Changes in Industrial Structure in the Australian Construction Industry: Causes and Implications

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Abstract

This paper examines changes in the firm-size and industrial structure of the private Australian construction industry that have occurred over the last two decades and assesses their causes and implications. The primary data source is ABS Construction Censuses. There has been significant change in the structure of production in the construction industry with a large decline in firm size and rapid growth of output and employment in the specialist sub-contractors segment. These changes are explained largely as a result of increased subcontracting and outsourcing by larger firms to smaller firms. The changes in firm-size and industrial structure have had an adverse effect on construction productivity; OH&S performance; skilled trade shortages and expenditures on innovation and R&D in the industry.

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Introduction

The purpose of this paper is to examine changes in the firm-size and industrial structure of the private Australian construction industry that have occurred over the last two decades and to assess the causes and implications of these changes.[1]

Section One describes the change in firm-size structure based largely on data from ABS Construction Censuses conducted over the1980s and 1990s. There has been significant change in the structure of production in the construction industry with a large decline in firm size and rapid growth of output and employment in the specialist sub-contractors segment. Section Two seeks to explain the changes in firm-size structure in the Australian construction industry and places these changes within the broader context of firm-size restructuring within the overall economy. Change in construction industry firm-size structure reflects a broad range of labour market and product market conditions, such as the use of subcontracting to cut costs; growth of labour hire firms; privatisation and corporatisation of construction related government activity; low barriers to entry for firms into the construction industry; and significant tax advantages of self-employment over Pay As You Earn (PAYE) employment. Section Three analyses the effects of changes in firm size and industry composition on productivity, Occupational Health & Safety (OH&S) performance; firms' investment on vocational training, and Research & Development (R&D) expenditures.

Changes in Firm-Size Structure and Industrial Composition

The principal data source used in this paper is the ABS Private Sector Construction Industry Census (ABS 8771.0; ABS 8772.0). These Censuses are conducted on an irregular basis, the most recent covered the period 1996-97 and prior to that 1988-89 and 1984-85. In 1988-89 there were 98,059 private sector establishments, employing 395,000 persons (including working proprietors and partners) and producing $15,691 million in gross product (Table 1). In 1996-97 there were 194,300 private businesses employing 484,000 persons producing $16,181million in gross product. Over the seven years to 1996-97 the number of establishments increased by 98 per cent, employment increased by 23 per cent and industry gross product increased in nominal terms by 3 per cent.[2] The rate of new firm creation was 4.2 times the rate of employment growth. Productivity as measured by nominal gross product per person employed was $39,723 in 1988-89; in 1996-97 it was $33,432, a fall of 16 per cent.

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There have also been major changes in the firm-size distribution of employment (Table 1). The proportion of firms employing less than five persons increased from 85.4 per cent to 93.6 per cent. The share of total employment in these small firms increased from 42.6 to 68.6 per cent. All of the employment growth over the period occurred in businesses with employment of less than five. Employment in larger firms actually declined, with the level of employment in firms with 20 or more employed persons falling by more than 50 per cent. The average employment size of firms in the construction industry declined from 4 to 2.5 person. Correspondingly, the share of gross product produced by these small firms increased from 30 to 54 per cent. The increase in the share of gross product is less than the share of employment because industry gross product per person in smaller firms is less than the construction industry average.

Table 1. Firm-Size Distribution of Employment and Industry Gross Product 1988-89 and 1996-97

	Firm-Size Employment			
	<5	5-19	> 20	Total
1988-89				
Employment x Establishment size.'000	168	97	130	395
Employment x Establishment size. Per cent	42.6	24.5	32.9	100
No. of Establishments	83742	12061	2255	98059
Establishments x Employment size. Per cent	85.4	12.3	2.3	100
Gross product per person employed $'000	27.97	39.8	54.9	39.7
Gross product x Establishment size. Per cent	30	24.6	45.5	100
1996-97				
Employment x Establishment size. '000	332.0	85.9	66	484.1
Employment by Establishment size. Per cent	68.6	17.7	13.6	100
Number of Establishments	182000	11100	1200	194300
Establishments x Employment size. Per cent	93.6	5.7	.6	100
Gross product per person employed $'000	26.1	41.7	60	33.4
Gross product x Establishment size. Per cent	53.5	22.1	24.4	100

Source: *Construction Industry Australia, Summary of Private Operations, 1988-89.* Cat no. 8771.0 and *Private Sector Construction Industry, 1996-97. Australia.* Cat no. 8772.0. Note that firm size data for 1988-89 was 5-20 instead of 5-19 as in 1996-97. Gross product was the concept used to measure net industry output in 1996-97. In the earlier Censuses value added was employed. The employment data includes employees, working proprietors and partners.

The changes in employment, firm-size and productivity are directly related to shifts in the industrial structure of construction activity. (Appendix). Over the two decades between 1984-85 and 1996-97 there was a near doubling in the number of establishments, of which around 80 per cent were accounted for by new Construction Trade Services establishments. The

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share of Construction Trade Services establishments increased from 73 per cent of total establishments in 1984-85 to 81 per cent in 1996-97. Construction Trade Services employment increased from 63 per cent of the total in 1984-85 to 74 per cent in 1996-97. The share of gross product in the Construction Trade Services industry increased from 52 per cent to 63 per cent between 1984-85 and 1996-97.

Causes of Change in Firm–Size and Industry Structure

A common feature of the construction industry across developed nations is the preponderance of small firms and individual contractors within the total number of firms in the industry (Raftery 1991). This is partly due to the fact that the industry's structure is highly segmented or specialised. Even very large firms within the construction industry are specialised to varying degrees. This segmentation is partly a function of the product market, and especially the segmentation within and across residential, non-residential and engineering output. This reflects the specialised technologies required to produce these different structures. It is also highly geographically segmented, given that the final product is not mobile and the construction 'service' has to be provided on-site. There are comparatively low barriers to entry, and the market is also highly competitive and mature. The low barriers to entry are the result of small capital requirements (given the industry's heavy reliance on rental of equipment and operational leases); low regulatory impediments to entry; no substantive regulatory barriers to inter-state trade or mobility of equipment and labour; and, minimal restraints on the acquisition of industry occupational skills.

The large number of small firms also reflects a risk management strategy within the industry. Given the very high levels of volatility of output within the industry, firms reduce risk by reducing their fixed costs (as evidenced by heavy reliance on operational leasing and rental of plant) and quasi-fixed costs, notably labour. (Labour is regarded as a quasi-fixed cost as the level of total employment adjusts less than proportionally to changes in output). An individual firm can reduce or shift risk by subcontracting activity that would otherwise be met by an expansion of the firm (Green, Burgess, Denniss and Mills 1996: 34-35). On the other hand, greater reliance on sub-contracting introduces principal-agent problems, though the balance of these competing risks is such as to encourage small firm growth. Finally, the labour process 'consists of many discrete sequential steps, each requiring different trade skills and materials. Hiring is consequently for a limited time, which under certain circumstances may encourage builders and

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subcontractors to use contract labour' (Underhill and Kelly 1993: 408). Although these are features of the construction industry they do not explain the acceleration in the number and proportion of new firms over the last two decades. A number of hypotheses to explain these trends are examined below.

Changes in ABS Methodology

The ABS methodology for the Construction Censuses remains largely unchanged over the years, so that the data from the various Censuses are conceptually similar and, therefore, comparable. The samples are drawn from the ABS Business Register for employing businesses, and non-employing businesses are derived from Australian Taxation Office sources. However, there is one change from previous years; in the 1996-97 Census the business unit about which data have been collected and published is the 'management unit'; earlier Censuses surveyed establishments. The shift to a management unit survey base has, if anything, understated the growth in the number of 'firms' given that some multi-establishment firms are only recorded as a single management unit. The term management unit is defined as 'the highest level unit within a business ... for which a set of management accounts are maintained' (ABS 1999 Cat No. 8772.0: 67).

Increased Risk

As noted above, the existence of considerable risk for firms in the construction industry is one of the factors leading to extensive subcontracting. The level of risk for each firm has increased, especially on larger projects due to the shift from cost-plus to fixed price contracts. Fixed price contracts were introduced in the later 1980s and became the norm in the early 1990s. Previously cost-plus contracts placed most of the risk of cost overruns and time delays on the developer or owner of a building project. With fixed price contracts a portion of the risk faced by 'the head contractor is passed down the contractual chain to each subcontractor. That is, subcontractors also face penalties for delays and are paid a fixed price for their services' (Productivity Commission 1999: 14). It is arguable that heightened risk facing each firm involved in larger construction projects has created an incentive towards greater subcontracting.

Outsourcing

The growing significance of small business in output and employment is not restricted to the construction industry, but reflects an economy wide

trend. Between 1983-84 and 1994-95 firms with less than 20 employees contributed 53 per cent of net employment growth. This contribution to growth is much higher than the small business share of total employment, which was 33 per cent in 1994-95 (Industry Commission 1997: ix). A key factor identified as influencing the growth of small business has been the practice of outsourcing activity from larger firms and the public sector (Industry Commission 1997: 72-73). It is argued that outsourcing provides a likely explanation for much of small business and employment growth in the construction industry. There is a considerable literature on the causes and consequences of outsourcing (Harrison 1994; Dunne and Hughes; Industry Commission 1996; Quiggin 1995). There are five inter-related management rationales for introducing outsourcing. These relate to risk reduction as described above; meeting peak demand for output by outsourcing production; buying-in specialised technology, equipment or skills; cost reduction by focussing on the competitive strengths of the firm and buying-in non-core products and services; and, introducing market discipline within the organisation out-sourcing activity and amongst external suppliers of services or goods by encouraging increased competition (Hall and Bretherton 1999: 20).

The outsourcing argument receives considerable support from the fact that the overwhelming bulk of increase in employment and number of firms has occurred in the Construction Trade Services segment of the construction industry. This industry provides specialised services such as excavation, plumbing, carpentry, bricklaying, electrical, concreting and painting, purchased by firms engaged in Residential, Non-Residential and Engineering Construction. Further support for the view that larger firms are seeking to cut costs is provided by data showing differential movements in output per worker between large and small firms. Between 1988-89 and 1996-97 nominal gross product per person in establishments with employment of more than 20 persons increased by 9.2 per cent, though it declined by 7.2 per cent in firms with less than five employees (Table 1). It is probable that larger firms are subcontracting an increasing share of the on-site construction work to Construction Trade Services and specialising and retaining more value-added work such as project bidding; design; financial management; project management and engineering.

Related to the above is the major shift of construction output and employment from large public sector enterprises with a substantial number of construction employees to the private sector, that occurred over the last decade.[3] This shift is due to a reduction in the public sector share of total construction expenditure and a reduction in the share of public construction

activity undertaken by the public sector (Industry Commission 1996; Denniss and Toner 1999; Toner 1999). The reduction in the share of public construction activity is due to increased outsourcing of construction work from public sector construction gangs to private firms. In turn this is due to public expenditure constraints; privatisation of public utilities such as ports, electricity generators and distributors which previously undertook construction activity; and increased reliance on private sector provision of infrastructure (such as toll roads).

Increase in Self-Employment

Another key factor in the change in firm-size and industry composition is the significant long run increase in contractor or self-employed status in the construction industry. One in four workers were employed on their 'own account' in 1985; this increased to one in three in 1997 (Buchanan and Allen 1998: 27). Data from the Taxation Office reveals that up to 40 per cent of the construction workforce were classifying themselves as self-employed in 1998 (Industry Commission 1999: 128-129). It should be noted that the official estimates of self-employment are likely to understate the actual figure. When firms incorporate, the owners of the company become employees of their own company, and these owners may record their status in official surveys as employee rather than self employed or employer (VandenHeuvel and Wooden 1995: 4; Underhill, Worland, and Fitzpatrick 1998: 406). A conversion of the existing workforce from employee to contractor status explains the fact that over the period 1988-89 to 1996-97 the number of new firms increased four times faster than total private construction industry employment. As specialist sub-contractors, such as carpenters, electricians, concreters, etc., these self employed are classified to the Construction Trades Services segment of the construction industry.

The decision to change employment status from employee to self employed is due in part to advantages in such arrangements to the employer in terms of increased flexibility in the use of labour. This increased flexibility includes, payments being made only for hours actually worked, reduced labour on-costs and perceived lower administrative burden (Underhill and Kelly 1993: 401; Underhill, Worland, and Fitzpatrick 1993: 407-408). In 1994, superannuation, workers' compensation and payroll tax were equivalent to 16 per cent of average wage and salary costs in the construction industry (Industry Commission/DIST 1997: Table 3.179). If other costs such as holiday pay, sick pay, long service leave and administrative costs associated with financial management of employees is taken into account, labour on-costs increase to at least 25-30 per cent of wage

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costs. The increase in self-employment also reflects a preference on the part of some employees to operate as a self employed business due to a range of personal, psychological and pecuniary reasons (Underhill, Worland, and Fitzpatrick 1998: 407-408). Regarding the latter, there are large tax advantages in self-employment compared to PAYE employment in the construction industry. The magnitude of these benefits is indicated by estimates that contract workers on an income of $50,000 can reduce their tax by an average $6,217 per worker per year compared to PAYE employees on the same salary (Buchanan and Allen 1998: 34). This is a 12.4 per cent increase in after tax income. It is arguable the rapid increase in the number of firms and contractors in the construction industry is due both to demand-pull factors from larger construction firms, keen to reduce risk and costs; and supply-push factors from employees, keen to access tax and other advantages flowing from a change in employment status.

Implications of Changes in Firm Size and Industry Structure

This section examines the implications of changes in firm size structure in the construction industry for productivity, vocational training and Occupational Health and Safety.

Productivity

The rapid growth of new firm formation within the construction industry and the overwhelming role of Construction Trade Services in this growth represents an impediment to productivity growth. This is because a larger proportion of construction output is being produced by firms with a comparatively low gross product per person (Appendix). Of particular importance is the consistently low comparative gross product per person of the Construction Trade Services industry. Between 1984-85 and 1996-97 the ratio of gross product per person of the Construction Trade Services industry to the construction industry's average has varied between .83 and .85.

In addition to a substantial increase in the proportion of output being produced by comparatively low productivity firms, productivity has also been adversely affected by total employment increasing at a faster rate than total gross product. It is arguable, that the growth in employment is linked, and indeed, caused by the rapid growth of new firm creation. The argument linking employment growth to the growth of new firms rests on the simple

proposition that in outsourcing production to smaller firms the employment to output ratio for this production necessarily increases. This follows from the robust finding that gross product per person declines with declining firm size (Table 1).

Other data, such as National Accounts estimates of gross product per person employed indicates positive, but comparatively low productivity growth for the construction industry (ABS 5206.0). Construction has the second lowest long-run rate of productivity growth in the market sector of the economy, and is significantly below the average for the market sector.[4] The recording of positive, if modest, productivity growth, is largely due to higher estimates of gross product in the National Accounts compared to the Construction Census. In turn, this is due to different methodologies for collecting output data between the Construction Census and other ABS measures of construction activity.

An intriguing implication of the adjustments in firm size and industry composition occurring over the last two decades is that whilst it is economically rational for each producer to cut costs by engaging labour on a sub-contract basis, it has the effect of lowering productivity, or at least restricting the rate of growth of productivity on a global industry basis. The problem can be restated: firms can cut their own costs and increase their competitiveness by sub-contracting work, but this reduction in costs is not the result of increased productivity amongst sub-contractors. The cost reduction seems to be brought about by avoidance of labour on-costs, increased work intensification and taxpayer subsidy to the earnings of subcontractors in shifting from PAYE to self-employed status. It has been demonstrated how labour on-costs, equivalent to 25-30 per cent of wage costs can be cut by engaging contract labour. Outside of the construction industry it has been found that contracting out of services can reduce costs by around 20 per cent (Quiggin 1995: 8). A major source of these gains is argued to be reduced conditions of employment (Ranald 1995). Increased work intensity may also apply to the Australian construction industry. Firstly, higher rates of deaths and accidents amongst self-employed are explained, in part, through increased work intensification (Mayhew and Quinlan 1995. This is examined in more detail later). Secondly, a survey of self-employed construction workers found they preferred to employ other self-employed labour because they perceived them as harder working than employees; though nearly one in five of those in the survey identified long working hours as one of the disadvantages of self-employment (Underhill, Worland, and Fitzpatrick 1998: 407, 409).

Rather than reflecting an increase in technical efficiency arising from increased competition amongst a growing number of construction sub-contractors, work intensification represents an income transfer from the sub-contractor to the contractee. Such work intensification represents an increase in worker effort without a corresponding increase in income (Quiggin 1996: 51-52). Other costs savings arise from tax benefits of self-employment. It has been argued that the exploitation of such tax advantages represents 'a significant subsidy from the tax system to the construction industry'(Buchanan and Allen 1998: 36).

Research and Development and Innovation

An important source of productivity is investment in Research and Development. It is well established that the structure of the construction industry is not conducive to R&D or innovation. In 1996-97 total public and private sector R&D expenditure on construction was $113.9 million or 1.3 per cent of total Australian R&D expenditures. The R&D expenditure for construction is significantly lower than the construction industry's share of total GDP, which is around 6.5 per cent (ABS 1994 Cat. No. 8112.0). Construction firms are also much less likely than other firms to undertake innovative activities.[5] Of the fifteen industries within the Australian Standard Industrial Classification, the construction industry has the second lowest proportion of firms undertaking innovation. (ABS 1994 Cat No. 8116.0: Table 1).

The impediments to innovation in the construction industry have been thoroughly examined by Tatum (1989). The comparatively low propensity for R&D by private business in the construction industry is partly a reflection of the small average size of firms in this industry. R&D and innovation expenditure is strongly and positively associated with increases in firm size (ABS 1994 Cat. No. 8112.0: Table 3). The reduction in average firm size that occurred over the last two decades, therefore, represents an impediment to innovation and productivity.

Training

There has been a marked reduction in construction firms' investment in training over the 1990s. It is arguable this reduction is linked to industrial re-structuring and reduction in firm size. Between 1993 and 1996 expenditure on structured training per employee in the construction industry fell by 25.5 per cent. This is much greater than the 3 per cent decline recorded across all industries (ABS 6353.0). Since 1994-95 there has been a sustained decline in construction apprenticeships, with levels over the 1995-96 and

1996-97 years significantly lower than that in the 1990-91 recession. The low levels over the period from 1995-96 to 1996-97 are extremely concerning, as in this period real construction activity was at near record real levels. The real level of construction output in 1996-97 was marginally higher than that in 1988-89, though the number of new building apprenticeship starts was 2.2 times greater in 1988-89 than in 1996-97 (NCVER Unpublished data; ABS 5206.0)

The marked deterioration in training performance is, in part, due to continued reduction in average firm size in the construction industry that occurred over the late 1980-90s.[6] Between 1988-89 and 1996-97 the proportion of firms in the construction industry with less than five employees increased from 43 per cent to 69 per cent. There is a very strong and positive relation between increase in firm size (number of employees) and the proportion of a firm's employees receiving training and the absolute level of investment in training per employee (Industry Commission/DIST 1997: 167; Toner 1998: 155). Even amongst some firms which continue to have a large number of employees, sub-contracting and out-sourcing are adversely affecting investment in training. For example, in the mid-1980s the NSW government and its utilities engaged ten per cent of the State's total annual intake of new building apprentices. By the mid-1990s this had declined to one per cent (Toner 1998). One factor in this is that Government utilities and larger private corporations are increasingly out-sourcing their demand for skilled trades labour to labour-hire companies. Labour hire companies are significant employers of tradespersons, but undertake minimal apprentice training (Marshman 1996, Australian National Training Authority 1998).

As a result of reduced vocational training over the 1990s skill shortages are currently being experienced for construction trades in NSW and Victoria, and these shortages may worsen in the medium to longer term (DEETYA 1998). These arguments regarding the adverse effect of increased sub-contracting within the private sector and associated changes in government instrumentalities have also been advanced by the peak national advisory body from industry to government on training matters in the construction industry (Construction Training Australia 1999; Vincent 1999).

Occupational Health & Safety

There is considerable evidence that the large increase in self-employment associated with the structural changes identified in this paper are linked to a deterioration in Occupational Health and Safety (OH&S) outcomes. Foley

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(1997) found in an examination of workers' compensation data for the construction industry that 'the self-employed are approximately twice as likely as wage and salary earners to experience a work related injury during a year' (Foley 1997: 81). Some of the reasons attributed to this include, intensification of competition and work arising from increased subcontracting in the construction industry. This leads sub-contractors to view OH&S 'as an impost rather than a benefit' (Mayhew and Gibson 1996: 66). The limited time available to self-employed and the absence of management specialisation available to larger firms, which may have specialist OH&S officers, results in small business and the self-employed having difficulties understanding OH&S legislation and requirements (Mayhew 1997: 2236). There is also the 'inherent disorganisation associated with outsourcing labour' on larger construction sites, which diminishes co-ordination and blurs responsibility for on-site safety. It is also more difficult for sub-contractors to organise for improved on-site safety compared to a unionised workforce (Mayhew and Quinlan 1997: 163). The inherent discontinuity in construction work where different building trades and specialists work sequentially on a physically changing site is exacerbated when the subcontractors on a site are strangers to one another and where the economic incentive for each is focussed on completing their particular task in minimum time (Rainbird 1991: 204).

Conclusion

Using data from the ABS Construction Censuses this paper has identified large changes in the industrial and firm size structure of the private Australian construction industry. The key changes are inter-related and comprise a large increase in the share of total construction employment and output accounted for by the Construction Trades Services sector of the industry; a significant growth in the number of new firms and large reduction in firm-size. These structural changes were attributed primarily to the growth of subcontracting and outsourcing of construction work from larger construction firms and privatisation and corporatisation of construction related government enterprises. Some of the reasons advanced for the growth of sub-contracting included, employment of subcontractors reduces a firm's exposure to volatility and risk in the industry; tax advantages of self-employment over PAYE and the absence of on-costs reduces labour costs, and it introduces a type of labour market flexibility in that payment is only made for hours worked. There are also undoubtedly considerable non-pecuniary benefits experienced by the self-employed. The growth of labour hire firms may have accelerated these trends. These structural changes were argued

to have adversely affected productivity growth, Research & Development, training and OH&S.

A number of areas for further research are suggested by this paper. For example, it is important to identify the sources of productivity differential between large and small firms in the construction industry. In particular, to what extent are the large recorded differentials due to scale economies or to what extent do they simply reflect differences in the nature of activity conducted across large and small firms. Other research by the author found quite large productivity differences, in the order of 100 to 300 per cent across different firm sizes in the same construction sub-industries- Residential Construction and Construction Trade Services (Croce, Green, Mills and Toner 1999). These differences might be due for example, to larger firms in Residential Construction concentrating on more value-added activities such as project management, whilst smaller firms focus on Residential on-site construction work. Secondly, it is important to resolve differences in productivity measures for the construction industry across the various ABS surveys identified in this paper.

Notes

1 There is little data on the public sector construction industry, as the last Public Sector Construction Census was conducted in 1988-89.

2 The estimate of Construction Industry gross product in the 1996-97 Census has a particularly high standard error of 50 per cent. Even if other data sources are used for estimating industry gross product, such as the National Accounts, the effect on the measurement of changes in productivity is small. In 1988-89 Construction gross product in real 1989-90 dollars was $26.151 billion and $28.177 billion in 1988-89 and 1996-97 respectively, an increase of only 7.7 per cent (*Australian National Accounts* Cat. No. 5206.0). This percentage increase in real output is outweighed by the recorded 23 per cent increase in employment. Whilst the levels of gross product per person may differ depending on the data source, the movement in per person gross product is still negative. Other estimates of construction productivity are discussed in Section 3.

3 There was large scope for a transfer of public sector construction activity to the private sector. The last ABS survey of public sector construction activity was in 1988-89. Total public sector on-site employment was 164,000, with total off and on-site employment of 203,000 (ABS *Public Sector Construction Activity, Australia 1988-89*, 8775.0). Total employment in the construction industry for 1988-89 was 570,500 (*Labour Force Australia*, ABS 6201.0). Public sector construction employment would not in general be captured by the Labour Force survey estimates of total construction industry employment because public sector employees working on construction projects are not classified to the construction industry. The number of public sector workers engaged directly and indirectly in construction work in 1988-89 was equivalent to 35.6 per cent of *Labour Force* estimates of construction industry employment.

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4 The index of real gross product per person adjusted for hours worked (base 1989-90=100) as at June 1997 for the market sector was 118.2. For the construction industry it was 108.7. Other industries included, Communications (178.1) Mining (147.2) and Electricity Gas and Water (185.5) (ABS 5206.0).

5 Innovation entails activities such as design; R&D; acquisition of patents and technology licenses; purchase of capital equipment enabling new process of products (ABS *Innovation in Australian Manufacturing 1994,* 8116.0).

6 One recent survey of self employed builders found that 'those self-employed who operate a small business are unwilling to hire employees and this unwillingness extends to their attitude toward hiring apprentices.' The authors noted that the 'growth in self-employment is likely to contribute to future skill shortages in the industry' (Underhill, Worland, and Fitzpatrick 1998: 412).

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Appendix

	Residential	Non-Residential	Engineering	Construction Trade Services	Total
Number of Establishments x Industry					
1984-85	20974	2987	3362	73467	100789
1988-89	15730	3888	3910	74531	98059
1996-97	31000	2100	3100	158000	194300
Percentage of Establishments x Industry in Total Construction Establishments					
1984-85	20.81	2.96	3.34	72.89	100
1988-89	16.04	3.96	3.99	76.01	100
1996-97	15.95	1.08	1.6	81.32	100
Employment x Industry					
1984-85	52465	31935	34915	206882	326198
1988-89	51200	47300	37000	259600	395000
1996-97	70300	21300	35600	356900	484100
Percentage of Total Employment x Industry					
1984-85	16.06	9.78	10.7	63.43	100
1988-89	12.96	11.97	9.37	65.72	100
1996-97	14.52	4.40	7.35	73.72	100
Gross Product x Industry $billions					
1984-85	1.253	1.21	1.328	4.158	7.95
1988-89	2.254	2.971	1.95	8.514	15.69
1996-97	2.642	1.004	2.402	10.013	16.181
Percentage of Gross Product per Industry					
1984-85	15.81	15.27	16.67	52.24	100
1988-89	14.37	18.94	12.43	54.26	100
1996-97	16.33	6.21	14.85	62.62	100
Gross Product Per Person Employed x Industry $'000					
1984-85	23.92	37.94	37.86	20.10	24.30
1988-89	44.03	62.83	52.71	32.80	39.72
1996-97	37.59	47.14	67.48	28.39	33.43
Ratio of Industry Gross Product Per Person x Industry to Total Gross Product Per Person					
1984-85	0.98	1.56	1.56	0.83	1.00
1988-89	1.11	1.58	1.33	0.83	1.00
1996-97	1.12	1.41	2.02	0.85	1.00

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