

Labour Movements during the Resources Boom

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Resource construction employment grew rapidly during the investment phase of the resources boom. However, both investment and employment in the resources sector peaked in 2013 and are expected to decline over coming years. A range of sources suggest that the earlier increase in resource construction employment largely drew on workers with experience in other types of construction, and that demand for their skills from other sectors is expected to be relatively strong in coming years. As a consequence, resource construction workers are generally expected to be able to find employment outside of the resources sector.

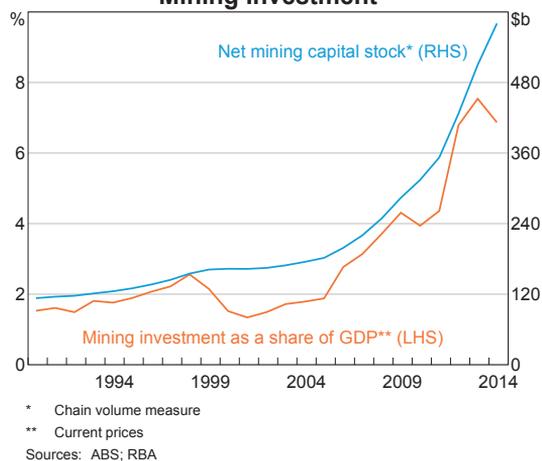
Introduction

Resource investment in Australia grew rapidly from the mid 2000s, as high commodity prices encouraged new investment in iron ore, coal and liquefied natural gas (LNG) facilities. Mining investment increased from around 2 per cent of GDP in the mid 2000s to a peak of close to 8 per cent in 2013. The level of the mining capital stock almost tripled over this period (Graph 1). The boom in investment led to a rapid increase in resources sector employment, as a large number of workers were required to construct the new facilities. On-site resource construction employment is estimated to have increased from around 15 000 in the mid 2000s to around 90 000 in 2013.¹ Resource construction activity is expected to fall over the next few years as resource projects are completed, and liaison-based estimates suggest that the labour required for the operation of the new mines and LNG facilities is typically only around one-third of that required for project construction. Consequently, there is likely to be a significant net decline in resources sector employment.

* The author is from Economic Analysis Department and would like to acknowledge the valuable input to this article from all colleagues in the Regional and Industry Analysis section.

1 There are no official data on the level of resource construction employment. The estimates presented here are based on information obtained through the RBA's business liaison program and should be interpreted as indicative rather than precise.

Graph 1
Mining Investment



This article looks at how the resources sector was able to increase employment so rapidly by considering the characteristics of workers who moved into resource construction jobs. Household-level data and information from the Bank's business liaison program² suggest that the majority of people who moved into resource construction jobs had previous experience in other types of construction. As a consequence, these workers have skills that should allow them to transfer back to non-resources sectors, such as residential and civil construction. Most liaison

2 For a description of the business liaison program, see RBA (2014).

contacts expect that workers will be able to return to their previous industries; for many workers, this has already occurred. Of course, this transition will also depend on the growth of aggregate labour demand, which is expected to remain a little below trend in the near future. The smoothness of this transition will also depend, in part, on geographical labour mobility, as many relevant job opportunities will lie outside of Western Australia and Queensland where most resource construction workers currently reside.

Two types of resources sector employment can be identified: construction and operational. There is also substantial resource-related employment in other industries, such as business services and equipment hire, which is not considered in this article.³ The ABS collects data directly on operational employment in the resources sector. Information from the Bank's business liaison program has been used to estimate the number of construction workers in the resources sector.

Labour Movements and Characteristics during the Run-up in Resource Investment

The resource investment boom was accompanied by a substantial adjustment in the labour market, as strong demand for labour and the high wage rates on offer in the resources sector attracted workers from other industries. However, this dynamic is difficult to quantify because there are no official data that specifically isolate resource construction workers from other types of construction workers. Consequently, this article relies on insights from the Bank's business liaison program.

Many contacts from the RBA's liaison program reported losing workers to the resources sector during the investment boom period, especially from the construction, agricultural, manufacturing and business services industries. A large number of these workers apparently moved into resource construction on a short-term basis, with liaison

contacts noting that some workers returned after a few months, typically before construction projects were complete. There appears to have been frequent turnover of on-site labour. Part of that reflected the reportedly high level of voluntary turnover in the industry. In addition to this, resource project construction usually occurs in stages, each lasting a few months and requiring different skills (such as earthmoving, construction of on-site infrastructure and assembly). Hence, while some construction workers who specialised in resource construction tended to move from project to project, contacts reported that many workers moved into the resources sector to work on a single project for a few months, and then returned to other sectors.

In addition to liaison information, two sources of household-level data are useful for determining the characteristics of workers who became involved in the construction phase of the resources boom:⁴

- Data from the Household, Income and Labour Dynamics in Australia (HILDA) Survey. The annual HILDA Survey provides longitudinal data on household characteristics, including income, employment and location.⁵ Accordingly, these data can be used to compare the characteristics of people who started a new job in the construction industry during the 2008–12 period (when resource investment and employment were growing most rapidly) with those who started a new job in construction in the five years prior.⁶
- Census data from 2011 can be used to identify categories of workers who are likely to be involved in resource construction. The focus

4 The construction industry is made up of three sub-industries as defined by the ABS: building construction, heavy & civil engineering and construction services. For both datasets, analysis of the construction industry excludes the building construction sub-industry. This eliminates some, but not all, residential, office, retail and industrial construction workers from the sample. The two remaining sub-industries, construction services and heavy & civil engineering, are likely to be most representative of resource construction workers.

5 For a longitudinal study, data are gathered for the same subjects over a period of time.

6 The two periods contain 469 and 634 observations, respectively, of workers commencing a job in the construction industry. Conclusions are robust to changes in dates.

3 These broader estimates are provided in Rayner and Bishop (2013).

here is on construction workers whose usual residence is in a mining region or whose place of work is in a mining region.

Previous industry and occupation

HILDA data can be used to draw inferences about resource construction workers' previous industries and occupations. The data do not distinguish between resource and non-resource construction workers, but inferences can be drawn regarding the effect of resource construction by comparing the period when resource investment was growing most strongly (2008–12) with the five years prior. Because a greater share of people starting a new construction job in the latter period were moving into resource construction work, the difference between the two periods is likely to represent the effect of the resource investment boom on construction employment. The 2003–07 period is used to represent 'normal' activity in the construction industry.⁷ While the evidence is circumstantial, it is consistent with liaison comments, which lends support to the methodology.

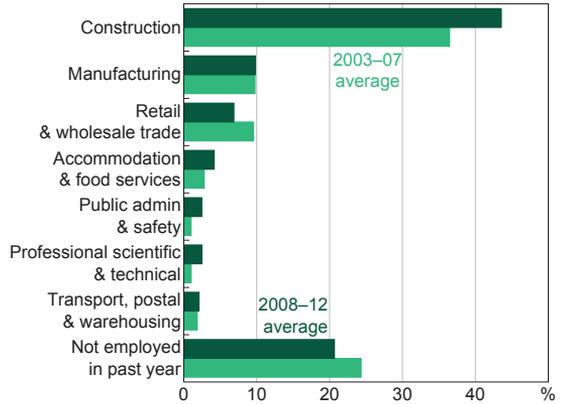
The HILDA data suggest that resource construction workers were largely recruited from other types of construction work; during the 2008–12 period, around 45 per cent of the people who started a new construction job were previously employed in the construction industry, compared with around 35 per cent in the five years prior (Graph 2).⁸ Transitions from the manufacturing, professional, scientific & technical and accommodation & food services industries remained a small share of total moves to construction, but became slightly more common in the 2008–12 period, supporting comments from liaison that some resource construction workers were also recruited from those industries. The share of people who were not employed in the past year decreased slightly over the two periods, suggesting

7 Between the two periods, both residential and other non-residential construction work done remained more or less constant. Public sector construction work done increased in the latter period, but this increase was small compared with the strong growth in resource construction.

8 Some of this increase may be attributable to the higher rate of turnover of resource construction workers.

Graph 2
Previous Industries of Construction Workers*

Share of people who moved to a new construction job in the past year



* Includes only heavy & civil engineering, construction services and construction (not further defined)
Source: HILDA Release 12.0

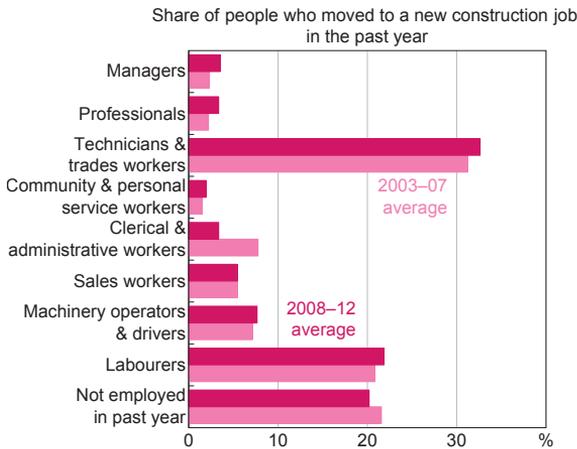
that resource construction workers were less likely than other types of construction workers to have moved from outside of employment.

Resource construction workers were likely to have been recruited from the same broad occupations as other construction industry workers. The HILDA data show that workers who started a new job in the construction industry in 2008–12 were drawn from the same sorts of previous occupations as was the case for those starting a new construction job in 2003–07 (Graph 3). This indicates that there was little difference between the work experience of resource construction workers and other types of construction workers.

Census data suggest that, compared with the construction industry as a whole, construction workers in mining regions were more frequently employed in lower-skilled rather than higher-skilled occupations, despite having similar previous experience (Graph 4).⁹ This implies that higher-skilled workers were moving into lower-skilled occupations (though these jobs may have paid more

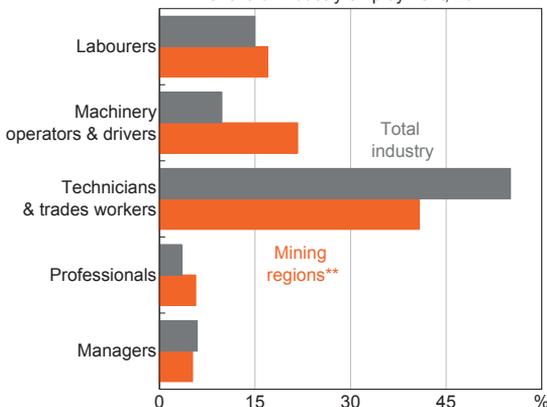
9 Note, however, that the data in Graph 4 may somewhat understate the skill level of resource construction workers if some higher-skilled workers are usually located off-site.

Graph 3
Previous Occupations of Construction Workers*



* Includes only heavy & civil engineering, construction services and construction (not further defined)
Source: HILDA Release 12.0

Graph 4
Construction Workers in Mining Regions* – By Occupation
Share of industry employment, 2011



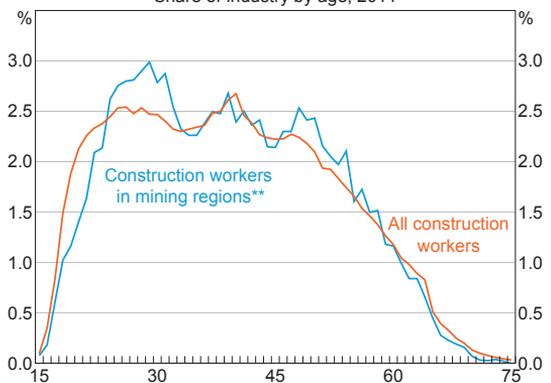
* Includes only heavy & civil engineering, construction services and construction (not further defined)
** Place of work; mining regions are Gladstone-Bioela, Bowen Basin - North, Central Highlands (Qld), Lower Hunter, Goldfields and Pilbara
Source: ABS

favourably than equivalent or even higher-skilled jobs outside of the resources sector). In particular, a higher share of construction workers in mining regions tended to work as labourers or machinery operators & drivers, and a smaller share as technicians & trades workers, than is typical in the rest of the construction industry.

Age and qualifications

Liaison contacts and industry reports note that resource construction firms had a strong preference to hire experienced and qualified workers, with opportunities for low-skilled workers or first-time job seekers fairly limited (see, for example, Atkinson and Hargreaves (2013)). Reflecting this, construction workers in mining regions were typically slightly older, and therefore likely to have more years of work experience, than the construction industry average (Graph 5).

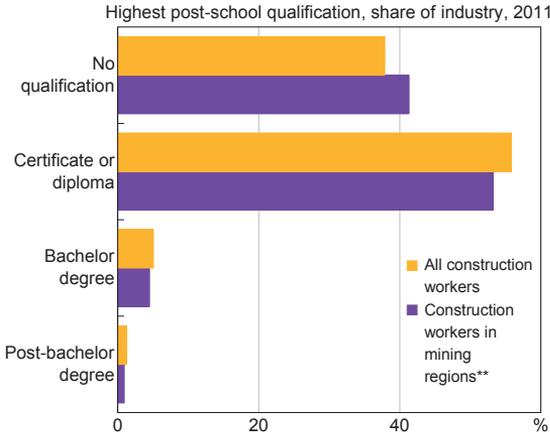
Graph 5
Age of Workers in the Construction Industry*
Share of industry by age, 2011



* Includes only heavy & civil engineering, construction services and construction (not further defined)
** Place of work; mining regions are Gladstone-Bioela, Bowen Basin - North, Central Highlands (Qld), Lower Hunter, Goldfields and Pilbara
Source: ABS

Resource construction workers generally had similar types and levels of qualifications to those of other construction workers, with the majority holding a certificate or diploma (Graph 6). As could be expected given the nature of the work, a slightly higher share of construction workers in mining regions held qualifications in engineering-related disciplines, and a smaller share held qualifications in other building trades (architecture and building; Graph 7). Around 40 per cent of construction workers living in mining regions held no post-school qualification, which is slightly higher than the share for the whole construction industry, but in line with the all-industries average.

Graph 6
Construction Workers* – Level of Qualification

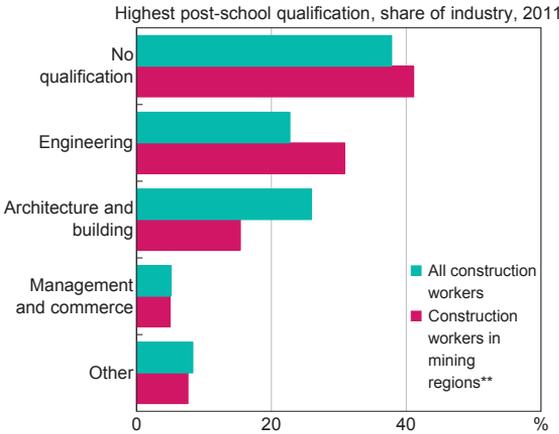


* Includes only heavy & civil engineering, construction services and construction (not further defined)

** Place of usual residence; mining regions are Gladstone-Bioela, Bowen Basin - North, Central Highlands (Qld), Lower Hunter, Goldfields and Pilbara

Source: ABS

Graph 7
Construction Workers* – Field of Qualification



* Includes only heavy & civil engineering, construction services and construction (not further defined)

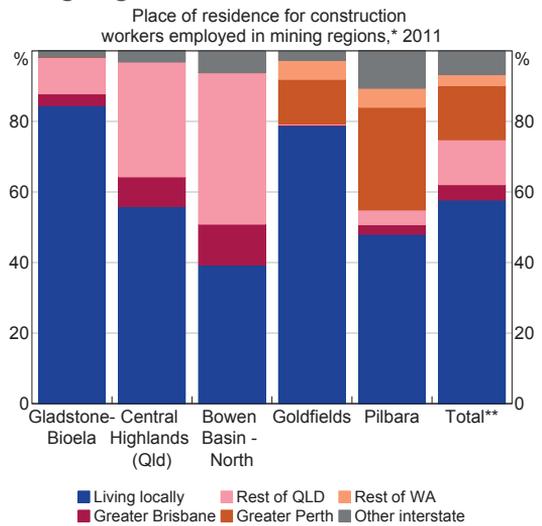
** Place of usual residence; mining regions are Gladstone-Bioela, Bowen Basin - North, Central Highlands (Qld), Lower Hunter, Goldfields and Pilbara

Source: ABS

Geographical factors

A large share of people who worked in resource construction were 'fly-in fly-out' or 'drive-in drive-out' workers, generally commuting from other parts of Western Australia and Queensland (Graph 8). The largest source regions for long-distance commuters were Perth and regional Queensland; interstate migration and commuting has become more common in the resources sector in recent years, but these workers remain a relatively small share of the workforce.

Graph 8
Mining Regions – Workers' Place of Residence



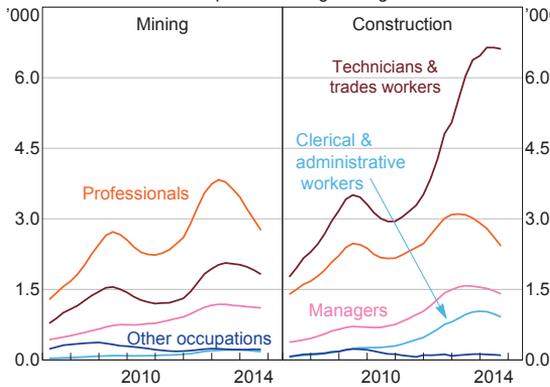
* Includes only heavy & civil engineering, construction services and construction (not further defined)

** Total of five mining regions

Source: ABS

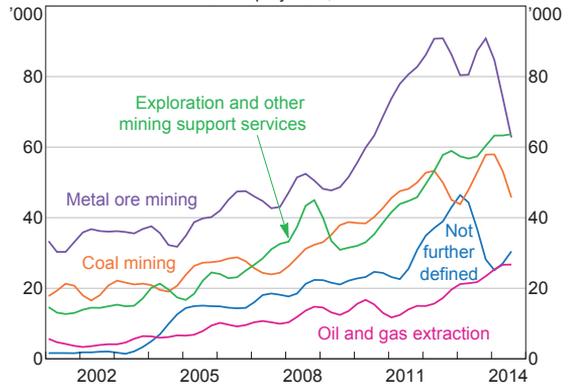
Resource firms also filled vacancies through the temporary skilled visa program (457 visas). This program allows employers to bring in workers from abroad on contracts of up to four years. When resource investment peaked in 2013, just over 2 per cent of the construction workforce and around 3½ per cent of the mining workforce in the resources states were on a 457 visa (compared with around 1 per cent of the total workforce). These visas were mainly used for engineers and other professional roles in the mining and construction industries, but were also used to bring in workers with trades skills that were difficult to find locally (Graph 9).

Graph 9
457 Visa Holders – By Industry and Occupation
 Four-quarter moving average



Source: Department of Immigration and Border Protection

Graph 10
Mining Industry Employment
 Total employment, trend*



* 7-period Henderson trend
 Sources: ABS; RBA

The Outlook for Resources Sector Employment

As the investment phase of the resources boom comes to an end and resource construction employment declines, operational employment in the newly constructed mines will increase. ABS data show that the operational part of the resources sector currently employs around 240 000 people (2 per cent of national employment), the majority of whom work on-site in production roles.¹⁰ Around 30 per cent of resources sector operational employment is in metal ore mining (which includes iron ore, gold, copper and bauxite), 20 per cent in coal mining and 10 per cent in oil and gas extraction (Graph 10).

Based on information provided by the Bank’s business liaison, employment in resource construction is estimated to have peaked at around 90 000 workers in 2013. This was around one-quarter of all people working in both resource construction and operations in that

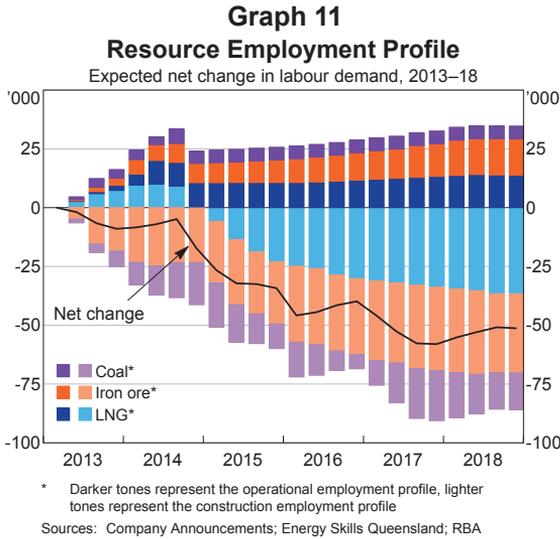
year, and ¾ per cent of the Australian workforce.¹¹ Employment in resource construction is expected to fall by 60 000 people from 2014 to 2018 (Graph 11).¹² However, as a result of recent investment, around 20 000 new operational positions have been created in 2013 and 2014 (an 8 per cent increase in permanent mining industry employment), and an additional 10 000 jobs are expected to be created over the next few years. Net employment in the resources sector is therefore expected to decline by around 40 000 workers between 2014 and 2018.

In terms of composition, the majority of the ongoing employment in the resources sector is in coal and iron ore production. However, the *net* addition to employment from operating coal mines over the coming years is expected to be negligible. Indeed, coal mining firms have been working to cut costs

10 Around two-thirds of employment in the mining industry is in direct operational roles that are likely to be located on-site (machinery operators & drivers, technicians & trades workers and labourers). A further 25 per cent of the industry works as professionals or managers, some of whom are also likely to work on-site.

11 This differs from the estimate provided in Rayner and Bishop (2013) for methodological reasons. They estimated that resource-related construction employment was 1½ per cent of total employment in 2011/12 based on input-output analysis. Their estimate represents a broader definition of resource-related construction employment; for example, it includes employment that has resulted indirectly from activity in the resources sector, as well as off-site construction industry employment. In contrast, this article uses information from the RBA’s liaison program, where contacts were asked how many construction workers were employed on-site at any one time. Rayner and Bishop (2013) also assume that productivity is constant for all types of construction workers.

12 Resource construction employment may actually increase slightly in 2016 if development of the Galilee Basin goes ahead.



in response to low global coal prices by reducing employment at operating mines while maintaining or increasing production levels. Some producers have also closed high-cost coal mines, and there may be further closures of high-cost mines. In contrast, iron ore operational employment is expected to increase gradually over time, partly due to an increase in the labour intensity of extraction as mines age. Conventional LNG operations in Western Australia and the Northern Territory will require very few workers, but the labour requirement is

likely to be more substantial for coal seam gas-LNG operations in Queensland, where a significant permanent workforce will be needed to regularly drill new wells to extract gas.¹³

Transitions within the resources sector

The skills required for resource operations are quite different from those required during construction, though there is some overlap (Table 1). In particular, operational workers are generally much more likely to be professionals and machinery operators & drivers, while resource construction workers are more likely to be technicians & trades workers. The labour requirement for LNG operations is slightly different from other resources, employing a greater share of professionals such as mining engineers, accountants and geologists, and a very small share of machinery operators & drivers.

As a consequence, only a fairly small share of current resource construction workers are likely to transition to operational work. A report by the Australian Workforce and Productivity Agency provides estimates of labour demand by detailed occupation for both the construction and the operations phase of the resources boom (AWPA 2013). These estimates suggest that there are only a few thousand roles for which construction and operations skills overlap

Table 1: Resources Sector – Skills Requirements
 Share of total, 2014–18

	Construction	Operations
Managers	6	11
Professionals	3	21
Technicians & trades workers	59	24
Clerical & administrative workers	10	10
Machinery operators & drivers	8	29
Labourers	12	4
Other	1	1

Source: Australian Workforce and Productivity Agency

¹³ A report by Energy Skills Queensland (2013) suggests that between 2014 and 2018, 11 000 to 16 000 workers will be required across all three coal seam gas-LNG projects, with the vast majority working in gas extraction.

(these include, for example, mining engineers, truck drivers and earthmovers), meaning that if construction workers are to remain in the resources sector, they would need to change occupations. Still, the estimates of changes in employment shown in Graph 11 indicate that total operations employment will increase only modestly from its current level. Hence, the majority of resource construction workers will need to move out of the resources sector.

Transitions from the resources to other sectors

The above analysis and business liaison suggest that many current resource construction workers have skills that are transferable to some other industries. In particular, a large share of these workers appear to have originally moved from other construction jobs, and so they have the requisite qualifications and experience to move back into non-mining construction jobs, contingent on labour demand. The most commonly cited barrier to moving from resource construction to other industries is the high wage expectations of these workers. If this is the case, some of these workers may choose to exit the labour force, at least for a period.

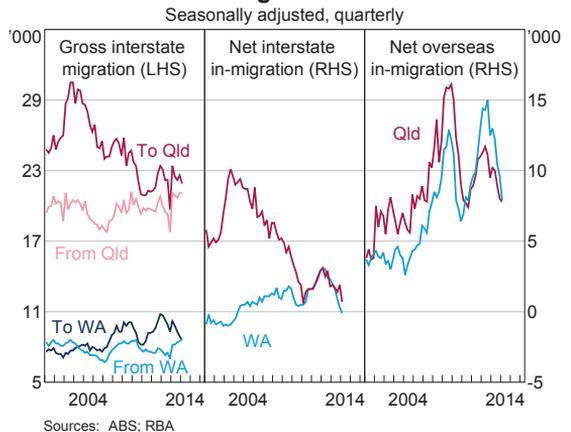
Within the construction industry, contacts have noted that non-residential (and particularly civil) construction is the most similar to resource construction. While a small amount of retraining is reportedly required for resource construction workers to move into some other types of construction (such as residential), in most cases workers already have many of the requisite skills. In addition, liaison contacts in the wholesale, manufacturing, agriculture and retail industries have noticed an improvement in the availability of suitable labour recently. Many attribute this to the return of workers from the resources sector, suggesting that former resource construction workers have also started to return to jobs outside of the construction industry.

At the same time, labour demand is currently strong in industries into which resource construction

workers can most easily move. With the recent increase in residential building approvals, particularly for high-density dwellings, demand for construction workers looks likely to continue to grow over the next few years. In civil construction, there are a number of infrastructure projects that are expected to ramp up in the next few years (mainly located in Sydney and Melbourne) that, according to their websites, are expected to create a total of around 20 000–30 000 jobs.

One obstacle could be that the majority of resource construction workers currently reside in Western Australia and Queensland, while much of the planned residential and civil construction work will be located in other states. Hence, substantial interstate migration will be required for former resource construction workers to fill these roles. There is some evidence that this is already occurring, with interstate migration data showing an increase in departures from Western Australia and Queensland of around 2 000 people per quarter in 2013 and early 2014 (Graph 12).

**Graph 12
Migration**



Liaison contacts note that the resources sector workers with skills that are least transferable to other industries are professionals, such as geologists and certain types of engineers. However, according to liaison reports, these highly skilled professionals are very mobile globally, moving to other countries

where their skills are in demand. In 2011, up to 20 per cent of some types of professionals in the mining and construction industries were on temporary work visas, and therefore are unlikely to remain in Australia when their current work comes to an end (Table 2). Recent data suggest that outward migration of resources sector workers on temporary visas is already starting to occur.

Although most workers have skills and experience that will allow them to take up jobs in other sectors, there are some specific groups that may have more difficulties changing jobs. Liaison contacts note that there are few non-mining job opportunities for workers who choose to remain in mining regions. In addition, young resource construction workers without qualifications beyond high-school are likely to experience difficulty obtaining work in other industries, although they comprise a relatively small share of resource construction employment.

Conclusion

Resource construction employment increased substantially during the investment phase of the resource investment boom, peaking at around ¾ per cent of national employment in 2013. The resources sector was able to increase employment rapidly by drawing workers whose skills were readily

transferable from other types of construction into resource-related construction.

Between 2014 and 2018, the number of resource construction jobs is estimated to decline by about 60 000, with only a relatively small offset from an increase in operational jobs over that period. This would lead to a net decrease in resources sector employment of 40 000. Nonetheless, the available data and the Bank’s liaison suggest that the workers released from the resources sector are likely to be absorbed by other sectors. While a large number of resource construction jobs are ending, this will take place over several years. Furthermore, these workers’ skills are reportedly quite transferable to residential and civil construction, for which labour demand is expected to remain relatively strong. Their above-average levels of experience and around-average levels of post-school qualifications should enable them to find work in other industries as well. Of the professional workers whose skills are reportedly least transferable to other industries, a substantial share are temporary migrants, who are unlikely to remain in Australia if they do not find ongoing work, while highly specialised domestic professionals are also reportedly globally mobile.

As newly constructed mines and LNG facilities come on line over the next few years, resource exports

Table 2: 457 Visa Holders – By Industry and Occupation
 Visa holders^(a) as a share of total employment, as at 2011 Census

	Mining industry	Construction industry
Construction managers	8	0
Engineers	12	12
– Mining engineers	8	5
– Civil engineers	20	12
Architectural, building and surveying technicians	6	1
Construction trades	2	1
Metal fitters, machinists, structural steel and welding trades workers	2	3
Contract, project and program administrators	4	4

(a) Year average of visa holders
 Sources: ABS; Department of Immigration and Border Protection

are expected to grow strongly. With estimates suggesting that approximately half of Australia's resource export receipts accrue to Australian residents,¹⁴ strong growth in exports is expected to stimulate further demand, which itself can be expected to create more employment throughout the Australian economy (Connolly and Orsmond 2011). ❖

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¹⁴ That is, through direct labour costs, use of domestically sourced intermediate inputs, tax and royalty payments and the small share of profits that are owned by Australian residents. This share may decrease in coming years as more LNG projects, which use fewer domestic inputs, begin exporting.