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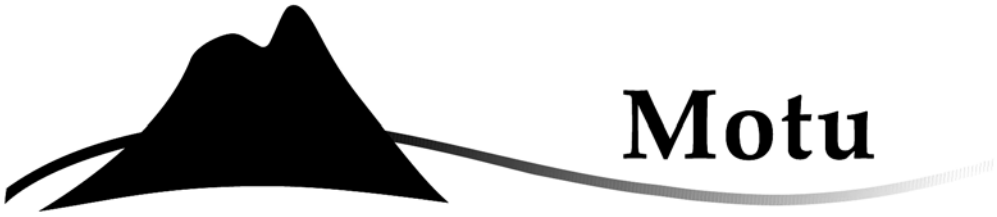

The Long-Run Impact of New Zealand's Structural Reform on Local Communities

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Abstract

New Zealand underwent a period of comprehensive market-oriented economic reforms from 1984-93. In this paper, we use data from the 1986, 1991, 1996 and 2001 Censuses to examine the long-run impact that these reforms had on local communities. We analyse the adjustment process in 140 local labour market areas (LMAs) by creating three measures of the impact of structural reform on local communities - an employment-based measure, a population measure and a housing price measure – and examine the persistence of these shocks over time. We find that communities which experienced smaller employment shocks have higher employment rates, higher average incomes and a more skilled workforce in the medium and long-term. Population shocks also have positive, sizeable and persistent effect on average incomes and population in the future. Overall, the initial impacts of the reforms undertaken in New Zealand on local communities appear to still endure more than a decade later.

JEL classification : R23, R11, J68

Keywords: Structural Reform, New Zealand, Communities, Local Labour Markets

1 Introduction

The 1980s marked a decade of structural adjustment around the world. Many developing countries, spurred by unsustainable fiscal deficits, currency crises, and external pressure from the World Bank and the IMF, gradually abandoned interventionist and protectionist policies that had shielded their economies from competitive forces. Several developed countries, such as the United Kingdom and Sweden, also instituted reforms in recognition that excessive regulation of domestic industries was a cause of sluggish growth.

In New Zealand, interventionist policies instituted in the 1930s grew steadily into the 1970s and turned the country into one of the most regulated economies in the OECD. By 1984, the country was facing unsustainable fiscal and current account deficits, inflation of over 12%, foreign debt at 46% of GDP and a foreign exchange crisis. Widespread recognition of the need for macroeconomic and microeconomic reforms led the government to initiate comprehensive market-oriented reforms that lasted until 1993. Over time, these policy changes opened the economy to foreign capital and international trade, dramatically reduced government assistance to industry, abolished agricultural subsidies, privatised state-owned enterprises, decentralised the employer-employee bargaining process and changed from universal provision of social welfare to a tightly targeted system.

In this paper, we use data from the 1986, 1991, 1996 and 2001 Census to examine the medium and long-run impact that these comprehensive reforms had on local communities. We analyse the adjustment process in 140 local labour market areas, across which there was large variation in the initial impact of the reforms. We do this by creating three measures of the impact that reform had on local communities – an employment-based measure, a population measure and a housing price measure – and examining the persistence of these changes over time. First, we examine how initial characteristics of each community related to the magnitude of the shock experienced. Next, we undertake a regression analysis which

estimates the impact of initial economic conditions and demographic characteristics in 1986 on outcomes in each community in 1991, 1996 and 2001. Then, we examine the impact of the employment, population and housing price shocks on outcomes in 1996 and 2001, controlling for initial economic and demographic characteristics.

The literature on spatial adjustment to economic factors is vast, spurred largely by regional declines in the U.S. and Europe in the 1970s and 1980s (see Heim, 1997; Hall, 1970; and Krugman, 1991). There is broad consensus that adjustment to demand shocks in the U.S. is achieved mainly through labour-supply responses, while the relative inflexibility of labour markets in Europe and the greater barriers to trade and entry have forced these countries to adjust through increases in regional unemployment. For example, Blanchard and Katz (1992) examine how states in the U.S. adjusted to employment shocks over a 40-year period. They find that these shocks had a permanent effect on future employment; when states experienced deviation from trend in growth due to shocks, they did return to their former growth rates but on a permanently different path of employment. In contrast, relative unemployment rates did not exhibit any trend and unemployment shocks have not had any permanent effects. Similarly, Topel (1986) examines labour-market dynamics across Census regions in the U.S. over the period 1977-79 and finds that transitory demand shocks in a region increase local relative wages, but that expectations of future demand reduce current wages because they attract migration inflows.

Consistent with these findings, our results indicate that the initial characteristics of communities are very important in explaining future outcomes, with areas that had relatively sound economic profiles in 1986 having relatively better outcomes in the short, medium and long-term. However, even after controlling for differences in these initial conditions, we find that the structural reforms had large, persistent effects on medium and long-term outcomes in local communities. For example, communities that experienced smaller employment shocks

had higher employment rates, higher average incomes, and more skilled workforces in 1996 and 2001. Population shocks also have positive, sizeable and persistent effect on average incomes and population in the future. Overall, the initial impacts of the reforms on local communities appear to still endure more than a decade later.

2 Background

2.1 Economic Reforms in New Zealand

Prior to reform, New Zealand had a highly regulated economy. Economic growth rates in the post-WWII period were sluggish and well below the OECD average. By 1984, the country was facing unsustainable fiscal and current account deficits, runaway inflation and a foreign exchange crisis. This led to a widespread recognition that macroeconomic reforms were needed to correct imbalances and reduce inflation, and microeconomic reforms were needed to improve productivity by getting prices and incentives right (McMillan, 1998).

Acting on this consensus, the government initiated comprehensive market-oriented economic reforms. Detailed analyses of these reforms are available in a number of sources.[1] Easton (1994) classifies the reform period into three phases: 1984-87, during which the market mechanism was increasingly used to regulate privately and publicly owned business; 1987-90, during which there was significant reform to the state sector and 1990-93, when major changes were made to the welfare system, health, education and labour market policy. Table 1, taken from Silverstone *et al.* (1996), documents the key events in the reform process.

The fostering of a more competitive environment was the thrust of the first phase of reforms. The economy was opened to foreign capital and international trade, with the abandonment of price controls, tariffication of import quotas and reduction of tariffs, removal of export incentives, lifting of foreign exchange controls and loosening of foreign ownership

[1] In particular, Silverstone *et al.* (1996); Bollard *et al.* (1987); Duncan *et al.* (1992), Duncan and Bollard (1992); Easton (1994, 1997); Evans *et al.* (1996); Kelsey (1995); Massey (1995).

restrictions. Government assistance to industry was reduced and agricultural subsidies were completely abolished. Considerable measures were initiated to decentralise economic administration while at the same time maintaining state ownership; for example, many government trading departments were corporatised to form state-owned enterprises (SOEs). During the second phase of reform, major changes were made to core government departments and many SOEs were privatised.

While various ad hoc changes to labour market regulation had occurred starting in 1984, including the reintroduction of compulsory unionism in 1985, major labour market reform did not take place until the third phase of reform. Starting in 1990, social welfare programmes were scaled back and a fundamental change from universal provision to a tightly targeted welfare system ensued (Boston et al., 1999). The most significant change to labour market regulation came with the introduction of the Employment Contracts Act in 1991, which decentralised the employer-employee bargaining process. While laying down mandatory minimum holiday entitlements, equal pay requirements for males and females and a statutory minimum wage, all other matters concerning pay and conditions were subject to negotiations (Evans *et al.*, 1996).

The reforms and their results remain controversial, particularly with respect to sequencing and the speed at which they took place.[2] Between 1984 and 1991, real per capita GDP growth averaged 0.4% and unemployment rose from 5% in 1984 to almost 11% in 1992. A number of papers document increased individual and regional income inequality over the reform period and beyond (Karagedikli *et al.,* 2000; Smith, 2000; Chapple, 2000; Dixon, 1998). There is also a view that reform led to little improvement in allocative efficiency in most industries (Hazledine and Murphy, 1996). For example, Morrison (2003) contends that the Employment Contracts Act had a negligible impact on labour market

efficiency and only served to reallocate existing employment, while Lang (1998) argues that trade policy liberalisation had an insignificant effect on the composition of employment across manufacturing industries. But others claim that New Zealand made considerable gains in technical efficiencies and that firms and workers responded to incentives introduced to create more competition and to improve labour productivity (McMillan, 1998).

2.2 Short-Run Impacts of the Reforms

A number of papers have examined the short-run impact of reforms on the New Zealand labour market. Gibson and Harris (1996) use data from the Quarterly Employment Survey to examine trends in short-run aggregate employment in the immediate post-reform period. They report that employment in central government trading enterprises, including SOEs, fell from 83,700 workers in 1987 to 21,600 in 1995 and that between 1987 and 1989, manufacturing employment fell by 30%, of which 20% was from retrenchment and 10% from plant closures. Chapple *et al.* (1996) construct indices of regional and occupational mismatch for short periods in the 1980s to examine whether the reform process led to increased unemployment because of these mismatches and find evidence for significant regional mismatch of workers and jobs in the post-reform period.

Maloney (2000; 2002) examines the impact of the reduction in social welfare benefits and tightening of eligibility criteria that occurred during the third phase of reforms on aggregate unemployment. While these papers find that the benefit reforms increased labour force participation and weekly hours worked, they also increased the official unemployment rate by nearly one-quarter of a percentage point. Examining households, Callister (2001) finds that job losses occurring during mid-1980s to early-1990s led to rapid growth in the proportion of people who lived in households with no workers. In his view, the changing

[2] See Dalziel (2002), Easton (1994, 1997), Kelsey (1995), Hazledine (1998) for a critical review of the reforms and the reform process.

distribution of work across households was primarily due to changes in the labour market rather than changes in household structure.

3 Data and Descriptives

This paper uses unit record data for the entire resident New Zealand population from the 1986, 1991, 1996 and 2001 Census to examine the long-run impact that these reforms had on local communities. We restrict our analysis throughout to individuals aged 25-54 to exclude students and individuals nearing retirement. Each census collects information about the current usual residential location of each individual. This location information is coded to the census meshblock. We use this information to identify local labour market areas (LMAs) in which most people who reside also work and most people work also reside, by using the algorithm derived in Newell and Papps (2001).[3] In our view, this is the appropriate unit of analysis for assessing adjustment costs borne by local communities, since an LMA is identified based on the both employment and residential criteria. Importantly, we construct these LMAs so they have the same boundaries throughout the sample period, meaning we are comparing outcomes over time in the same geographic areas.

We begin our analysis by using the 1986 and 1991 census data to describe the short-term impact that structural reform had on outcomes in these communities. Ideally, we would like to compare outcomes in the 1991 (or 1996) census to those in the 1981 census to capture changes over the entire reform period. Unfortunately, we do not have access to the 1981

[3] Labour market areas (LMAs) are created using travel-to-work data at area unit level drawn from the 1991 census. 140 LMAs are defined by enforcing a minimum employed population of 2,000 and 75% self-containment of workers (allowing for some trade-off between the two). These LMAs have an average size of approximately 1900 square kilometres. In main urban areas, LMAs generally encompass the urban area and an extensive catchment area. In rural areas, LMAs tend to consist of numerous small areas, each centred on a minor service centre. Appendix Figure A1 maps the 140 LMAs..

census data. However, as we will show, there are large changes in outcomes between 1986 and 1991 and the size of these changes varies significantly across regions. [4]

We create three measures of the impact of the structural reform on local communities: first, an employment based measure, which is the change in the prime-age employment rate in each community between 1986 and 1991; second, a population measure, which is the percentage change in the prime-age population in each community between 1986 and 1991; and third, a housing price measure, which is the percentage change in the mean sales price of residential dwellings in each community between 1986 and 1991.[5] The local price of houses summarises a host of tangible and intangible components relating to the community of interest such as incomes in the area, the availability of local services, the demographic make-up of the community and factors such as climate and proximity to natural amenities. If wages are sticky, as Choy et al. (2002) find, it is possible that changes in land and house prices served as the adjustment channel through which labour markets were impacted. We investigate this possibility.

Table 2 summarises the distribution of the impact of economic reform on communities. Panels A and B in Table 2 report unweighted and weighted distributions of our three shocks measures. We first examine the unweighted results, which treat each of the 140 LMAs equally. On average, employment rates fell by 5 percentage points across LMAs. However, there was wide spatial variation, with communities in the bottom decile experiencing a 10 percentage point decline and those in the top decile experiencing no change in employment rates. The population of the average community grew by 5 percentage points, with the bottom

[4] The 1984-86 period was mainly associated with an improvement in economic conditions. The negative effects of the reforms started being manifest mainly from 1987 onwards.

[5] We use house price data sourced from Quotable Value New Zealand (QVNZ) for census years 1986, 1991, 1996 and 2001. QVNZ provides data for residential dwellings covering several categories, and in this analysis we use residential dwellings defined as those dwellings of a fully detached or semi-detached style on their own clearly defined piece of land. Data are incomplete for one small LMA which we control for in our regression estimates by including a dummy variables for that LMA where appropriate.

10% of communities experiencing a 6 percentage point decline in population compared to a 17 percentage point population growth in the top decile. House prices increased by 1 percentage point in the average community, declining by 24 percentage points in the bottom decile of communities and increasing by 27 percentage points in the top decile.

The numbers in Panel B are weighted by the initial population of each LMA. Thus these results represent the impact for the average prime-age person in 1986, as opposed to the average community. The spatial distribution of the change in employment rates is the same even when bigger weights are given to more populated LMAs. On the other hand, most individuals live in communities that experienced population growth between 1986 and 1991, with the average individual living in a community with a 10 percentage point growth in population (as opposed to the average community having 5 percentage point growth). A similar result is found with respect to house prices. While house prices only increased in the average community by 1 percentage point, the average individual lived in a community where house prices increased by 6 percentage points. Most communities where house prices declined between 1986 and 1991 had few people living in them.

Figure 1 maps these three measures for the 140 LMAs. Employment rates increased in only 14 LMAs between 1986 and 1991. The darker areas experienced greater employment loss over this period. Several concentrations of employment loss relative to population can be seen. There was also substantial change in the distribution of population between 1986 and 1991 across large tracts of the country. Population declined in 39 LMAs, while 71 LMAs had changes in population between -5 and 5 percentage points. The largest increases in population occurred in relatively small, predominantly coastal areas. The distribution of the change in nominal house sales prices is shown in the third panel. The largest increases in sales prices occurred primarily in the main urban centres and in coastal areas.

A broad visual inspection of the three panels in Figure 1 suggests that many communities experienced a significant negative impact of the reforms in terms of all three measures. This is more evident in the North Island, with communities that had the biggest employment shocks, also experiencing the biggest changes in prime-age population and in house prices. The impact of shocks seemed to occur mainly through changes in prime-age population and house prices on the South island, with little change in employment rates.

Figure 2 graphs each of the three measures of the short-term impact of structural reform in each community as a function of the initial economic conditions in that community. The initial conditions are captured by the employment rate and average real incomes in 1986.[6] The line in each graph is a locally weighted regression of the size of the shock on the initial conditions in each community using running-line weighted least-squares smoothing with a bandwidth of 0.8. Areas that had higher employment rates in 1986 experienced, on average, smaller declines in employment rates and smaller changes in working-age populations between 1986 and 1991. The relationship between initial employment rates and changes in house prices is less clear. Similarly, there is no apparent relationship between average incomes in 1986 and the impact of the shocks.

Figure 3 plots the relationship between the size of the shock in each community and economic outcomes – employment rate and average real incomes – in those communities in 2001. The objective is to examine the extent to which shocks persisted over time. This figure reveals that areas which had smaller shocks (e.g. smaller decreases in employment) between 1986 and 1991, had higher employment rates in 2001. Moreover, this relationship is stronger than the relationship between the size of the employment shock and initial employment rates

[6] The only income data collected in the census asked each individual to recall their total income over the previous year and reported this as being in one of nine brackets. Average nominal income in each LMA is created by weighting the midpoints of the income brackets by the count of individuals in each bracket, with the top brackets coded as $170,000. This is then converted to 2005 dollars by dividing by the CPI (adjusted for GST).

in 1986. In other words, areas that had relatively high employment rates in 1986 experienced smaller employment shocks, and in turn, had higher employment rates in 2001. Areas with smaller decreases in employment in the reform period also had higher incomes in 2001. However, there is no discernible relationship between the other two measures of shock – changes in population and changes in house prices – and outcomes in 2001.

4 Regression Results

The relationship between the size of the shock and later outcomes presented in Figure 3 above does not account for the initial economic and sociodemographic characteristics of these communities. We next turn to regression analyses to examine: first, the relationship between initial economic and sociodemographic characteristics of the 140 LMAs in 1986 and outcomes in 1991, 1996 and 2001; and second, the impact of the employment, population and housing price shocks on outcomes in 1996 and 2001, while controlling for initial economic and sociodemographic characteristics in 1986.

The purpose of the first analysis is to examine the persistence of economic outcomes over time, holding other local area characteristics constant. For example, if employment rates in 2001 are highly correlated with employment rates in 1986 even after controlling for sociodemographic conditions in 1986, this suggests that on average, structural reforms had little impact on medium and long-term employment trends. The objective of the second analysis is then to estimate the impact of our three measures of shocks on medium and long-term economic outcomes, controlling for 1986 characteristics. Together, these two analyses describe the extent to which communities adjusted to the impact of structural reforms.

4.1 The Relationship between Initial Conditions in 1986 and Future Outcomes

We first examine the relationship between initial conditions in 1986 and future outcomes by estimating three specifications of the following ordinary least squares (OLS) regression model:

$$Y_c^{J(t)} = \alpha + \sum_J \beta^J Y_c^{J(86)} + \delta X_c^{(86)} + \varepsilon_c, \quad (1)$$

where c indexes communities (LMAs), $Y_c^{J(t)}$ is one of J=4 outcomes - i) employment rates, ii) log mean real incomes, iii) log population, and iv) log real mean house prices, measured in t=3 time periods - 1991, 1996, or 2001 (for a total of 12 outcome measures), $Y_c^{J(86)}$ is each of these four outcomes measured in 1986, $X_c^{(86)}$ is a vector of control variables for the initial sociodemographic characteristics in 1986, and ε_c is a random error term. Our primary interest is in the β^J coefficients, which indicate the relationship between initial economic conditions in 1986 and future outcomes, controlling for initial sociodemographic characteristics. We also discuss some of the more interesting results for δ, which indicate the relationship between initial sociodemographic characteristics and future outcomes, controlling for initial economic conditions.

We estimate three specification of regression model (1) in which we vary the variables that are included in the $X_c^{(86)}$ vector of initial sociodemographic characteristics. In the first specification, we control for the following demographic characteristics: i) the percentage of the population in each of six five-year age groups (dropping one group); ii) the percentage that is female; iii) the percentage that is Māori and the percentage that is neither Māori nor European/Pakeha; iv) the percentage that is foreign-born; and v) the percentage with no qualifications, school qualifications, post-school qualifications, university degrees and missing qualifications (dropping one group).

The impact of structural reforms was not uniform across all industries and occupations. To account for this variation, in the second specification, we include additional controls for the industrial and occupational composition in each LMA in 1986.[7] Beyond the industrial and

[7] Despite major changes in the classification of industry and occupation between 1986 and 2001 we are able to form a reasonably consistent aggregated classification of industry and occupation. Our ten-category classification for industry includes: 1) Agriculture, Hunting, Forestry and Fishing; 2) Mining and Quarrying; 3) Manufacturing; 4) Electricity, Gas and Water; 5) Construction; 6) Wholesale and Retail Trade, Restaurants and

occupational distribution, the distribution of skills in a labour market can determine how an area adjusts to economic shocks. Therefore, in the third specification, we control for the demographic characteristics included in the first specification, except education, and introduce additional controls for educational, industrial and occupational skill indices in 1986. These are created following the methodology used by Hyslop et al (2003) and are summary measures of the educational, industrial and occupational composition in each LMA.[8] Appendix Tables B1 and B2 in the appendix present summary statistics for economic conditions over time and sociodemographic characteristics of each LMA in 1986, respectively.

Table 3 presents the results from the three specifications of regression model (1). All regressions are weighted by the prime-age population of each LMA in 1986 and robust standard errors are reported. Thus, the estimates reflect the relationship for the average individual in 1986, as opposed to the simple average across the 140 LMAs. To keep our discussion focused, we only present the results for the β^J coefficients (which indicate the relationship between initial economic conditions in 1986 and future outcomes, controlling for initial sociodemographic characteristics) and some key results for the relationship between sociodemographic characteristics in 1986 and future outcomes.

Hotels; 7) Transport, Storage and Communication; 8) Finance, Property and Business Services; 9) Community, Social and Personal Services; and 10) Missing. Our eight-category classification for occupation includes: 1) Agricultural, Forestry and Fishery Workers; 2) Professional, Technical and Related Workers; 3) Administrative and Managerial Workers; 4) Clerical and Related Workers; 5) Sales Workers; 6) Service Workers; 7) Production, Transport Workers, Labourers and Related Workers; and 8) Missing.

[8] Two educational skill indices are included, one that measures the qualifications of only employed individuals and a second that measures the qualifications of the entire prime-age population. These indices are constructed for different LMAs over time by first calculating the average income of each qualification group, industry group and occupation group across the whole population in 1986 and treating this as the 'price' of that group and then weighting each qualification, industry and occupation by its respective share in the total. This index of skill intensity holds constant the 'prices' of different skill levels across LMAs and over time, and normalises the size of the population. Thus, any observed change in LMA skill intensity over time is entirely due to changes in the skill distributions within the LMA, and do not reflect either changing employment levels or incomes. The use of average annual income as the price of skill tends to confound the unit price (ie, hourly wage) effect with employment intensity (ie, hours of work), which may vary systematically across various skill groups, over time, and/or across LMAs (Hyslop et al, 2003).

Starting with the first specification, our estimates show that communities which had high employment rates in 1986 also have higher employment rates and higher average incomes in future years. While this association weakens over time for employment, it grows stronger for incomes. There is a positive correlation in population over time, although communities with higher employment rates in 1986 have smaller populations in the future, controlling for initial population levels. Communities with higher employment rates in 1986 also have significantly lower house prices in 1991 and 1996, controlling for initial house prices. Communities with higher levels of mean income in 1986 have higher employment rates and mean incomes, and lower population and house prices in all three future years. Communities with higher house prices in 1986 also have higher house prices in the future and larger prime-age populations.

Among the sociodemographic characteristics, communities with relatively larger Māori populations in 1986 have lower employment rates, average incomes, population, and house prices in future years, even after controlling for initial economic characteristics. This is consistent with the reforms having particularly large impacts on communities with generally lower-skilled populations. Communities with relatively larger foreign-born populations have lower employment rates in the future, but higher incomes and more population growth.

Turning to the second specification, when we add controls for the industrial and occupational composition in each community in 1986, the relationship between employment rates in 1986 and future employment rates and incomes get stronger, but they are now imprecisely estimated. The relationship between average incomes in 1986 in each community and future population growth remains negative and significant. Controlling for industrial and occupational composition, we still find that communities with relatively larger Māori populations in 1986 have significantly lower employment rates and incomes in 1991, 1996,

and 2001. However, this characteristic appears to have no impact on population and house prices in future years.

In the third specification, which includes the alternative controls for educational, industrial, and occupational composition, we find evidence that the relationship between employment rates in 1986 and future employment rates, between average incomes in 1986 and future average incomes, and between house prices in 1986 and future house prices is stronger and more precisely estimated than in the first two specifications. Adding these controls also substantially increases the magnitude of the relationship between initial employment rates and future average incomes, and substantially decreases the relationship between initial employment and future population.

We find consistent evidence across the three specifications that average incomes, working-age populations and house prices are positively correlated with their respective future levels. Housing prices in 1986 are also positively correlated with future population levels. Similar results are reported in Chapple (2000), which uses the 1981 – 1996 censuses to study labour-market adjustment in 1,080 urban areas in New Zealand and finds that regional variation in labour-force participation and unemployment over this time period was persistent and varied little in the long-term.

4.2 The Impact of Shocks on Future Outcomes

We next examine the impact of the employment, population and housing price shocks on outcomes in 1996 and 2001, controlling for initial economic and sociodemographic characteristics in 1986 by estimating three specifications of the following OLS regression model:

$$Y_c^{J(t)} = \alpha + \sum_K \gamma^K Shock_c^{K(91-86)} \sum_J \beta^J Y_c^{J(86)} + \delta X_c^{(86)} + \varepsilon_c, \quad (2)$$

where $Shock_c^{K(91-86)}$ is one of J=3 shocks previously defined, i) the change in the employment rate in each LMA between 1986 and 1991, ii) the percentage change in the population of each

LMA between 1986 and 1991, and iii) the percentage change in the mean house price in each LMA between 1986 and 1991. Because the shocks are defined using 1991 outcomes, we now examine outcomes for t=2 time periods, 1996 or 2001, for a total of 8 outcome measures. Our primary interest is now the γ^K coefficients, which indicate the relationship between each economic shocks measure and future outcomes, controlling for economic conditions and sociodemographic characteristics in 1986.

Table 4 presents the results from the three specifications of regression model (2). Again, all regressions are weighted by the prime-age population of each LMA in 1986 and robust standard errors are reported. As in Table 3, estimates in the first panel control for the initial economic and demographic characteristics in 1986, those in the second panel also control for industrial and occupational composition in 1986, while those in the third panel include educational, industrial, occupational skill indices as control variables instead of educational, industrial, and occupational composition. To keep our discussion focused, we only present the results for the γ^K and β^J coefficients, which indicate the impact of shocks on the 1996 (medium-term) and 2001 (long-run) outcomes, controlling for all initial conditions, and the relationship between initial economic conditions in 1986 and future outcomes, respectively.

The results from the first specification indicate that a 1 percentage point smaller decline in the employment rate (e.g. a less negative or smaller shock) in a community between 1986 and 1991 is associated with that community having a 0.84 and a 0.75 percentage point higher employment rates in 1996 and 2001, respectively.[9] In other words, controlling for employment rates in 1986 (which are strongly related to future employment rates), communities in which the employment rate declined the most between 1986 and 1991 have the lowest employment rates in 2001 relative to 1986. Communities which experienced

[9] Since employment rate shocks were negative for most LMAs, we interpret an increase in employment rate change in terms of a 'smaller' employment shock.

smaller employment shocks also have higher average incomes in 1996 and 2001. In fact, the relationship between employment shocks and future incomes is getting stronger over time, with a 1 percentage point smaller decline in the employment rate in a community between 1986 and 1991 associated with that community having 1.2% and 1.4% higher average incomes in 1996 and 2001, respectively. We find no relationship between the magnitude of employment shocks and future population levels or house prices in different communities.

Communities with greater population increases between 1986 and 1991 have higher future incomes and larger populations. For example, LMAs that experienced 1% greater population growth between 1986 and 1991 have 0.5% higher average incomes in 1996, 0.4% higher average incomes in 2001, 1.3% larger populations in 1996 and 1.5% larger populations in 2001. On the other hand, we find no relationship between population shocks and future employment rates and house prices. Turning to our third shock measure, changes in house prices between 1986 and 1991 are generally unrelated to all future outcomes, except to future house prices. LMAs that had 1% large increases in house prices between 1986 and 1991 have 0.4% higher house prices in 1996 and 0.9% higher house prices in 2001, controlling for the relationship between house prices in 1986 and future house prices.

These results are generally robust to the inclusion of controls for industrial and occupational composition or for skill indices. The only exception is that the impacts of employment and population shocks on average incomes both become statistically insignificant in the second specification, but this is not true in the third specification. Overall, we find consistent evidence that changes in community fortunes between 1986 and 1991 are associated with long-run outcomes in these communities, even after controlling for the fact that there are wide-ranging differences between communities in 1986.

4.3 The Impact of Shocks on Future Skill Levels

We next examine the impact of these shocks on the skill indices in 1996 and 2001. These are alternative measures of long-term economic performance in communities, as they indicate whether the local population is upskilling over time. We re-estimate the three specifications of regression model (4) using the four skill indices discussed above as our outcome measures in 1996 and 2001. These results are reported in Table 5.

Our main finding is that employment shocks also had long-run impacts on community skill-levels. For example, the results from the first specification indicate that communities which experienced a 1 percentage point smaller decline in the employment rate between 1986 and 1991 have a 0.93% (0.55%) higher industry skill index, a 0.76% (0.39%) higher occupation skill index, and a 0.36% (0.33%) higher qualifications skill index for the working-age population in 1996 (2001).[10] The effect of employment rate shocks on the qualifications skill index among those employed is insignificant. Neither population nor house price shocks have significant or persistent impacts on any of the skill indices.

Turning to the second specification, introducing controls for industrial and occupational concentration in 1986 magnifies the impact of employment shocks on future industry, occupation and qualifications skill indices, while population and house price shocks remain unrelated to future skill levels. In the third specification, we find that employment shocks have even larger impacts on future skills in a community, once we control for the initial skill distribution in each local area. These results indicate that communities which experienced a 1 percentage point smaller decline in the employment rate between 1986 and 1991 have a 1.15% (0.75%) higher industry skill index, a 1.01% (0.69%) higher occupation skill index and a 0.45% (0.44%) higher qualifications skill index in 1996 (2001).

[10] These percentage changes are calculated by comparing the coefficients in Table 5 to the overall mean skill indices in 1996 and 2001 as reported in Appendix Table B1.

5 Conclusions

This paper uses data from the 1986, 1991, 1996 and 2001 Census to examine the medium and long-run impact that structural reforms introduced in the 1980s in New Zealand had on local communities. We analyse the adjustment process in 140 local labour market areas, across which there was large variation in the initial impact of the reforms. We do this by creating three measures of the impact of structural reform on local communities – an employment based measure, a population measure and a housing price measure – and examining the persistence of these shocks over time. We then undertake a regression analysis which estimates the impact of initial economic conditions and demographic characteristics in 1986 on outcomes in each community in 1991, 1996 and 2001 and examines the impact of the employment, population and housing price shocks on outcomes in 1996 and 2001, controlling for initial economic and demographic characteristics in 1986.

Our results indicate that initial characteristics are very important in explaining future outcomes. Areas that had higher employment rates and average income in 1986 have relatively better outcomes in the short-term, medium-term and long-term. We also find consistent evidence that the changes in community fortunes that occurred between 1986 and 1991 are associated with long-run effects on these communities, even after controlling for the fact that there are wide-ranging differences between communities in 1986. For example, communities that experienced smaller employment shocks have higher employment rates and average incomes in 1996 and 2001, while those that experienced smaller population shocks have higher future incomes and larger populations. Changes in house prices between 1986 and 1991 are generally unrelated to all future outcomes, except to future house prices. However, urban communities that witnessed bigger increases in house prices between 1986 and 1991 saw increases in their populations in 1996 and 2001. We also find evidence that

employment shocks had long-run impacts on community skill-levels, while population and house price shocks did not.

Two recent papers estimate empirical vector autoregression (VAR) models to examine regional adjustment to local employment shocks in New Zealand. Choy *et al.* (2000) uses quarterly data from the 1986 – 2001 Household Labour Force Survey (HLFS) to examine the channels through which labour markets adjust to employment shocks in 12 aggregated regional councils. They find that employment shocks translate to long-run changes in employment levels, but that the impact is partially mitigated by population change (i.e. migration) and changes in labour force participation, while wages do not appear to adjust. Similarly, Grimes *et al.* (2007) use HLFS data from 1986 – 2006 along with additional data from the Quarterly Employment Survey and Quotable Value New Zealand to examine adjustment to employment shocks in 15 regions. They also find that employment shocks result in long-run changes in employment levels and population changes, while having little impact on local house prices.

Our results are somewhat consistent with the findings in these papers. In a similar vein, we also find that employment shocks have long-run impacts on employment levels and that they are unrelated to future house prices in the community. However, in contrast, we find that employment shocks have large impacts on future incomes (suggesting that wages do adjust) and no impact on future population levels. While these papers are able to examine quarterly changes in outcomes, as opposed to the five-yearly changes we focus on, they are not able to examine outcomes at the community level as in this paper, and instead focus on aggregated regions. It is also worth noting that neither of these papers focuses on the impact of shocks in the structural reform period, but on more general 'employment shocks'. Thus, it is not clear whether much should be made of the differences in findings.

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Table 1: Major events in New Zealand's economics reforms 1984-1993

1983	Phase out of import licensing requirements Closer Economic Relations with Australia trade agreement
1984	Labour wins general election Major agricultural reform including the abolition of supplementary minimum prices for farming and the termination of producer boards for eggs, milk and wheat Phase out of export performance tax incentives Deregulation of foreign exchange trading, and removal of controls on outward investment and borrowing and the lifting of interest rate controls More market-based employment bargaining under Industrial Relations Act (compulsory unionism reinstated)
1985	Free float of New Zealand Dollar on foreign exchange markets End of formal financial controls (reserve ratio requirements, sector lending priorities)
1986	State-Owned Enterprises Act led to corporatisation and restructuring of electricity generation and transmission and the introduction of user pays principles for remaining state trading activity Broadened tax base with introduction of a goods and services tax (GST) on virtually all final domestic consumption. Start of reduction of import tariffs from an average of 28 percent to 5 percent
1987	Corporatisation of 24 state owned enterprises (in transport, finance, tourism, forestry, broadcasting, utilities, and service industries) Full or partial privatisation of many SOEs such as Air New Zealand, Bank of New Zealand, Shipping Corporation, Rural Bank, Post Office Savings Bank, Radio New Zealand, Telecom Corporation. Removal of tax concessions for savings Some contestability in union coverage under Labour Relations Act
1988	Flattening and lowering of personal income tax rate Reform of core government departments on corporate lines through the State Sector Act, with separation of policy, provision, and funding
1989	Independence of Reserve Bank formalised (monetary policy devoted to achieving price stability) Termination of restrictions on shop trading hours Public sector management reform through Public Finance Act and the redesign of government accounts on a more commercial basis with accrual accounting and output based monitoring systems
1990	Requirement for local authorities to corporatise local-authority trading enterprises and tender out services
1991	Major social policy reform with the introduction of the Employment Contracts Act and large cuts to spending on education, health, social welfare and superannuation. State housing assistance integrated into private sector rental and mortgage provision Resource Management Act to govern more liberal planning and environmental legislation
1992	Corporatisation of government research bodies (Crown Research Institutes) Quasi corporatisation and fee paying for tertiary education institutions Separation of funding from provision of state health services, establishment of Crown Health Enterprises and private sector deregulation
1993	Corporatisation, privatisation and deregulation of gas and electricity distribution and introduction of competition in electricity generation. Privatisation of New Zealand Rail

Source: This table is based on that found in the introduction to Silverstone et al (1996). See also Evans et al (1996, pp. 1856-902) for another detailed timeline of key reforms.

Table 2: The Distribution of the Impact of Economic Reforms on Communities between 1986 and 1991

	Employment Rate Change	Population Change	House Price Change
Unweighted			
Mean	-0.05	0.05	0.01
Standard Deviation	0.05	0.09	0.22
10th Percentile	-0.10	-0.06	-0.24
25th Percentile	-0.08	-0.01	-0.13
50th Percentile	-0.05	0.04	0.00
75th Percentile	-0.03	0.10	0.12
90th percentile	0.00	0.17	0.27
Weighted by 1986 working age population			
Mean	-0.06	0.10	0.06
Standard Deviation	0.03	0.06	0.11
10th Percentile	-0.09	0.02	-0.08
25th Percentile	-0.07	0.05	0.01
50th Percentile	-0.05	0.10	0.07
75th Percentile	-0.05	0.15	0.14
90th percentile	-0.03	0.16	0.15
Communities	140	140	140

Note: The employment rate change is the change in the proportion of the working age population between 1986 and 1991 that is in either full-time or part-time employment in each community. The population change is the change in working age population between 1986 and 1991 divided by the working age population in 1986. The house price change is the percentage change in the mean sales price of residential dwellings in each community between 1986 and 1991.

Table 3: Regression Estimates of the Impact of Initial Economic Conditions in 1986 on Outcomes in 1991, 1996 and 2001

	Employment Rate			Log Mean Real Income			Log Population			Log Real Mean House Price		
Variable in 1986	1991	1996	2001	1991	1996	2001	1991	1996	2001	1991	1996	2001
Employment Rate	1.034***	0.895***	0.754***	1.137***	1.732***	2.002***	-0.348**	-0.669***	-0.569	-1.350***	-1.278**	-0.244
	[0.084]	[0.108]	[0.129]	[0.238]	[0.369]	[0.395]	[0.168]	[0.253]	[0.363]	[0.503]	[0.616]	[0.843]
Ln Mean Real Inc	0.046*	0.044*	0.064**	0.674***	0.579***	0.421***	-0.176***	-0.471***	-0.703***	-0.020	-0.499**	-0.527**
	[0.025]	[0.024]	[0.025]	[0.079]	[0.113]	[0.127]	[0.063]	[0.106]	[0.147]	[0.120]	[0.193]	[0.255]
Ln Population	-0.001	-0.001	-0.001	-0.005	-0.010	-0.013	0.993***	1.001***	1.002***	0.018	0.048***	0.003
	[0.002]	[0.003]	[0.003]	[0.006]	[0.008]	[0.008]	[0.005]	[0.007]	[0.011]	[0.014]	[0.017]	[0.018]
Ln Real Mean Hse Prc	0.015	0.029**	0.011	-0.005	0.030	0.002	0.125***	0.270***	0.421***	0.781***	0.851***	1.028***
	[0.010]	[0.013]	[0.015]	[0.031]	[0.040]	[0.040]	[0.025]	[0.045]	[0.062]	[0.057]	[0.071]	[0.089]
% Female	-0.174	-0.355	-0.387	0.304	0.650	-0.464	1.540***	1.234*	1.364	2.203*	1.590	3.666*
	[0.268]	[0.277]	[0.317]	[0.785]	[1.111]	[1.126]	[0.466]	[0.715]	[1.048]	[1.227]	[1.635]	[2.040]
% Maori	-0.236***	-0.332***	-0.313***	-0.138*	-0.265**	-0.241**	-0.163***	-0.243**	-0.352***	-0.275*	-0.418**	-0.143
	[0.028]	[0.036]	[0.041]	[0.071]	[0.103]	[0.093]	[0.056]	[0.093]	[0.122]	[0.140]	[0.200]	[0.248]
% Non-Pak, Non-Mao	0.000	-0.008	0.373*	-0.577	-1.681**	-1.570*	-0.453	-0.801	-0.940	1.239	0.338	-1.097
	[0.126]	[0.150]	[0.197]	[0.465]	[0.728]	[0.822]	[0.346]	[0.578]	[0.837]	[0.941]	[1.090]	[1.416]
% Foreign-born	-0.252***	-0.361***	-0.592***	0.575*	1.146**	1.316**	0.497*	0.934*	1.182*	-0.114	0.979	2.162**
	[0.090]	[0.111]	[0.150]	[0.341]	[0.533]	[0.600]	[0.281]	[0.482]	[0.705]	[0.691]	[0.772]	[1.039]
R-squared	0.92	0.90	0.85	0.95	0.87	0.89	1.00	1.00	1.00	0.96	0.95	0.94
Employment Rate	1.608*	1.659	1.487	1.694	3.153	6.472**	-0.151	0.658	2.469	-0.476	3.302	9.663
	[0.912]	[1.053]	[1.160]	[2.171]	[3.232]	[2.852]	[2.358]	[3.804]	[5.064]	[5.868]	[8.454]	[9.808]
Ln Mean Real Inc	0.082***	0.083**	0.094**	0.854***	0.982***	0.675***	-0.134*	-0.329***	-0.514***	0.206	-0.319	-0.200
	[0.024]	[0.036]	[0.042]	[0.073]	[0.124]	[0.143]	[0.076]	[0.125]	[0.159]	[0.201]	[0.257]	[0.340]
Ln Population	0.003	0.001	0.000	-0.005	-0.001	-0.008	0.992***	1.005***	1.014***	0.050***	0.069***	0.056**
	[0.002]	[0.004]	[0.004]	[0.006]	[0.009]	[0.009]	[0.008]	[0.012]	[0.014]	[0.018]	[0.023]	[0.027]
Ln Real Mean Hse Prc	0.023**	0.032**	0.013	0.016	0.045	0.018	0.079***	0.162***	0.273***	0.729***	0.835***	0.962***
	[0.011]	[0.014]	[0.016]	[0.026]	[0.032]	[0.036]	[0.023]	[0.044]	[0.060]	[0.060]	[0.085]	[0.107]
% Female	-0.229	-0.316	-0.287	-0.442	-0.203	-1.314	1.235**	1.348	1.929	1.916	1.268	5.201**
	[0.246]	[0.336]	[0.358]	[0.676]	[0.859]	[0.863]	[0.605]	[0.946]	[1.302]	[1.527]	[1.850]	[2.430]
% Maori	-0.248***	-0.368***	-0.362***	-0.283***	-0.476***	-0.374***	-0.104	-0.111	-0.196	-0.178	-0.166	-0.085
	[0.026]	[0.050]	[0.057]	[0.074]	[0.112]	[0.104]	[0.078]	[0.128]	[0.173]	[0.171]	[0.257]	[0.371]
% Non-Pak, Non-Mao	0.318**	0.231	0.535**	0.791**	0.372	-0.046	-0.292	-1.039	-1.886**	0.359	2.109*	-1.729
	[0.142]	[0.190]	[0.237]	[0.392]	[0.626]	[0.749]	[0.413]	[0.663]	[0.919]	[0.809]	[1.216]	[1.452]
% Foreign-born	-0.448***	-0.495***	-0.694***	-0.319	-0.044	0.336	0.329	1.079**	1.810***	0.806	0.537	2.662**
	[0.115]	[0.156]	[0.195]	[0.320]	[0.523]	[0.651]	[0.302]	[0.471]	[0.667]	[0.626]	[0.838]	[1.020]
R-squared	0.95	0.92	0.88	0.98	0.95	0.95	1.00	1.00	1.00	0.97	0.96	0.95

Employment Rate	1.270***	1.142***	1.086***	2.008***	2.793***	3.261***	-0.466**	-1.235***	-1.568***	-0.509	-1.886**	-0.146
	[0.084]	[0.121]	[0.159]	[0.297]	[0.435]	[0.505]	[0.208]	[0.363]	[0.519]	[0.541]	[0.875]	[0.940]
Ln Mean Real Inc	0.047*	0.022	-0.006	0.722***	0.790***	0.464***	-0.129**	-0.440***	-0.637***	0.106	-0.271	-0.235
	[0.026]	[0.030]	[0.032]	[0.088]	[0.115]	[0.132]	[0.062]	[0.099]	[0.128]	[0.149]	[0.189]	[0.271]
Ln Population	0.002	0.001	0.000	0.008	0.012	0.006	0.995***	0.999***	0.997***	0.023*	0.051***	0.014
	[0.002]	[0.003]	[0.004]	[0.006]	[0.009]	[0.010]	[0.005]	[0.007]	[0.011]	[0.013]	[0.019]	[0.017]
Ln Real Mean Hse Prc	0.016**	0.030***	0.012	-0.039	-0.001	-0.032	0.109***	0.276***	0.438***	0.806***	0.950***	1.057***
	[0.008]	[0.009]	[0.011]	[0.026]	[0.032]	[0.041]	[0.021]	[0.040]	[0.056]	[0.047]	[0.060]	[0.076]
% Female	-0.258	-0.346	-0.387	-0.339	-0.126	-1.301	1.352***	1.223	1.404	2.046*	2.137	3.828**
	[0.236]	[0.261]	[0.291]	[0.716]	[0.989]	[1.009]	[0.504]	[0.769]	[1.115]	[1.123]	[1.551]	[1.739]
% Maori	-0.218***	-0.320***	-0.301***	-0.018	-0.109	-0.081	-0.127***	-0.253***	-0.385***	-0.268**	-0.504**	-0.097
	[0.025]	[0.031]	[0.036]	[0.056]	[0.081]	[0.078]	[0.048]	[0.085]	[0.110]	[0.116]	[0.212]	[0.249]
% Non-Pak, Non-Mao	-0.023	-0.091	0.153	0.007	-0.635	-0.925	-0.152	-0.810	-0.991	0.745	-0.213	-0.766
	[0.169]	[0.169]	[0.201]	[0.637]	[0.787]	[0.775]	[0.385]	[0.555]	[0.804]	[0.784]	[0.920]	[1.139]
% Foreign-born	-0.181*	-0.265**	-0.391***	0.469	0.780	1.279**	0.381	0.936**	1.164**	0.326	1.158*	2.038**
	[0.106]	[0.117]	[0.144]	[0.391]	[0.522]	[0.533]	[0.266]	[0.397]	[0.583]	[0.601]	[0.676]	[0.798]
R-squared	0.92	0.89	0.84	0.94	0.88	0.87	1.00	1.00	1.00	0.96	0.95	0.94
Observations	140	140	140	140	140	140	140	140	140	139	139	139

Note: All regressions are weighted by the 1986 working-age population in each LMA and robust standard errors are in brackets. The estimates in the first panel control for demographic characteristics in 1986. In addition to these controls, the results reported in second panel also control for the industry and occupation composition in each LMA in 1986. The estimates in the third panel control for demographic characteristics in 1986 (excluding qualifications) and education, industry and occupation skill indices in 1986.

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 4: Regression Estimates of the Impact of Economic Shocks on Outcomes in 1996 and 2001

	Employment Rate		Log Mean Real Income		Log Population		Log Real Mean Hse Price	
Variable in 1986	1996	2001	1996	2001	1996	2001	1996	2001
Employment Rate Change	0.848***	0.746***	1.189***	1.348***	0.115	0.448	0.824	-1.278
	[0.082]	[0.130]	[0.373]	[0.368]	[0.187]	[0.360]	[0.644]	[0.897]
Population Change	-0.019	-0.060	0.503***	0.397**	1.314***	1.519***	0.344	-0.057
	[0.030]	[0.047]	[0.178]	[0.160]	[0.120]	[0.232]	[0.288]	[0.308]
House Price Change	-0.016	-0.026	-0.022	-0.102*	0.015	0.095	0.434***	0.928***
	[0.013]	[0.020]	[0.062]	[0.056]	[0.029]	[0.061]	[0.132]	[0.142]
Employment Rate in 86	0.835***	0.672***	1.871***	1.977***	-0.080	0.195	-0.440	1.003
	[0.087]	[0.124]	[0.380]	[0.393]	[0.147]	[0.295]	[0.617]	[0.745]
Ln Mean Real Inc in 86	0.001	0.018	0.615***	0.424***	-0.233***	-0.439***	-0.425**	-0.413*
	[0.018]	[0.026]	[0.096]	[0.118]	[0.054]	[0.112]	[0.192]	[0.229]
Ln Population in 86	0.000	0.000	-0.004	-0.006	1.013***	1.015***	0.044**	-0.012
	[0.002]	[0.003]	[0.008]	[0.007]	[0.004]	[0.009]	[0.020]	[0.016]
Ln Real Mean Hse Prc in 86	0.015	0.002	-0.059	-0.092*	0.096***	0.233***	0.872***	1.261***
	[0.014]	[0.015]	[0.046]	[0.049]	[0.024]	[0.050]	[0.101]	[0.101]
R-squared	0.94	0.89	0.89	0.91	1.00	1.00	0.96	0.96
Employment Rate Change	0.847***	0.819***	0.427	0.905***	0.553***	1.322***	0.896	-0.913
	[0.102]	[0.147]	[0.299]	[0.325]	[0.186]	[0.379]	[0.702]	[1.016]
Population Change	-0.018	-0.074	0.221*	0.194	1.307***	1.514***	0.054	-0.179
	[0.040]	[0.059]	[0.128]	[0.121]	[0.082]	[0.149]	[0.287]	[0.366]
House Price Change	-0.019	-0.021	0.033	-0.065	-0.006	0.056	0.656***	0.975***
	[0.016]	[0.023]	[0.052]	[0.050]	[0.031]	[0.055]	[0.120]	[0.166]
Employment Rate in 86	1.138	0.881	2.673	5.977**	0.088	1.872	-0.694	12.626
	[0.779]	[1.052]	[3.311]	[2.947]	[1.633]	[2.820]	[7.892]	[10.162]
Ln Mean Real Inc in 86	0.013	0.021	0.976***	0.635***	-0.191***	-0.429***	-0.423*	-0.279
	[0.036]	[0.042]	[0.123]	[0.142]	[0.057]	[0.102]	[0.250]	[0.310]
Ln Population in 86	-0.001	-0.002	-0.001	-0.005	1.018***	1.025***	0.041**	0.013
	[0.003]	[0.004]	[0.009]	[0.009]	[0.005]	[0.009]	[0.020]	[0.025]
Ln Real Mean Hse Prc in 86	0.009	-0.006	0.025	-0.036	0.042	0.135***	0.962***	1.257***
	[0.017]	[0.019]	[0.044]	[0.048]	[0.026]	[0.046]	[0.087]	[0.124]
R-squared	0.95	0.91	0.96	0.95	1.00	1.00	0.97	0.96
Employment Rate Change	0.866***	0.844***	1.142***	1.590***	0.059	0.319	0.518	-1.262
	[0.076]	[0.114]	[0.412]	[0.379]	[0.197]	[0.368]	[0.639]	[0.818]
Population Change	-0.009	-0.041	0.560***	0.466***	1.255***	1.399***	0.106	-0.172
	[0.030]	[0.047]	[0.173]	[0.160]	[0.120]	[0.225]	[0.292]	[0.318]
House Price Change	-0.021	-0.027	-0.069	-0.131**	0.031	0.131**	0.424***	0.892***
	[0.013]	[0.019]	[0.060]	[0.059]	[0.031]	[0.063]	[0.148]	[0.146]
Employment Rate in 86	0.890***	0.822***	2.768***	3.016***	-0.500**	-0.776*	-1.539*	0.646
	[0.092]	[0.138]	[0.428]	[0.508]	[0.211]	[0.401]	[0.907]	[0.858]
Ln Mean Real Inc in 86	-0.019	-0.048	0.819***	0.461***	-0.267***	-0.466***	-0.259	-0.239
	[0.024]	[0.029]	[0.100]	[0.120]	[0.049]	[0.094]	[0.186]	[0.226]
Ln Population in 86	0.000	-0.001	0.015**	0.010	1.008***	1.005***	0.042*	-0.001
	[0.002]	[0.003]	[0.008]	[0.009]	[0.005]	[0.010]	[0.023]	[0.016]
Ln Real Mean Hse Prc in 86	0.013	-0.003	-0.098**	-0.137***	0.135***	0.296***	1.001***	1.273***
	[0.011]	[0.013]	[0.041]	[0.047]	[0.025]	[0.049]	[0.083]	[0.088]
R-squared	0.95	0.89	0.91	0.90	1.00	1.00	0.96	0.96
Observations	140	140	140	140	140	140	139	139

Note: All regressions are weighted by the 1986 working-age population in each LMA and robust standard errors are in brackets. The estimates in the first panel control for demographic characteristics in 1986. In addition to these controls, the results reported in second panel also control for the industry and occupation composition in each LMA in 1986. The estimates in the third panel control for demographic characteristics in 1986 (excluding qualifications) and education, industry and occupation skill indices in 1986.

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 5: Regression Estimates of the Impact of Economic Shocks on Skill Upgrading in 1996 and 2001

	Industry Skill Index		Occupation Skill Index		Qualifications Skill Index		Quals Skill Index (Employ)	
Variable in 1986	1996	2001	1996	2001	1996	2001	1996	2001
Employment Rate Change	0.303***	0.196***	0.258***	0.147**	0.123***	0.120**	0.053*	0.020
	[0.069]	[0.067]	[0.056]	[0.063]	[0.033]	[0.049]	[0.030]	[0.044]
Population Change	0.019	0.015	0.034*	0.022	-0.003	0.006	-0.012	0.015
	[0.024]	[0.027]	[0.020]	[0.022]	[0.015]	[0.020]	[0.012]	[0.016]
House Price Change	-0.012	-0.009	-0.020**	-0.014	0.005	0.004	0.005	0.005
	[0.010]	[0.011]	[0.009]	[0.010]	[0.005]	[0.007]	[0.005]	[0.006]
Employment Rate in 86	0.108	-0.009	0.230***	0.097	0.088**	0.089**	0.058*	0.061*
	[0.079]	[0.081]	[0.050]	[0.060]	[0.034]	[0.043]	[0.030]	[0.034]
Ln Mean Real Inc in 86	0.086***	0.093***	0.067***	0.062***	0.010	-0.003	0.013*	-0.011
	[0.013]	[0.013]	[0.012]	[0.013]	[0.009]	[0.012]	[0.007]	[0.010]
Ln Population in 86	0.004**	0.003	0.004***	0.004***	0.001	0.004***	0.001*	0.003***
	[0.002]	[0.002]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]
Ln Real Mean Hse Prc in 86	0.011	0.009	0.011	0.011	-0.006	-0.010*	-0.011***	-0.007
	[0.008]	[0.008]	[0.007]	[0.007]	[0.005]	[0.005]	[0.004]	[0.005]
R-squared	0.92	0.88	0.96	0.94	0.96	0.96	0.97	0.97
Employment Rate Change	0.318***	0.233***	0.291***	0.217***	0.107**	0.126**	0.051	0.013
	[0.059]	[0.063]	[0.042]	[0.056]	[0.041]	[0.050]	[0.033]	[0.046]
Population Change	0.011	0.004	0.015	-0.001	0.006	0.003	0.005	0.020
	[0.021]	[0.024]	[0.016]	[0.021]	[0.017]	[0.018]	[0.014]	[0.017]
House Price Change	-0.006	-0.005	-0.003	0.002	-0.005	0.003	-0.004	0.001
	[0.009]	[0.011]	[0.008]	[0.010]	[0.007]	[0.008]	[0.006]	[0.007]
Employment Rate in 86	-0.190	-0.380	0.235	0.096	0.274	-0.210	0.190	-0.314
	[0.536]	[0.561]	[0.403]	[0.457]	[0.327]	[0.391]	[0.287]	[0.316]
Ln Mean Real Inc in 86	0.042**	0.054***	0.033**	0.032*	0.025*	-0.001	0.015	-0.011
	[0.018]	[0.018]	[0.015]	[0.017]	[0.014]	[0.017]	[0.010]	[0.015]
Ln Population in 86	0.002	0.001	0.000	0.000	0.003**	0.003**	0.002**	0.004***
	[0.002]	[0.002]	[0.001]	[0.002]	[0.001]	[0.001]	[0.001]	[0.001]
Ln Real Mean Hse Prc in 86	0.006	0.002	0.009	0.006	-0.009	-0.009	-0.013***	-0.007
	[0.008]	[0.007]	[0.007]	[0.008]	[0.006]	[0.006]	[0.004]	[0.006]
R-squared	0.97	0.94	0.98	0.97	0.97	0.96	0.98	0.98
Employment Rate Change	0.374***	0.271***	0.343***	0.257***	0.154***	0.160***	0.108**	0.066
	[0.039]	[0.043]	[0.041]	[0.055]	[0.046]	[0.054]	[0.043]	[0.047]
Population Change	0.043***	0.044***	0.036*	0.030	0.013	0.021	0.004	0.029
	[0.014]	[0.017]	[0.018]	[0.023]	[0.019]	[0.022]	[0.020]	[0.021]
House Price Change	-0.010	-0.008	-0.007	-0.001	0.009	0.009	0.013	0.012*
	[0.007]	[0.008]	[0.007]	[0.009]	[0.007]	[0.008]	[0.008]	[0.007]
Employment Rate in 86	0.185***	0.130**	0.194***	0.139**	0.198***	0.221***	0.207***	0.213***
	[0.039]	[0.057]	[0.045]	[0.063]	[0.051]	[0.061]	[0.060]	[0.057]
Ln Mean Real Inc in 86	0.003	0.011	-0.001	-0.016	0.002	-0.025*	-0.008	-0.035**
	[0.011]	[0.013]	[0.012]	[0.015]	[0.013]	[0.014]	[0.013]	[0.013]
Ln Population in 86	0.001	0.000	0.001	0.002*	0.001	0.004***	0.002	0.003**
	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]
Ln Real Mean Hse Prc in 86	0.007	0.006	0.007	0.007	-0.013**	-0.013**	-0.017***	-0.009*
	[0.005]	[0.005]	[0.005]	[0.006]	[0.005]	[0.005]	[0.005]	[0.005]
R-squared	0.97	0.94	0.97	0.96	0.93	0.94	0.93	0.95
Observations	140	140	140	140	140	140	140	140

Note: All regressions are weighted by the 1986 working-age population in each LMA and robust standard errors are in brackets. The estimates in the first panel control for demographic characteristics in 1986. In addition to these controls, the results reported in second panel also control for the industry and occupation composition in each LMA in 1986. The estimates in the third panel control for demographic characteristics in 1986 (excluding qualifications) and education, industry and occupation skill indices in 1986.

* significant at 10%; ** significant at 5%; *** significant at 1%

Figure 1: Spatial Distribution of Impact of Economic Reforms on Communities

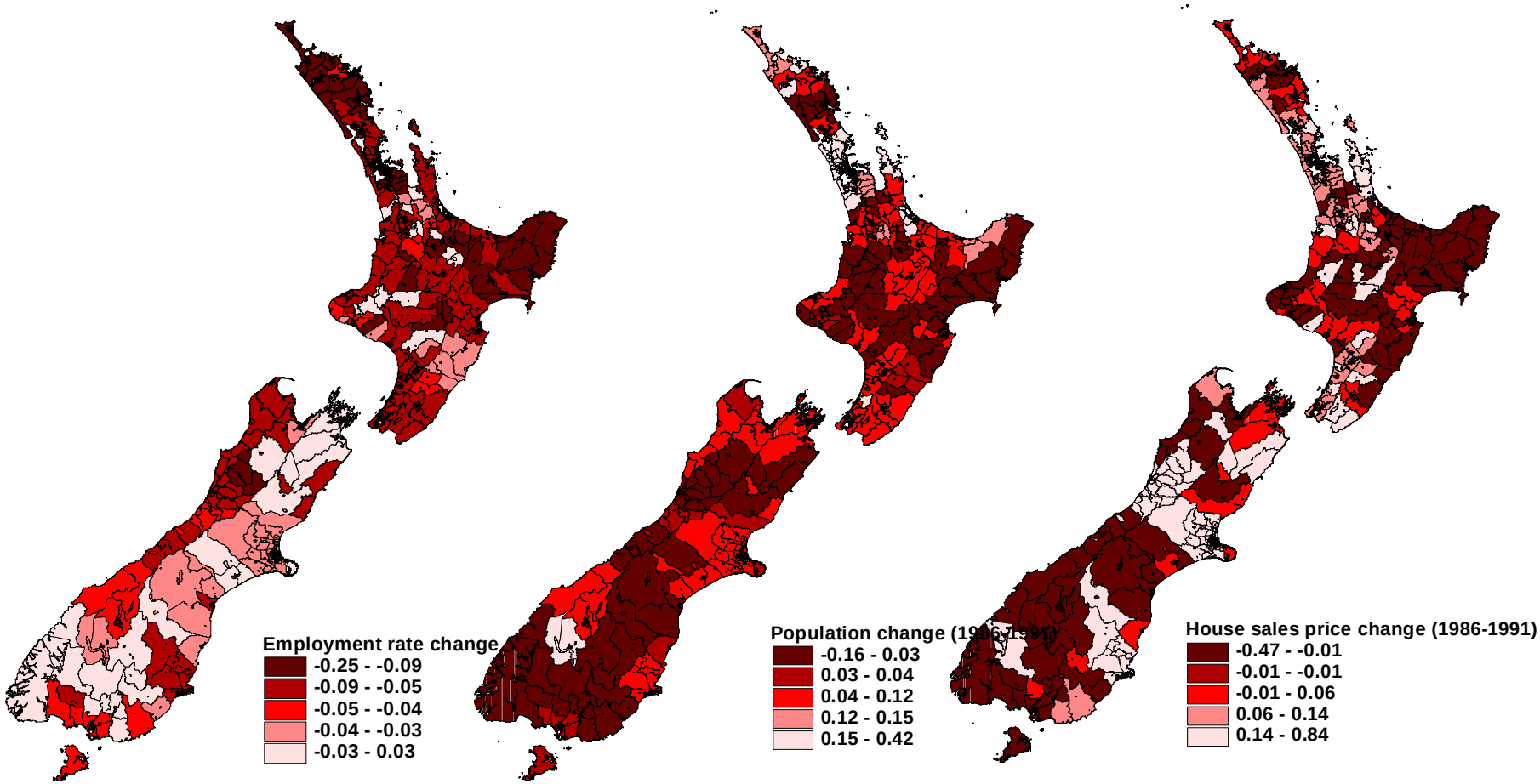


Figure 2: Relationship between Initial Conditions and the Impact of Economic Reforms on Communities

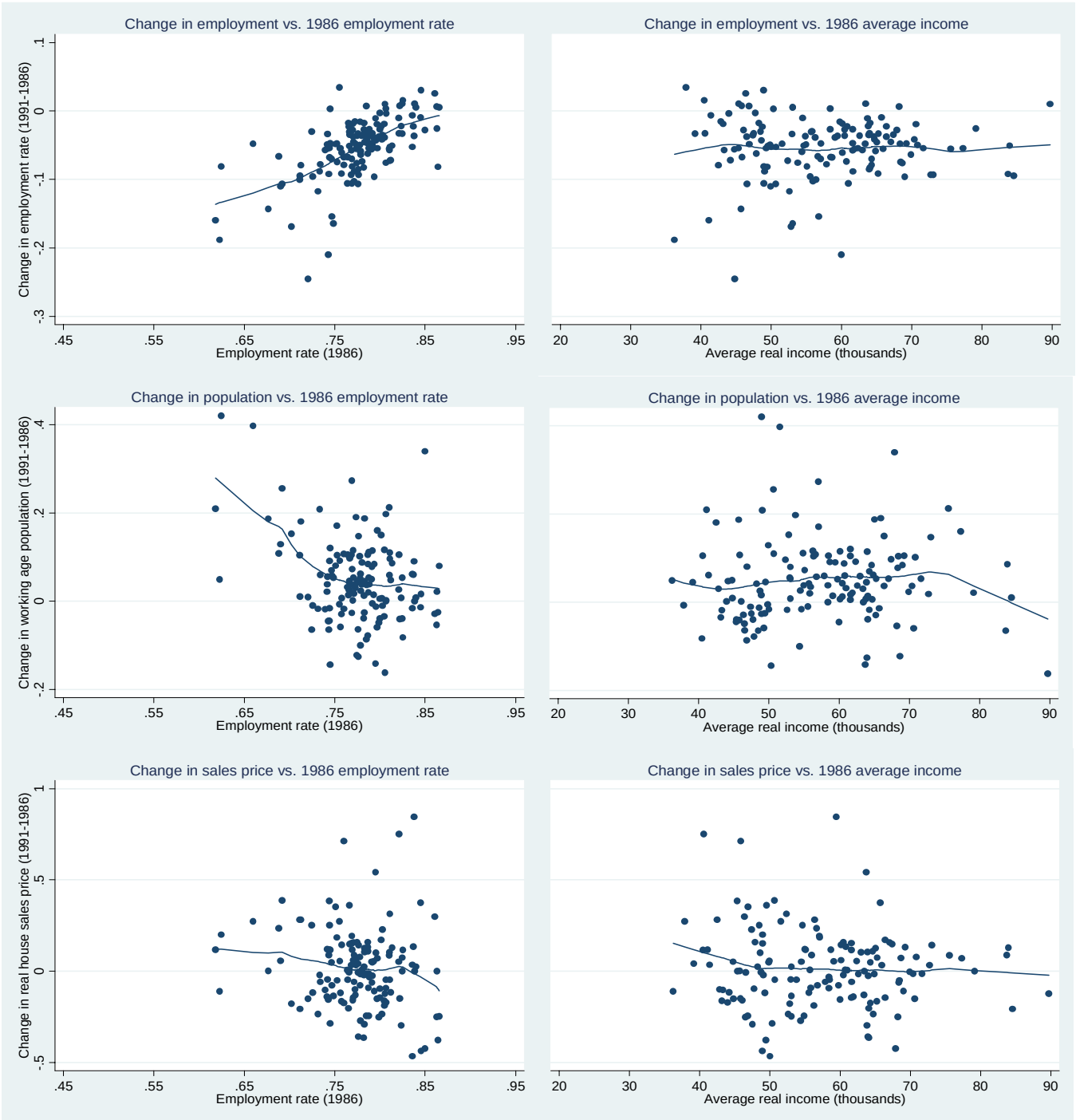


Figure 3: Relationship between the Impact of Economic Reforms on Communities and Long-Run Outcomes

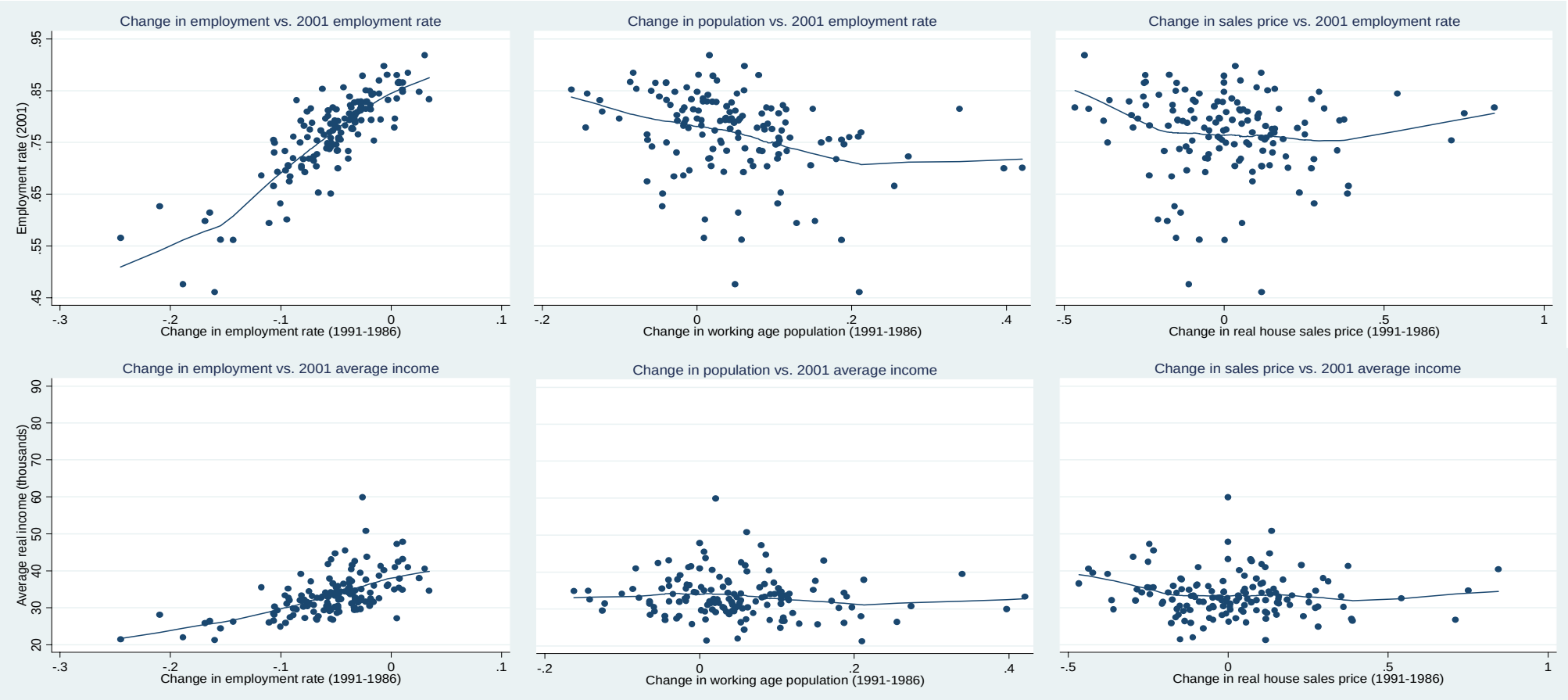
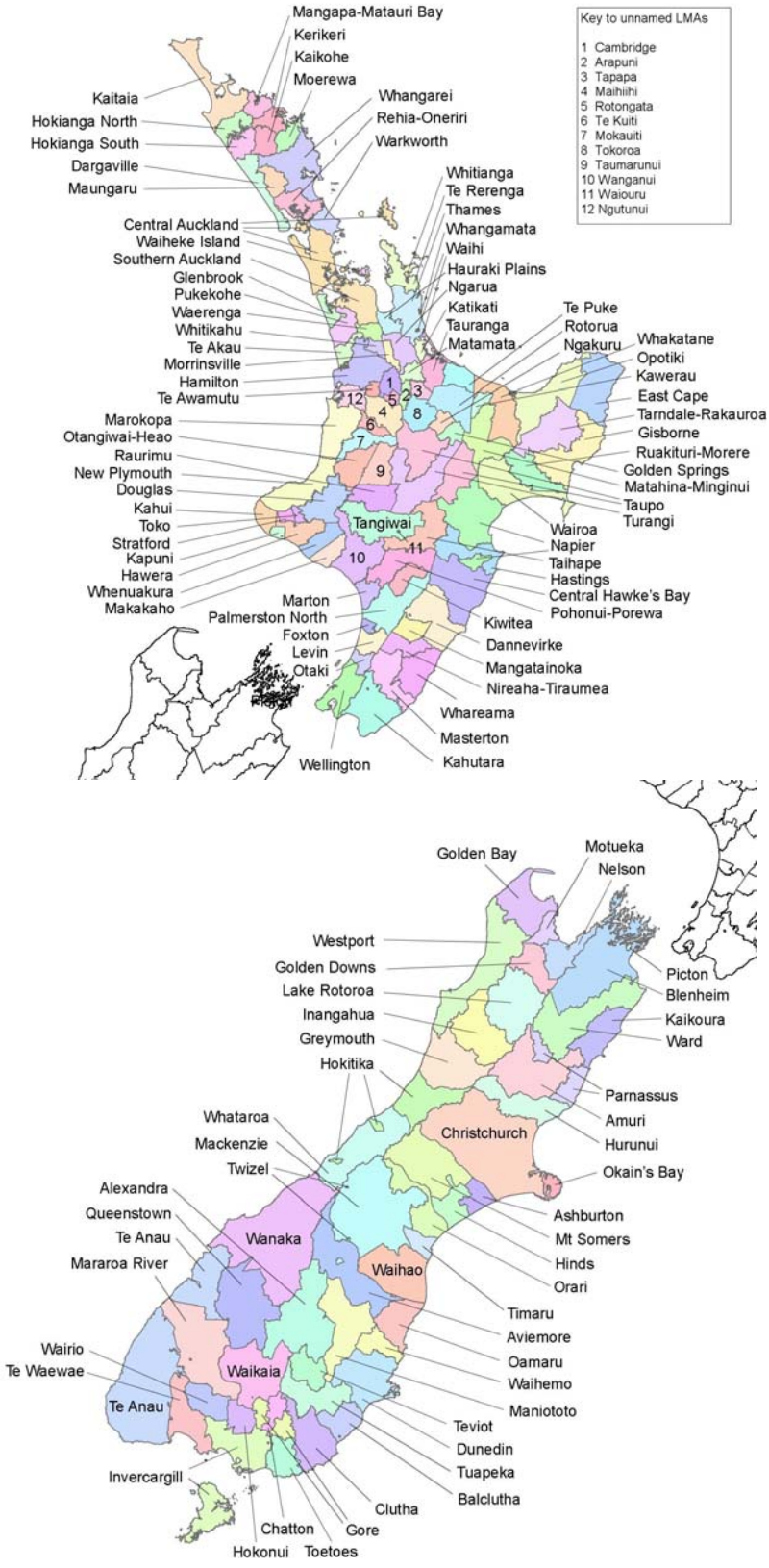


Figure A1: New Zealand Labour Market Areas



Appendix Table B1: Summary Statistics for Economic Conditions in each LMA: Mean (Standard Deviation)

	1986	1991	1996	2001
Employment Rate	0.78	0.72	0.74	0.76
	(0.02)	(0.04)	(0.04)	(0.04)
Log Real Mean Income	11.15	10.62	10.40	10.49
	(0.14)	(0.16)	(0.15)	(0.15)
Log Population	10.56	10.65	10.76	10.79
	(1.60)	(1.63)	(1.66)	(1.70)
Log Real Mean House Sales Price	11.63	11.70	11.88	11.99
	(0.51)	(0.39)	(0.43)	(0.49)
Industry Skill Index	0.37	0.35	0.33	0.36
	(0.03)	(0.03)	(0.03)	(0.02)
Occupation Skill Index	0.38	0.36	0.34	0.38
	(0.03)	(0.03)	(0.03)	(0.03)
Qualification Skill Index	0.36	0.38	0.34	0.36
	(0.02)	(0.02)	(0.02)	(0.03)
Qualification Skill Index (Employed Only)	0.43	0.45	0.42	0.45
	(0.02)	(0.02)	(0.02)	(0.03)
Communities	140	140	140	140

Note: All variables refer to the working-age population. Summary statistics are weighted by the working-age population in each community in 1986. Detailed variables descriptions are available in the paper.

Appendix Table B2: Summary Statistics for Sociodemographic Characteristics in each LMA in 1986

	Mean	Std. Dev.
Aged 25-29	0.21	0.01
Aged 30-34	0.20	0.01
Aged 35-39	0.19	0.01
Aged 40-44	0.15	0.01
Aged 45-49	0.13	0.01
Aged 50-54	0.12	0.01
Female	0.50	0.01
Maori	0.10	0.08
Non-European/Pakeha, Non-Maori	0.06	0.05
Foreign-born	0.19	0.08
No Qualifications	0.36	0.06
School Qualifications	0.20	0.02
Post-School Qualifications	0.30	0.02
University Degree	0.07	0.03
Missing Qualifications	0.06	0.01
Professional,Technical & Related Workers	0.17	0.04
Administrative & Managerial Workers	0.06	0.03
Clerical & Related Workers	0.16	0.04
Sales Workers	0.10	0.02
Service Workers	0.10	0.03
Production, Transport, Labourers and Related Workers	0.29	0.06
Agricultural, Forestry & Fishery Workers	0.11	0.13
Missing occupation	0.01	0.00
Agriculture, Hunting, Forestry and Fishing	0.09	0.11
Mining and Quarrying	0.00	0.01
Manufacturing	0.16	0.06
Electricity, Gas and Water	0.01	0.01
Construction	0.06	0.02
Wholesale and Retail Trade, Restaurants and Hotels	0.14	0.03
Transport, Storage and Communication	0.06	0.02
Finance, Property and Business Services	0.06	0.03
Community, Social and Personal Services	0.20	0.05
Missing industry	0.23	0.02

Note: All variables refer to the working-age population. Summary statistics are weighted by the working-age population in each community in 1986. Detailed variables descriptions are available in the paper.

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