 4, and a number of significant ($p < .05$) results obtained. The respondents said they were more likely to return to the central city if they were happy to move back to higher building ($r = .38$), a higher level in a building ($r = .35$), they were less satisfied with their present premises ($r = -.31$), transport to the new premises was more difficult ($r = .30$), they saw it as important to be near complementary businesses ($r = .31$) or facilities for staff ($r = .29$), they reported more difficulty in customers finding them ($r = .28$), they saw it as important to be near similar businesses ($r = .25$), they were prepared to pay more rent than they pay in the new premises ($r = .19$),

they paid less rent in the present premises than they paid previous ($r = -.18$), they were prepared to pay more rent in the inner city than they paid there previously ($r = .17$), they were previously in a higher building in the central city ($r = .17$), more of the staff were working from home ($r = .17$), they had less storage space in the new premises ($r = -.14$), and they were in a higher level in the previous inner city building ($r = .14$).

An initial multiple regression (ordinary least squares) was calculated regressing the estimated chances of return to the central city as a function of all the significantly associated variables listed in the previous two paragraphs. This multiple regression found significant beta-weights for just three variables. A multiple regression on just these three independent variables produced a significant overall R^2 of .18 ($n = 197$) and significant effects of satisfaction level in the new premises ($\beta = -.28$), owning land in the central city ($\beta = .25$) and paying lower rent in the new, relocated premises ($\beta = -.21$).²

Discussion

Both common sense and the results of previous work (e.g. Ray-Bennett, 2010; Zhang et al., 2009) suggest that the Christchurch businesses surveyed here would report that they still face many difficulties a year or so after the February event. Table 1 shows that they have been adversely affected in a number of different ways. Most important perhaps, the majority of businesses reported reduced profitability and more have reduced than increased staff. To some, unknown extent, such results may reflect the wider picture of subdued national and world economies over the period 2011-2012. On the other hand, it is worth remembering that the present survey respondents were businesses that had survived this period.

On the optimistic side, many of the results indicate that businesses have often adjusted to their new circumstances and surrounding. Indeed, as shown by their rebuilding plans, many are adjusting their surroundings. Business owners reporting later in the survey period were generally more satisfied with their new premises, suggesting that the longer they spend in their new environments in the future, the more satisfied they will become with them and the less likely they

² Clearly, there are a number of different multiple regressions that could be done here, but, because a number of the variables have naturally missing values, analysis with large numbers of variables entails a reduced sample size. For example, the initial multiple regression described was based on only 109 respondents.

are to return to an inner city location. One would also expect that some of the specific problems reported at present – for example, difficulty for customers in finding the relocated business – would decrease with time. Presumably, too, the longer they stay in their new locations the greater the commitment to this location and the less the commitment to the original central location (Greenhalgh, 2008).

Much of the practical value of the present survey derives from extrapolating the results to make tentative predictions about how businesses might behave in the future. Such extrapolation is useful because decisions are actually being formulated now about the shape of the inner city, even though its construction is still some way off (e.g. Christchurch City Council, 2012). However, it is also true that the present results are limited in at least two important ways.

Firstly, the present sample cannot be regarded as representative of all the relocated businesses. It was probably impossible to obtain such a sample. Most surveys have difficulties with the non-participation of potential respondents, and the respondents required for the present one were busier than most. More seriously, there was no single register of eligible businesses or any real possibility of creating one. Indeed, basic questions like how many of the original inner city businesses remain or how many of their workers are still in Christchurch were not answerable. In effect the surveying suffered from the problems of disruption faced by the city as a whole.

Secondly, surveying intentions is notoriously unreliable (e.g. Neuman, 2000, ch. 10). We attempted to mitigate this problem by including questions that dealt with present or immediate past behaviour. Hence, for example, the analysis of predictors of satisfaction with the new premises and the inclusion of items regarding what is important for the operation of the business. However, some direct questioning of intentions seemed unavoidable in a survey whose main practical value is the insight it might offer into future behaviour.

Bearing these limitations in mind, we draw some very tentative conclusions. Overall, it seems that some businesses will move back to the central city, particularly, for example, if they own land there or need to be near complementary businesses that are located there. Others will not. Overall the chances of return were about 48 %. A somewhat differently conducted survey by CBRE and Lincoln University (2012) found 32 % of

businesses wishing to return. Thus, according to both studies, it seems likely that many relocated businesses will continue to remain outside the central city.

Such an outcome would have a number of implications for the Christchurch community. In the first place, we should note that the current intention of the Christchurch City Council (2012) is actually to have a smaller and perhaps greener central city. This plan might fit rather well with the overall intentions of relocated businesses. Secondly, between now and the time when large-scale re-occupancy of the inner city takes place, there will be a good deal of turnover of businesses themselves. Some existing businesses will no longer exist in their present form. Other new businesses will have been set up. Thirdly, it is possible that the future will see the development of new business hubs outside of the central city and most likely somewhat to the west of it. Christchurch has traditionally had a transport system with a strong central hub, but this arrangement may not be ideal in the future.

It is worth remarking that the pattern of immediate relocation, close to the central city and to the west of it nicely follows previous research suggesting that business owners tend to relocate in relatively up-market neighbourhoods and try not to move too far from the original locations (Greenhalgh, 2008; Sleutjes and Völker, 2012)³. Also in line with previous research on business relocation as well as common sense are the evident concern about rentals, and the finding that those businesses more likely to move back already own land in the central city (Nguyen et al., 2013; Sleutjes & Völker, 2012).

Although, as outlined in the introduction, there has been some previous research into the effects of disasters on business, no previous research to our knowledge has looked at the experiences and intentions of businesses that have been forced to relocate. Yet this research is important because the aggregate of the business decisions made by the businesses is of crucial importance for the community as a whole. For example, if virtually all the relocated businesses were unwilling to return to the former central city, then the central city would effectively be forced to relocate. The present findings, however, suggest that parts of the former central city will relocate and this process will lead to a less centralised city. Future research on the

³ The west of Christchurch generally has higher property values than the east, north or south. It is also likely that relatively more business owners live there.

development of Christchurch will lead to the confirmation or otherwise of this expectation.

If one gained all one's knowledge of disasters through the media one could get the impression that disasters like earthquakes occur as terrifying but brief events which can be quickly followed by rapid recovery, and, if recovery is not rapid, then this is essentially the fault of mismanagement or lack of political will. Those who work with or research disasters know this impression to be false, and that there are a variety of reasons why recovery is slow. To take just two reasons: earthquakes are not single events and ruined buildings must be removed before new ones are constructed on the old sites. The research presented in this paper presents yet another reason for delay. At least at a collective level, the business community is made uncertain about where they should locate for the medium to long term.

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