Can we level the playing field? A comparative analysis of the levels of labour productivity between industries in New Zealand

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Abstract

Analysing labour productivity levels is important because it can help improve our understanding of New Zealand's productivity performance relative to other countries (notably Australia). In this paper, we use Statistics NZ's recently released information on levels of labour hours paid to carry out a shift-share analysis. Shift-share analysis enables us to recognise the shifts in employment among industries that have different levels of labour productivity. As the movement of resources (specifically labour) from low productivity to high productivity industries directly affects a nation's average productivity level, recognising these shifts is important to help explain the income gap with Australia. The results show that historically, New Zealand has been directing resources toward lower productive industries, and only in recent years have we begun to change our economic structure in a way that is conducive for overall productivity growth.

Introduction

Since the release of the Organisation for Economic Co-operation and Development's (OECD) estimates of productivity growth in the OECD Productivity Database in 2004, international attention has turned towards productivity levels. Currently, several statistical agencies, international organisations, academic institutions, and private institutions[1] release estimates of labour productivity levels. While there are differences in the coverage and methods of these estimates, as well as a lack of international guidelines or best practices for the measurement of productivity levels across countries, efforts to standardise the differences in methodologies are ongoing.

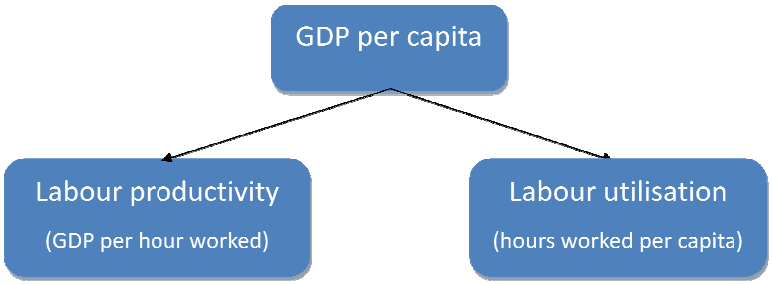
Estimates of productivity growth serve as a measure of economic performance in many countries, and are therefore important for policy analysis. Productivity levels can provide additional information and insight than growth rates. In particular, they can highlight gaps between industries and "inform policy making in light of [possible divergence and], catch-up and convergence" (Van Ark & Timmer, p3, 2006).

Productivity is a measure of how efficiently inputs (capital and labour) are used within the economy to produce outputs. Productivity is commonly defined as a ratio of a volume measure of output to a volume measure of input. Growth in productivity means that an industry or economy can, for example, produce more output from the same amount of input, or the same level of output from fewer inputs. Labour productivity is the most widely used productivity measure. It is a single-factor[2] measure, meaning that it captures only one dimension of "how well the economy is doing in terms of transforming inputs into outputs" (Baldwin, Maynard, Tanguay, Wong, & Yan, 2005, p10). Labour productivity growth is important because it is closely related to gross domestic product (GDP) per capita. GDP per capita is a commonly used measure of living standards. Growth in GDP per capita can come from one of two sources (see figure 1):

[1] United Kingdom's Office of National Statistics (ONS), United States Bureau of Labor Statistics, Statistics Canada, Eurostat, the International Labour Organisation, Groningen Growth and Development Centre, and the Conference Board.

[2] It is assumed that the reader has fundamental knowledge of how productivity is compiled and how to interpret partial measures of productivity. For more detail refer to Appendix 1.

Figure 1
Decomposition of GDP per capita



Historically, productivity analysis in New Zealand using official statistics has focused on growth rates rather than levels. This is due to a number of factors:

- Until recently, only productivity growth rates were available from official statistics.
- Differences in the way inputs and outputs are measured across countries can invalidate cross-country comparisons of GDP per hour.
- Robust purchasing power parities at an industry level are not available.

In March 2012, Statistics NZ released information on levels of labour hours paid to supplement the official productivity growth series. Hours paid data enables the compilation of industry productivity estimates of GDP per hour paid, or productivity levels. Levels of labour hours paid are sourced from Statistics NZ's labour volume series. Like the productivity growth series, the levels of labour hours paid cover industries in the measured sector of the economy.

Using the hours-paid data we can carry out a shift-share analysis to investigate how New Zealand's aggregate productivity growth rate can be affected by changes in the industrial composition of employment.[3] A shift-share analysis decomposes aggregate labour productivity growth into the contribution from productivity growth in each industry and the shift of employment between industries. This is important for understanding the income gap with Australia because output per capita differences can be traced back to the industry level.

In this paper we focus on the relationship between labour productivity growth and structural change in industries in New Zealand. Our analysis uses the levels of labour hours paid data, where hours paid are used as a proxy for employment. This paper is divided into five sections. 'Context' provides some background about this analysis and describes New Zealand's productivity problems. 'Industry labour hours paid' explains why aggregate labour productivity differentials can be accounted for at the industry level. 'Methodology' outlines the theory and methodology used in shift-share analysis. 'Results' presents the results from our shift-share analysis. The final section outlines the implications of our results for narrowing the income gap with Australia, and suggests possible extensions and future work.

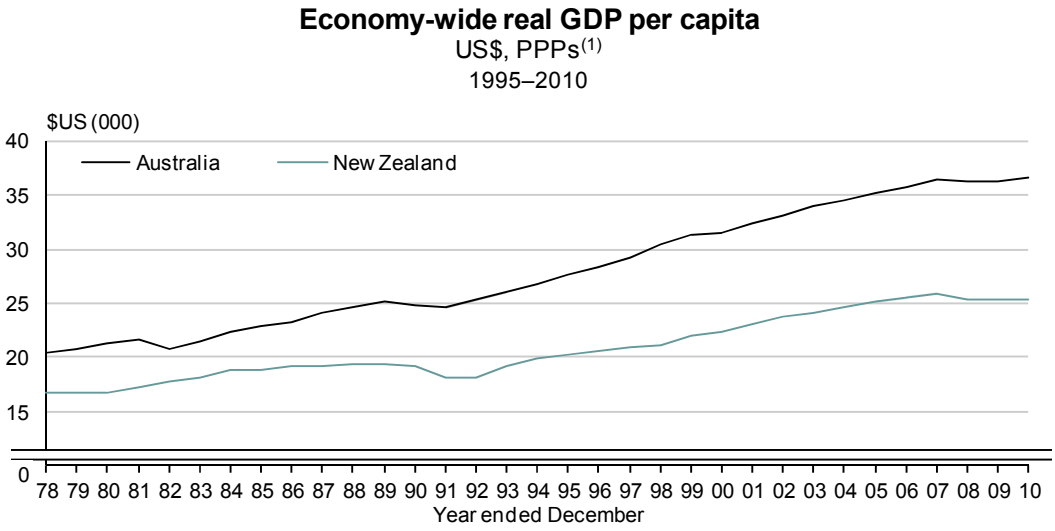
Context

Analysing levels of labour productivity is of special interest to New Zealand because they can help improve our understanding of New Zealand's productivity performance relative to other countries (notably Australia). The 2025 Taskforce (2009) approximated that Australian incomes (as represented by GDP per capita) were (in 2009) 35 percent higher than those in New Zealand. To close this gap, the Taskforce identified labour productivity as a key driver to increasing our production per capita. Figure 2 indicates the extent of this gap. In 2010, GDP per capita in US dollars for 2005 (ie in constant prices and purchasing power parity exchange rates based on the

[3] Labour hours are used as a proxy for employment.

reference year 2005) was $36,570 in Australia (the sixth highest of OECD countries) and $25,306 in New Zealand (the 23rd highest of OECD countries). To close the gap New Zealand would have to raise its labour productivity growth rate to around 3 percent or more, per year.

Figure 2
Australia and New Zealand GDP per capita gap

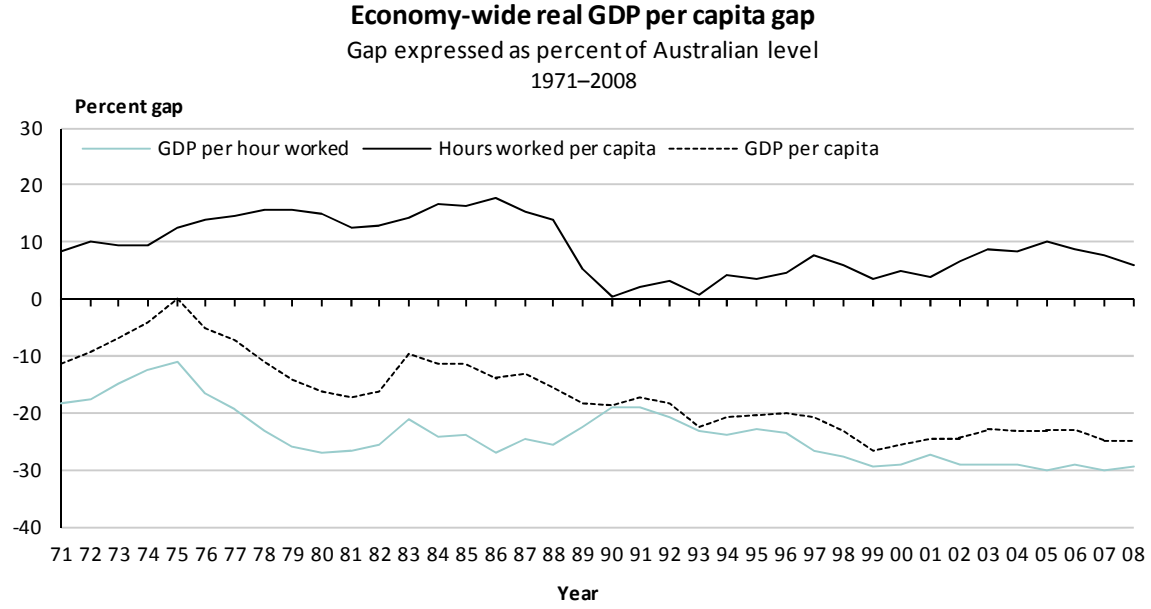


1. Calendar years in constant prices using purchasing power parity exchange rates based on reference year 2005.

Source: OECD

At the aggregate level, levels of labour productivity can be combined with measures of labour utilisation to provide information on cross-country differences in per capital income levels (Van Ark & Timmer, 2006, p8). Figure 2 outlines a decomposition of the gap between New Zealand and Australia GDP per capita growth into these two components (Statistics NZ, 2010).

Figure 3



Source: OECD

The above graph shows that empirically, holding all else equal, the divergence in labour productivity growth has been the key determinant of the gap in GDP per capita between New Zealand and Australia (Mason & Osborne, 2007).

At the industry level, differences in labour productivity levels indicate the potential for catch up relative to productivity leaders. The differentials capture differences in technology, intangibles, human capital, quality of capital, and capital intensity (Van Ark & Timmer, 2006, p8).

Industry labour hours paid

GDP per capita differences (and aggregate productivity differences) can be traced back to the industry-level. This is because aggregate labour productivity growth can be disaggregated to contributions from each industry. Aggregate labour productivity growth can be expressed as the weighted contribution of industry labour productivity growth plus a residual that reflects the effect of the reallocation of hours between industries. This implies that the overall productivity growth rate reflects not only the rate of growth of productivity in individual industries, but also the change in the industrial composition over time (Biatour, Fiers, Kegels, & Michel, 2007, p32). Productivity developments at the industry-level allow us to identify the main drivers of labour productivity growth at the aggregate level.

Statistics NZ's labour hours paid data is an hours-paid measure which covers industries in the measured sector[4] of the economy. Levels of labour hours paid are sourced from Statistics NZ's LVS. This series was the preferred source for an official industry labour hours-paid series because the LVS provides a more robust measure of labour hours at the industry level (Statistics NZ, 2012).

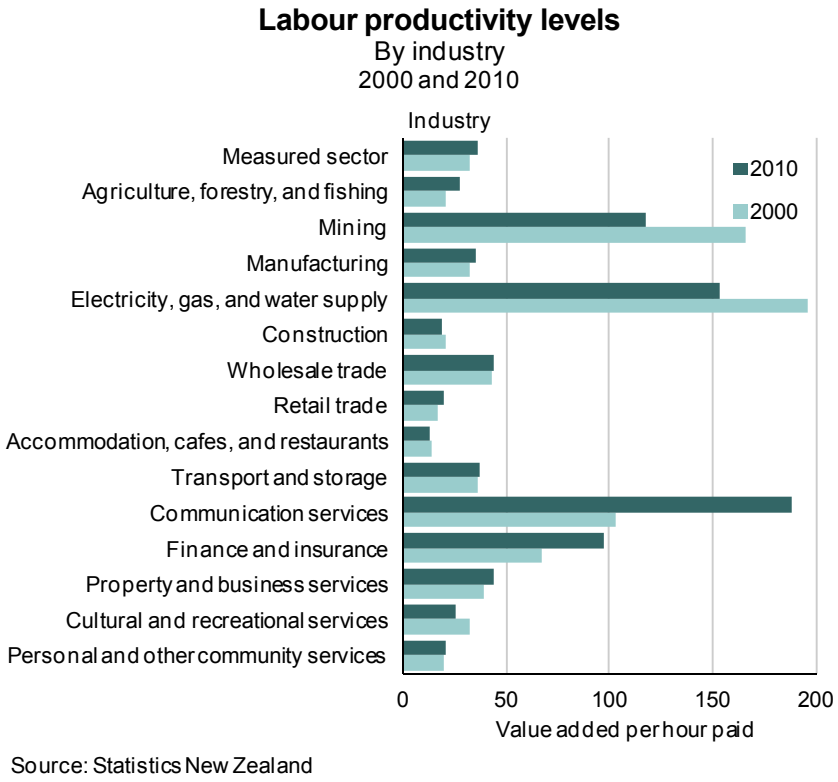
Hours paid data enables the compilation of industry productivity estimates of GDP per hour paid, or productivity levels. However, it is important to note that interpreting a measure of labour productivity levels that is based on hours-paid should be done alongside a productivity growth series. This is because growth rates enable labour productivity growth to be decomposed into contributions from capital deepening, and growth in multifactor productivity (MFP). A labour productivity level series does not factor in other inputs.

In general, average productivity levels vary considerably by industry. Analysis using the labour hours paid data has shown that from 2000 to 2010, GDP per hour paid in the measured sector increased from $32.0 to $36.3[5] (see figure 3).Over this period, the differences in labour productivity levels between the high- and low-productive industries was substantial. In 2010, GDP per hour paid was highest in the communication services industry (over five times that of the measured sector); followed by electricity, gas and water supply; and mining. The top three performers in 2010 were also the industries with the highest levels of labour productivity in 2000. In contrast, accommodation, cafes, and restaurants recorded the lowest level of labour productivity throughout the 2000–10 period. Construction recorded the second lowest level of labour productivity in 2010, followed by retail trade; and personal and other community services (Statistics NZ, 2012).

A key reason for these differences are the varying rates of capital intensity between the low productive and high productive industries. For example, the highly labour productive communication services industry is highly capital intensive with relatively little labour input. In contrast, the lower productive industries such as accommodation, cafes, and restaurants and cultural and recreational services have been experiencing a decline in capital available per worker from 2007 (Statistics NZ, 2012). Moreover, industries such as agriculture, forestry, and fishing; construction; and retail trade also recorded relatively low levels of labour productivity in 2000 and 2010. Again, this is predominantly due to the relative labour-intensive nature of these industries.

[4] See the Methodology section for industry coverage of the measured sector.
[5] GDP (or value added) per hour paid is expressed in 1995/96 New Zealand dollars.

Figure 4



Source: Statistics New Zealand

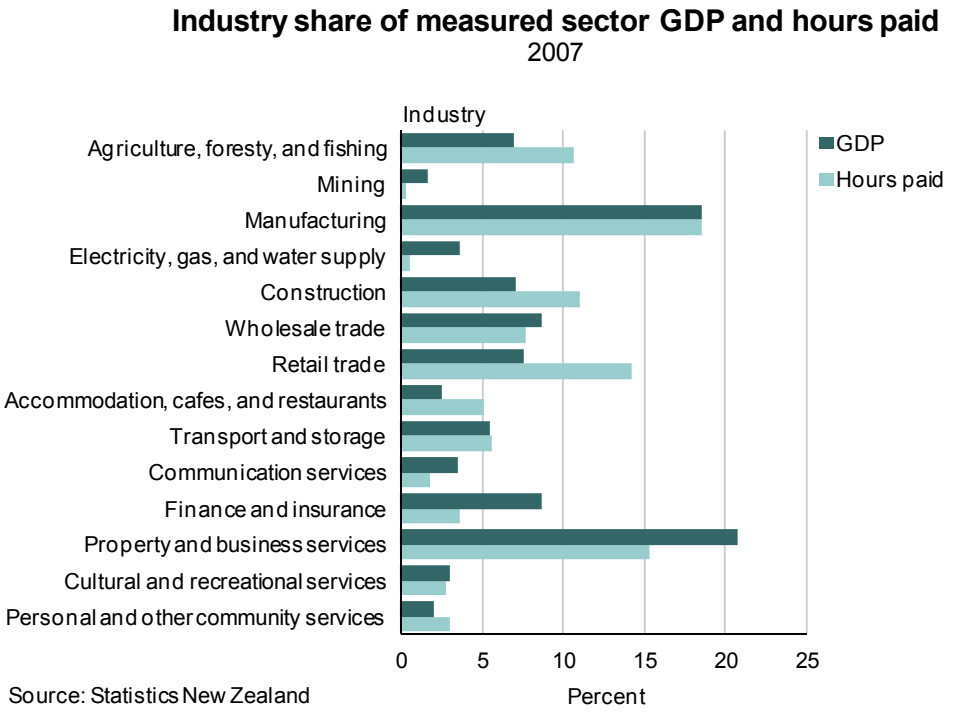
Industry-level analysis of labour productivity also illustrates how a nation's aggregate productivity growth rate can be affected by changes in the industrial composition of employment (where labour hours are used as a proxy for employment). For example, while the labour productivity levels for the top performing industries were markedly high in New Zealand, these industries remain relatively small in terms of their current-price GDP proportions and labour hours share. Therefore, they have less impact on the aggregate labour productivity level. Previous analysis revealed that the property and business services industry is the largest industry for which labour productivity is compiled in New Zealand. Therefore, although it is not a stand-out performer (it recorded labour productivity that was only 22 percent higher than for the measured sector), the large weight of this industry means that its productivity growth provides a strong positive contribution to aggregate labour productivity (Statistics NZ, 2012).

In addition, the sectoral structure in New Zealand has changed considerably over the last century. For instance, agriculture (which has traditionally been important to New Zealand), is now providing a declining contribution to GDP (see figure 4), as is the case in most OECD countries[6] (Ministry of Economic Development, 2011). The share of the goods-producing sector[7] in New Zealand has also been decreasing over the past 20 years – reflecting the relative decline in manufacturing's economic contribution and the sector's minimal labour productivity growth. Despite this, manufacturing had the highest share of hours paid in the measured sector in 2007, as well as a similar proportion of GDP to its share of hours paid. In contrast, the share of the service-sector has been expanding, indicating the high weight the service industries have in the

[6] Agriculture, forestry, and fishing has a markedly higher share of hours paid than of GDP reflecting its labour-intensive nature.
[7] The goods-producing sector comprises these ANZSIC96 industries: manufacturing; electricity, gas, and water supply; and construction.

measured sector. For instance, the property and business services industry recorded the highest share of GDP in 2007.[8]

Figure 5



Methodology

To empirically investigate how aggregate productivity is mechanically linked to differential levels of labour productivity and the reallocation of labour between industries, shift-share analysis can be employed. Shift-share analysis was first introduced by Fabricant (1942) to study the relationship between productivity and the movement of labour. Today, the method is frequently used by economic historians, economic geographers, trade analysts, and industrial economists to decompose overall productivity growth.

The relationship between the economic structure of a country and its productivity growth can help explain why some countries enjoy higher rates of productivity growth compared with other countries. Traditionally, those nations that specialise in technologically progressive industries tend to have higher rates of productivity growth, as opposed to those who undertake relatively low-tech activities (Fagerberg, 2000, p394). This may imply slower growth in welfare in the latter. In this case, it is in a country's best interest to change its pattern of specialisation towards more productive (and promising) industries.

Salter (1960) investigated the role of technical change on productivity and found that the scope for technological productivity advancement differed significantly across industries. This implied that "a flexible structure of production is an important element in the high rate of productivity increase, for it allows an economy to rapidly redistribute its resources so as to take maximum advantage of changing patterns of technological progress" (Salter, 1960, p9). Salter's empirical analysis of productivity growth in the United Kingdom in the first half of the 20th century showed that this flexibility (that is, the ability to undertake structural change) is equally important as

[8] The industry's larger share of GDP than share of hours paid reflects its relative capital-intensive nature.

productivity increases within individual industries. Furthermore, the growth accounting literature also emphasises “structural change as a major impetus to growth” (Fagerberg, 2000, p394).

More recently, Fagerberg (2000) investigated the impact of specialisation and structural changes on productivity growth in manufacturing. This stems from the evidence of several theoretical models, which now suggest that countries that specialise in technologically progressive industries will enjoy higher growth rates than other countries (see Massell, 1961). Fagerberg used a sample of 39 countries and 24 industries for the period 1973–1990. The results found that while structural change has not encouraged growth in productivity, the countries that increased their presence in the electronics industry (the technologically most progressive industry in this period) experienced higher productivity growth than other countries.

Shift-share theory

Shift-share analysis decomposes aggregate labour productivity growth between two years into two main effects:

1. a within-industry effect
2. a between-industry effect.

The within-industry effect measures the contribution of growth within individual industries to aggregate labour productivity growth. The contribution is weighted by the share of these industries in total hours paid.

The between-industry effect represents the shifts in hours paid shares among industries with differing rates of labour productivity growth. It is important to note that the change over time in the industry composition of labour inputs (hours paid) can have both static and dynamic effects on overall labour productivity. This is because industries not only differ in their productivity levels, but also in their productivity growth rates. Therefore, the between-industry effect can be broken down into a static-shift effect and a dynamic-shift effect. The between-industry effect will be negative if some industries that increase productivity faster than average have declining shares of employment.

The between-industry effect can be decomposed further into:

- a static-shift effect
- a dynamic-shift effect.

The static-shift effect weights the changes in hours paid shares with the level of productivity in the previous year. The static-shift effect will be positive if there is a net shift in hours paid shares to high productive industries. Therefore, this effect reflects the ability of a country to move resources from low to high productivity industries.

The dynamic-shift effect (also known as the interaction-effect) weights the change in hours paid shares with the change in labour productivity. In general, the dynamic-shift effect reflects “the ability of a country to reallocate its resources towards industries with rapid productivity growth” (Fagerberg, 2000, p402). It will be positive if the fast-growing labour productivity industries also increase their share of employment. A positive dynamic-shift effect supports the structural bonus hypothesis which postulates “a positive relationship between structural change and economic growth, based upon the assumption that during the process of economic development, economies upgrade from industries with comparatively low to those with a higher value added per labour input” (Peneder, 2003, p2). A reallocation of labour hours toward industries with higher productivity levels occurs because firms in these industries can afford to pay higher wages and therefore, attract higher-skilled, mobile workers.

In this paper we apply the same methodology as presented in Fagerberg (2000). Our choice of labour input is labour hours paid, and output. Total labour productivity can be decomposed as follows:

Define labour productivity as: $= \frac{Y}{H}$, where Y is value added and H is labour hours paid.

In a time perspective: $LP_{I,t} = \frac{Y_{I,t}}{H_{I,t}}$,
where t=final year, $t-1$=base year, and I=sum over industries i.

Therefore growth in labour productivity is given by:

(1)

$$\Delta LP = \frac{LP_{I,t} - LP_{I,t-1}}{LP_{I,t-1}}.$$

We define the share of industry i in total measured sector labour hours paid as: $S_{i,t} = \frac{H_{i,t}}{H_{I,t}}$.

This gives us:

(2)

$$\Delta LP = \frac{\sum_{i=1}^{n}(LP_{i,t} - LP_{i,t-1})S_{i,t-1} + \sum_{i=1}^{n}(S_{i,t} - S_{i,t-1})LP_{i,t-1} + \sum_{i=1}^{n}(LP_{i,t} - LP_{i,t-1})(S_{i,t} - S_{i,t-1})}{LP_{I,t-1}},$$

where:

- the first term on the numerator is the within-industry effect
- the second term on the numerator is the static-shift effect
- the third term on the numerator is the dynamic-shift effect
- and the second and third terms combined is the between-industry effect.

We carry out a dynamic shift-share analysis of labour productivity growth for the seven growth cycles over 1978–2010. Breaking the time series down into growth cycles allows for more meaningful comparisons between sub-periods. The final growth cycles selected also took into account the economic events throughout the series, which justified the cycles generated from the Hodrick-Prescott filter.[9]

Our analysis is based on the disaggregation of 14 industries in the measured sector. The industry coverage is shown in table 1.

Table 1
Productivity industry coverage(1)

Measured sector industries	Omitted industries
A Agriculture, forestry, and fishing	LB Ownership of occupied dwellings
B Mining	M Government administration and defence
C Manufacturing	N Education
D Electricity, gas, and water supply	O Health and community services
F Wholesale trade	
G Retail trade	

[9] Statistics NZ investigated a number of univariate filters to generate cycles over the series, and ultimately the Hodrick-Prescott filter was seen as the most appropriate approach (see Statistics NZ, 2007 for more detail about the methodology for calculating growth cycles).

H Accommodation, cafes, and restaurants	
I Transport and storage	
J Communication services	
K Finance and insurance	
L Property and business services[2]	
P Cultural and recreational services[2]	
Q Personal and other community services[2]	

1 Based on the Australian and New Zealand Standard Industrial Classification 1996 (ANZSIC96).
2 Included from 1996 in the measured sector

Source: Statistics New Zealand

This level of industry detail was selected because the data used to compile labour-input estimates for working proprietors (self-employed) are of a better quality at a more-aggregated industry level. While the growth series are representative at a slightly more-detailed industry level, the level of labour volume tends to be less reliable.

Statistics NZ's labour hours paid data are released for the time series 2000–10. The end-point of the series coincides with the final year of the industry productivity growth series. The series are available for this period for several reasons:

- the Linked Employer-Employee Data (LEED)-based labour volume series (LVS) starts in 2000, and offers a more reliable estimator of working-proprietor counts than the data sources used before 2000
- industry-level Household Labour Force Survey data are not used extensively from this time
- the final year in which detailed LEED data is available for both employees and working proprietors is 2010.

To compute growth in labour productivity before 2000, we used the industry labour volume growth rates previously published by Statistics NZ to estimate hours paid from 1978–2000.

Results

Table 2 shows the results of a dynamic shift-share analysis of labour productivity growth. The change in each growth cycle is calculated as the arithmetic mean of year-on-year percentage changes within each cycle.

Table 2

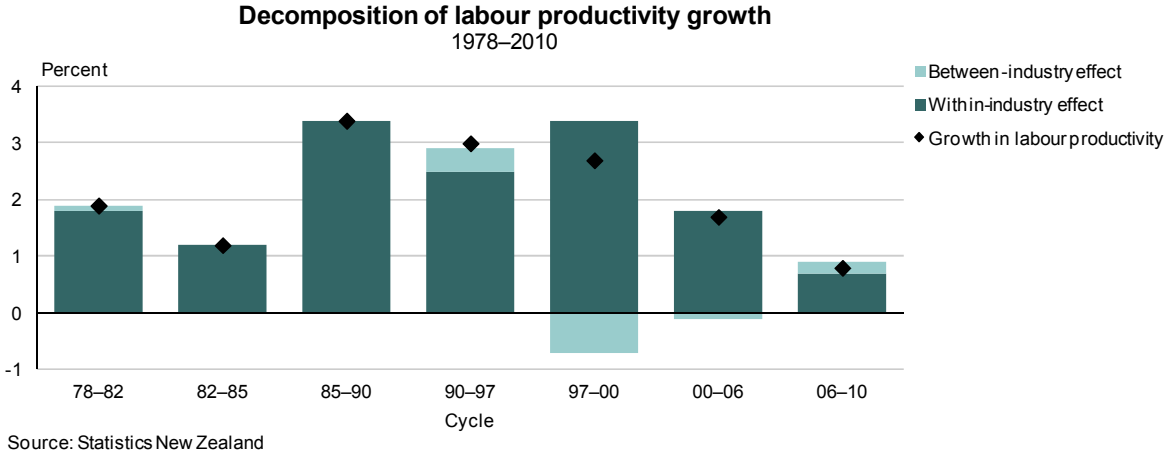
Dynamic shift-share analysis of labour productivity growth [1][2]

			Between-industry effect		
Cycle	Growth in Labour Productivity	Within-industry Effect	Static-shift effect	Dynamic-shift effect	Total between-industry effect
1978-82	1.9	1.8 (95)	0.0 (0)	0.0 (0)	0.1 (5)
1982-85	1.2	1.2 (100)	0.0 (0)	0.0 (0)	0.0 (0)
1985-90	3.4	3.4 (100)	0.1 (3)	-0.1 (-3)	0.0 (0)
1990-97	3.0	2.5 (83)	-2.4 (-80)	2.8 (93)	0.4 (13)
1997-2000	2.7	3.4 (126)	-0.5 (-19)	-0.2 (-7)	-0.7 (-26)
2000-06	1.7	1.8 (106)	0.0 (0)	-0.1 (-6)	-0.1 (-6)
2006-10	0.8	0.7 (88)	0.2 (25)	0.0 (0)	0.2 (25)

1 Percent
2 Figures in parentheses are the percentage share of overall growth in labour productivity.

The results indicate that aggregate growth in labour productivity is largely accounted for by productivity growth within individual industries (the within-effect). This implies that labour productivity within industries is a more predominant source of overall labour productivity growth than the effect of employment shifts between industries or sectors.

Figure 6



Source: Statistics New Zealand

The within-effect remained positive throughout the time series. Table 3 shows the contribution of various industries to the within-effect. From 1985–97, the most significant positive contributor to the within-effect was the agriculture, forestry, and fishing industry. This industry has traditionally been important to the New Zealand economy and has experienced rising output over time. However, the hours-paid share of this industry in the measured sector has been rapidly declining over time (see table 4).

The between-industry effect is positive for most of the seven growth cycles, recording negative values only in the 1997–2000 and the 2000–06 periods. The positive between-industry effect in the most recent cycle (2006–10) indicates a shift of labour input towards industries with a high level of labour productivity. This means that after nearly a decade of directing resources toward lower productive industries, New Zealand has now begun to change its economic structure in a way that is conducive for overall productivity growth.

In the most recent cycle (2006–10) the industries that recorded decreases in their labour productivity were:

- manufacturing (down 0.1 percent)
- construction (down 0.1 percent)
- wholesale trade (down 0.1 percent).

The decline in manufacturing is the driving factor behind the minimal growth (0.8 percent) in aggregate labour productivity for this cycle. This is because manufacturing continues to be the largest industry in New Zealand since the productivity series began in 1978 (contributing 14.9 percent to GDP). However, its hours-paid share has been rapidly declining over time. Therefore, the negative impact of low labour productivity growth in the manufacturing industry on aggregate productivity growth is slightly offset by this industry experiencing declining labour input shares while at the same time, becoming less productive. In this case, the between-industry effect is positive and structural change has a positive impact on overall growth.

In contrast, the construction and wholesale trade industries appear to have increasing labour shares. However, their contribution to overall labour productivity growth is minimal due to their shares being relatively small. In general, less productive industries tend to experience slight increases in their employment shares. This is because such industries are often stagnant and

less progressive. Thus, their low productivity growth means that they automatically have higher labour requirements.

In general, industries that have increased their employment share over time are those in the service sector. In particular, the property and business services industry (L) had the second-largest share of measured sector hours in 2010 (16.0 percent), just behind manufacturing (16.8 percent). However, since 1996, the service industries have made minimal contributions to the within-effect. This implies that the reason for the slow-down in New Zealand's productivity growth is the smaller gains from productivity in the service industries given the increasing share of employment in this sector. Therefore, services should be the priority sector in efforts to raise productivity growth in New Zealand.

Table 3

Decomposition of the within-industry effect by industry
Contribution over cycles 1978–2010

	Cycle						
	1978-82	1982-85	1985-90	1990-97	1997-2000	2000-06	2006-10
Within-Effect [1]	1.8	1.2	3.4	2.5	3.4	1.8	0.7
Agriculture, forestry, and fishing	0.3	0.0	0.8	0.7	0.0	0.3	0.1
Mining	-0.2	0.2	0.1	0.2	0.0	-0.1	0.0
Manufacturing	0.7	0.8	0.8	0.3	0.7	0.4	-0.1
Electricity, gas, and water supply	0.2	0.1	0.2	0.3	0.5	-0.1	0.0
Construction	0.2	0.1	0.1	0.0	0.0	0.0	-0.1
Wholesale trade	0.1	-0.2	0.2	-0.2	0.6	0.1	-0.1
Retail trade	0.0	-0.3	0.1	0.1	0.2	0.2	0.1
Accommodation, cafes, and restaurants	-0.1	-0.1	0.0	0.0	0.0	0.0	0.0
Transport and storage	0.1	0.3	0.6	0.4	0.1	0.0	0.0
Communication services	0.1	0.1	0.5	0.6	0.7	0.5	0.4
Finance and insurance	0.2	0.1	0.0	0.3	0.7	0.3	0.4
Property and business services [2]				-0.1	-0.2	0.3	0.2
Cultural and recreational services [2]				0.0	0.0	-0.1	0.0
Personal and other community services [2]				0.0	0.2	0.0	0.0

1 Industry percentages are not additive due to rounding.
2 Included in the measured sector from 1996 on.

Table 4

Share of measured sector hours paid
Average share over cycles 1978–2010

	Cycle						
	1978-82	1982-85	1985-90	1990-97	1997-2000	2000-06	2006-10
Agriculture, forestry, and fishing	18.3	18.5	17.4	16.5	12.8	12.4	10.6
Mining	0.6	0.6	0.5	0.4	0.3	0.3	0.4
Manufacturing	29.0	28.7	27.6	25.7	21.1	19.8	18.0
Electricity, gas, and water supply	1.3	1.3	1.3	1.1	0.6	0.5	0.6
Construction	10.1	9.5	9.9	9.0	8.6	9.6	11.0
Wholesale trade	8.0	7.9	7.9	8.7	8.1	7.6	7.7
Retail trade	14.1	14.9	15.9	16.3	14.2	14.1	14.2
Accommodation, cafes, and restaurants	3.1	3.5	4.0	4.6	4.7	5.0	5.2
Transport and storage	8.2	7.7	7.4	6.3	5.3	5.5	5.7
Communication services	3.4	3.3	3.2	2.4	1.9	1.7	1.7
Finance and insurance	3.9	4.1	4.9	5.0	3.9	3.4	3.6
Property and business services [1]				2.9	13.3	14.5	15.5
Cultural and recreational services [1]				0.5	2.2	2.6	2.9
Personal and other community services [1]				0.7	3.0	2.9	3.1

1 Included in the measured sector from 1996 on.

Evidence from Australia

A similar industry-level shift-share analysis was carried out by the Australian Treasury for two periods: 2004–05 and 2005–06. The analysis found that in 2005–06, the non-market sector and the mining and construction industries dampened labour productivity. The mining and

construction sectors "subtracted around 0.3 of a percentage point...as a fall in within mining productivity more than offset a strong positive contribution due to an increasing share of employment" (Ewing, Fenner, Kennedy & Rahman, 2007, p14).

The fall in labour productivity in the mining sector was due largely to capital shallowing[10]. This is because there has been a rapid increase in investment in labour in mining in response to large increases in commodity prices. However, at this time (2005–06), it was yet not reflected in higher output. Furthermore, studies (see Gruen & Kennedy, 2006) have shown that it takes around five years for increases in mining investment to be transformed into high output growth. Additionally, decreasing production in the oil sub-industry has also contributed to declining productivity growth in mining.

Conclusion

This paper focused on the impact of structural changes on labour productivity growth in measured sector industries in New Zealand. It was based upon previous shift-share analyses and studies that showed that structural change played an important role for aggregate productivity growth. The results reported here, based on the 14 industries in the measured sector between 1978 and 2010, indicate that structural change does matter. From 1997 to 2006, New Zealand has been directing its labour resources towards low productive industries, resulting in reduced productivity gains at the aggregate level. However more recently, New Zealand has begun to change its economic structure, shifting employment toward high productive industries.

Potential future work includes carrying out a similar shift-share analysis for Australia to make cross-country comparisons, and using econometric testing to validate our results.

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