Appendix I Application of ICT in retail and wholesale

The Commission selected the retail and wholesale trade industries as a case study of how ICT raises productivity in services and how the barriers discussed in Chapter 9 may play out in practice. The retail and wholesale industries account for 10% of New Zealand's GDP.

During the 1990s ICT helped to boost labour productivity growth in retail and wholesale in North America and Australia. The New Zealand retail and wholesale industries have used ICT with increasing intensity over the last 25 years (Statistics New Zealand, 2013). Despite this increase, labour productivity in retail and wholesale remains much lower in New Zealand than Australia with little sign of catch-up over the last 15 years.

This appendix looks at how ICT has contributed to productivity growth in retail and wholesale internationally and evidence for its effects and barriers to its use in New Zealand. The coverage is selective and focuses mostly on retail, which has experienced particularly dramatic changes as a result of ICT use. Indeed, many big retail chains have integrated wholesale into their operations.

I.1 ICT has boosted productivity growth in retail and wholesale in the United States and Canada

ICT facilitates economies of scale and scope

Retail and wholesale have been at the centre of an international revolution enabled by ICT. From 1995 to 2005 US labour productivity grew strongly, averaging 2.8% each year (Jorgensen, Ho & Stiroh, 2008). Retail, with a 9% share of GDP, accounted for 11% of the labour productivity growth over this period, with annual labour growth rates of between 4.2% and 6.0% from 1995 to 1999 (Doms, Jarmin & Klimek, 2006). Managerial and technical innovations enabled by ICT and competitive pressure from Walmart (Box I.1) partly explain productivity growth in the general merchandise part of the industry (McKinsey, 2002).

ICT has facilitated large economies of scale across supply chains from producers to retailers, and within stores. Retail is a transaction- and information-intensive industry. In the United States, daily retail transactions number in the hundreds of millions across supply chains from manufacturers to consumers. This volume of transactions provides a fertile ground for streamlining processes and targeting effort. ICT boosts retail productivity through:

- better merchandise planning and management (using sales and other data to forecast demand, order stock, set prices, track purchasing behaviour and target promotions);
- better coordination of production and inventories with sales (often involving the vertical integration of wholesaling and retail);
- improved logistics, including optimising routing, cross-docking distribution centres[1] and use of barcodes and radio frequency identification (RFID) to track and redistribute shipments; and
- automation of store operations through scanning technology and management software.

Scale economies are important. Doms, Jarmin and Klimek (2006) find that only large US retail firms (with more than 100 employees) experienced productivity benefits from intensive use of ICT. For these firms, a 10% higher share of capital expenditure on ICT was associated with almost 2% higher labour productivity in 1992 and higher labour productivity growth during the 1990s.

Basker (2012) identifies another productivity benefit of the efficient identification, tracking, sorting and delivery of products enabled by ICT. The range of items typically stocked in US supermarkets increased

[1] Cross-docking refers to offloading and breaking down incoming consignments at a distribution centre and re-assembling outgoing consignments and shipping them to their next destination without storing them.

enormously, from about 6 000 items in each store in about 1960 to 45 000 items in 1996. The same technology enables "big-box" formats such as Walmart to offer a wider variety of products in one store.[2] Customers have more choice at "one-stop" destinations and stores can operate at greater scale and lower cost.

Successfully implementing ICT-enabled retail strategies requires not only substantial ICT investments, but also thoroughly reorganising business operations and investing in new buildings and machinery. For example, new stores help capture the benefits of the increased scale that ICT facilitates. New cross-docking distribution centres use ICT to identify and sort incoming shipments and reallocate them to outgoing shipments. Decisions about purchasing, pricing, presentation and promotions once made by the individual store can now be made by chain managers helped by merchandise management systems (APC, 2000; Stanback, 1990).

Foster, Haltiwanger and Krizan (2006) noted (unsurprisingly) that labour productivity rises with capital intensity in US retail firms. The share of computer investment in capital investment is highest in the top 20% of firms by labour productivity. But the larger the chain, the more important are complementary investments in new stores and distribution centres to leverage the full benefits from ICT. As a result, the share of computer investment in capital investment falls as chain size grows (Foster, Haltiwanger & Krizan, 2006).

Business models based on ICT shake up the North American market

95% of labour productivity growth in US retail between 1986 and 1997 was attributable to the entry and exit of stores (including new stores of existing firms) (Foster, Haltiwanger & Krizan, 2006). The average size of stores grew, and the number of single-branch stores fell. This was associated with national chain stores being much more productive than single-branch stores. Entering stores of a national chain had higher labour productivity than existing stores, and grew faster in productivity after entry than surviving existing stores. Unsuccessful entrants (those that made an early exit) had especially low productivity.[3]

70% of the productivity growth in the Canadian retail sector between 1984 and 1998 was attributable to output and input shifting from exiting firms to entering firms that were more productive. Foreign-controlled firms (such as Walmart) accounted for 30% of labour productivity growth over this period, but only 20% of sales. Successful new-entrant firms (the more productive) grew and improved their performance over time as they learnt about best business practices (Baldwin & Gu, 2009). In contrast, the 2000s were a period of consolidation when most productivity growth was attributable to more productive existing firms growing at the expense of less productive incumbents (Baldwin & Lafrance, 2013).

Box I.1 The United States retail productivity story is a Walmart story

"Back of envelope" calculations show that between 1982 and 2002 half of US labour productivity growth in the general merchandise retail sub-industry was attributable directly to Walmart (Basker, 2007). In the 2000s Walmart's prices were about 10% lower than competitors. Entry of a Walmart store led to a fall in competitors' prices in the same location of between 1% and 2%.

Starting with a single store in Arkansas in 1962, Walmart grew to 4 000 US stores with 1.3 million employees by 2007. It accounted for 6.5% of US retail sales in 2004, and 15% of US imports of consumer goods from China in 2007. Its expansion strategy has centred on locating new stores close to existing distribution centres – optimising the trade-off between reducing distribution costs and cannibalising the sales of existing stores.

Technology and scale are at the core of the Walmart advantage. As early as the late 1970s all its stores and distribution centres were connected by a computer network. Walmart installed barcode readers

[2] A big-box format is a retail store with a very large amount of space and a wide variety of products. Economies of scale enable the store to operate at high volumes, low margins and thus low prices. The term "big-box" is derived from the typical store's physical appearance.

[3] In their investigation of the productivity effects of IT in the United States retail industry during this period, McKinsey (2002, p. 19) found "For the most part …IT applications that favourably impact productivity also favourably impact profitability". They noted a large gap between industry best practice and average performance in the effectiveness with which the US retail industry has used IT in supply chain management, merchandise planning and revenue management (pricing).

throughout its operations by the late 1980s and inventory management software in 1990. In the 2000s it mandated the use of RFID by its suppliers. General merchandise is characterised by low margins on each item, so improving efficiencies across the supply chain can increase profits substantially (McKinsey, 2002).

"Walmart's better technology has allowed it to grow, and this growth has lowered its operating costs." A 10% increase in total sales volume decreases marginal cost by 2%. Poorer consumers have benefited disproportionately from Walmart's rise (Basker, 2007, p. 180).

Scale means that Walmart can import at lower cost than other retailers, while the ability to offer lower prices as a result of cheaper imports increases demand. This, in turn, increases optimal chain size. Barcodes and RFID increase the range of products offered in stores and so increase optimal store size (Basker, 2007).

ICT favours the growth of large retail chains at the expense of small firms

Variations on the business model developed by Walmart (Box I.1) were quickly adopted by other North American retailers such as Costco and Target in general merchandise and CVS and Walgreens in pharmacy. The United States and Canada saw the average firm size increase.[4] National chains grew at the expense of single establishment firms (McGuckin, Spiegelman & van Ark, 2005). The number of single-store retailers in the United States fell by 55% between 1963 (one year after the first Walmart store opened) and 2002. Over the same period, the number of chain stores nearly doubled, and the number belonging to chains with more than a 100 stores more than tripled (Basker, 2007). Average store size also increased (McGuckin, Spiegelman & van Ark, 2005).

The growth of online shopping

Online retailing (through online services and traditional retailers with online services) is expanding rapidly. E-commerce sales grew by 15% in the United States in 2012 – seven times faster than traditional retail (Anders, 2013).[5] Online shopping in some retail categories in the United States now exceeds 20% of the market and traditional retailers are under intense pressure (Jordan, 2014).

Amazon, the world's largest online retailer, has continually expanded the scale and scope of its operations since it began in 1994, using new technologies at almost every step. Its worldwide sales are now about US$75 billion per year. Starting as an online bookstore, Amazon has diversified into a wide range of products and services. These include electronic hardware, e-books, printing titles on demand, cloud computing and providing an online platform for other retailers. Amazon is currently investing US$14 billion to expand its network of US distribution centres to reduce shipping times and so increase sales. It has also offered distribution services to other retailers since 2006. It invests heavily in technology "to create the most advanced warehouses, the smoothest customer-service channels, and other features that help it grab an ever larger share of the market" (Anders, 2013). Amazon has worked on the philosophy that while competitors can copy its business model, it keeps ahead of them through excellent delivery performance and efficient logistics (Girotra & Netessine, 2013).

Online shopping reduces customer search costs and often, as in the case of Amazon, provides a reliable and easily accessible source of consumer review. Together with greater product variety offered online, this increases the collective share of niche products in sales, more accurately reflecting consumer preferences (Brynjolfsson, Hu & Simester, 2011). Online shopping eliminates costs associated with maintaining a traditional "bricks and mortar" presence and, through ICT-assisted scale economies, enables more efficient distribution from supplier to the customer's door. Some traditional national US chains such as Sears and Macys have been reducing the size of their stores and increasing sales online to better compete with purely

[4] In this chapter "firm" refers to a business that has one or more geographic units or outlets. "Store" refers to a single geographic outlet.

[5] Only a few countries, including the United States and the United Kingdom, collect official data on online sales. The online share of all retail sales appears to have been much higher and growing more quickly in the United Kingdom than in the United States in 2011 (APC, 2011).

online retailers (Frost & Sullivan, 2012). Online grocery shopping is also growing and now accounts for over 3% of the market in the United Kingdom (*The Economist*, 2013).

The international scope of retail chains grows

While most retailers continue to operate only in their home markets, some larger European and US chains (including Carrefour (France), Tesco (UK), Aldi (Germany), Zara (Spain), IKEA (Sweden) and Walmart and Costco (US)) have expanded internationally. Of the top 250 international retailers, 93 have headquarters in the United States and 87 are based in Japan, the United Kingdom, France and Germany. Also 58% of these top 250 retailers sell food (Nordås, Grosso & Pinali, 2008).

The trend for retailers to "go international" reflects less a search for economies of scale (eg, in international purchasing) than the opportunity to take advantage of proprietary knowledge about business organisation and technology. Not all business models transfer successfully to new locations. For example, Walmart quickly withdrew from the German market. Its failure there was apparently due to cultural conflicts, labour market institutions that did not fit Walmart practices, German preferences for smaller stores and mistakes in transplanting United States product preferences into the German context (DW, 2006; Macaray, 2011). The large retail chains aim to internationalise by quickly becoming one of the three largest retailers in the markets they enter, and withdrawing promptly if they fail to achieve this rank (Nordås, Grosso & Pinali, 2008).

I.2 Retail productivity in Europe and the United Kingdom lags behind the United States

Labour productivity levels in the retail industry in Europe (except France) and the United Kingdom are generally well below those in the United States. Retail and wholesale trade accounted for 50% of the US lead over Europe in productivity growth in the period 1995 to 2000 (McGuckin, Spiegelman & van Ark, 2005). Europe was slower to adopt the new technologies and their benefits were limited by market conditions, the regulatory environment and European management practices.

Smaller markets and regulation make new retail models less profitable in Europe

Wholesale and retail markets in Europe are smaller than in the United States as a result of language, cultural and regulatory differences and national borders. No European retail chain could achieve the scale economies of a Walmart. Transport was deregulated later in Europe than the United States, delaying improvements in logistics and making early adoption of the new technologies less profitable. More restrictive labour market regulation in Europe also made it relatively difficult for European firms to move to new business models (whether through the rise of new firms and the exit of incumbents, or through changes within firms) (McGuckin, Spiegelman & van Ark, 2005).

Land-use regulation in the United Kingdom and some European countries such as Denmark made it hard to establish new stores at an efficient scale and in the right locations so as to fully reap the benefits of the new technologies. Instead, UK supermarket chains have been expanding into small convenience store formats in high street locations (Griffith & Harmgart, 2005).

The United States does IT better

The personnel management practices of US firms are better suited to innovative business models. European and UK firms acquired by US multi-nationals make more successful use of IT than similar firms acquired by other multi-nationals (Bloom, Sadun & Van Reenen, 2012). US firms pay closer attention than other firms to hiring decisions, incentivising high performance and managing poor performance. As a result, managers give employees more flexibility to adapt to fast-changing technological and organisational environments (Chapter 9).

1.3 ICT lifts productivity in Australian retailing and wholesaling

Most innovations in Australian retail and wholesale trade originated from overseas (APC, 2011). This includes the rise of self-service grocery shopping in the latter half of the last century, checkouts using barcodes and, more recently, self-checkouts. It also includes the rise of franchises, such as 7-Eleven convenience stores, Dymocks and Harvey Norman. During the 1980s capital intensity in retail grew mostly as a result of the growth in market share of large firms at the expense of smaller firms (APC, 2011).

Continuing this trend, big-box retailing emerged in the 1990s, typically occupying large floor space in single-storey buildings with large areas for parking. The business strategy relies on high volumes and low margins and on using ICT to achieve efficiencies in purchasing, supply, store operations and marketing. Australian retailers introduced their own versions based on international experience. For instance, Wesfarmers launched Bunnings in 1994, modelled on the American Home Depot. Investment in ICT rose strongly during this period and into the 2000s (APC, 2011).

During the 1990s other parts of Australian retail consolidated. The number of service stations fell dramatically. Service stations installed self-service pumps together with single-operator consoles and added a convenience store. Motor vehicle servicing shifted to dealers with electronic diagnostic systems that could match the increasingly sophisticated computer systems in vehicles. Specialty chains developed in clothing, targeting particular groups of customers and operating with minimal staff (APC, 2000).

Over the 20 years to 2000, and particularly in the 1990s, ICT use and business reorganisation transformed Australian wholesaling. Barcodes and RFID combined with warehouse management systems and enterprise resource planning greatly reduced the labour needed in the industry, and the need to hold inventories.[6] Many retailers took control of the wholesale function directly, with integrated supply chains from manufacturers to retail stores and sometimes (eg, whiteware and high-end computer hardware) to customers' homes. Cross-docking rose during the 1990s as centralised distribution centres replaced high-rise warehouses built in the 1970s and 1980s to store goods. Some retail stores in Sydney and Adelaide now receive supplies directly from distribution centres in Melbourne. Computerised systems allowed trucks to be routed more efficiently, making petroleum wholesaling, in particular, more efficient. It is now common for wholesalers to outsource transport to carriers who can exploit economies of scale. Lead times from manufacturer to delivery have substantially reduced (APC, 2000).

A number of large international retailers entered the Australian market in the 2000s as prospects for further growth in their home markets declined and the Australian economy boomed. Entrants included Aldi from Germany, Costco and Gap from the United States, Zara from Spain, Uniqlo from Japan and IKEA from Sweden. Australian retailers Woolworths and Wesfarmers have operations in New Zealand. In 2010 Woolworths ranked 20th and Wesfarmers ranked 23rd in global sales revenue.

Online retailing has also added to the competitive pressures that traditional Australian retailers face. While they have responded by developing their own online sales capability, one submitter to the Australian Productivity Commission (APC) retail inquiry in 2011 argued that they were five years behind developments in the United States (APC, 2011). The online share of some traditional retailers' sales remained very low in 2011 – often less than 1.5%, and even as low as 0.1% for Harvey Norman. This was much lower than their counterparts in the United States and the United Kingdom. The APC estimated that the online share of retail sales in Australia in 2011 was about 4%, with a third of these sourced from overseas (APC, 2011).[7] Frost & Sullivan (2013a) estimate that online sales are growing at a rate of about 13% each year in Australia.

I.4 ICT in New Zealand retailing and wholesaling

New Zealand has seen many of the same ICT-enabled developments in retail and wholesale as Australia. IT investment in retail and wholesale grew strongly between 1996 and 2011 at a rate close to the service industry average (Figure I.1). IT capital deepening made a stronger contribution to labour productivity

[6] Enterprise resource planning (ERP) is business management software that integrates and uses data from a range of business processes to support decision making. For example, in retail it could include merchandise orders, people and financial management systems, and sales and inventory management. Warehouse management systems is a subset of ERP.

[7] According to APC estimates, the online share of retail sales in Australia was a little lower than in the United States and substantially lower than in the United Kingdom (APC, 2011).

growth than other forms of capital. Multi-factor productivity (MFP) growth has made a particularly important contribution, particularly in wholesale (Figure I.2). This is likely to reflect the effects of industry reorganisation and improvement of logistics as a result of the use of ICT.

Figure I.1 Average input growth, 1996-2011

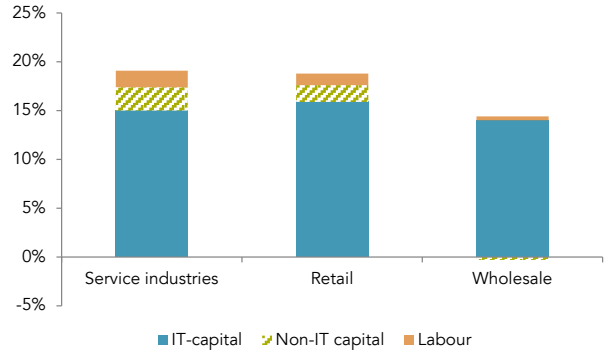
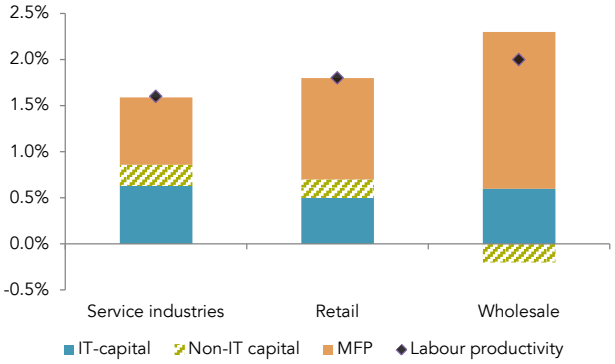


Figure I.2 Contribution to labour productivity growth, 1996-2011



Source: Statistics New Zealand (2013).

The Warehouse Group illustrates these developments. It occupies a Walmart-like niche in New Zealand retail, allowing for a vast difference in the scale of the two firms. It entered the New Zealand market in 1982 with one store on Auckland's North Shore and has now expanded to about 90 Warehouse stores and almost 50 Warehouse Stationery stores. In 2012 it acquired the Noel Leeming chain of more than 70 electronic goods and whiteware stores, including those operating under the name Bond & Bond. The Warehouse established the big-box format in New Zealand by first locating stores in the suburbs, and competing with low prices, direct purchasing from overseas and efficient ICT-enabled distribution. In 2003 The Warehouse launched its brand in Australia with 126 stores, but the venture was unsuccessful and it sold its operation in 2005. It began its online shopping operation in 2009. Noel Leeming was already operating online before The Warehouse bought it.

The two supermarket chains, Progressive (Countdown) and Foodstuffs (PAK'nSAVE, New World and Four Square) have continued to occupy a dominant role in food retailing. Foodstuffs North Island recently announced a multi-million dollar contract with Fujitsu to replace its retail software and hardware infrastructure. This will enable the chain to receive information on operations in real time. Progressive is owned by Woolworths in Australia and its current general manager of logistics in New Zealand has previously worked in Australia and with Tesco in the United Kingdom. This illustrates how international labour markets can facilitate the transfer of knowledge about global developments in the use of ICT.

Over the past 20 years, big mall formats, such as Sylvia Park in the Auckland suburb of Mount Wellington, have gained ground at the expense of traditional "high street" locations (NZRA, 2013a).

Many smaller retailers are now using ICT in their businesses to streamline their operations, improve how they respond to customers and to reduce costs. A market of 40 to 50 competing firms that develop and supply off-the-shelf and customised retail software packages has emerged. Yet Richard Brett of Fieldpine, a retail software development company, told the Commission that the ICT sophistication of smaller retailers varies considerably. Firms that do not use ICT survive, but generally do not grow. Franchisees of foreign firms are the most sophisticated in this segment. Diverse approaches to the use of technology co-exist in the small-business segment of the New Zealand retail market.[8]

Unlike Australia, New Zealand has not proved attractive to big international retail chains such as Costco, Aldi and Zara. There was a failed attempt to bring IKEA to Auckland in the mid-2000s (Box I.5). Yet some Australian retail chains have extended their operations into New Zealand, including Bunnings, Harvey Norman and Dick Smith (all Wesfarmers), and Woolworths. Collectively, Australian firms or their subsidiaries occupy a substantial part of the New Zealand retail market. These firms have introduced their own ICT-

[8] Diverse production technologies co-existing in the same retail markets have been documented for Chile (de Vries & Koetter, 2011).

enabled business models and practices (based on international models) into New Zealand. Some New Zealand retail firms such as Pumpkin Patch, Kathmandu and Michael Hill Jewellers have successfully established operations overseas.

Online shopping is growing rapidly in New Zealand

Online shopping has grown rapidly over the last decade, but measuring that growth has lagged. BNZ (2013) has created an index using credit card data to estimate the yearly value of online purchases. In 2013 online purchases were $2.7 billion or 6% of all retail sales (9.5% if groceries and liquor are removed). About $1 billion or roughly 40% of all online purchases are bought overseas. Frost & Sullivan (2013a; 2013b) surveyed 1 200 consumers in Australia and New Zealand using a broader definition of retail that includes travel and entertainment. They estimated the value of online sales at $3.7 billion or 7% of all retail sales in New Zealand. Local retailers have raised questions about the unequal GST treatment of overseas online purchases (Box I.2).

Frost & Sullivan (2013a; 2013b) found that the Australian and New Zealand online markets are similar in maturity, but that New Zealanders (54%) are much less likely than Australians (79%) to buy from overseas. In their 2012 survey, 35% of New Zealanders' online purchases were from overseas, compared with 45% for Australians (Frost & Sullivan, 2012). This may reflect the success of locally-based Trade Me in New Zealand.

The rapid rise in online shopping in New Zealand mirrors the experience in Australia, the United States and the United Kingdom. The volume of online sales covered in the BNZ index doubled in the four years to September 2013, while retail sales rose by about 10%.[9] Online purchases from overseas grew faster than domestic purchases, reflecting the appreciation of the New Zealand dollar against the US dollar.

Box I.2 **Retailers have an issue with unequal GST treatment of overseas online purchases**

New Zealand retailers have raised the issue of goods purchased online from overseas not attracting GST. Customs generally do not collect GST on imported goods consignments with a value of less than $400. With the rise of direct-to-the-consumer online sales, the volume of consignments imported with a value of less than $400 has risen sharply. New Zealand retailers charge 15% GST on all domestic transactions. Unequal treatment of GST adds to increased competitive pressure from overseas online retailers (Box I.3). As a result, New Zealand online retailers, as well as traditional retailers, cannot match international prices, other things (such as scale economies, freight costs and margins) being equal.

New Zealand consumers benefit from the increased choice and competition that overseas online retailers provide. Yet differential tax treatment distorts consumer choices in favour of overseas online retailers.

In May 2013 the Government announced that it would issue a discussion document to canvass views on GST and online shopping. Late last year it decided to delay release of the document, pending a study of wider cross-border tax issues and how other countries tax online sales.

Most large New Zealand retailers offer online shopping, but consolidated information on its relative importance in their business models is lacking. Online shopping so far has favoured compact non-perishable items such as books, apparel and some electronic goods. As a result, traditional retailers face particular pressure in these areas. Retailers of larger or more perishable goods are now supplementing their in-store offerings with online sales. Consumers are increasingly expecting a multi-channel service delivery where online and in-store functions are seamlessly interwoven; they can access products online from in-home, in-store and mobile devices; and can use, for example, social media and group buying sites to buy products (NZRA, 2011; Frost & Sullivan, 2012).

Trade Me is a purely online business success story that maps on a New Zealand scale the growth strategy of Amazon (section I.1). Starting in 1999 as a site for buying and selling second-hand goods, it has expanded

[9] The BNZ online retail index currently focuses on retail goods that can be benchmarked against Statistics New Zealand's retail trade survey and "includes purchases of groceries, liquor, clothing, footwear, hardware, electronic goods, homewares and recreational goods, among other store types" (BNZ, 2013).

relentlessly since then. Its websites now cover travel, property sales and rentals, jobs, dating, motor vehicles, and health and life insurance. About 40% of goods sold on Trade Me are new. In 2012 it acquired the Tradevine platform and is launching a campaign to increase the sales of new goods through it. About 40% of visits to Trade Me's website are from mobile devices and it has developed applications for Android, iPad and iPhone.

Box I.3 **Competition from online shopping leads to JK Kids exiting the market**

Online shopping is putting intense competitive pressure on traditional "bricks and mortar" retailers in areas such as children's apparel and books. Ben Sproat, the owner of the 22-store national children's clothing chain JK Kids cited these pressures as the "new normal" when he recently announced the chain's closure (Booker, 2013).

Online apparel retailers are offering broader choice and lower prices, with consumers becoming increasingly comfortable with the ever-developing online infrastructure and delivery systems. While JK Kids made 12% to 13% of its sales online, this percentage was not enough for the chain to stay profitable in the face of online competition. New Zealand's purely online retailers were buying end-of-line products overseas and selling them at extremely low prices. Direct online consumer purchases from overseas often did not attract GST.

Analysts expect other New Zealand traditional clothing chains to feel the same pressures (Morrison, 2013).

Source: Booker (2013); Adams (2013); Morrison (2013).

Competitive pressure from online retailing (Box I.3) may partly explain falling New Zealand retail profit margins. The New Zealand Retailers Association calculates the net profit before tax as a percentage of total income for the retail industry (NZRA, 2013a). Profits have fallen from 6.3% of total income in 2003 to between 2.0% and 3.0% from 2009 to 2011. The global financial crisis and economic slowdown has also affected profits.

Consolidation in New Zealand retail and wholesale

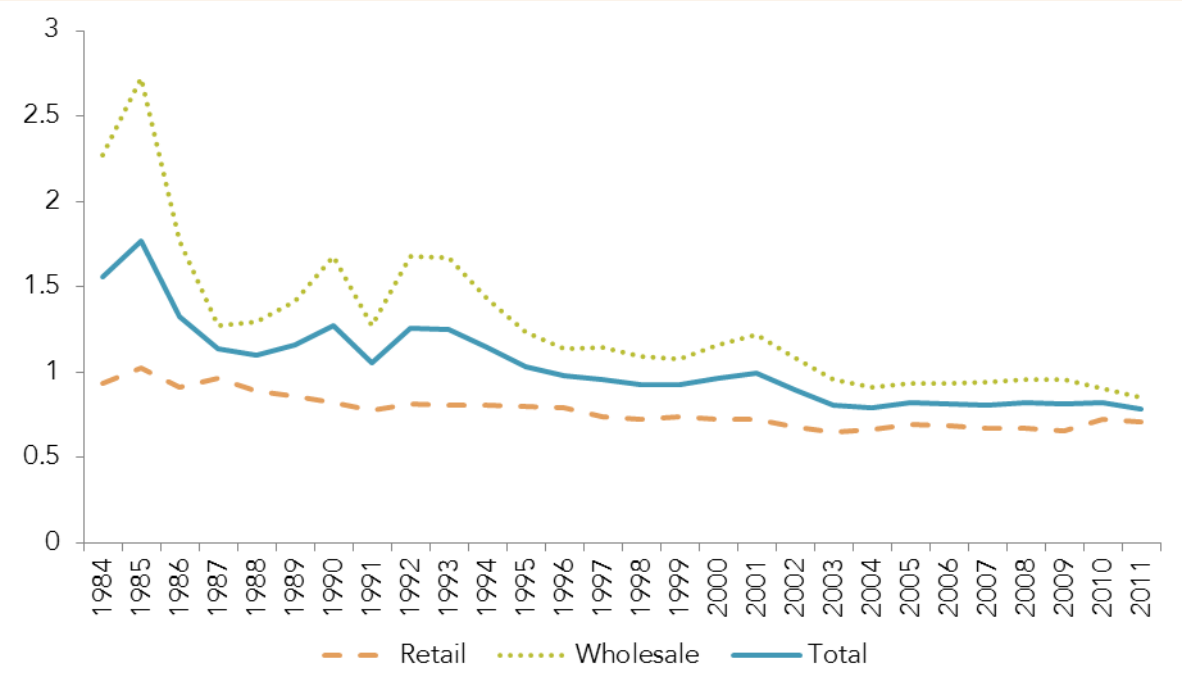
The New Zealand retail and wholesale industries, like their counterparts in other countries, have consolidated over the last 15 years or more.[10] ICT has enabled more efficient management of inventories. As a result, inventories have been falling as a proportion of industry value-added since the mid-1980s (Box I.4).

[10] Because of limitations in the available data from the Statistics New Zealand website, this section presents trends only from 2000 using the ANZSIC06 industry classification. Earlier data exists based on the ANZSIC96 classification dating from 1997 which show that firm size was increasing and retail chains growing in some retail sub-industries over the period 1997 to 2003. To simplify the discussion, these trends are not shown in this section.

Box I.4 **Industry reorganisation reduces the need to hold inventories**

The efficiencies achieved in wholesale-retail supply chains have greatly reduced the need to hold inventories to support sales. There has been a notable decline in the ratio of inventories to industry value-added in retail and wholesale in Australia (APC, 2000) and New Zealand (Figure I.3).

Figure I.3 Ratio of inventories to value-added – retail and wholesale trade

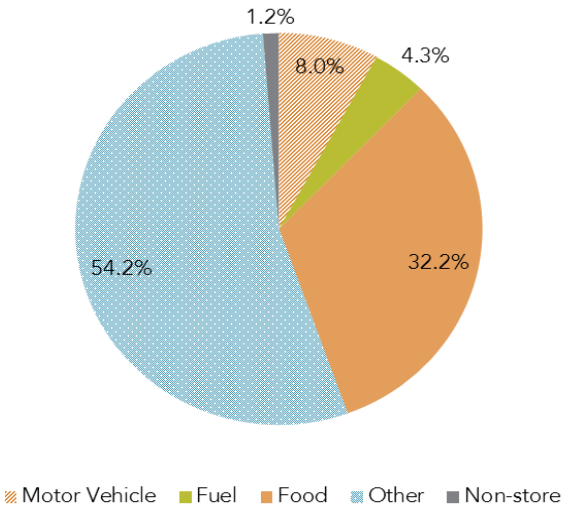


Source: Productivity Commission; Statistics New Zealand national accounts and retail trade and wholesale trade surveys.

Consolidation of retail and wholesale in other countries has led to stores and firms becoming larger on average and a decline in single-store firms (section I.1). If investment in ICT in retail and wholesale is productive, it should be having similar effects in New Zealand. The effect will likely vary by the market served and the products sold in different parts of the retail and wholesale industries. In some segments, such as supermarkets, ICT has enabled integration of retail and wholesale. Food wholesaling has become concentrated in larger firms and stores as a consequence (Figure I.8 and Figure I.9).

Figure I.4 shows the employment shares of the retail sub-industries in 2012. This helps assess the relative economic importance of the trends shown in the following figures. Statistics are available for five categories of retail. Other store-based retailing (54% of employment) includes furniture, electric and electronic goods, hardware, recreational goods, apparel, department stores and pharmacies.

Figure I.4 Retail sub-industries employment shares, 2012



Source: Statistics New Zealand NZ.Stats tables.

Average firm size and average numbers of stores in retail chains in parts of the industry have increased since 2000. Chains are relatively important in "other" retailing. While food retailing is dominated by two large chains (Table I.1) it also has many single-store firms (Figure I.6). More than 60% of employees in food retailing work in firms with more than 100 employees and this changed little over the 12 years to 2012.

Employment in "other" retail has shifted towards larger firms in the 12 years to 2012, and average numbers of stores per retail firm has increased (Figure I.5 and Figure I.6). This may be because single store firms have dropped out of the market or because retail chains have grown in size, or both. Yet other data shows that the number of clothing outlets (which belong to the "other" retailing category) grew strongly over the last decade, perhaps meeting the needs of niche markets (NZRA, 2011; 2013a).

Fuel retailing, a small part of retailing by employment, has also consolidated. The number of outlets and employees in fuel retailing has fallen over the period (NZRA, 2013a; Statistics New Zealand).

Figure I.5 Retail sub-industries share of employment in firms with more than 100 employees

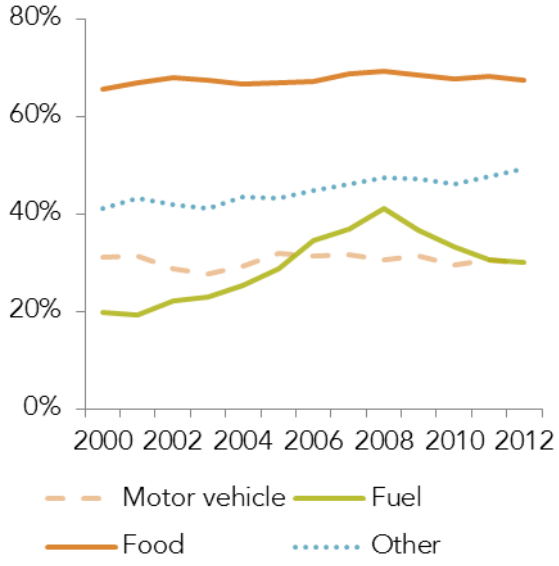
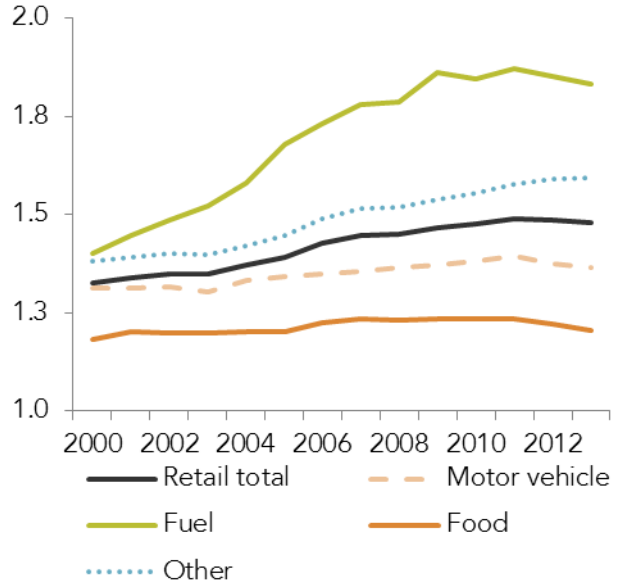


Figure I.6 Retail stores per firm



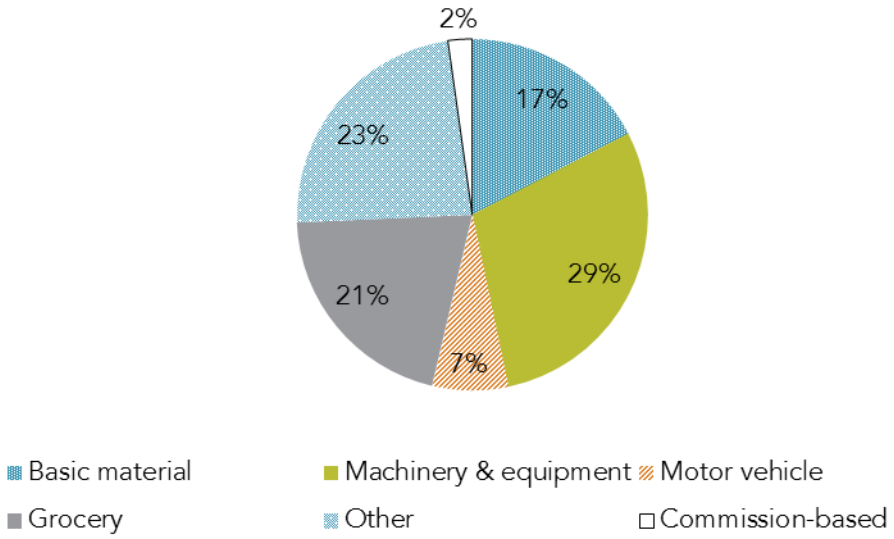
Source: Statistics New Zealand NZ.Stats tables.

Notes:

1. Firms with no employees are excluded.
2. Stores include all establishments at separate locations including head offices.

Figure I.7 shows the employment shares of the wholesale sub-industries in 2012.

Figure I.7 Wholesale sub-industries employment shares, 2012



Source: Statistics New Zealand NZ.Stats tables.

Employment has been shifting to larger stores and larger firms in grocery and machinery wholesale since 2000 (Figure I.8 and Figure I.9).

Figure I.8 Wholesale sub-industries share of employment in firms with more than 100 employees

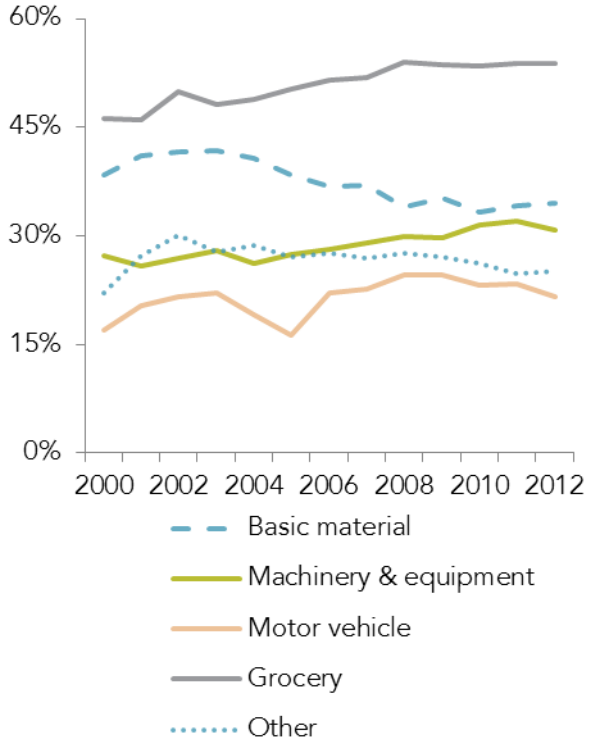
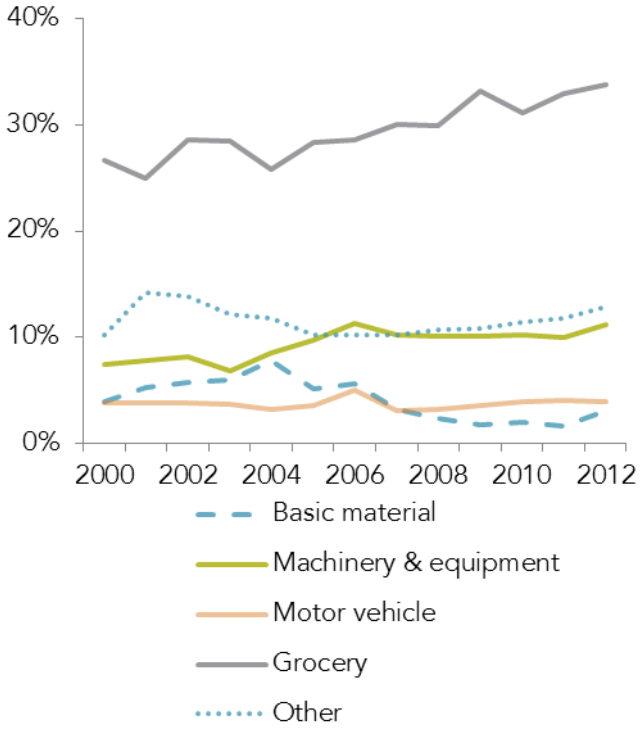


Figure I.9 Wholesale sub-industries share of employment in stores with more than 100 employees

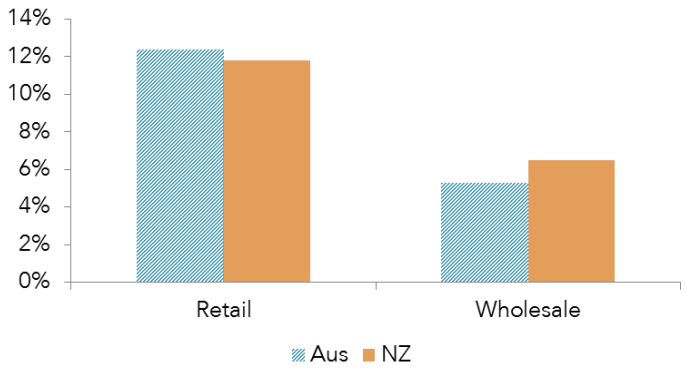


Source: Statistics New Zealand NZ.Stats tables.

I.5 Retail and wholesale productivity is lower in New Zealand than in Australia

Retail accounts for a slightly larger share of employment in market industries in Australia than in New Zealand, while wholesale accounts for a slightly smaller share (Figure I.10). Together, retail and wholesale account for about 18% of all market industry employment in each country.[11]

Figure I.10 Share of employment in market industries GDP, 2009



Source: Mason (2013).

Labour productivity levels in retail and wholesale in New Zealand are about 50% to 60% of those in Australia. Labour productivity in the Australian retail industry is, in turn, 64% of the US level (APC, 2011). In wholesale, the gap between Australian and New Zealand is explained equally by differences in capital intensity and differences in MFP. As Figure I.11 shows, differences in MFP account for the greater part of the gap in retail.

Figure I.11 Contributions to the within-industry gap in labour productivity in Australia and New Zealand, 2009

Source: Mason (2013).

Note:

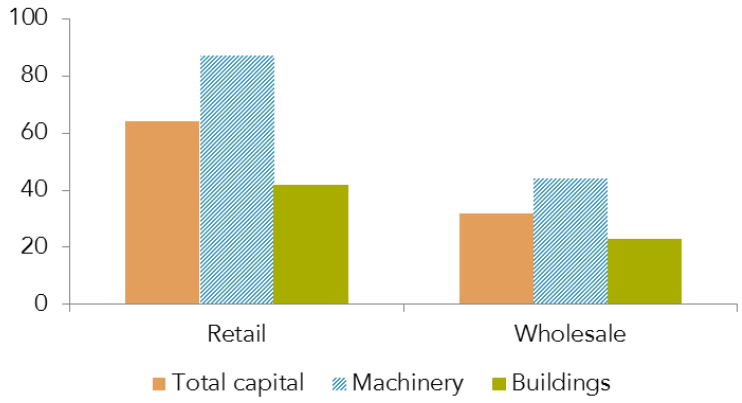
1. The vertical axis shows the labour productivity gap between Australia and New Zealand as a percentage of the Australian level.

Capital per hour worked in New Zealand retail and wholesale were (respectively) 64% and 45% of the Australian level in 2009 (Figure I.12). Capital per hour worked in "machinery & equipment, including computers" is lower in New Zealand in both industries, and particularly low in wholesale.[12] Relative to New Zealand wholesale firms, Australian firms appear to have invested more heavily in buildings and equipment, including ICT.[13] New distribution centres and stores are important complements to ICT in

[11] Market industries are defined as "industries that are dominated by market-based providers of goods and services" (Mason, 2013, p. 10). In the Australian and New Zealand market, industries account for just over 75% of total hours worked.
[12] Some of the difference between Australia and New Zealand in capital intensity may be due to firms in New Zealand being more likely to lease rather than own buildings, equipment and vehicles.
[13] This is similar to the pattern in the United States, with larger retail chains being more capital intensive in buildings (section I.1).

improving efficiency in distribution. Australian wholesale firms also appear to have invested more in computer software than their New Zealand counterparts.[14]

Figure I.12 Capital per hour worked: New Zealand relative to Australia, 2009



Source: Mason (2013).

Notes

1. Capital per hour worked in Australia is set to 100.
2. Machinery includes computers.

Retail labour productivity grew a little faster in New Zealand than in Australia over the period from 1997 to 2008. Wholesale labour productivity grew slightly more slowly in New Zealand than in Australia (Figure I.13). In both industries, capital per hour worked grew faster in Australia (Mason, 2013). Productivity in the retail industry in Australia grew more slowly than in the United States over much the same period (APC, 2011).

Figure I.13 Labour productivity growth rates, 1997-2008

Source: Mason (2013).

I.6 Barriers to productivity gains from ICT in New Zealand retail and wholesale

New Zealand has experienced many of the same trends in retail and wholesale as Australia. Yet New Zealand's labour productivity levels are lower. Since 1997 the gap in levels between the two countries has not closed in wholesale. While it did close a little in retail between 1997 and 2008, this trend was strongly reversed in the following two years (Mason, 2013). Lower productivity levels in New Zealand are partly explained by New Zealand's lower investments in ICT (section I.5). This section examines some other explanations for New Zealand's lower retail and wholesale productivity. It considers barriers that might reduce the benefits that can be gained from the use of ICT (Chapter 9).

[14] This can be deduced from the fact that "intangibles" comprise 5% of wholesale capital stocks in Australia, but only 1% in New Zealand. "Intangibles" cover software and "oil and gas exploration and other exploration" (Mason, 2013). Only software is relevant to wholesale.

Market, firm and store scale

New Zealand's small market offers fewer economies of scale from using ICT than larger markets. New Zealand's largest retail chain, The Warehouse, made net sales of $1.7 billion in 2012. By contrast, Walmart made net sales of US$444 billion worldwide.

While New Zealand retail has benefited from improved logistics, more integrated supply chains, increased responsiveness to customer preferences and more efficient in-store processes, the investments are spread over a much smaller customer base. In the future, cloud computing will make it easier for smaller firms to invest in ICT at a scale and cost that best fits their business (Chapter 11). Yet much of the international productivity gains in retail and wholesale have been built on large investments in physical infrastructure and international purchasing arrangements where significant scale economies will continue to operate.

New Zealand's smaller cities support relatively smaller stores. The fixed costs of technology and operating overheads are also spread over a smaller customer base at the store level. Smaller stores are likely to keep older business processes longer because of the fixed costs of moving to a new model.

Transport infrastructure

The best location for distribution centres and stores depends on the quality of transport networks which, in turn, partly depends on population density. A driver delivering goods by truck from Tauranga to Wellington faces very different conditions to a driver delivering goods from Melbourne to Sydney or Adelaide (section 1.3). As a result, New Zealand distribution centres are likely to be located relatively close to the centres of population that they serve, be relatively smaller than those in Australia, and involve relatively smaller vehicles making deliveries. The gains from sophisticated use of ICT will be correspondingly lower.

The Commission's international freight inquiry (NZPC, 2012a) considered road infrastructure. The Commission was told that the availability of routes with sufficient bridge capacity for high productivity motor vehicles (HPMV)[15] was limited in New Zealand.

In its submission to the draft report the New Zealand Transport Agency (NZTA) stated:

> On High Productivity Motor Vehicles (HPMVs) the NZTA is seeing significant freight productivity gains being made from greater route access. The NZTA is aware of industry aspirations for greater HPMV access and the progressive opening up of routes remains a priority for us. The NZTA is working closely with freight operators to: develop new HPMV designs that are safer and more efficient, identify priority HPMV routes for investment, and streamline the HPMV permitting process. We are also working with local government who are responsible for local road HPMV access. (NZTA, 2012, p. 5)

Local governments face increased costs from HPMVs in terms of road maintenance and bridge upgrades but receive no corresponding increase in revenue. The NZRA also submitted on behalf of Progressive Enterprises on the need for improved road networks that support larger vehicles and reduce congestion in major urban centres (NZRA, 2012).

Lower competition

Other things being equal, a smaller market means less intense competition and lower incentives for firms to innovate. Retail and wholesale trade have weak to moderate levels of competition relative to other New Zealand service industries (Chapter 5). Some market segments, such as supermarkets, have only a few chains (Table I.1). Yet competition may still be vigorous even in these segments, for instance because of the ease with which consumers can switch between retailers.

[15] HPMVs are a class of vehicle that are allowed to exceed standard length and mass limits (NZTA, 2011).

Table I.1 Grocery and supermarket market shares, 2005-07

Market share	Australia	United Kingdom	Canada	Ireland	Netherlands	New Zealand
Top 2	54	42	51	35-45	Around 45	Around 100
3th and 4th	19	24	25	15-25	Around 16	Around 0
Top 4	73	65	76	50-70	Around 60	100

Source: APC (2011).

Notes:

1. Percentage values rounded up to nearest whole number.
2. Data are for shares of grocery sales and supermarket sales for various years between 2005 and 2007, so are only partially comparable.

The rise in online shopping and fall in retail profit margins (section 7.4; NZRA, 2013a; 2013b) suggest that competitive pressures in retail will grow.

Land use regulation

Stores and distribution centres need best-for-the-chain locations and the right scale to get the full benefits of ICT. Retail chains have noted that consent processes under the Resource Management Act 1991 and its amendments are a barrier to them deciding where to locate their stores. In the mid-2000s, IKEA's attempt to enter the New Zealand market was blocked by planning processes (Box I.5).

In a submission to the APC retail industry inquiry in 2011, the NZRA noted:

> Some retailers, particularly the larger supermarkets and general merchandise retailers have had some concerns that planning laws have acted as a barrier to the establishment of new retail businesses, particularly in metropolitan centres. (NZRA, 2011)

In the course of this inquiry, the NZRA told the Commission that planning laws remain a pressing issue, not just for new development but also for redevelopment or extension of existing facilities. Certainly, consents can work smoothly for some large retail projects. Recently Bunnings have successfully obtained planning consent for a new store in the central Auckland suburb of Arch Hill. The application was reviewed first by the Auckland Council and then by a panel of independent commissioners. The decision may still be appealed to the Environment Court (New Zealand Herald, 2013).

In 2009 the Resource Management Act was amended to stop it being used to oppose trade competitors. The two major supermarket chains had for many years battled through the courts over the siting of a new PAK'nSAVE supermarket in Wairau Road on Auckland's North Shore. The Government cited this case as evidence of the need for an amendment. While the amendment may address the most egregious anti-competitive behaviour, battles between competitors may shift to district plans rather than specific consents. They may involve property developers rather than retail firms directly.

For example, in May 2013, Todd Property Group, the owner of the Kāpiti Landing commercial development at the Kāpiti Coast Airport entered a war of words with Coastlands, the existing retail mall in Paraparaumu. At issue was the Kāpiti Coast district plan restriction on large format retail in the new development. Kāpiti Landing chair Sir Noel Robinson argued against "outdated patch-protecting regulations in the new district plan" (Maxwell, 2013). In the other corner, Richard Mansell, the chief executive of Coastlands "require[d] the council to be resolute in its defence of the overall provisions for the Kāpiti Coast" (Maxwell, 2013). Similar battles have emerged in the past over other developments (eg, Johnsonville vs. Lambton Quay and Harbour Quays precinct vs. Lambton Quay).

Box I.5 **IKEA barred in land-use hearing**

Redwood Group, the developer of a new retail site in the Auckland suburb of Mount Wellington, planned to bring IKEA into New Zealand in the mid-2000s. Lengthy planning procedures culminated in an Environment Court hearing. Consent for the development was finally given in 2008 based on agreement among the parties to the proceedings. Consent was subject to "extra-tough" conditions on the types of outlets that could be located there (Dey, 2008). IKEA was explicitly barred.

The main grounds for opposition to the development were its effects on traffic flows in the immediate locality. It was argued that IKEA was known as a generator of high traffic volumes. The owners of the Sylvia Park retail centre (across the road from the proposed development) joined the Environment Court process. Other types of outlets explicitly barred in the decision included supermarkets, department stores or discount department stores, all of which already had a presence in Sylvia Park. The wider consumer benefits in stimulating competition in the New Zealand market through the entry of a new international chain were not apparently considered.

Source: Dey (2008); *Redwood Group Limited* v *Auckland City Council* (2008).

In a survey of businesses conducted for the Commission's local regulation inquiry, businesses in the wholesale industry were the most likely (54% of wholesale businesses responding) of all industries to agree that "[l]ocal government regulations (not rates) place a significant financial impact on my business." Some 59% of wholesale businesses and more than 40% of retail businesses reported that regulatory compliance had greatly impacted their financial position or performance. Across all industries, firms were most likely to identify building and construction consents, and planning, land use or water consents among their top compliance costs (NZPC, 2012b).[16]

Direct regulation of retail

New Zealand ranks fourth among OECD countries for the least restrictive regulation of retail trade (OECD, 2013). This rank is based on requirements for registration or licensing or for permits to engage in various types of retail activity, including siting over and above "general urban planning provisions".

I.7 Summing up: New Zealand trails the ICT revolution in retail and wholesale

The global retail and wholesale industries have been undergoing sustained transformation as a result of ICT use. Successive waves of ICT have led to ongoing evolution of business models that replace the traditional approaches. Currently online retailing is growing very rapidly and is increasingly being integrated with other more traditional retail modes and evolving modes of electronic access. Online retailing is exposing New Zealand retailers to international competition much more than in the past. Yet the rise of cloud computing should allow smaller New Zealand retailers to be more efficient users of ICT than before. As ICT develops further these changes are likely to continue.

Globally, the largest productivity gains from ICT in retail and wholesale have come from achieving enormous scale economies. These are associated with very large markets, particularly the United States, and the related growth of huge retail chains (eg, Walmart) operating with large distribution centres and outlets. While scale economies of this size are never going to be available to New Zealand retailers, there are still opportunities for further productivity growth through the use of ICT.

Changing retail and wholesale business models require reorganisation within firms and complementary investments in physical capital and training. The constant turnover of firms as successful models increase their market share requires resources to shift between firms. Barriers to reallocation of resources can reduce the productivity gains from ICT and delay firms making ICT investments. International evidence shows that restrictive labour market and land use regulation can have an adverse effect on labour productivity growth

[16] Nevertheless, more than 40% of retail and wholesale businesses reported that employment regulations had a greater impact than the top-ranked local government regulation. See Chapter 9 for a discussion of employment regulation and the adoption of ICT.

in retail and wholesale. There is no strong evidence that these types of regulation act as a barrier to resource reallocation in New Zealand.

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