

A city that makes things: reconstituting manufacturing

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Abstract: Recent debates about manufacturing in Australia emphasize the primacy of macroeconomic conditions (high dollar, cheap overseas imports), but provide limited discussion of the dynamics and contingencies within cities and regions that shape outcomes. This paper acknowledges that macroeconomic forces have urban/regional effects, but does not simplistically assume that decline is 'inevitable'. For many reasons, not least the pressing need to reconfigure forms of production and consumption in light of climate change, manufacturing is likely to remain on the agenda. Given this, we explore the proposition that the future of manufacturing will also depend on endogenous, path dependent factors within cities and regions, as well as how discourses about manufacturing and the capacities of local workers are promulgated in policy, media and industry circles. The argument is illustrated by building on regional ABS data and qualitative sector-specific projects, all in Wollongong, NSW – a city especially troubled by the prospects of declining manufacturing and busily contemplating what changes are needed. Manufacturing economies can and are being remade – but the pertinent questions are in what form we might wish them to take, and what existing resources, assets and capacities make transformation possible.

Introduction

The announcement in August 2011 that BlueScope Steel was about to close one of its Port Kembla blast furnaces and cease steel exports spurred public debate in Australia, not just about steel but about the very future of manufacturing. That debate subsequently intensified with job losses in other industries such as automotive manufacturing and food processing. The assumption is that the decline of Australian manufacturing is inevitable – exemplified in commentaries by 'experts' in metropolitan broadsheets who have depicted recent crises as part of an inevitable and permanent transition, a 'historic shift in the structure of the global economy as the Industrial Revolution finally reaches the developing countries', as Ross Gittins puts it (*Sydney Morning Herald*, 31 August 2011). According to this argument, all rich countries such as Australia must now find other things to do to replace manufacturing: dig up resources to supply manufacturers in China; focus on the so-called 'knowledge' industries (where the greatest proportion of the value of a product is in its intellectual or design content, not its material fabrication); become tourist destinations or service industry hubs – exporting 'know-how' rather than physical commodities.

This paper contrasts such generalisations with a closer analysis of regional complexities. Our analysis is informed by a geographical perspective that troubles simplistic and overly linear depictions of scalar processes and transitions (Brenner 1998). Macroeconomic forces have certainly impacted on urban/regional manufacturing, and headlines of closures and cutbacks are borne out in data on regional employment, examined below. Nevertheless, assuming the ascendancy of seemingly detached global processes in the debate about manufacturing has come at the expense of economic knowledges that are attuned to the active role of state policy and the contingencies of geographical scale, reflecting the 'neoliberal tendency to override the evidence of empirical complexity in favour of a more simple narrative' (Pritchard 2005: 103).

The result is that the debate has missed much of the complexity amplifying the vulnerability of Australian manufacturing, and especially the internal dynamics of specific industries and regions (Warren and Gibson 2013). Debate has rested instead on simplistic explanations of what constitutes the national economy (especially mining), and doctrinaire policy prescriptions often formulated 'on the run' subsequent to firm-specific 'crises'. As Bill Pritchard (2005:103) argues, neoliberalism's

'simplified conception of regional economic and social life... pays little regard to their richness, complexity and grounded realities'. This paper seeks to discuss some of that richness, complexity and grounded reality in the context of one Australian city especially troubled by the prospects of declining manufacturing and busily contemplating what changes are needed – Wollongong, NSW.

The substantive remainder of this paper is structured in three broad parts. The first discusses some of the challenges facing Australian manufacturing. That section also discusses the false dichotomy apparent in recent years between manufacturing on the one hand, and the knowledge and creative industries on the other. The second section introduces the reader to the city of Wollongong, provides historical context, and consults ABS data on employment change in manufacturing in the region. That data confirms general decline in manufacturing employment, though with some sectoral and spatial complexity. The third section delves deeper again and through qualitative exploration of one niche sector in Wollongong – surfboard making – discusses industry-specific variables influencing manufacturing growth and decline. This case study-within-a-case study was part of a wider qualitative economic geography project conducted in Australia, Hawaii and California on the surf products industry (Warren and Gibson 2014). It involved interviewing over a hundred surfboard-makers in 35 workshops in the three countries, including five surfboard workshops from Wollongong: Carabine Surf Designs (CSD), Byrne Surfboards, Chris Homer Creations (CHC), Dylan Surfboards and Skipp Surfboards. This example of a regional manufacturing industry demonstrates the inseparability of manual production, knowledge and creativity.

Manufacturing on the move?

Jobs in traditional heavy industries and in clothing and textiles have suffered significantly since the 1970s. Over 139,000 jobs have been lost in Australian manufacturing in the past decade alone (Table 1). The background is an increasingly fractured urban and regional system (Baum et al 2005) and deregulation policies (such as tariff removal) that have had dire consequences, felt intensely within regions (Schultz 1985). More recent policy-making around manufacturing has tended to respond to crisis, rather than to the need to synthesize industry, infrastructure and social policy, constricting coordinated efforts at effective regional development initiatives (Beer et al 2005). The high Australian dollar has limited export markets, and coupled with the need to develop more knowledge-intensive, carbon-sensitive industries, those forms of production geared towards high volume and cheap labour have struggled (Atuahene-Gima 1996). Nevertheless, some forms of manufacturing have survived, and with the apparent peak of the dollar having passed during 2013, the contraction in manufacturing triggered by the mining boom and the high currency has been far from fatal (Minifie et al 2013). Although vulnerable to exchange rate and labour market pressures, Australian manufacturing has persisted, though it has been thoroughly reorganized, with implications for regional development (Stimson et al 2003). Casting aside the future of manufacturing as doomed to global forces says nothing of the active role of state policy, nor of the path-dependent complexity that connects specific sectors to both global commodity chains and regional communities (Oro and Pritchard 2011).

Table 1. Employment change, by sector, Australia, March 2003 to March 2013 ('000)

Industry	Change in Employment
Services	1,687.5
Construction	277.6
Mining	170.7
Retail Trade	88.1
Wholesale Trade	77.8
Agriculture, forestry and fishing	-32.0
Manufacturing	-139.5

Source: ABS, Labour Force, Australia, Detailed, Quarterly, Original (Cat No. 6291.0.55.003)

A simple mistake often smuggled into the national debate on manufacturing is to presume that manufacturing is dominated by large firms using mostly low-skilled labour within Fordist assembly lines. Despite the headlines of job losses in large firms, SMEs with fewer than 50 employees make up a majority of Australian manufacturing firms (OECD 2013). Some products continue to be made in Australia because they are heavy and expensive or tricky to transport; others are made here by specialist firms because clients want customised products and ongoing support and therefore seek manufacturers who respond quickly, can visit in person and who speak the same language. Although overall employment has declined since the mid-20th century, total output in manufacturing has quadrupled - a picture of labour productivity, multiplication of specialist niches, as well as the shift to high-value added production (Productivity Commission 2003).

Australian manufacturing SMEs display increasing levels of specialization, absorptive capacity, innovation expertise and niche marketing (Huang 2009), across sectors as diverse as hearing aids and hi-fi speakers to satellite dishes and shock absorbers. And, contra the assumption that manufacturing is somehow moribund, it remains the most significant investor in research and development (R & D) of any Australian industry sector, measured on a per-employee basis (Department of Industry, Innovation, Climate Change, Science, Research and Tertiary Education 2013). Those investments have increased at a rate faster than in the remainder of the Australian economy – even during the recent post-GFC period. And yet, in academic research on manufacturing as well as in much policy debate, the connection between contemporary manufacturing and the knowledge and creative economies is rarely acknowledged or explored. The bulk of research on the knowledge and creative economies has been limited by formal definitions to examining the so-called creative industries such as music, film, television and design, as well as seemingly ‘weightless’ sectors trading in intellectual property, finance and information (Galloway and Dunlop 2007).

More worryingly, manufacturing has been assumed by some to be antonymic with innovation and creativity. An illustrative example is Richard Florida’s (2002) widely influential creative index methodology, within which the presence of a high proportion of manufacturing workers in a region can be construed as a negative characteristic. Following Florida’s conception of the creative economy, the assumption is that the dominance of manufacturing within a region is a proxy for lack of innovation (Gibson and Klocker 2005). And yet arguably at no time in recent memory has the task of developing innovative, low-carbon, knowledge-intensive forms of material commodity production been more important. We need smarter material goods that use fewer finite resources, last longer, that take advantage of already-present human skills and resources, and that capitalize on existing regional specializations (Bryson, Taylor and Cooper 2008). The picture of Australian manufacturing therefore needs to be made more complex in public policy debate, and its sectoral diversity, and existing and

potential connections to innovation and creativity as well as the carbon reduction agenda duly acknowledged.

Wollongong and the Illawarra region – a snapshot

What then, characterises manufacturing in Wollongong, an archetypal ‘city that makes things’? It has long been considered one of the nation’s industrial ‘heartlands’. Early economic activities focused on cedar-getting, coal mining and rural processing. Flour mills, salt works, saw mills, brickworks, dairying and meat processing plants were all established during the mid- to late 1800s, mostly orientated towards local consumption, but then gradually increasing their supply links into nearby Sydney. Early on Wollongong enjoyed ‘borrowed size’ (Phelps 2004) from its proximity to Sydney’s much larger metropolitan economy.

Metal refining and processing proved the catalyst for significant expansion into manufacturing in the 20th century. Metal production started with the Electrolytic refining and Smelting Co (ERS) at Port Kembla in December 1908 and Metal Manufacturers Ltd in 1916 (converting copper into wire, cable, sheet tube and alloys), and later Hoskins Iron and Steel Company’s blast furnace at Port Kembla (1927) and Australian Iron and Steel Ltd (AIS, in 1928) (Kass 2010). Broken Hill Pty Ltd subsequently took over AIS in the wake of the Great Depression, and purchased coal mines at Bulli and Mount Keira to feed its steelmaking plant. Lysaghts soon followed, producing rolled steel sheet (it would eventually become part of Bluescope Steel, the demerged entity spun off from BHP in 2002), and in 1939 Commonwealth Rolling Mills began producing high finish steel for car bodies and appliances. The region’s steel industry proved to be a significant component in the national war effort during World War II, setting the stage for subsequent massive post-war expansion in Wollongong, in both industrial output and urban population (Kass 2010). Thousands of migrants arrived to work in steel-making, diversifying the region’s cultural profile considerably. The city’s University was established in 1951 as a provider of technical education for engineers and metallurgists needed for the region’s steel industry.

International competition and falling demand for steel nevertheless resulted in crisis for the region’s steelworks in the early 1980s. Both the Fraser and Hawke Federal Governments prioritised restructuring the manufacturing sector, and ‘the worst recession in Australia’s post-war history both forced the pace of the restructure [of the steel industry] and disguised it’ (Schultz 1985:ix). Some 8,000 workers left the BHP steelworks as part of mass lay-offs between 1982 and 1984; the company emerged with a drastically reduced workforce, but a stronger and more profitable steel division. The Federal Government policy-driven restructure took ‘those most dependent on BHP for their livelihoods by surprise... and was not offset by jobs created elsewhere’ (Schultz 1985:x). The pace and depth of restructuring amplified socio-economic hardship in many parts of the region, and cast a dark cloud over the region’s manufacturing sector that it has arguably never since been able to evade.

The immediate problems of unemployment and regional recession (Haughton 1990) prompted Wollongong to seek alternatives. The downsizing of the steelworks fed increasing levels of unemployment, and the city was stigmatized in the Australian media by high levels of unemployment, pollution and union militancy – isomorphic with nearby Sydney, which was fast embracing a ‘world city’ vision, with its tourism, finance and information economies (Daly 1982). Wollongong was pressed by the need to find new futures outside heavy industry. The challenges of economic restructuring became a catalyst for the first stirring of engagements with ideas of culture-led regeneration. Culture was positioned as means by which Wollongong could ‘break from the past’ (Guppy and Associates and National Economics 2000: 4) by becoming more innovative and creative – a new means to civic pride in response to the shame of deindustrialization. This notion of creativity and innovation as replacement for manufacturing still lingers in policy thinking about the region – though as discussed above, rests on the assumption that innovation, creativity and knowledge economies remain distinct from physical manufacture – shaped by the particularities of Wollongong’s experiences of restructuring. If the city was to be ‘saved’ by a transition to the creative or knowledge economies, its sectoral makeup would apparently need to look and feel distinct to steel.

And yet, unlike in Newcastle (which more fully embraced the creative economy discourse via Marcus Westbury's Renew Newcastle initiative), Wollongong's steel plant remains open, although downsized again in 2011. Port Kembla remains the single largest concentration of heavy industry in Australia, with its steel plant, a fertiliser plant, a copper smelter, locomotive workshop, a coal export terminal, a grain export terminal and industrial gases manufacturing plant. The retention of heavy industry means that aspirations to transform Wollongong into a city of innovation have had to jostle with other competing ideas and emotions about what are the drivers of the city's economy (cf. Jayne 2004). Primary metal and metal product manufacturing remain significant in employment terms, although nowhere near the levels in the 1960s. In the 2011 census for instance that segment employed some 5,300 people, over five times the nearest segment (Table 2). Factoring in job losses shortly after the 2011 census, Bluescope Steel continues to employ around 3,100 workers (Langford 2013).

Table 2. Employment by place of work, manufacturing 2-digit ANZSIC categories, Illawarra region, 2011 (by local government area)

LGA	Wollongong	Shellharbour	Shoalhaven	Kiama	Total
Manufacturing, nfd	526	68	182	11	787
Food Product Manufacturing	322	83	508	35	948
Beverage and Tobacco Product Manufacturing	34	3	24	10	71
Textile, Leather, Clothing and Footwear Manufacturing	143	22	50	0	215
Wood Product Manufacturing	259	70	259	4	592
Pulp, Paper and Converted Paper Product Manufacturing	12	3	110	0	125
Printing (including the Reproduction of Recorded Media)	84	13	41	15	153
Petroleum and Coal Product Manufacturing	16	7	35	0	58
Basic Chemical and Chemical Product Manufacturing	106	6	94	4	210
Polymer Product and Rubber Product Manufacturing	104	21	31	0	156
Non-Metallic Mineral Product Manufacturing	401	102	95	4	602
Primary Metal and Metal Product Manufacturing	5026	29	306	4	5365
Fabricated Metal Product Manufacturing	476	46	213	4	739
Transport Equipment Manufacturing	230	50	120	3	403
Machinery and Equipment Manufacturing	658	29	203	14	904
Furniture and Other Manufacturing	173	28	87	10	298
Total	8570	580	2358	118	11626

Source: ABS (2013)

Beyond metals, regional manufacturing has since the 1960s become more diverse; as Table 2 illustrates, metals manufacturing now accounts for less than half of the region's total manufacturing workforce. Although less prominent in terms of total employment, food processing has a significant presence in the region, and deep history. Streets ice-creamery began in the region (though later moved to Sydney), and post-war European migration resulted in niche production of continental smallgoods in the 1950s – some of which still survives (Kass 2010). Clothing and textile factories

opened in the 1940s and 1950s, including Berlei (in 1945) and King Gee (in 1952). Unlike steel, which has been a masculine industry historically (Schultz 1985), clothing and textiles firms have been large employers of women in the region, frequently of migrant background. As with steel, the removal of protectionist barriers and tariff reductions in the 1970s and 1980s impacted on this sector, with widespread factory closures and job losses. Some women retrained and found jobs in retail and services, though those with the poorest prospects struggled most, even with government-sponsored retraining (Weller and Webber 1999). Pacific Brands (makers of Bonds undergarments) finally closed their Unanderra factory in 2010, shifting all production offshore.

Meanwhile, and without fanfare, specialist firms focusing on value-added products for specific industries have grown. Stolway Holdings for instance makes industrial air conditioners in Unanderra - the units are designed for hazardous areas like on oil rigs where high levels of explosive gases means that ordinary AC units cannot be used. They export these systems globally. Total Aerospace Solutions in Albion Park Rail fit out small aircraft to become air ambulances. They have designed a gantry system to transfer patients from the ambulance stretcher into the plane (previously for critically ill patients this process could take hours). They have also designed intensive care cribs for air transporting babies. In such firms innovation underpins the development of specific value-added niches, with the vast bulk of their market outside the region.

A snapshot of the varied fortunes of manufacturing by sector across the Illawarra region is provided in Figures 1-4, both for the whole region, and broken down by local government area (Wollongong city, plus Shoalhaven and Shellharbour – both discrete urban settlements within the region, to the south). This data (enumerated by place of work) demonstrates both sectoral and spatial complexity within the region. Overall, between 2006 and 2011, total employment in manufacturing decreased by 15 percent, largely driven by decline in the Wollongong LGA. To the south, both Shellharbour and Shoalhaven recorded slight overall growth in employment (3 percent and 0.8 percent), concordant with increasing diversity of firm activity in those LGAs (including yacht-building, dairy processing, chemicals, paper products and building products). Within the region there has thus been a spatial shift, away from the older core of manufacturing around Port Kembla and Wollongong's inner-city (Unanderra, Coniston, Fairy Meadow) towards new suburban industrial estates around Albion Park, Dapto and Nowra.

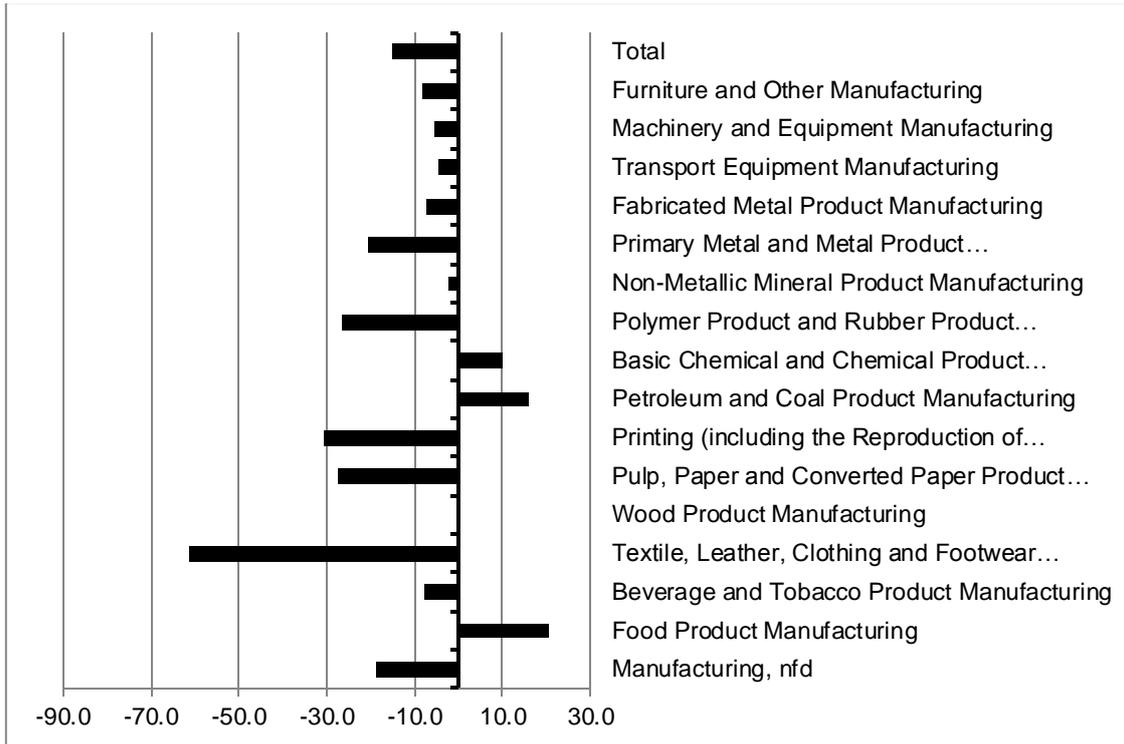


Figure 1. Change in manufacturing employment, 2006-2011, Illawarra region (Wollongong, Shellharbour, Shoalhaven and Kiama LGAs)

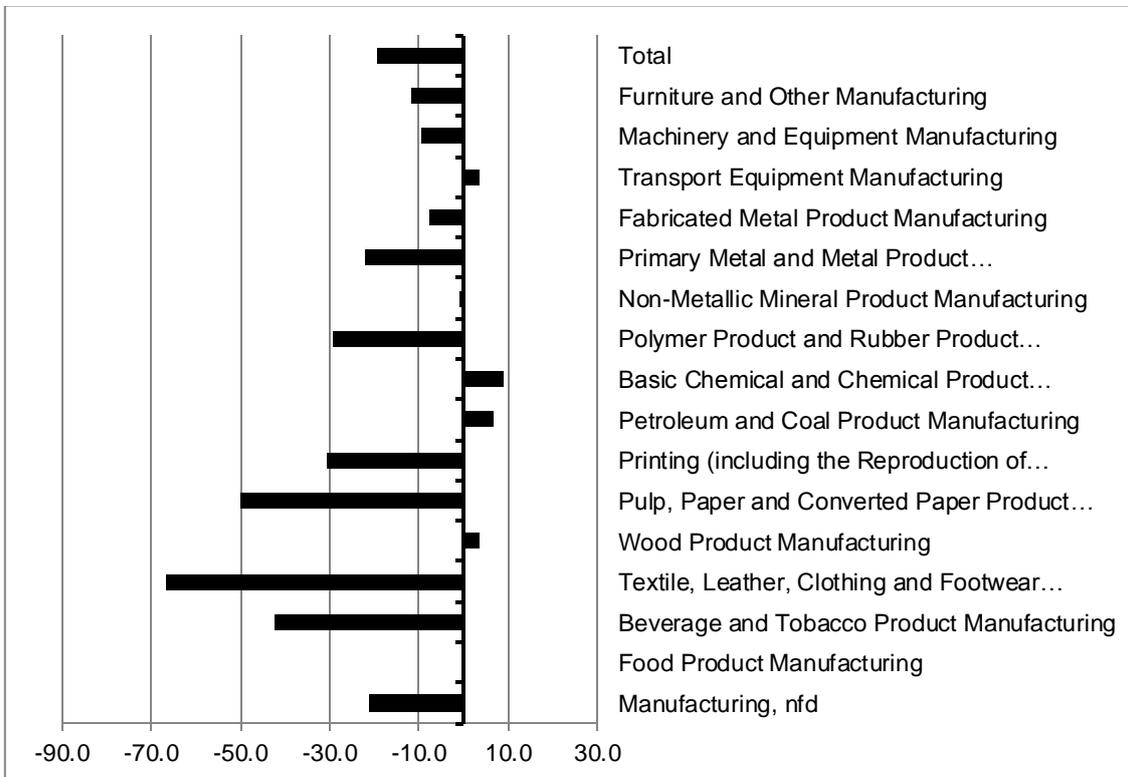


Figure 2. Change in manufacturing employment, 2006-2011, Wollongong LGA

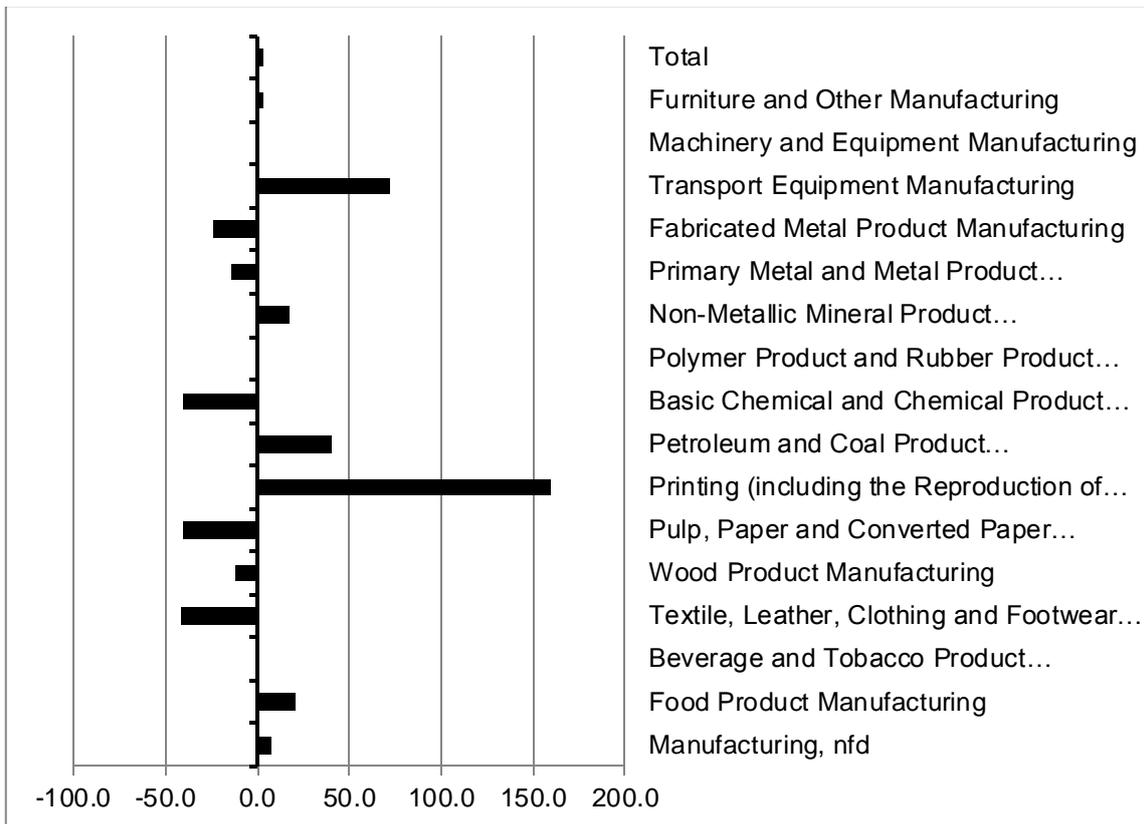


Figure 3. Change in manufacturing employment, 2006-2011, Shellharbour LGA

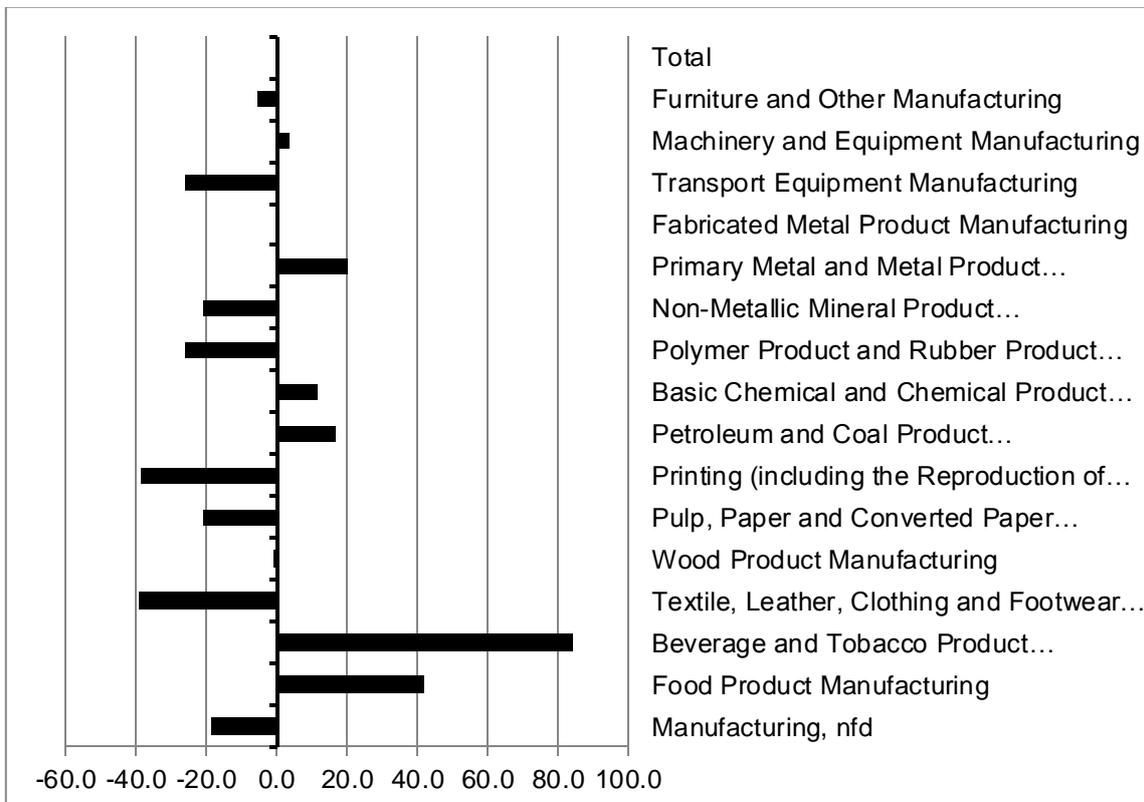


Figure 3. Change in manufacturing employment, 2006-2011, Shoalhaven LGA
(source for all figures: ABS 2013)

Such data also reveal the varied fortunes of individual sectors: consistent with the national picture, textiles and clothing employment fell sharply, as did paper products and printing (reflecting the increasing use of digital means for information capture and access). Food product manufacturing recorded the largest increase in the region (21 percent), with most of that growth in the Shoalhaven (42 percent increase for the LGA). Petroleum and coal product manufacturing employment also increased overall (16 percent) and was one of only a few sectors to increase within Wollongong LGA (7 percent), along with basic chemical production employment (9 percent). Stark proportional rises in employment in printing and transport manufacturing recorded for Shellharbour are nevertheless deceptive: they reflect low bases (less than 50 employees in total in each sector) – though they do clearly illustrate the importance of the contribution of SMEs to manufacturing growth within specific sectors.

The following, final substantive section of the paper delves deeper again, into the dynamics internal to one niche industry that has grown regionally since the 1970s: surfboard-making.

Surfboard-making in the Illawarra

The example of surfboards may appear quite specific, in that it relates to the region's vibrant surfing subcultures and accommodating coastal environment (conditions common, though far from universal across Australia). But as a sector dominated by small independent workshops (the 'major' surf labels, Billabong, Rip Curl and Quiksilver by and large trade in apparel, not in surfing hardware) that cater to niche user groups, it typifies newer forms of Australian manufacturing. It also provides a contrasting story of the experience of regional manufacturing than steel or clothing and textiles: of craft-based forms of production, customization, and embeddedness within local social and cultural life.

The Illawarra is home to a thriving surf culture, which is supplied by a smaller concentration of local surfboard workshops, several of which have international reputations and markets. When surfing globalised most rapidly in the 1950s and 1960s, beaches in the Illawarra were early hubs, and the region has remained a thriving surfboard-making location – though with much less of a visible tourist element than in other major global surfboard-making centres (Oahu, Hawai'i, southern California, Queensland's Gold Coast) (Warren and Gibson 2014).

Surfboards are still made by hand, by expert "shapers" who plane and sand foam "blanks", and "glassers" who seal them against the elements. Because they are customised to local waves and body size, most Australian surfers ride boards made locally – even when cheaper imported boards are available. Nevertheless the industry is in the midst of a significant phase of reorganisation: automated production techniques using computer-aided design (CAD) and computer numerical control (CNC) machines have replaced hand-shaping at the cheaper, lower-quality end of the market (automation was not technically possible until very late, in the 1990s), and increasingly Thai and Chinese firms specialising in a range of sporting equipment production have diversified into surfboards (Warren and Gibson 2014). The latter have flooded Australian and American markets with low-cost boards that can be purchased off-the-shelf rather than via a custom board order with a local independent boardmaker.

Workshops in the Illawarra, in parallel with the experience of high-quality makers in California and Hawai'i, have felt the impacts of the high dollar and competition with cheap imports. But local firms have responded by introducing a degree of small production runs of automated boards (that are still sanded and glassed by hand), as well as by emphasizing high quality, customization and loyalty among regional surfing communities – who display strong degrees of place identification (Warren and Gibson 2014). Workshops in the Illawarra have escaped the wilder fluctuations experienced in surfboard-making on the Gold Coast – due to a mix of factors including absence of retail superstores (who tend to stock off-the-shelf imported boards, thus undercutting independent workshops); better succession planning as older shapers retire; strong brand identity among competitive board-riders and with elite boardmakers in Hawai'i and California, and expanding external supplier relationships nationally – consolidating an east coast distribution network for CNC-made boards spanning from Queensland to Victoria (Warren and Gibson 2013; cf. Tonts, Plummer and Taylor 2012).

Illawarra workshops also have lower levels of risk, debt and exposure to currency due to a strong base among loyal local customers (rather than export markets), small workforce, and less overall investments in flagship retail developments and high-cost brand marketing. Of the workshops toured 75 percent of current production was for custom made boards where local surfers met personally with makers. The other 25 percent is the sale of stocked retail boards; from either internal retail space or through external dealers. This is a comparatively high proportion of sales from custom made boards, partly explained by the lack of tourism, but is also representative of strong loyalties among local surfing subcultures. Although during the 'boom years' of expansion, pre-GFC, Illawarra surfboard-making firms did not expand to be as large as their Gold Coast counterparts (averaging only 4.5 employees each), they have maintained market share, augmented hand-shaping with CAD/CNC production and been able to continue to produce high-quality custom products with significant design input and embodied human skills.

Conclusions

If Australia is to have a mature debate about its economic future beyond the mining boom (and without recourse to simplistic generalisations) then more regional analyses of sector-specific dynamics are needed, with requisite qualitative depth. Even if the dollar drops substantially, the more complicated truth is that there are deeper structural and human transformations in the making of things in Australian cities and regions.

The legacies of steel industry restructuring in the 1980s illustrate the continued importance of the state in shaping industrial outcomes. Through strong environmental regulation and significant public investment, other countries have already led the way in new generation manufacturing. Germany for instance now holds more than 17,000 patents for new green production technologies (OECD 2012). Policy responses for Australian regions will need to be subtler than generalising statements about the future of the national economy, attuned instead to the realities, existing skills and aspirations of workers in different regional contexts. Significant public investment in manufacturing doesn't have to be nostalgic or nationalistic. Rather, in a more calculating fashion, governments could take seriously the regional competitive advantages already in the hands and minds of manufacturing workers.

Shifting the discourse on manufacturing means inviting more open conversations about what makes up manufacturing, and where it is concentrated regionally in Australia. Beyond assembly lines are product design, prototyping and testing, customisation and 'learning firms' engaging international niche markets, as well as loyal communities regionally. Wollongong exemplifies this, and is an ideal place to move beyond thinking about manufacturing and innovation as mutually exclusive.

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