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**Impacts of Structural Changes In Australia’s Economy (2006 – 2016) on labour productivity, income inequality and competition in local markets**

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# EXECUTIVE SUMMARY

This research paper reveals and analyses the massive structural economic changes that occurred in Australia between 2006-2016. These changes have weakened growth in productivity, hollowed out middle-income jobs, increased income inequality, reduced competition in wholesale and retail sectors, and prompted a shift of jobs offshore. Post COVID-19 economic planning needs to avoid repeating the failures of past policy settings.

There is unanimous agreement among economists and commentators on the need to lift labour productivity to ensure a more prosperous Australia in the future. But how is this to be done? There is a consensus across many academics, think tanks and industry bodies that lifting labour productivity will require further reforms, continuing the approach adopted by the Hawke/Keating Governments in floating the dollar, winding back industry assistance, increasing labour flexibility and other macro-economic measures.

This study shows that pressing on with yet more of the Hawke/Keating agenda cannot be the answer. It sets out the outcomes of this old agenda by identifying the structural changes that occurred in Australia’s economy from 2006-2016 at both an industry and occupational level.

Structural change from 2006-2016 affected one in six jobs in Australia. By analysing census data, we can identify net changes of around 210,000 jobs lost to offshoring, 223,000 jobs lost to automation and 150,000 jobs lost through digital transformation.

Structural change has resulted in around 412,000 fewer jobs in manufacturing and 148,500 fewer jobs in wholesale trade, while at the same time it was associated with growth of around 321,000 jobs in health, social assistance and education. The release of the next Census (2021) will allow the analysis to be extended to a more current period.

Growth in labour productivity is essential for any increase in economic wellbeing, but this growth has been made more difficult by a structural shift from manufacturing to people-servicing jobs. Manufacturing is typically the area of the economy associated with the greatest productivity growth while people servicing typically suffers from low gains in productivity.

Competition has also suffered. Regulatory failure appears to have contributed to structural changes that have reduced competition, with entrenched incumbents increasing vertical integration and squeezing out smaller independent businesses. This lack of competitive pressure further reduces incentives to increase productivity.

With structural change creating impediments for productivity growth, it is harder to achieve real wage growth. The jobs created through structural change have been in both low-wage and very high-wage occupations while middle-income jobs have shrunk. The hollowing out of middle-income jobs has increased income inequality in Australia.

Besides the shift away from manufacturing, reduced competition and the loss of middle-income jobs, structural change can be driven by a range of other factors. These include changes in the demand for goods and services, technological changes that make jobs redundant through automation, digital transformation, and by increased productivity. They can also be driven by policy decisions that can result in the off-shoring of jobs.

Most of these structural changes have involved a shift from industries with a record of high growth in labour productivity to industries with inherently low potential for growth in labour productivity. The recently released 2021 Intergenerational Report (Treasury, 2021) and various proposals from industry bodies to increase productivity do not consider the impact of most, or indeed any, of these structural changes. This makes it unlikely that their policy approaches will be able to deliver real growth in labour productivity.

In addition to the structural decline in manufacturing, the analysis has highlighted a collapse in wholesale trade, with a structural loss of around 148,500 jobs. The collapse in wholesale trade with a shift to direct sourcing is likely to be associated with a reduction in competition in food retailing, and can explain the firm markups (the ratio of the prices charged compared to the marginal cost of production) observed in the Treasury paper on Product Market Power published in June 2021.

To summarise, the current study provides evidence of these structural changes from 2006 to 2016 and of their consequences. The data show that:

* The economy has suffered a narrowing of its economic base. This is manifested in the collapse in manufacturing and the shift of resources to low productivity, high-wage sectors (such as specialist health care). Moreover jobs of this latter type are typically funded by government and are likely to create problems for future governments in funding these services.
* Opportunities to increase the productivity of the Australian workforce have been restricted by the structural changes that have occurred. Moreover, from 2006 to 2016 there appears to have been relatively little growth in employment in knowledge industries or in other tradeable sectors of the economy.
* The narrowing of the economic base has led to an increased reliance on commodities such as: wheat, iron ore and other primary produce. This has intensified the sensitivity of the Australian economy to the commodity boom and bust cycle.
* The Government’s focus on nominal growth in GDP has led to shifts of resources into construction and people servicing. This has led to the risk of continued slow growth in GDP per capita. It also puts Australia on the path of having to attract ever more migrants to keep the city building and people servicing industries growing, with all their associated deleterious effects on productivity. This means that while growth in nominal GDP will continue, meaningful growth in per capita GDP will languish.
* The labour market has become stratified, with a hollowing out of middle-class, middle-income occupations, leading to more income inequality. This structural change is associated with a large increase in the ‘working poor’ population and a small, but substantial, increase in high-income workers. The policies of exposing Australia’s industries to global competition appear to have had real world consequences of systemic shifts in the workforce leading to an increasing share of employment in low productivity sectors.
* The market power of firms in a range of industry sectors appears to be unchecked by the competition regulator. This, together with the collapse of the wholesale trade industry, is likely to further reduce competition, entrench existing oligopolies, stifle innovation and deter new entrants into the market. Reduced competition and the increased market power of existing firms is leading to rent seeking behaviour and an to an undermining of legislation prohibiting retail price maintenance.

# INSIGHTS INTO HOW AUSTRALIAN ECONOMIC POLICY SETTINGS HAVE LED TO STRUCTURAL CHANGE IN THE ECONOMY AND SLOWER PRODUCTIVITY GROWTH

Over the past two decades the Australian economy has been shaped by both policy reforms and technological change. In the same period, the absolute number of people in the labour force has grown with high levels of immigration swelling the workforce. With changes to the size of the workforce over time, it can be difficult to identify patterns of structural change, as these can be masked by nominal growth.

With Australia’s economy in the period from 2010-2020 growing at the slowest rate in 60 years, the need for insight is clear. To develop an understanding of the impact of changes in the composition of jobs and industries Mimesis Labs have worked to develop a profile of the economy as it would have looked in 2016 if the overall growth in the size of the workforce matched the actual aggregate change in workforce numbers from 2006-2016, but with an unchanged composition of workers by industry and occupation.

The available data on occupation covers 478 occupation groups and the data on industry covers 717 industry classes. This means that we could identify the extent to which the pattern of jobs held by industry and occupation that were actually held in 2016 varied from the counts that would have been expected if there had been no change in the share of jobs held by occupation and industry as at 2006. And we could do this at a very granular level.

The variance between the expected values in 2016 (based on an unchanged composition of jobs by occupation and industry) and actual values observed from the 2016 Census is referred to as structural change in this paper.

There are a range of reasons why structural change may occur in an economy. These reasons include factors relating to technology, policy and market demand. For example, a shift in technology from film to digital technology may explain why employment in the occupation of photographic developers and printers fell by 64% over this period.

Working with such a detailed level of data on structural changes at the occupation and industry level has allowed this analysis to quantify the level of structural change. And for a large number of occupations, to also identify the extent to which the changes have been driven by automation of work, digital disruption and the off-shoring of jobs.

For each of the 478 occupation groups we were able to determine the average weekly personal income as at 2016, and to then explore the impact of structural change on income inequality in Australia.

The analysis has shown that around one in six jobs in Australia were affected by structural change between 2006-2016, with a structural shrinkage of 696,101 jobs from the manufacturing, wholesale trade and retail industries. In contrast, jobs in health care and social assistance and education and training grew faster than the overall rate of growth in the workforce, with structural growth of 385,664 additional jobs in these industry divisions.

The June 2021 report of the Productivity Commission ‘PC Productivity Insights: Recent Developments’ identified that in the decade from 2010-2020 Australia experienced its lowest level of economic growth in 60 years (both in terms of output per person and of income per person). (Productivity Commission, 2021) Their report states:

*“The longer term slowdown in MFP [multifactor productivity] growth in Australia is consistent with a global slowdown that began in about 2005. Indeed, Australia’s slowdown in productivity is actually less pronounced than that experienced in most other advanced economies, and for a time its effects on living standards were masked by the mining investment boom.*

*Nonetheless, the effect has been to contribute to a slump in growth in living standards. The Commission (2017, 2019, 2020) has previously summarised the numerous theories thought to explain slower global productivity growth. Whatever the ultimate causes, it is unlikely that domestic policy factors play a strong role given how widespread the slowdown is, unless there are a common policy flaws across the developed world. But whether or not the main factors behind Australia’s slower growth in GDP per capita are the direct result of policy decisions, how governments respond will have a lasting effect on living standards*

*Considering that Australia’s poor economic performance in the 1970s was a key justification for the economic reforms of the 1980s and 1990s, the fact that the last decade of growth was even worse warrants further reflection.”*

 The Productivity Commission’s review concludes that Australia had experienced its lowest rate of economic growth in 60 years over the decade from 2010 – 2020.

It argues that slow income growth is attributable to slow growth in labour productivity along with declining terms of trade and labour utilisation as shown in the chart below taken from their report.

| Figure 1: Labour productivity, utilisation, GNI per capita 1985-2020  Slow income growth is due to slow labour productivity growth along with declining terms of trade and labour utilisation …Five year lagged average growth in gross domestic income and labour productivity, and the contributions from labour utilisation the terms of trade and the net inflow of foreign income |
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| This figure plots the 5-year lagged average growth in gross domestic income and the contributions from labour utilisation, labour productivity, the terms of trade and the net inflow of foreign income. The figure shows that slow income growth in last decade has been caused by a declining terms of trade along with slow labour productivity growth and falling labour utilisation. Prior to this, 5-year lagged income growth was relatively strong especially between the period 1995 to 2010.    |
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| The effect of labour utilisation is defined as the difference between GDP per capita growth and labour productivity growth. The terms of trade effect is defined as the difference between GDP and GDI growth. The effect of the net inflow of foreign income is defined as the difference between growth in GNI and GDI**.** |
| *Source*: Commission estimates using ABS (*Australian System of National Accounts, 2019‑20*, Cat. no. 5204.0, table 1). |

Figure 1 Labour productivity, utilisation, Gross National Income (GNI) per capita 1985-2020 Source: Productivity Insights: Recent Developments, Productivity Commission, Canberra June 2021

A core argument of the Productivity Commission has been that exposing Australia’s manufacturing industries to global competition would result in flows of capital and labour to industry sectors with higher productivity and growth potential. The idea was that the ‘freeing up’ of capital and skilled resources would result in both productivity growth and real wage growth in the Australian economy.

A McKinsey report (Making it in America – revitalising US manufacturing, 2017) estimated that manufacturing in the US accounts for around 9% of employment and contributes 35% of productivity growth. This makes a strong manufacturing sector a critical enabler of growth in labour productivity.

The impact that Australian economic policies, including free trade agreements, have had on the manufacturing sector is explored below. A range of free market reforms had been introduced prior to 2006, but the effects of these policies were latent until the Australian dollar rose in the early 2000’s. This development made import substitution and offshoring of jobs a rational choice for Australian businesses.

## A DEEP DIVE INTO MANUFACTURING

There are 199 industry classes listed by the Australian Bureau of Statistics (ABS) within the industry division of manufacturing. Of these, 158 experienced structural decline and 41 were stable or achieved some structural growth between 2006 and 2016. Total structural job growth was around 19,600 jobs while structural job losses were around 431,700, resulting in a net structural loss of around 412,000 jobs in manufacturing.

The census provides data on structural job losses at the 4-digit level. This means that we were not only able to quantify the structural job losses (shown in Table A1 in the Appendix to this report) at a very detailed level, but were also able to match the manufacturing workers to the types of goods or services they produced. From this we were able to link data on imports and exports of these goods and services (sourced from the Department of Trade and Foreign Affairs) and see whether imports rose as jobs fell (indicating offshoring of work) or whether both imports and jobs declined.

The change in value of net trade by 3-digit product/commodity group from 2006-2016 is provided in Table A2 in the Appendix.

Table 1 below shows the linked data matching structural job losses in manufacturing industries with changes in the balance of trade for the same manufactured product. For example, there was a structural loss of around 15,000 workers from motor vehicle parts manufacturing. During the same time period the balance of trade (exports minus imports) for vehicle parts and accessories deteriorated by $576 million.

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| **Table 1 Change in balance of trade by 3-digit Standard International Trade Classification (SITC) code and structural change in employment counts at 4 digit Australia and New Zealand Standard Industrial Classification (ANZSIC): actual employed 2016 minus expected employed 2016 with no structural change** |
| SITC Description | Change in trade balance from 2006-2016 (‘000’s) $ | ANZSIC 4-digit code description of industry | Structural job losses from 2006-2016 |
| Passenger motor vehicles | -9,879,499 | Motor vehicle manufacturing | -17,175  |
| Automotive Electrical Component Manufacturing | -2,304  |
| Motor Vehicle Body and Trailer Manufacturing | -1,150  |
| Vehicle parts & accessories | -576,570 | Other Motor Vehicle Parts Manufacturing | -15,145  |
| Printed matter | -5,765 | Printing | -15,121  |
| Plastic plates, sheets & film | -484,386 | Rigid and Semi-Rigid Polymer Product Manufacturing | -8,285  |
|  |  |  |  |
| **SITC Description** | **Change in trade balance from 2006-2016 (‘000’s) $?** | **ANZSIC 4 digit code description of industry** | **Structural job losses from 2006-2016** |
| Furniture, mattresses & cushions | -2,032,881 | Other Furniture Manufacturing | -8,190  |
| Wooden Furniture and Upholstered Seat Manufacturing | -4,635  |
| Mattress Manufacturing | -429  |
| Furniture Manufacturing, nfd | -416  |
| Furniture and Other Manufacturing, nfd | -59  |
| Metal Furniture Manufacturing | -1,099  |
| Men's clothing (excl knitted) | -646,558 | Clothing Manufacturing | -10,947 |
| Women's clothing (excl knitted) | -825,917 |
| Men's clothing, knitted | -255,534 |
| Women's clothing, knitted | -532,650 |
| Clothing accessories, nes | -216,978 |
| Vegetables, prepared or preserved | -390,188 | Fruit and Vegetable Processing | -6,970  |
| Aluminium |  | Aluminium Rolling, Drawing, Extruding | -5,462  |
| Aluminium | -3,024,333 | Aluminium Smelting | -4,042  |
| Other textile clothing | -1,447,233 | Cut and Sewn Textile Product Manufacturing | -6,272  |
| Pigments, paints & varnishes | -234,334 | Paint and Coatings Manufacturing | -4,040  |
| Alcoholic beverages | -1,335,226 | Wine and Other Alcoholic Beverage Manufacturing | -4,865  |
| Meat, salted or dried | -37,129 | Cured Meat and Smallgoods Manufacturing | -2,152  |
| Milk, cream, whey & yoghurt | -381,616 | Milk and Cream Processing | -2,010  |
| Cheese & curd | -313,290 | Cheese and Other Dairy Product Manufacturing | -704  |
| Seafood, prepared or preserved | -381,179 | Seafood Processing | -768  |
| Cereal preparations | -438,860 | Cereal, Pasta and Baking Mix Manufacturing | -1,885  |
| Biscuit Manufacturing (Factory based) | -2,126  |
| Cake and Pastry Manufacturing (Factory based) | -2,459  |
| Bakery Product Manufacturing (Non-factory based) | -2,624  |
| Sugar confectionery | -124,894 | Confectionery Manufacturing | -3,114  |
| Animal feed | -260,709 | Prepared Animal and Bird Feed Manufacturing | -1,278  |
| Tobacco, manufactured | -946,950 | Cigarette and Tobacco Product Manufacturing | -1,390  |
| Other vegetable textile fibres | -4,780 | Natural Textile Manufacturing | -855  |
| Refined petroleum | -7,151,997 | Petroleum Refining and Petroleum Fuel Manufacturing | -2,302  |
| Fixed vegetable oils & fats, hard | -131,376 | Oil and Fat Manufacturing | -646  |
| Medicaments (incl veterinary) | -2,457,622 | Human Pharmaceutical and Medicinal Product Manufacturing | -3,126  |
| Perfumery & cosmetics (excl soap) | -538,592 | Cosmetic and Toiletry Preparation Manufacturing | -936  |
| Soap & cleansers | -274,890 | Cleaning Compound Manufacturing | -1,579  |
| Fertilisers (excl crude) | -682,805 | Fertiliser Manufacturing | -736  |
| Insecticides, herbicides, disinfectants | -610,278 | Pesticide Manufacturing | -546  |
| Explosives & pyrotechnics | -70,602 | Explosive Manufacturing | -254  |
| Leather manufactures | -27,051 | Leather Tanning, Fur Dressing and Leather Product Manufacturing | -1,508  |
| Rubber tyres, treads & tubes | -783,357 | Tyre Manufacturing | -3,369  |
| Veneers, plywood & particle board | -370,593 | Veneer and Plywood Manufacturing | -595  |
| Paper & paperboard, cut to size | -730,442 | Pulp, Paper and Converted Paper Product Manufacturing, nfd | -1,265  |
| Pulp, Paper and Paperboard Manufacturing | -3,284  |
| Corrugated Paperboard and Paperboard Container Manufacturing | -3,113  |
| Paper Stationery Manufacturing | -3,770  |
| Sanitary Paper Product Manufacturing | -1,557  |
| Paper Bag Manufacturing | -472  |
| Knitted or crocheted fabrics | -17,327 | Knitted Product Manufacturing | -1,229  |
| Made-up textile articles, nes | -894,175 | Textile Finishing and Other Textile Product Manufacturing | -1,938  |
| Floor coverings | -305,067 | Textile Floor Covering Manufacturing | -2,110  |
| Glass | -304,489 | Glass and Glass Product Manufacturing | -2,813  |
| Pottery | -54,729 | Other Ceramic Product Manufacturing | -2,379  |
| Uncoated flat-rolled iron & steel | -34,065 | Sheet Metal Product Manufacturing (except Metal Structural and Container Products) | -3,212  |
| **SITC Description** | **Change in trade balance from 2006-2016 (‘000’s) $?** | **ANZSIC 4 digit code description of industry** | **Structural job losses from 2006-2016** |
| Iron, steel, aluminium structures | -1,457,507 | Prefabricated Metal Building Manufacturing | -1,116  |
| Architectural Aluminium Product Manufacturing | -4,820  |
| Other Structural Metal Product Manufacturing | -3,463  |
| Metal containers | -11,702 | Other Metal Container Manufacturing | -1,526  |
| Wire products | -55,956 | Spring and Wire Product Manufacturing | -2,999  |
| Nails, screws, nuts, bolts & rivets | -125,383 | Nut, Bolt, Screw and Rivet Manufacturing | -1,051  |
| Hand or machine tools | -204,812 | Machine Tool and Parts Manufacturing | -2,304  |
| Agric machinery (excl tractors) & parts | -619,800 | Agricultural Machinery and Equipment Manufacturing | -3,143  |
| Heating & cooling equipment & parts | -1,946,163 | Fixed Space Heating, Cooling and Ventilation Equipment Manufacturing | -1,446  |
| Pumps (excl liquid pumps) & parts | -933,449 | Pump and Compressor Manufacturing | -1,294  |
| Computers | -1,459,562 | Computer and Electronic Office Equipment Manufacturing | -3,211  |
| Medical electrodiagnostic apparatus | -284,302 | Medical and Surgical Equipment Manufacturing | - 661  |
| Household-type equipment, nes | -1,500,226 | Whiteware Appliance Manufacturing | -2,810  |
| Other Domestic Appliance Manufacturing | -942  |
| Railway vehicles (incl hovertrains) | -244,914 | Railway Rolling Stock Manufacturing and Repair Services | -2,388  |
| Prefabricated buildings | -68,807 | Prefabricated Wooden Building Manufacturing | -160  |
| Lighting fixtures & fittings | -824,835 | Electric Lighting Equipment Manufacturing | -2,675  |
| Textile clothing accessories | -252,519 | Textile, Leather, Clothing and Footwear Manufacturing, nfd | -1,635  |
| Footwear | -989,452 | Footwear Manufacturing | -1,126  |
| Optical goods, nes | -355,497 | Photographic, Optical and Ophthalmic Equipment Mfing | -1,467  |
| Prams, toys, games & sporting gds | -1,101,756 | Toy, Sporting and Recreational Product Manufacturing | -1,755  |
| Jewellery | -533,603 | Jewellery and Silverware Manufacturing | -1,769  |

Table 1:Change in balance of trade by 3 digit SITC code and structural change in employment at 4 digit ANZSIC code Sources: Department of Foreign Affairs and Trade (DFAT) and ABS Table Builder

It is likely that the offshoring of jobs from the manufacturing sector is significantly higher than shown above. This is because Table 2 only represents the industry classes in manufacturing that could be directly matched to the standard trade classification. Other industry classes that are likely to involve transfer of jobs to overseas include offshoring of some aircraft maintenance, steel manufacturing and energy intensive manufacturing industry classes. The table below shows some of the manufacturing industry classes with structural job losses that have not been matched to import replacement data.

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| **Table 2: Structural job losses (actual jobs in 2016 minus jobs that would have been expected in 2016 had there been no structural change) for 4-digit manufacturing industry classes not matched to trade data** |
| Industry of employment (INDP) - 4-digit Level | Structural job loss count | Av weekly wages 2016 |
| Iron Smelting and Steel Manufacturing | - 21,205  |  $ 1,446  |
| Other Fabricated Metal Product Manufacturing nec | - 7,499  |  $ 1,376  |
| Machinery and Equipment Manufacturing, nfd | - 6,731  |  $ 1,310  |
| Structural Steel Fabricating | - 4,870  |  $ 1,372  |
| Boatbuilding and Repair Services | - 4,672  |  $ 1,075  |
| Other Electronic Equipment Manufacturing | - 4,211  |  $ 1,429  |
| Aircraft Manufacturing and Repair Services | - 3,328  |  $ 1,644  |
| Polymer Film and Sheet Packaging Material Manufacturing | - 3,246  |  $ 1,481  |
| Basic Inorganic Chemical Manufacturing | - 1,388  |  $ 1,927  |
| Industrial Gas Manufacturing | - 1,170  |  $ 1,842  |
| Basic Organic Chemical Manufacturing | - 1,008  |  $ 1,595  |

Table 2 ANZIC 4 digit industry classes not matched to SITC data Source ABS Table Builder

The hope that Australia’s advanced manufacturing sectors would flourish failed to materialise, as indicated by the structural declines in some of these industries, as shown below.

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| **Table 3: Structural job losses (actual jobs in 2016 minus jobs that would have been expected in 2016 had there been no structural change) for selected manufacturing industries** |
| Industry of employment (INDP) - 4-Digit Level | Structural job loss count | Av weekly wages 2016 |
| Photographic, Optical and Ophthalmic Equipment Manufacturing |  1,467  |  $ 1,285  |
| Communication Equipment Manufacturing |  2,332  |  $ 1,490  |
| Other Professional and Scientific Equipment Manufacturing |  2,780  |  $ 1,773  |
| Computer and Electronic Office Equipment Manufacturing |  3,211  |  $ 1,528  |
| Human Pharmaceutical and Medicinal Product Manufacturing |  3,126  |  $ 1,628  |

Table 3 Structural declines in advanced manufacturing Source ABS TableBuilder

## Sectors with structural gain – people servicing, health care and social assistance, education and training

So far, we have been concerned about the impact of job losses in manufacturing on the capacity of the Australian economy to deliver robust growth in labour productivity. A second factor putting limits on achievable productivity growth has been the structural increase in jobs and industries associated with people servicing, especially health care and social assistance, education and training.

Structural gains (growth beyond the overall rate of the growth of the labour force from 2006-2016) added around 371,500 jobs in health care and social assistance and education and training. Many of the jobs in these industries (such as nurses and doctors) have long shown low gains in labour productivity, though high wages. Caps on Medicare rates may have contributed to a structural shift in the medical workforce towards specialism. In 2006 around 60% of Australia’s doctors were GPs, by 2016 this proportion had dropped to 40%. Many of the jobs in these sectors are publicly funded, directly or indirectly through taxation.

The Community and Personal Service Worker occupation division is of particular note. Their combined structural growth in child carers, aged and disabled carers and nursing support and personal care workers (that is growth above and beyond what might have been expected from population growth) amounts to an extra 96,181 jobs. Another burgeoning people-servicing industry is the hospitality industry with structural growth of 18,155 bar attendants and baristas. Structural decline in employment of Security Officers and Guards may be associated with increased automation of surveillance technology and remote monitoring.

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| **Table 4: Key structural changes in health, education, community and personal service occupations 2006-2016** |
| Community And Personal Service Workers and selected health professionals and managers with structural change of more than 2000 workers in occupation classes |  2006 Actual  |  2016 Actual  | Expected 2016 (No Structural Change) | Nominal Change 2006-2016  |  Net Structural Change  |

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| Aged and Disabled Carers |  77,413  |  132,324  |  90,913  |  54,911  |  41,411  |
| Child Carers |  85,258  |  139,595  |  100,126  |  54,337  |  39,469  |
| Registered Nurses |  172,565  |  220,981  |  202,658  |  48,416  |  18,323  |
| Bar Attendants and Baristas |  55,995  |  83,915  |  65,760  |  27,920  |  18,155  |
| Education Aides |  56,770  |  84,132  |  66,670  |  27,362  |  17,462  |
| Nursing Support and Personal Care Workers |  58,171  |  83,616  |  68,315  |  25,445  |  15,301  |
| Generalist Medical Practitioners |  35,452  |  54,105  |  41,634  |  18,653  |  12,471  |
| Enrolled and Mothercraft Nurses |  19,396  |  34,231  |  22,778  |  14,835  |  11,453  |
| Health and Welfare Services Managers |  12,161  |  24,250  |  14,282  |  12,089  |  9,968  |
| Early Childhood (Pre-primary School) Teachers |  15,277  |  27,130  |  17,941  |  11,853  |  9,189  |
| University Lecturers and Tutors |  35,592  |  49,227  |  41,799  |  13,635  |  7,428  |
| Social Workers |  12,442  | 21,943  |  14,612  |  9,501  |  7,331  |
| Occ. and Environmental Health Professionals | 10,840  | 19,899  | 12,730  |  9,059  |  7,169  |
| Psychologists | 13,440  | 22,730  |  15,784  |  9,290  |  6,946  |
| Physiotherapists | 12,285  | 20,746  |  14,427  |  8,461  |  6,319  |
| Welfare, Recreation and Community Arts Workers | 13,930  | 22,372  | 16,359  |  8,442  |  6,013  |
| Pharmacists | 15,337  | 23,372  | 18,012  |  8,035  |  5,360  |
| Welfare Support Workers | 40,298  | 52,345  | 47,325  |  12,047  | 5,020  |
| Other Personal Service Workers | 6,785  | 12,873  |  7,968  |  6,088  |  4,905  |
| Private Tutors and Teachers | 26,052  | 35,122  |  30,595  |  9,070  |  4,527  |
| Occupational Therapists | 6,836  | 12,352  |  8,028  |  5,516  |  4,324  |
| Special Education Teachers | 13,732  | 20,290  |  16,127  |  6,558  |  4,163  |
| Other Medical Practitioners | 5,850  | 10,989  |  6,870  |  5,139  |  4,119  |
| Medical Imaging Professionals | 10,146  | 15,887  |  11,915  |  5,741  |  3,972  |
| Midwives | 12,236  | 18,315  |  14,370  |  6,079  |  3,945  |
| Dental Assistants | 15,379  | 21,888  |  18,061  |  6,509  |  3,827  |
| Nurse Managers | 10,899  | 16,059  |  12,800  |  5,160  |  3,259  |
| Internal Medicine Specialists | 3,590  | 7,423  |  4,216  |  3,833  |  3,207  |
| Ambulance Officers and Paramedics | 9,099  | 13,725  |  10,686  |  4,626  |  3,039  |
| Dental Practitioners |  9,071  |  13,130  |  10,653  |  4,059  |  2,477  |
| Education Professionals, nfd | 3,126  | 5,813  |  3,671  |  2,687  |  2,142  |
| Security Officers and Guards |  41,102  |  45,525  |  48,270  |  4,423  | - 2,745  |

Table 4 4 digit occupations within Community and Personal Service worker division with high levels of structural change Source: ABS TableBuilder

This discussion does not deny the community need for these services. Rather we present this data to highlight the need to have an appropriate industry base so that we can generate the real economic growth (productivity growth) which will enable us to fund these services in the future.

## Knowledge industries and services

Table 5 below shows structural changes in professional occupations between 2006-2016 for the five professional occupations most affected by structural decline and the five professional occupations with highest levels of structural growth.

|  |
| --- |
| **Table 5 : Key structural changes in professional occupations 2006-2016** |
| Professionals | 2006 Actual | 2016 Actual | Expected 2016 (No Structural Change) | Nominal Change 2006-2016 | Net Structural Change |
| Engineering Professionals, nfd |  21,744  |  13,844  |  25,536  | - 7,900  | - 11,692 |
| Vocational Education Teachers  |  30,841  |  30,893  |  36,219  |  52  | - 5,326 |
| Training and Development Professionals |  19,905  |  18,273  |  23,376  | - 1,632  | - 5,103 |
| Financial Dealers |  18,004  |  16,365  |  21,144  | - 1,639  | - 4,779 |
| ICT Professionals, nfd |  19,334  |  18,822  |  22,706  | - 512  | - 3,884  |
| Generalist Medical Practitioners |  35,452  |  54,105  |  41,634  |  18,653  |  12,471  |
| Software and Applications Programmers |  52,859  |  79,579  |  62,077  |  26,720  |  17,502  |
| Registered Nurses |  172,565  |  220,981  |  202,658  |  48,416  |  18,323  |
| Advertising and Marketing Professionals |  36,618  |  61,835  |  43,004  |  25,217  |  18,831  |
| Management and Organisation Analysts |  34,941  |  62,973  |  41,034  |  28,032  |  21,939  |

Table 5 key structural changes in professional occupations 2006-2016, Source ABS Table Builder

There is little structural growth in professions associated with a knowledge economy. For example, software and application programmers only increased by around 17,500. The structural increase in management and organisation analysts can be partially explained by the outsourcing of public service jobs to management consultancy agencies.

The relatively small growth in the knowledge-based jobs that can deliver productivity growth essentially means that Australia is relying on good prices for agricultural products and exports of minerals and energy to drive the economy in the future.

The analysis developed here suggests that the structural changes to Australia’s economy that have been advocated over the years by the Productivity Commission (opening up Australia’s manufacturing and other industries to global competition) have delivered perverse outcomes – an increase in income inequality (explored shortly), a decline in terms of trade, a hollowing out of middle-income jobs in Australia, a decline in the capacity of the Australian economy to generate productivity growth, together with reduced resilience to global supply chain shocks.

# CHALLENGES TO SOCIAL COHESION –THE GROWTH OF INCOME INEQUALITY AND THE SHRINKING OF MID INCOME, MIDDLE AUSTRALIA

The analysis found clear evidence that structural change has contributed to the ‘hollowing out of the middle-class’ in Australia and has contributed to the growth of income inequality.

There is a growing literature on the social issues being attributed to the collapse of middle-income jobs, the challenges facing the working poor and the gap between stagnant wages for ordinary workers and the massive increases of wealth of elites.

To date we have not seen any analysis that has correlated changes in the structure of the Australian economy with changes in income distribution. In the current study we calculated the average personal weekly income for workers (from the 2016 Census data) in each of the 478 identified occupation classes and sorted the occupation classes into income deciles.

Next, the structural changes at the level of occupational class were calculated and the number of jobs lost or gained through structural change was calculated.

The most significant impact of structural change on income distributions has been shrinkage of lower middle and middle-income jobs. At the same time the number of high-income earners has expanded, with structural change leading to around an extra 158,000 workers in the top income decile. Both the bottom deciles and the top deciles have grown from structural change, while the mid and lower mid deciles have been hollowed out with income deciles 4&5 losing around 265,000 jobs.

Table 6 below shows the pattern of structural change for each income decile.

|  |
| --- |
| **Table 6 Structural change in job counts by personal weekly income decile** |
| Personal weekly income decile (1-low, 10 -highest) | Personal weekly income range in decile | Jobs lost | Jobs gained | Net structural change |
| 1 | $315.61 - $523.67 | - 18,968  |  64,797  |  45,829  |
| 2 | $525.71 -$715.04 | - 76,169  |  131,821  |  55,652  |
| 3 | $716.28 - $899.70 | - 132,570  |  86,096  | - 46,474  |
| 4 | $904.69 - $1,019.12 | - 195,980  |  67,662  | - 128,318  |
| 5 | $1,020.87 - $1,132.69 | - 169,225  |  32,843  | - 136,382  |
| 6 | $1,133.32 - $$1,255.69 | - 100,059  |  35,781  | - 64,278  |
| 7 | $1,257.31 - $1,433.60 | - 100,882  |  77,841  | - 23,041  |
| 8 | $1.442.02 - $$1,616.04 | - 39,115  |  99,181  |  60,066  |
| 9 | $1,619.01 - $1,917.30 | - 64,131  |  143,409  |  79,278  |
| 10 | $1,924.35 - $2,824.22+ | - 17,327  |  174,994  |  157,667  |

Table 6 Jobs lost/gained through structural change by avg personal weekly income of job holder Source: ABS TableBuilder

Figure 2 Structural job losses and gains by weekly income decile Source ABS Table Builder

This analysis provides clear evidence that, contrary to the claims that exposing Australian industry to international competition would lift productivity and lift the wages of ordinary workers, it has instead contributed to the growth of income inequality. This means more working poor, a hollowing out of lower middle to middle-income employment and a huge increase in the number of top decile income earners.

There will be a number of factors associated with the structural changes that have occurred, including offshoring of manufacturing, automation and digital transformation. The contribution of these factors is discussed in the next section.

## INCREASE IN SHARE OF INCOME GOING TO CAPITAL OWNERS

In addition to the hollowing out of middle-income jobs, it is likely that the structural changes and associated offshoring of jobs have contributed to an overall reduction in the share of income paid to workers in wages and salaries (labour share) compared to the share of income going to capital owners in profits (capital share).

The Reserve Bank of Australia in a review of labour and capital shares of income noted that:

 “…the share of total income paid to workers in wages and salaries (the ‘labour share’) rose over the 1960s and 1970s but has gradually declined since then. The corollary is that the share of income going to capital owners in profits (the ‘capital share’) has risen…” (La Cava, 2019).

Where companies that previously manufactured goods in Australia shifted production offshore a reduced cost of manufacturing would have enabled these companies to continue trading and maintain margins. In this case dividends would still be paid to the owners of these businesses while aggregate wages paid to Australian workers would drop with every job sent offshore.

In this case, not only do we have structural shifts with a hollowing out of middle-income jobs, we also have an increase in the concentration of wealth among owners of capital.

In Table 1 (in the deep dive into manufacturing) we were able to establish that the balance of trade worsened with a net growth in imports of $53,187 billion for a range of manufactured traded goods over the period from 2006-2016.

The manufacturing industries that produced these goods in Australia had a structural job loss of approximately 224,500 jobs in the same period.

The annual wages lost (through structural job loss) for these jobs was approximately $14.5 billion.

For the financial year 2018-2019 the Australian Bureau of Statistics produced estimates of multi-factor productivity for the Australian manufacturing industry and calculated that the labour share of the value of manufactured goods in Australia at the time was an average of 18.4%.

Matching the wages associated with structural job losses in manufacturing with the change in value of imports shows that the Australian labour cost would have equalled 27% of the value of the imports.

Comparing the labour share of the jobs that survived the structural changes of 2006-2016 (18.4%) and the estimate of the labour share that would have applied if there had been no structural loss of manufacturing jobs in Australia (27%) means that for every structural job lost offshore firms were able to reduce costs by a minimum of around $22,000/year/worker.

In addition to the structural decline in manufacturing, there was also a nominal decline in the number of workers in this sector over this period. It is likely that this reduced the bargaining capacity of labour, with a lower number of jobs available and the threat of offshoring if they were to bargain too hard.

It is likely that the relatively low level of angst shown in the business community about structural change in the manufacturing sector can be explained by the ability of firms to maintain margins, profitability and dividend payments by switching to imports rather than manufacturing.

|  |
| --- |
| **Table 7 Analysis of the subset of traded goods that could be directly matched to manufacturing industry class and impact on labour share** |
|  |  |
| Change in trade balance from 2006-16 '000's [is this $ or ‘000s$?] | -53,187,163 |
| Structural job loss count from 2006-16 | - 224,471  |
| Annual wages lost ('000's) | -$ 14,527,708  |
| Average labour share of import value | 27% |
| Wage component from MFP (18.4%)  | - 9,786,438  |
| Gap between labour share of import value and MFP  |  4,741,270  |
| Gap per worker lost  | -$21,122  |

Table 7 Summary data on change in trade balance and structural changes in manufacturing employment

# PROSPECTS FOR FUTURE JOBS – THE IMPACT OF ECONOMIC POLICY, AUTOMATION AND DIGITAL TECHNOLOGIES ON AUSTRALIAN JOBS

The very detailed data on industry and occupation allowed us to develop hypotheses on factors driving structural change. Of the 478 occupation groups studied, there were 239 occupations with structural decline.

We have developed some hypothesis around key factors causing structural changes in Australian jobs. First, where there are structural job losses for goods and services manufactured in Australia and these are matched to a corresponding increase in the value of imports, we are assuming that the structural job losses are associated with offshoring of work.

Second, where technology changes can be identified (e.g. decline in letter volumes associated with a shift to digital channels for bills and other communications) and these are mapped to specific occupations (e.g. mail sorters), the structural changes have been hypothesised as being due to digital transformation.

Third, where the need for specific occupations has shrunk due to automation of work (such as self-service checkouts) and these have been matched to a specific occupation (checkout operators and cashiers), these structural changes have been attributed to automation of work.

Over the period from 2006-2016 of the approximately 915,000 jobs in occupations that experienced structural decline (using the above criteria), we could allocate around 582,000 to offshoring, automation or digital transformation as follows:

* At least 210,000 jobs offshored
* 220,000 job losses to automation
* 150,000 job losses to digital disruption

## OFFSHORING OF JOBS – HYPOTHESISED LOSSES

Table 8 below shows the occupations with structural job losses that have been hypothesised to have been lost to offshore workers. It is possible that a range of factors may be associated with these structural job losses. For example, structural declines in butchers and smallgoods in occupation employment may be linked both to increased imports of processed meats, and to independent butchers being squeezed out by supermarkets selling pre-packaged meats.

|  |
| --- |
| **Table 8 : Hypothesised estimated structural job losses 2006-2016 due to offshoring** |
| OFFSHORE | 2006 Actual | 2016 Actual | Expected 2016 (No structural change) | Structural Job losses | Avg weekly income ($) |
| Product Assemblers | 32,669 | 22,459 | 38,366 | -15,907 | 859 |
| Metal Fitters and Machinists | 80,826 | 80,197 | 94,921 | -14,724 | 1,615 |
| Manufacturers | 21,197 | 13,085 | 24,894 | -11,809 | 1,156 |
| Engineering Professionals, nfd | 21,744 | 13,844 | 25,536 | -11,692 | 1,917 |
| Structural Steel and Welding Trades Workers | 60,175 | 58,981 | 70,669 | -11,688 | 1,281 |
| Metal Engineering Process Workers | 14,925 | 7,527 | 17,528 | -10,001 | 1,009 |
| Packers | 51,776 | 50,855 | 60,805 | -9,950 | 686 |
| Engineering Production Systems Workers | 22,433 | 16,538 | 26,345 | -9,807 | 1,340 |
| Electronics Trades Workers | 28,145 | 23,354 | 33,053 | -9,699 | 1,160 |
| Machine Operators, nfd | 27,494 | 22,786 | 32,289 | -9,503 | 1,119 |
| Cooks | 43,331 | 42,099 | 50,887 | -8,788 | 661 |
| Sewing Machinists | 13,314 | 8,132 | 15,636 | -7,504 | 649 |
| Other Factory Process Workers | 13,741 | 9,647 | 16,137 | -6,490 | 799 |
| Toolmakers and Engineering Patternmakers | 7,347 | 2,793 | 8,628 | -5,835 | 1,183 |
| Food and Drink Factory Workers | 29,351 | 28,934 | 34,469 | -5,535 | 988 |
| Butchers and Smallgoods Makers | 17,630 | 15,819 | 20,704 | -4,885 | 907 |
| Plastics and Rubber Production Machine Operators | 9,319 | 6,536 | 10,944 | -4,408 | 1,157 |
| Timber and Wood Process Workers | 8,165 | 5,185 | 9,589 | -4,404 | 832 |
| Textile and Footwear Production Machine Operators | 5,071 | 1,871 | 5,955 | -4,084 | 893 |
| Product Quality Controllers | 11,418 | 9,659 | 13,409 | -3,750 | 1,098 |
| Plastics and Rubber Factory Workers | 4,454 | 1,801 | 5,231 | -3,430 | 818 |
| Paper and Wood Processing Machine Operators | 7,582 | 5,544 | 8,904 | -3,360 | 1,054 |
| Aircraft Maintenance Engineers | 13,609 | 12,706 | 15,982 | -3,276 | 1,771 |
| Sheetmetal Trades Workers | 7,244 | 5,314 | 8,507 | -3,193 | 1,188 |
| Importers, Exporters and Wholesalers | 16,194 | 15,940 | 19,018 | -3,078 | 1,433 |
| Factory Process Workers, nfd | 11,491 | 10,461 | 13,495 | -3,034 | 793 |
| Technicians and Trades Workers, nfd | 17,856 | 18,065 | 20,970 | -2,905 | 1,320 |
| Bakers and Pastrycooks | 23,484 | 24,693 | 27,579 | -2,886 | 807 |
| Meat, Poultry and Seafood Process Workers | 17,237 | 17,782 | 20,243 | -2,461 | 825 |
| Clothing Trades Workers | 7,500 | 6,639 | 8,808 | -2,169 | 672 |
| Industrial Spraypainters | 5,767 | 4,693 | 6,773 | -2,080 | 1,212 |
| Vehicle Painters | 9,658 | 9,440 | 11,342 | -1,902 | 1,050 |
| Precision Metal Trades Workers | 6,531 | 6,111 | 7,670 | -1,559 | 1,108 |
| Metal Casting, Forging and Finishing Trades Workers | 3,238 | 2,436 | 3,803 | -1,367 | 983 |
| Vehicle Body Builders and Trimmers | 5,321 | 4,898 | 6,249 | -1,351 | 987 |
| Mechanical Engineering Draftspersons and Technicians | 4,094 | 3,756 | 4,808 | -1,052 | 1,586 |
| **Hypothesised total job losses from offshoring** |   |   |   | **-209,567** |   |

Table 8 Estimated job losses from offshoring Source: ABS Table Builder

At the same time that high productivity jobs were being shed offshore, the property price boom encouraged new entrants into real estate, with the industry having a structural growth of an additional 9,100 real estate agents.

## JOBs LOST THROUGH AUTOMATION

The occupation with the largest structural collapse in employment was secretaries, with a structural loss of 67,720 secretarial jobs. We hypothesise that much of the structural change in clerical and administrative jobs is related to job losses through automation and the shift to digital. For example, as banks have reduced their branch footprints there was a structural loss of 15,769 bank worker jobs. At the same time, the banking industry had structural growth of 9158 jobs, indicating a shift in the occupations in banking from customer service to technology.

Similarly, as the deployment of software as a service increases, functions typically done by bookkeepers are being automated and managed through on line accounting software.

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| --- |
| Table 9 Estimated structural job losses 2006-2016 attributable to automation of jobs |
|  |  |  |  |  |  |
| Automation | 2006 Actual | 2016 Actual | Expected 2016 (No Structural Change) | Job Losses | Avg Weekly Income |
| Secretaries | 94,403 | 43,146 | 110,866 | -67,720 | $ 963 |
| General Clerks | 206,292 | 219,845 | 242,267 | -22,422 | $ 967 |
| Corporate Services Managers | 21,804 | 7,199 | 25,606 | -18,407 | $ 1,916 |
| Bank Workers | 54,329 | 48,034 | 63,803 | -15,769 | $ 1,169 |
| Keyboard Operators | 52,923 | 47,655 | 62,152 | -14,497 | $ 835 |
| Bookkeepers | 77,559 | 79,231 | 91,084 | -11,853 | $ 905 |
| Checkout Operators and Office Cashiers | 95,681 | 102,803 | 112,367 | -9,564 | $ 390 |
| Shelf Fillers | 51,103 | 50,616 | 60,015 | -9,399 | $ 475 |
| Other Clerical and Office Support Workers | 15,701 | 10,951 | 18,439 | -7,488 | $ 684 |
| Storepersons | 96,846 | 108,209 | 113,735 | -5,526 | $ 881 |
| Purchasing and Supply Logistics Clerks | 61,911 | 67,394 | 72,708 | -5,314 | $ 1,156 |
| Filing and Registry Clerks | 14,444 | 12,271 | 16,963 | -4,692 | $ 960 |
| Switchboard Operators | 6,300 | 3,258 | 7,399 | -4,141 | $ 830 |
| Telecommunications Trades Workers | 19,128 | 18,449 | 22,464 | -4,015 | $ 1,300 |
| Library Assistants | 8,256 | 6,710 | 9,696 | -2,986 | $ 705 |
| Credit and Loans Officers | 24,346 | 25,704 | 28,592 | -2,888 | $ 1,456 |
| Librarians | 10,080 | 9,002 | 11,838 | -2,836 | $ 1,280 |
| Security Officers and Guards | 41,102 | 45,525 | 48,270 | -2,745 | $ 1,026 |
| Insurance, Money Market and Statistical Clerks | 23,653 | 25,801 | 27,778 | -1,977 | $ 1,216 |
| Accounting Clerks | 89,682 | 103,638 | 105,321 | -1,683 | $ 1,074 |
| Judicial and Other Legal Professionals | 9,192 | 9,261 | 10,795 | -1,534 | $ 2,035 |
| Electronics and Telecommunications Trades Workers, nfd | 1,911 | 713 | 2,244 | -1,531 | $ 1,321 |
| Signwriters | 5,658 | 5,328 | 6,645 | -1,317 | $ 950 |
| Insurance Investigators, Loss Adjusters and Risk Surveyors | 4,726 | 4,381 | 5,550 | -1,169 | $ 1,627 |
| Court and Legal Clerks | 11,421 | 12,358 | 13,413 | -1,055 | $ 1,043 |
| **Total job losses** |  |  |  | - 222,526 |  |

Table 9 Estimated job losses through job automation Source: ABS Table Builder

## JOBS LOST THROUGH DIGITAL TRANSFORMATION

Structural shifts in the employment of sales workers are likely to be driven by the transition of sales of a range of goods and services from bricks and mortar to online.

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| --- |
| Table 10: Estimated structural job losses due to digital disruption 2006-2016 |
| Digital Disruption  | 2006 Actual | 2016 Actual | Expected 2016 (No Structural Change) | Job Losses | Avg Weekly Income |
| Retail Managers | 188,733 | 184,751 | 221,646 | -36,895 |  $ 1,091  |
| Sales Representatives | 98,528 | 87,263 | 115,710 | -28,447 |  $ 1,401  |
| Sales Assistants and Salespersons, nfd | 22,503 | 6,191 | 26,427 | -20,236 |  $ 1,045  |
| Printers | 15,312 | 9,506 | 17,982 | -8,476 |  $ 1,134  |
| Motor Mechanics | 80,884 | 86,592 | 94,989 | -8,397 |  $ 1,026  |
| Mail Sorters | 13,617 | 10,152 | 15,992 | -5,840 |  $ 917  |
| Couriers and Postal Deliverers | 35,602 | 36,147 | 41,811 | -5,664 |  $ 960  |
| Telemarketers | 10,548 | 6,870 | 12,387 | -5,517 |  $ 777  |
| Inquiry Clerks | 51,155 | 54,980 | 60,076 | -5,096 |  $ 1,021  |
| ICT Sales Assistants | 14,424 | 12,692 | 16,939 | -4,247 |  $ 1,200  |
| Panelbeaters | 12,839 | 11,118 | 15,078 | -3,960 |  $ 1,074  |
| Graphic Pre-press Trades Workers | 5,050 | 2,026 | 5,931 | -3,905 |  $ 1,141  |
| Journalists and Other Writers | 18,709 | 19,157 | 21,972 | -2,815 |  $ 1,363  |
| Photographic Developers and Printers | 3,285 | 1,184 | 3,858 | -2,674 |  $ 752  |
| Models and Sales Demonstrators | 10,791 | 10,400 | 12,673 | -2,273 |  $ 605  |
| Binders, Finishers and Screen Printers | 4,466 | 3,096 | 5,245 | -2,149 |  $ 889  |
| Betting Clerks | 3,123 | 1,866 | 3,668 | -1,802 |  $ 760  |
| Survey Interviewers | 3,407 | 2,631 | 4,001 | -1,370 |  $ 653  |
| **Total job losses** |   |   |   | -149,762 |   |

Table 10 Estimated job losses through digital disruption Source: ABS Table Builder

Australia has often been referred to as ‘the lucky country’. It is possible that Australia has avoided some of the worst impacts of de-industrialisation (such as the rust-belt towns of the US) through the historical accident of having the majority of the population of Australia contained in a small number of cities.

The US had many single-employer towns and when firms shut down there were high costs of

There is the potential for Australia to thrive in the new economy, but if it is to do so we will need a knowledge framework for policy settings that will allow the new industries to flourish. A critical element in this will be the development of appropriate industry support and effective competition policies.

Looking back over the period from 2006-2016 we can see that the policy settings that drove structural change in Australia have not delivered improved income equality and more well-paid jobs across the board. On the contrary, they have led to more working poor, less secure employment for many and a shrinkage of the powerhouse for productivity growth – manufacturing.

# THE FAILURE OF COMPETITION POLICY TO RESPOND TO STRUCTURAL CHANGES IN THE AUSTRALIAN ECONOMY

Structural changes in Australia’s economy have also involved increased consolidation and the weakening of the wholesale industry sector.

A key premise of reforms to Australia’s economy (including reducing industry support) has been that exposure to competition will make markets work more effectively with greater price competition. The decade from 2006-2016 was remarkable for the rise of oligopolies and the extent to which competition was suppressed through companies vertically integrating.

Table 10 below illustrates the outcomes of both increased automation and concentrated market power in the food retail industry. From this it can be seen that there was a structural decline of around 9,500 checkout and cashier jobs from 2006-2016,

Independent food retailers selling meat, fish, poultry, fruit and vegetables had a structural loss of around 6,500 jobs. Despite employing fewer checkout operators, supermarkets and grocery stores added around 2,350 jobs through structural change.

|  |
| --- |
| Table 11 Impact of food industry consolidation and job losses through automation  |
| Industry or occupation | 2006 actual  | 2016 actual | Expected 2016 (no structural change) | Structural change |
| Supermarkets and Grocery Stores | 218,823 | 254,271 | 251,913 | 2358 |
| Checkout Operators and Office Cashiers |  95,681  |  102,803  | 112367 | - 9,564  |
| Fish and Seafood Wholesaling |  2,477  |  4,201  |  4,836  | - 2,359  |
| Food Retailing, nfd |  5,779  |  9,323  |  10,731  | - 4,952  |
| Fresh Meat, Fish and Poultry Retailing |  21,564  |  22,924  |  26,387  | - 4,823  |
| Fruit and Vegetable Retailing |  14,141  |  13,828  |  15,917  | - 1,776  |

Table 11 Impact of food industry consolidation and job losses through automation Source: ABS Table Builder

There has been public debate and discussions on the reasons for the decline in manufacturing, including discussions on the impacts of government policy (e.g. withdrawal of support for motor vehicle manufacturing, free trade agreements etc.) and the impact of rising costs of energy. But there has been relatively little public discussion on the structural changes in wholesale trade.

The impact on manufacturing of offshoring and the switch to direct sourcing can be seen in the dramatic structural losses of the wholesale industry sector. In this sector there was a small amount of structural growth in areas such as professional and scientific goods wholesaling, with total structural growth across the wholesale trade of 2,961 jobs. Offsetting this were other sectors in wholesale trade that experienced a structural decline of 151,454 jobs as shown in Table 12.

Significant structural decline in the wholesale trade sector of the economy may lead to higher concentration of ownership in the retail sector, and increased vertical integration of supply chains. This in turn is likely to lead to more offshoring of jobs and reduced market competition. Factors involved are: the failure of competition policy and the reliance of competition regulators on technical definitions of markets together with market power in assessing market power. All these are likely to result in policy settings that reduce competition and stifle innovation.

Further, the regulator appears to be allowing changes to the relationships between manufacturers and retailers that make the retailer an agent of the manufacturer. The direct effect of these relationships is the removal of the ability of the retailer to compete on price. This effectively results in the re-introduction into Australia of retail price maintenance (which was originally outlawed in Australia in the 1970’s).

The sectors [as defined by the ABS] within wholesale trade that were particularly hard hit included:

• Wholesale Trade not further defined

• Computer and Computer Peripheral Wholesaling

• Other Agricultural Product Wholesaling

• Clothing and Footwear Wholesaling

• Other Goods Wholesaling

• Other Electrical and Electronic Goods Wholesaling

• Meat, Poultry and Smallgoods Wholesaling

• Fruit and Vegetable Wholesaling

• Other Grocery Wholesaling

• Pharmaceutical and Toiletry Goods Wholesaling

• Telecommunication Goods Wholesaling

• Industrial and Agricultural Chemical Product Wholesaling

• Other Specialised Industrial Machinery and Equipment Wholesaling

• Liquor and Tobacco Product Wholesaling

• Motor Vehicle New Parts Wholesaling

Significant declines in the wholesale trade can make it more difficult for new entrants to the market. For example, if incumbents enter into direct supply arrangements with suppliers, then a smaller new entrant may not have sufficient scale to enter into similar arrangements. Moreover, access to distribution networks is reduced, placing new entrants at a competitive disadvantage.

Further, more manufacturers are entering into agency arrangements with retailers. In these arrangements title in the goods does not change hands until the sale is made to the customer and the manufacturer can set non-negotiable prices for their goods which are purchased through retail stores.

These practices are now becoming widespread involving such things as white goods, most of the power tools used by the construction industry and are increasingly being viewed as the new model for vehicle sales.

As indicated, these arrangements represent an effective re-introduction of retail price maintenance which was initially outlawed in the 1970’s in Australia.

The massive power of entrenched market incumbents, highly concentrated ownership of key industry sectors and de-facto limits on price competition deliver rent to the incumbents. As well as this, through the dampening of price competition and the erection of barriers to new entrants, they add further hurdles to the market dynamics that can deliver productivity growth.

Thus, without change to competition policy, the income divide will increase and the hope of real productivity growth delivering more well-paid jobs will remain a distant dream.

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| Table 12 Structural change in the wholesale industry sector from 2006 - 2016 |
| **Wholesale Industry at 4 digit level** | 2006 Actual | 2016 Actual | Expected 2016 (No Structural Change) | Structural change |
| Wholesale Trade, nfd | 29,323 | 14,926 | 33,752 | -18,826 |
| Other Agricultural Product Wholesaling | 17,775 | 10,611 | 20,459 | -9,848 |
| Clothing and Footwear Wholesaling | 16,364 | 10,175 | 18,835 | -8,660 |
| Other Goods Wholesaling nec | 13,682 | 7,551 | 15,748 | -8,197 |
| Meat, Poultry and Smallgoods Wholesaling | 12,090 | 6,313 | 13,916 | -7,603 |
| Fruit and Vegetable Wholesaling | 13,196 | 8,098 | 15,189 | -7,091 |
| Computer and Computer Peripheral Wholesaling | 16,748 | 12,507 | 19,277 | -6,770 |
| Other Grocery Wholesaling | 24,728 | 21,777 | 28,463 | -6,686 |
| Other Electrical and Electronic Goods Wholesaling | 25,261 | 22,802 | 29,076 | -6,274 |
| Pharmaceutical and Toiletry Goods Wholesaling | 18,056 | 16,367 | 20,783 | -4,416 |
| Paper Product Wholesaling | 12,234 | 9,869 | 14,082 | -4,213 |
| Dairy Produce Wholesaling | 4,329 | 1,170 | 4,983 | -3,813 |
| Industrial and Agricultural Chemical Product Wholesaling | 7,675 | 5,065 | 8,834 | -3,769 |
| Other Hardware Goods Wholesaling | 22,597 | 22,248 | 26,010 | -3,762 |
| Motor Vehicle New Parts Wholesaling | 12,975 | 11,210 | 14,935 | -3,725 |
| Furniture and Floor Covering Wholesaling | 6,720 | 4,062 | 7,735 | -3,673 |
| Toy and Sporting Goods Wholesaling | 5,475 | 2,816 | 6,302 | -3,486 |
| Other Specialised Industrial Machinery and Equipment Wholesaling | 11,672 | 10,014 | 13,435 | -3,421 |
| Liquor and Tobacco Product Wholesaling | 6,188 | 3,777 | 7,123 | -3,346 |
| Telecommunication Goods Wholesaling | 7,152 | 4,921 | 8,232 | -3,311 |
| Textile Product Wholesaling | 4,890 | 2,754 | 5,629 | -2,875 |
| Other Machinery and Equipment Wholesaling nec | 11,001 | 9,906 | 12,662 | -2,756 |
| Metal and Mineral Wholesaling | 10,258 | 9,051 | 11,807 | -2,756 |
| Car Wholesaling | 6,808 | 5,143 | 7,836 | -2,693 |
| Book and Magazine Wholesaling | 3,623 | 1,679 | 4,170 | -2,491 |
| Fish and Seafood Wholesaling | 4,201 | 2,477 | 4,835 | -2,358 |
| Kitchen and Diningware Wholesaling | 3,815 | 2,096 | 4,391 | -2,295 |
| Jewellery and Watch Wholesaling | 3,074 | 1,342 | 3,538 | -2,196 |
| Timber Wholesaling | 5,534 | 4,569 | 6,370 | -1,801 |
| Cereal Grain Wholesaling | 2,203 | 1,330 | 2,536 | -1,206 |
| Machinery and Equipment Wholesaling, nfd | 2,001 | 1,098 | 2,303 | -1,205 |
| Petroleum Product Wholesaling | 5,540 | 5,286 | 6,377 | -1,091 |
| Plumbing Goods Wholesaling | 6,219 | 6,138 | 7,158 | -1,020 |
| Motor Vehicle Dismantling and Used Parts Wholesaling | 2,464 | 2,103 | 2,836 | -733 |
| Commission-Based Wholesaling | 6,740 | 7,136 | 7,758 | -622 |
| Other Goods Wholesaling, nfd | 894 | 554 | 1,029 | -475 |
| Motor Vehicle and Motor Vehicle Parts Wholesaling, nfd | 861 | 549 | 991 | -442 |
| Wool Wholesaling | 900 | 656 | 1,036 | -380 |
| Furniture, Floor Covering and Other Goods Wholesaling, nfd | 1,353 | 1,208 | 1,557 | -349 |
| Commercial Vehicle Wholesaling | 3,994 | 4,299 | 4,597 | -298 |
| Trailer and Other Motor Vehicle Wholesaling | 786 | 618 | 905 | -287 |
| Other Machinery and Equipment Wholesaling, nfd | 1,374 | 1,491 | 1,582 | -91 |
| General Line Grocery Wholesaling | 5,680 | 6,461 | 6,538 | -77 |
| Basic Material Wholesaling, nfd | 394 | 398 | 454 | -56 |
| Specialised Industrial Machinery and Equipment Wholesaling, nfd | 54 | 86 | 62 | 24 |
| Mineral, Metal and Chemical Wholesaling, nfd | 32 | 77 | 37 | 40 |
| Agricultural Product Wholesaling, nfd | 101 | 162 | 116 | 46 |
| Textile, Clothing and Footwear Wholesaling, nfd | 55 | 110 | 63 | 47 |
| Grocery, Liquor and Tobacco Product Wholesaling, nfd | 907 | 1,131 | 1,044 | 87 |
| Agricultural and Construction Machinery Wholesaling | 9,088 | 10,599 | 10,461 | 138 |
| Timber and Hardware Goods Wholesaling, nfd | 127 | 309 | 146 | 163 |
| Professional and Scientific Goods Wholesaling | 7,149 | 10,646 | 8,229 | 2,417 |

Table 12 Structural change in the wholesale sector at the 4 digit level 2006-2016 Source:ABS Tablebuilder

#

# CONCLUSIONS

Table 13 below shows the extent of structural change in Australia’s industries from 2006-2016 at the industry sector level. The column showing the percentage of the industry sector that has been affected by structural change (adding together the absolute number of people in the industry sector affected by either structural increase or structural decrease, and dividing this by the total employment count in the sector in 2016) shows that 66% of employment in manufacturing and 50% of employment in wholesaling was affected by structural change.

The massive level of structural change has been masked to some extent by firms continuing to trade in Australia, with head office functions retained here but the manufacturing work being shifted offshore. The lower costs of offshore workers have allowed these firms to trade profitably, however the hollowing out of well paid middle income jobs has led to a significant increase in working poor and people struggling to make ends meet.

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| Table 13 Structural change at the industry sector level from 2006 -2016 |
| INDUSTRY SECTOR 1 DIGIT LEVEL | Employed in industry in 2016 | Structural shift in employment | Net employment change from structural shift | % employment in sector affected by structural change |
|  |  | Increase | Decrease |  | \*\* |
| Manufacturing |  683,662  | 19,614  |  431,754  | - 412,140  | 66% |
| Wholesaling |  307,741  | 2,962  |  151,442  | - 148,480  | 50% |
| Newspapers, TV, radio, movies, internet and other comms |  179,534  | 13,190  | 37,209  | - 24,019  | 28% |
| Retail |  1,053,838  | 29,981  |  165,380  | - 135,399  | 19% |
| Banking & Finance |  384,592  | 19,150  |  35,797  | - 16,647  | 14% |
| Office admin services and labour supply and placement |  179,257  | 10,187  |  13,555  | - 3,368  | 13% |
| Repairs and maintenance |  173,276  | 2,482  |  15,959  | - 13,477  | 11% |
| Government Administration |  443,458  |  7,666  |  12,907  | - 5,241  | 5% |
| Mining |  177,627  |  62,427  |  7,897  |  54,530  | 40% |
| Construction |  911,054  |  204,476  |  110,459  |  94,017  | 35% |
| Transport, storage |  499,486  |  85,427  |  78,336  |  7,091  | 33% |
| Aged care and other residential care services |  408,646  |  107,538  |  13,891  |  93,647  | 30% |
| Child care |  118,232  |  32,906  |  -  |  32,906  | 28% |
| Hospitals, medical and allied health services |  824,134  |  167,531  |  43,618  |  123,913  | 26% |
| Justice & Correctional Services |  40,389  |  6,684  |  2,754  |  3,930  | 23% |
| Personal services |  222,737  |  35,054  |  14,185  |  20,869  | 22% |
| Sports, recreation, creative arts, health and fitness centres |  177,115  |  33,830  |  3,545  |  30,285  | 21% |
| Building cleaning, pest control and gardening services |  186,480  |  39,282  |  63  |  39,219  | 21% |
| Cafes, restaurants, food, pubs and accomodation |  738,221  |  109,460  |  33,215  |  76,245  | 19% |
| Education |  925,895  |  142,120  |  19,442  |  122,678  | 17% |
| Business and property services |  958,123  |  121,074  |  33,038  |  88,036  | 16% |
| Utilities |  115,756  |  15,561  |  2,773  |  12,788  | 16% |
| Police, fire, other public order and regulatory services |  152,717  |  15,355  |  -  |  15,355  | 10% |
|  |  |  |  |  |  |
|  |

Table 13 Structural changes at the 1 digit industry sector level 2006-2016 Source ABS Tablebuilder

Australia has often been referred to as ‘the lucky country’. It is possible that Australia has avoided some of the worst impacts of de-industrialisation (such as the rust-belt towns of the US) through the historical accident of having the majority of the population of Australia contained in a small number of cities.

The US had many single-employer towns and when firms shut down there were high costs of relocation to find work in other regions. By contrast the large capital cities of Australia effectively each act as a single labour market (albeit with some very long travel times to work) which increases the opportunity of finding work if retrenched.

There is the potential for Australia to thrive in the new economy, but if it is to do so we will need a knowledge framework for policy settings that will allow the new industries to flourish. A critical element in this will be the development of appropriate industry support and effective competition policies.

Looking back over the period from 2006-2016 we can see that the policy settings that drove structural change in Australia have not delivered improved income equality and more well-paid jobs across the board. On the contrary, they have led to more working poor, less secure employment for many and a shrinkage of the powerhouse for productivity growth – manufacturing.

Technology driven job losses (automation and digital disruption) will require a comprehensive assessment of the skill needs of jobs of the future. This is necessary to clearly identify the most appropriate re-training and skill enrichment to offer to those displaced by these changes.

The Australian economy faces a number of challenges today as it emerges from the COVID-19 epidemic and grapples with how to decarbonise the economy. A significant risk to the future strength of the economy is making policy decisions based on economic theories and beliefs that are flawed or inaccurate. The structural changes observed in this paper have occurred under policy settings endorsed by the major political parties and the technocrats employed in the Productivity Commission and the Treasury.

Earlier industrial revolutions including the steam age and the introduction of electricity transformed entire economies. It is likely that the world is on the cusp of the next industrial revolution – the world of digital twins, Internet of Things (IoT), machine learning and augmented reality.

The structural shifts observed in Australia’s economy from 2006-2016, in particular the collapse of manufacturing, are likely to have been associated with a range of policy decisions made by Australian governments. These include global parity pricing for energy, which stripped away a competitive advantage for energy intensive manufacturing industries. In addition, the mining boom and the associated rise in the value of the Australian dollar in the early 2000’s increased price competition from imports.

Even with the current push to onshore jobs and reduce exposure to global supply chains that has arisen with the COVID-19 epidemic, the logistic of re-establishing industries in Australia is made more difficult when firms have ceased production in Australia. This is because established firms have productive capacity with investments that can span many years, so much of the cost of these facilities and technologies is depreciated. In turn, having depreciated assets lowers the threshold for return on investment. In contrast, to recommence operations from scratch involves major capital outlays that make it very difficult for owners to obtain an adequate rate of return on capital invested.

An increase in investment in enabling people to compete in the knowledge economy does not, of itself, lead to high productivity knowledge jobs being anchored in Australia. This is because, unlike manufacturing with physical locations where people are employed, many services in the knowledge economy can be provided from any location with an adequate internet connection.

The challenge of making good jobs ‘sticky’ is perhaps the biggest challenge facing policy makers across the globe today. Good jobs have a high enough level of pay for people to have a reasonable level of disposable income. In turn, this allows spending on cultural, artistic and social activities that create vibrancy and liveability.

If we are to have a workforce with a high level of disposable income, we need growth in labour productivity. The evidence in this study illustrates the negative impact that free trade policies have had on labour productivity. This means that we need to re-evaluate policy options on trade, competition, industry support, innovation and technology.

**Postscript**

It can be argued that political parties, commentators, industry bodies and academics have shared a consensus on the appropriate policy settings for the Australian economy, with the implicit assumption being that policy settings that encouraged aggregate economic growth (GDP) would flow through to drive productivity growth. As West & Bentley wrote in the Griffith Review in 2016 (Bentley, 2016):

“In one sense, Australia is a victim of its own success over the last quarter century. Australia’s recent economic success arose from a political consensus forged in the 1980s, which became globally influential. Precisely because it was successful in the prior era, it is now constraining the country’s ability to find its way towards new policies that will achieve future prosperity.

The consensus is so dominant it is rarely questioned, and so pervasive it inhibits discussion of many of the most pressing challenges. Productivity growth, hours worked and real wages have stalled. Business investment is feeble. After the long income surge of the mining boom, the predicted tapering of mining investment is not leading to the expected transition to growth driven by non-mining sectors. In effect, Australia has emerged from a spectacular resources boom without any clear approach to achieving growth beyond it.

The fact that Australia avoided the global recession in 2009 only reinforced confidence in its existing economic consensus. That confidence, in turn, hardened assumptions that have dominated since the 1980s and which were apparently validated by the long period of uninterrupted growth, which reached twenty-five years in 2016. But the faltering performance of the economy and the logjam of national policy in recent years show that a different direction is now needed.”

The presumption is that Australia has achieved economic growth and success over the past quarter century because of economic policies which reduced barriers to trade and whittled away industry support. In the consensus framework there is no assessment of what Australia may have looked like under different policy settings.

The structural shrinkage of the manufacturing sector (which is of critical importance for productivity growth) that occurred under this consensus framework demonstrates a lack of rigour in academic thinking and highlights the extent to which group think and naïve adoption of assumptions that have framed economic policy in Australia.

Australia is unlikely to find answers to deliver productivity growth through efforts to find a new consensus. Instead, the task will require academics to do more basic research, to challenge and test assumptions, and to improve the evidence base for decision making.

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# APPENDICES

|  |
| --- |
| Table A1 Manufacturing industry groups with structural loss >500 jobs from 2006-2016 (Difference between actual employment in 2016 and expected employment in 2016 from structural) |
| INDP - 4 Digit Level | Structural loss >500 jobs | Av weekly wages 2016 |
| Manufacturing, nfd |  47,720  |  $ 1,161  |
| Iron Smelting and Steel Manufacturing |  21,205  |  $ 1,446  |
| Motor Vehicle Manufacturing |  17,175  |  $ 1,506  |
| Other Motor Vehicle Parts Manufacturing |  15,145  |  $ 1,223  |
| Printing |  15,121  |  $ 1,137  |
| Wooden Structural Fitting and Component Manufacturing |  11,690  |  $ 1,050  |
| Clothing Manufacturing |  10,947  |  $ 808  |
| Rigid and Semi-Rigid Polymer Product Manufacturing |  8,285  |  $ 1,256  |
| Other Furniture Manufacturing |  8,190  |  $ 1,098  |
| Other Fabricated Metal Product Manufacturing nec |  7,499  |  $ 1,376  |
| Other Electrical Equipment Manufacturing |  7,156  |  $ 1,464  |
| Fruit and Vegetable Processing |  6,970  |  $ 1,206  |
| Machinery and Equipment Manufacturing, nfd |  6,731  |  $ 1,310  |
| Cut and Sewn Textile Product Manufacturing |  6,272  |  $ 930  |
| Aluminium Rolling, Drawing, Extruding |  5,462  |  $ 1,424  |
| Structural Steel Fabricating |  4,870  |  $ 1,372  |
| Wine and Other Alcoholic Beverage Manufacturing |  4,865  |  $ 1,165  |
| Architectural Aluminium Product Manufacturing |  4,820  |  $ 1,136  |
| Boatbuilding and Repair Services |  4,672  |  $ 1,075  |
| Wooden Furniture and Upholstered Seat Manufacturing |  4,635  |  $ 977  |
| Mining and Construction Machinery Manufacturing |  4,232  |  $ 1,686  |
| Other Electronic Equipment Manufacturing |  4,211  |  $ 1,429  |
| Aluminium Smelting |  4,042  |  $ 1,719  |
| Paint and Coatings Manufacturing |  4,040  |  $ 1,407  |
| Steel Pipe and Tube Manufacturing |  3,961  |  $ 1,353  |
| Paper Stationery Manufacturing |  3,770  |  $ 1,069  |
| Other Structural Metal Product Manufacturing |  3,463  |  $ 1,154  |
| Tyre Manufacturing |  3,369  |  $ 1,179  |
| Aircraft Manufacturing and Repair Services |  3,328  |  $ 1,644  |
| Pulp, Paper and Paperboard Manufacturing |  3,284  |  $ 1,621  |
| Other Wood Product Manufacturing nec |  3,277  |  $ 960  |
| Polymer Film and Sheet Packaging Material Manufacturing |  3,246  |  $ 1,481  |
| Sheet Metal Product Manufacturing (ex Metal Structural and Container Products) |  3,212  |  $ 1,181  |
| Computer and Electronic Office Equipment Manufacturing |  3,211  |  $ 1,528  |
| Iron and Steel Casting |  3,182  |  $ 1,339  |
| Lifting and Material Handling Equipment Manufacturing |  3,177  |  $ 1,488  |
| Agricultural Machinery and Equipment Manufacturing |  3,143  |  $ 1,160  |
| Human Pharmaceutical and Medicinal Product Manufacturing |  3,126  |  $ 1,628  |
| Confectionery Manufacturing |  3,114  |  $ 1,357  |
| Corrugated Paperboard and Paperboard Container Manufacturing |  3,113  |  $ 1,593  |
| Spring and Wire Product Manufacturing |  2,999  |  $ 1,210  |
| Other Manufacturing nec |  2,880  |  $ 1,066  |
| Glass and Glass Product Manufacturing |  2,813  |  $ 1,383  |
| Whiteware Appliance Manufacturing |  2,810  |  $ 1,335  |
| Other Professional and Scientific Equipment Manufacturing |  2,780  |  $ 1,773  |
| Other Polymer Product Manufacturing |  2,743  |  $ 1,298  |
| Electric Lighting Equipment Manufacturing |  2,675  |  $ 1,277  |
| Other Machinery and Equipment Manufacturing nec |  2,662  |  $ 1,307  |
| Log Sawmilling |  2,625  |  $ 1,081  |
| Bakery Product Manufacturing (Non-factory based) |  2,624  |  $ 501  |
| Cake and Pastry Manufacturing (Factory based) |  2,459  |  $ 798  |
| Clay Brick Manufacturing |  2,442  |  $ 1,477  |
| Railway Rolling Stock Manufacturing and Repair Services |  2,388  |  $ 1,702  |
| Other Ceramic Product Manufacturing |  2,379  |  $ 1,253  |
| Communication Equipment Manufacturing |  2,332  |  $ 1,490  |
| Automotive Electrical Component Manufacturing |  2,304  |  $ 1,368  |
| Machine Tool and Parts Manufacturing |  2,304  |  $ 1,324  |
|  |  |  |
| INDP - 4 Digit Level | Structural loss >500 jobs | Av weekly wages 2016 |
| Petroleum Refining and Petroleum Fuel Manufacturing |  2,302  |  $ 2,172  |
| Plaster Product Manufacturing |  2,189  |  $ 1,523  |
| Cured Meat and Smallgoods Manufacturing |  2,152  |  $ 1,006  |
| Log Sawmilling and Timber Dressing, nfd |  2,150  |  $ 1,065  |
| Concrete Product Manufacturing |  2,138  |  $ 1,393  |
| Biscuit Manufacturing (Factory based) |  2,126  |  $ 1,176  |
| Textile Floor Covering Manufacturing |  2,110  |  $ 1,221  |
| Ready-Mixed Concrete Manufacturing |  2,048  |  $ 1,395  |
| Milk and Cream Processing |  2,010  |  $ 1,443  |
| Timber Resawing and Dressing |  1,956  |  $ 1,218  |
| Textile Finishing and Other Textile Product Manufacturing |  1,938  |  $ 901  |
| Other Specialised Machinery and Equipment Manufacturing |  1,913  |  $ 1,464  |
| Cement and Lime Manufacturing |  1,887  |  $ 1,867  |
| Cereal, Pasta and Baking Mix Manufacturing |  1,885  |  $ 1,219  |
| Metal Coating and Finishing |  1,791  |  $ 1,032  |
| Jewellery and Silverware Manufacturing |  1,769  |  $ 954  |
| Toy, Sporting and Recreational Product Manufacturing |  1,755  |  $ 990  |
| Sugar Manufacturing |  1,693  |  $ 1,352  |
| Other Basic Non-Ferrous Metal Manufacturing |  1,647  |  $ 1,991  |
| Textile, Leather, Clothing and Footwear Manufacturing, nfd |  1,635  |  $ 1,004  |
| Cleaning Compound Manufacturing |  1,579  |  $ 1,338  |
| Non-Metallic Mineral Product Manufacturing, nfd |  1,571  |  $ 1,218  |
| Sanitary Paper Product Manufacturing |  1,557  |  $ 1,666  |
| Other Metal Container Manufacturing |  1,526  |  $ 1,404  |
| Leather Tanning, Fur Dressing and Leather Product Manufacturing |  1,508  |  $ 936  |
| Reconstituted Wood Product Manufacturing |  1,489  |  $ 1,397  |
| Photographic, Optical and Ophthalmic Equipment Manufacturing |  1,467  |  $ 1,285  |
| Fixed Space Heating, Cooling and Ventilation Equipment Manufacturing |  1,446  |  $ 1,456  |
| Cigarette and Tobacco Product Manufacturing |  1,390  |  $ 1,885  |
| Basic Inorganic Chemical Manufacturing |  1,388  |  $ 1,927  |
| Printing Support Services |  1,344  |  $ 991  |
| Transport Equipment Manufacturing, nfd |  1,331  |  $ 1,211  |
| Pump and Compressor Manufacturing |  1,294  |  $ 1,560  |
| Prepared Animal and Bird Feed Manufacturing |  1,278  |  $ 1,311  |
| Pulp, Paper and Converted Paper Product Manufacturing, nfd |  1,265  |  $ 1,349  |
| Knitted Product Manufacturing |  1,229  |  $ 948  |
| Other Non-Metallic Mineral Product Manufacturing |  1,226  |  $ 1,155  |
| Electric Cable and Wire Manufacturing |  1,202  |  $ 1,377  |
| Industrial Gas Manufacturing |  1,170  |  $ 1,842  |
| Natural Rubber Product Manufacturing |  1,155  |  $ 1,304  |
| Motor Vehicle Body and Trailer Manufacturing |  1,150  |  $ 1,098  |
| Footwear Manufacturing |  1,126  |  $ 950  |
| Prefabricated Metal Building Manufacturing |  1,116  |  $ 1,270  |
| Metal Furniture Manufacturing |  1,099  |  $ 1,279  |
| Potato, Corn and Other Crisp Manufacturing |  1,088  |  $ 1,394  |
| Nut, Bolt, Screw and Rivet Manufacturing |  1,051  |  $ 1,230  |
| Wood Chipping |  1,038  |  $ 1,317  |
| Basic Organic Chemical Manufacturing |  1,008  |  $ 1,595  |
| Polymer Product Manufacturing, nfd |  1,006  |  $ 1,153  |
| Reproduction of Recorded Media |  997  |  $ 1,484  |
| Boiler, Tank and Other Heavy Gauge Metal Container Manufacturing |  981  |  $ 1,275  |
| Other Domestic Appliance Manufacturing |  942  |  $ 1,341  |
| Cosmetic and Toiletry Preparation Manufacturing |  936  |  $ 1,116  |
| Natural Textile Manufacturing |  855  |  $ 1,169  |
| Cement, Lime, Plaster and Concrete Product Manufacturing, nfd |  853  |  $ 1,377  |
| Other Food Product Manufacturing nec |  824  |  $ 1,237  |
| Copper, Silver, Lead and Zinc Smelting and Refining |  777  |  $ 1,670  |
| Seafood Processing |  768  |  $ 882  |
| Fertiliser Manufacturing |  736  |  $ 1,824  |
| Polymer Foam Product Manufacturing |  718  |  $ 1,170  |
| Cheese and Other Dairy Product Manufacturing |  704  |  $ 1,416  |
| Medical and Surgical Equipment Manufacturing |  661  |  $ 1,432  |
| Oil and Fat Manufacturing |  646  |  $ 1,289  |
| Computer and Electronic Equipment Manufacturing, nfd |  633  |  $ 1,268  |
| Other Basic Non-Ferrous Metal Product Manufacturing |  627  |  $ 1,202  |
| Shipbuilding and Repair Services |  598  |  $ 1,670  |
| INDP - 4 Digit Level | Structural loss >500 jobs | Av weekly wages 2016 |
| Veneer and Plywood Manufacturing |  595  |  $ 1,105  |
| Ice Cream Manufacturing |  587  |  $ 1,092  |
| Pesticide Manufacturing |  546  |  $ 1,778  |
| Synthetic Resin and Synthetic Rubber Manufacturing |  509  |  $ 1,635  |

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| Table A2 Change in value of net trade by commodity 2006-2016 ($‘000’s) |
| **Code** | **Standard International trade classification 3 digit level** | **Change in value of net trade $A000's (exports - imports) from 2006 to 2016** |
| 781 | Passenger motor vehicles | -9,879,499 |
| 334 | Refined petroleum | -8,139,238 |
| 764 | Telecom equipment & parts | -5,017,859 |
| 988 | Confidential items of trade | -3,854,548 |
| 684 | Aluminium | -3,024,333 |
| 782 | Goods vehicles | -2,845,113 |
| 542 | Medicaments (incl veterinary) | -2,457,622 |
| 821 | Furniture, mattresses & cushions | -2,032,881 |
| 741 | Heating & cooling equipment & parts | -1,946,163 |
| 893 | Plastic articles, nes | -1,578,634 |
| 775 | Household-type equipment, nes | -1,500,226 |
| 752 | Computers | -1,459,562 |
| 691 | Iron, steel, aluminium structures | -1,457,507 |
| 541 | Pharm products (excl medicaments) | -1,451,234 |
| 845 | Other textile clothing | -1,447,233 |
| 112 | Alcoholic beverages | -1,335,226 |
| 285 | Aluminium ores & conc (incl alumina) | -1,192,476 |
| 287 | Other ores & concentrates | -1,126,924 |
| 894 | Prams, toys, games & sporting goods | -1,101,756 |
| 778 | Electrical machinery & parts, nes | -1,100,300 |
| 931 | Special transactions & commodities | -1,098,865 |
| 699 | Manufactures of base metal, nes | -1,053,460 |
| 288 | Non-ferrous waste & scrap | -1,044,115 |
| 851 | Footwear | -989,452 |
| 335 | Residual petroleum products, nes | -984,438 |
| 872 | Medical instruments (incl veterinary) | -978,972 |
| 683 | Nickel | -951,412 |
| 122 | Tobacco, manufactured | -946,950 |
| 743 | Pumps (excl liquid pumps) & parts | -933,449 |
| 658 | Made-up textile articles, nes | -894,175 |
| 842 | Women's clothing (excl knitted) | -825,917 |
| 813 | Lighting fixtures & fittings | -824,835 |
| 831 | Travel goods, bags & like containers | -821,720 |
| 625 | Rubber tyres, treads & tubes | -783,357 |
| 642 | Paper & paperboard, cut to size | -730,442 |
| 562 | Fertilisers (excl crude) | -682,805 |
| 841 | Men's clothing (excl knitted) | -646,558 |
| 899 | Misc manufactured articles, nes | -641,351 |
| 874 | Measuring & analysing instruments | -627,490 |
| 721 | Agric machinery (excl tractors) & parts | -619,800 |
| 591 | Insecticides, herbicides, disinfectants | -610,278 |
| 747 | Taps, cocks & valves | -587,761 |
| 784 | Vehicle parts & accessories | -576,570 |
| 772 | Electrical circuits equipment | -540,298 |
| 553 | Perfumery & cosmetics (excl soap) | -538,592 |
| 897 | Jewellery | -533,603 |
| 844 | Women's clothing, knitted | -532,650 |
| 714 | Non-electric engines & motors | -522,937 |
| 667 | Pearls & gems | -509,178 |
| 681 | Silver & platinum | -505,979 |