'Anomalies', Damned 'Anomalies' and Statistics: Construction Industry Productivity in Australia

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The Australian Building and Construction Commission was established by the Howard government with coercive powers unprecedented in Australian employment relations. A few months before the 2007 federal election, it released a consultant's report purporting to demonstrate that labour productivity had soared in the sector of the industry in which it had been exercising its coercive powers. However, re-analysis of original data on building costs, which the report cited as its key source, demonstrates no major savings or economic benefits and shows welfare gains to be based on discredited cost data or what it calls 'anomalies'.

Introductionⁱ

The Australian Building and Construction Commission (ABCC) was established by the Howard government in 2005 under special legislation. This enables the ABCC to exercise coercive powers that are unique in industrial relations, in an effort to regulate union activity in the industry. This legislation, which provides for six months jail for people who refuse to cooperate with ABCC inquiries, is still in place. Its future is presently being considered, and is the subject of an inquiry by Hon Murray Wilcox QC (see Wilcox 2008).

Many of the arguments to retain the ABCC in its current form are based on economic data that suggest productivity and economic welfare benefits from maintaining a separate regulatory regime. In 2007, the ABCC released a report by private consultants, Econtech, that purported to demonstrate that the ABCC and the BCII Act had been effective in bringing about significant reforms in the building and construction industry that had resulted in improvements in labour productivity. The aim of this paper is to assess the merits of the economic data on which this debate was cast in 2007, and its implications for the current review of the future of regulation of the building and construction industry.

Productivity and construction unions

The 2007 Report followed on from an earlier Econtech report in 2003 that had been undertaken for the then Department of Employment and Workplace Relations (DEWR), which had sought to compare average costs in the domestic and commercial construction sectors. That earlier report claimed to show that 'building tasks such as laying a concrete slab, building a brick wall, painting and carpentry work cost an average of 10% more for commercial buildings than domestic residential housing' (Econtech 2007a, i; also Econtech 2003). The claim was based on analysis of data from Rawlinson's, a quantity surveyor that collects and publishes data on such costs in effect by contacting firms and contractors and asking them the cost of a specific task. The comparison was made between costs in the largely non-union domestic (housing) construction sector, and the more unionised commercial construction sector. The logic behind the comparison was that costs would be higher in the commercial sector because of the union presence there, and the difference in costs reflected the impact of unions in creating inefficient work practices and reducing productivity. Thus the 10% cost gap was attributed to the presence of unions in the commercial sector.

This methodology was criticised, e.g. by Toner (2003), as naively assuming unions were the only potential source of cost differences between the sectors. Other structural factors could also explain them, including greater on-site complexity (it is more costly to affix a plasterboard wall on the tenth floor of a high rise than on a ground floor cottage), higher capital intensity and higher profit margins in the commercial sector. Econtech responded that if the gap declined then it would reflect not structural explanations but changes in work

practices associated with the activities of the ABCC (Econtech 2007a, p i). So 'Toner's theory was disproved by Econtech's 2007 update of the cost gap analysis' (Econtech 2007b).

Toner argued that ABS data (Cat No 8772.0) showed labour productivity was markedly *higher* in engineering and non-residential construction than in residential construction. Referring to studies examined by the Royal Commission into the Building and Construction Industry, that were summarised in the Commission's Discussion Paper 15 (2002) and relied upon by Econtech, Toner also pointed out that 'in three out of four studies of [construction] labour productivity, Australia is on par with the US and generally performing better than Japan, Singapore, Germany and France'.

Such studies would seem contrary to the adversarial philosophy behind the ABCC approach of seeking to suppress union activity in the commercial building sector. Nor does the existing economic literature offer strong support to that approach. Ever since Freeman and Medoff's seminal study What Do Unions Do? (1984), which provided empirical support for the argument that unions may enhance productivity through both 'monopoly response' (higher union wages force firms to introduce more productive technology) and 'voice' effects (unions reduce the costs associated with quits and increase tenure by enabling employees to seek improvements in the workplace), the once accepted wisdom that unions necessarily harmed productivity has been turned upside down. There was empirical support for Freeman and Medoff's claims in US data (Allen 1985; Ben-Ner & Estrin 1986; Phipps & Sheen 1994), along with some critics (Addison & Barnett 1982; Drago & Wooden 1992). The British evidence was initially negative (Edwards 1987), but by the 1990s these effects had disappeared (Addison & Belfield 2004). The evidence that unions reduce guits and increase job tenure is more consistent (Addison & Belfield 2004; Freeman, R 2005). Twenty years after the publication of What Do Unions Do?, the general consensus amongst those who had reviewed the literature was that there was no regular relationship evident between unions and productivity, with a wide variety of results but with the direct impact of unions on productivity tending towards zero (Addison & Belfield 2004; Freeman 2004; Hirsch 2004; Similarly, studies which, one way or another, contrasted unionised Kaufman 2004). collective bargaining with non-union individual contracting showed no advantage for individual contracting over union bargaining (Gilson & Wagar 1997; Fry, Jarvis & Loundes 2002; Hull & Read 2003; Peetz 2005), despite Perry's vigorous defence of New Zealand's Employment Contracts Act 1991 (ECA) (Perry 2006), which nonetheless failed to show any superior productivity performance by the individualising ECA over Australia's union-based collective bargaining arrangements (Dalziel & Peetz 2008).

There is one consistent positive relationship that comes through in the literature: 'what matters is not unionism *per se* but the interaction of unions with management, which can differ across industries, firms, and even establishments' (Freeman 2005:657), as 'union plants with cooperative labor relations and high-performance HRM practices have above-average productivity, whereas union plants with adversarial relations and traditional 'job control' HRM practices have below-average productivity' (Kaufman 2005 citing Hirsch 2004). For example, in Australia it has been shown that the intensity of collaboration between management and workers (via unions) has a positive effect on performance (Alexander & Green 1992). The highly adversarial practices of the ABCC, which take a confrontational approach not only to unions but also to employers who enjoy collaborative relations with unions, would thus not be expected to promote enhanced productivity unless there were some rather large restrictive work practices awaiting removal. While there is old overseas evidence on the harmful effects of restrictive practices (e.g. Elbaum & Wilkinson 1979), there were major changes to such practices in Australia in the 1980s and early 1990s due to industrial relations reforms, so there can be no presumption that such practices are still important.

The release of the 2007 report

Econtech was an economic consultancy based in Canberra. It most visibly entered the recent public debate on industrial relations reform when in July 2007 it produced a report for major employers, that was then used in advertising, even before the report was released (Workplace Express 2007), to support a campaign against abolition of WorkChoices. The report received considerable positive coverage in the media, especially *The Australian*, when it was released. However, there was also scepticism and even criticism in some coverage, because of problems with the report (Coorey 2007a,b; Gittins 2007; Peetz 2007; Streketee 2007).

Around the same time, Econtech produced a report for the ABCC, an 'Economic Analysis of Building Industry Productivity'. Econtech's 2007 report to the ABCC purported to provide an 'up to date assessment of the cost gap', using the same methodology as the 2003 report to DEWR. This 2007 report was widely trumpeted as demonstrating the economic gains resulting from the ABCC and the *Building and Construction Industry Improvement Act 2005* that established the ABCC and gave it its powers (e.g. Lewis 2007). The ABCC issued a media release stating that its report 'reveals that the activities of the ABCC have dramatically improved the productivity of the building and construction industry' (Office of the Australian Building and Construction Commissioner 2007). As mentioned, the 2007 findings were primarily based on an analysis of cost data from Rawlinson's. The report claimed:

After averaging 10.7 per cent in the 10 years to the end of 2002, the cost gap has recently closed dramatically to be only 1.7 per cent at 1 January 2007. This is not consistent with claims that the cost gap was due to structural factors. Rather, closing of the cost gap has coincided with the operation of the ABCC and its predecessor the Taskforce.

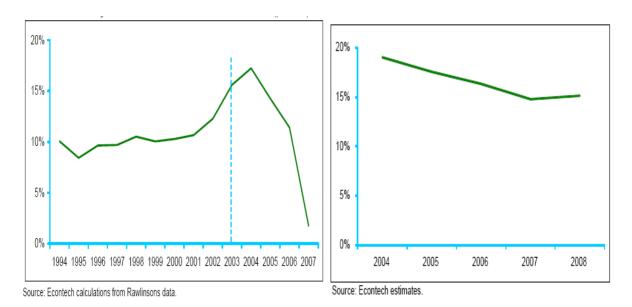
In a media release Econtech enthusiastically argued that a 9.4% lift in productivity in commercial building was 'due to improved work practices associated with the activities of the ABCC.' (Econtech 2007b) This was depicted in a chart, replicated in Figure 1, below.

The numbers are unquestionably, as Econtech say, 'dramatic'. If they are due to the activities of the ABCC, then they imply that perhaps in the first three months of ABCC activities (from October 2005 to January 2006), the cost differential between domestic and commercial construction fell by up to 2.9 percentage points (20 percent). Over the next twelve months, the cost differential fell by a further 9.7 points (85% of the 2006 gap). In total, over fifteen months (if this is to be attributed to the ABCC), the cost differential had allegedly fallen by 12.6 percentage points, from 14.3% to 1.7%.

This translated to an increase in productivity in commercial non-residential building of 17.6%. This in turn means, across construction *as a whole* (including domestic and commercial), the labour productivity gap between what productivity could be and what it was, allegedly was down to an average of just 1.8 percentage points from 11.2 points (the alleged average over the ten years 1994-2003), a drop of 9.4 percentage points or 84% (Econtech 2007a, piv). Econtech then plugged its estimated productivity gains 'from the recent closing of the cost gap between commercial building and domestic housing' (Econtech 2007a, p37, emphasis added).into its MM600+ economic model:

Figure 1: Charts Purporting to Depict Average Cost Differences between Commercial Building and Domestic Residential Building for the Same Tasks for 5 states, 2007 & 2008 Econtech Reports

Panel 1: 2007 Report Panel 2: 2008 Report



Source: 2007 Econtech Report, Chart 1, p iii, 2008 Report, Chart 2.3, p9

This modelling leads it to summarise the 'economy wide effects of the impact of ABCC':

[C]onsumer prices are lower (by 1.2 per cent), and Australian GDP is higher (by 1.5 per cent) than would have been *if the ABCC had not existed*.' (Econtech 2007b emphasis added; also Econtech 2007a, p i).

In addition, 'higher labour productivity reduces the price of dwellings by around 3%' (Econtech 2007a p42) and 'the higher construction productivity leads to an increase in consumer living standards (the annual economic welfare gain) of about \$3.1 billion' (p46).

A month later, the cost differential methodology was subjected to a major critique by Mitchell (2007). He argued Econtech 'provides no transparency in their published work and replication of their results is impossible'. Using ABS implicit price deflator data he found non-residential construction prices grew at a slightly slower rate than residential and non-residential building and 'found no evidence to support the hypothesis that a sudden "event"...has altered the time series behaviour of the...data.' (Mitchell 2007). Econtech (2007b) aggressively challenged this. However, another reason Mitchell was unable to replicate Econtech's findings was that Econtech had not accurately used Rawlinson's data.

Problems with the 2007 Report

In an attempt to verify the Econtech report, we went back to the original source data of Rawlinson's. We obtained data for January in the years 1993, 1995, 2001, 2002 and 2004 to 2008. We replicated the stated Econtech methodology, obtaining data on the following eight tasks in domestic residential and commercial construction: reinforced concrete 25 mpa suspended slab ne 150mm thick; class 3 formwork sofit of suspended slab 100/200mm thick; clay brickwork wall or skin of hollow wall 110mm thick; carpentry wall framing plates 75 x 38mm; doors, timber, hollow core, std 2040 x 820 x35 hardboard for painting; steel roofing corrugated, zinc coated 0.42mm; plasterboard flush finished, 10mm thick to timber wall framing; and painting, woodwork, acrylic, primer, one undercoat, 2 gloss,

We identified the ratio of commercial to domestic costs for each item for each year in each mainland capital city (Sydney, Melbourne, Brisbane, Perth, and Adelaide). There are, it appears, what Econtech describe as 'slight differences in the precise definitions' of tasks used by us and Econtech, but Econtech advise that these differences 'are not material' and led to a

discrepancy of merely 0.1% in estimates of movements in the cost differential in 2008. ii So, for all practical purposes, we used the same data as Econtech. We calculated an average cost differential for each capital. We also calculated two national average cost differentials: initially, an unweighted one, which gave equal weight to data for each of the five mainland capitals; subsequently, a weighted one which used the weights Econtech provided, based on each state's 'average contribution to national contribution activity'. For this paper, we refer exclusively to the weighted data, which are directly comparable to Econtech's estimates.

Australia, 8 items 125.0 ratio commercial:residential (index- parity = 100) 120.0 115.0 110.0 105.0 100.0 Aust Rawlinson 95.0

Aust Econtech

2002

90.0

1995

Figure 2: Comparison of Econtech data and state-weighted original Rawlinson data, eight items, Australia, 1995-2007.

Our results based on the original Rawlinson's data were wildly different to those of Econtech. National level comparisons are shown in Figure 2. Critically, for the eight tasks selected by Econtech, we found only a small drop of 1.3 percentage points in the cost differential between 2006 and 2007, which was pretty much the normal size of the movement from one year to the next. This was only one seventh the size of the movement claimed by Econtech. For 2006, we detected a fall of just 1.5 points, barely half the 2.9 point fall claimed by Econtech and, again, within a fairly normal range. So, over the period January 2005-January 2007, the actual fall in the cost differential was not 12.6 points, but an unexceptional 2.8 points.

2004

2005

2006

2007

Notably, the cost differential in 2007 was still 11.7%. This was actually slightly higher than the gap of 10.8% in January 2002, before even the establishment of the Building Industry Task Force. In fact the cost differential was higher in 2007 than in each of the early years for which we had collected data: 1993 (8.6%), 1995 (9.8%), 2001 (10.6%) and 2002. We also noticed that the errors in the Econtech data were observable in all states, and in most years, with the exception of 2001 and, to a lesser extent, 2005. Nationally and in each state Econtech appeared to exaggerate the cost differential in their peak year, 2004.

Presenting the 2008 revision

On 1 July 2008, the ABCC requested Econtech to update its report (Lloyd 2008). It was finalised on 30 July and released on 1 August. By this time, the ABCC had been made aware of the inaccuracies in the 2007 report that rendered invalid the key conclusions about major changes in the cost differential. Indeed, the cost data in Econtech's 2008 report were totally different to the data in the 2007 report. The extent of the difference can be seen by comparing the 2008 chart on cost differentials, replicated in Panel 2 of Figure 1, with Panel 1. The huge drop in the cost differential in 2007, that appeared in the 2007 report, has disappeared from the 2008 report. Instead, the cost differential shows a gently sloping line that falls slightly by 2007 but then, without comment, rises by 0.4 points to 2008. By our analysis, and by the Econtech re-analysis of 2008, the 2007 Report's cost data were discredited.

The ABCC issued a media release and 'backgrounder' similar in tone to those of the previous year, called 'Productivity in the Construction Industry Continues to Improve'. The media release claimed that the 2008 report 'reaffirms the ABCC's role in improving productivity in the construction industry' (Office of the Australian Building and Construction Commissioner 2008). Commissioner John Lloyd said 'It is encouraging to find that *all* indicators are pointing to increased productivity across the construction industry' (emphasis added).

Despite the wholesale overturning of the cost comparisons data that formed the basis for the 2007 report, exactly the same conclusions were reached about the impact on GDP and consumer prices as were reached in the 2007 report. Econtech estimated that the 'economywide impacts of the ABCC activities' were that: GDP is 1.5% higher than it otherwise would be; the CPI is 1.2% lower than it otherwise would be; the price of dwellings are 2.5% lower than they otherwise would be; and improved consumer living standards reflected in an annual economic welfare gain of \$5.1 billion. (Office of the Australian Building and Construction Commissioner 2008; see also Econtech 2008 p27)

If ever there was an example of how economic modelling results are driven by assumptions and not data, this is it. In addition to the immovability of the GDP and CPI outcomes in response to massive downsizing of the claimed cost gains from the ABCC's operations, the estimate of the net welfare gain has, as if by magic, gone up by \$1 billion. (On the surface, it looks like the welfare gain had gone up by \$2 billion. However, in a footnote Econtech explains that, although this is not recorded anywhere in the 2007 report, 'In the 2007 Econtech Report, the gain in annual economic welfare was expressed in 1998/99 terms, giving a gain of \$3.1 billion. Here the gain is expressed on a more up-to-date basis in 2006/07 terms, giving the gain reported in the text of \$5.1 billion' (Econtech 2008, p27). Unfortunately, this 65% or \$2 billion increase in the welfare gain cannot be explained by inflation between the base years. The 2006-07 national accounts showed that increase in the GDP deflator between 1998/99 and 2006/07 was 33.5%, meaning that \$3.1 billion in 1998/99 dollars is the same as \$4.1 billion in 2006/07 dollars. This leaves \$1 billion of the blow-out in the welfare gain unattributed.) How the welfare gain could have expanded by one quarter, without any change in the estimated benefits for GDP or the CPI, is never explained.

Econtech was able to produce the same macroeconomic outcomes from the 2008 analysis as in the 2007 analysis because it chose to assume the same productivity outcome in 2008 as in the 2007 report, despite the stark reversal of the evidence. It stated that 'this report also assumes an ABCC-related gain in construction industry labour productivity of 9.4 per cent for the purposes of the economy-wide modelling'. (Econtech 2008, p18) Recall that in 2007 the 9.4% productivity assumption was based on 'the recent closing of the cost gap between commercial building and domestic housing' (Econtech 2007a, p37). In 2008, it was discovered that this closing of the productivity gap was a mirage. But Econtech still hung onto the 9.4% productivity assumption, even though the basis for it had disappeared. As before, the spin on the report was accepted uncritically by the media (e.g. Norington 2008).

Econtech dealt with the major revisions in the reports by describing them as 'anomalies':

Econtech has reviewed its previous use of the Rawlinsons data to remove anomalies. For the original 2007 Econtech Report, some data was inadvertently juxtaposed in manually extracting it from Rawlinson's annual hard copy publications. The use of all Rawlinsons data has been carefully checked and is now correct (Econtech 2008, p8).

There is no admission anywhere of the magnitude of the impact of these 'anomalies'. There is no apology to Toner, whose 2003 report is no longer 'disproved'. There is no acknowledgement that Mitchell was right in criticising the Econtech analysis for its lack of replicability, nor discussion of any implications arising from the major errors.

Narrowing the tasks and time period

Econtech made other adjustments to methodology. One involved removing two of the eight tasks. In a concession to a major critic, it said 'we agree with Mitchell (2007) that corrugated zinc roof and single skin face brick walls are best excluded from the estimation'.

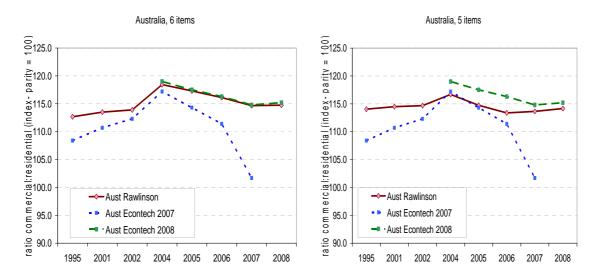
In Panel 1 of Figure 3, we plot new estimates of the cost differential, based on just the six items chosen by Econtech for their 2008 report. The Econtech estimates in their 2008 report closely track our own figures based on Rawlinsons. This is also the case in state level data. The discrepancies are very small and likely explained by the slight differences in definitions.

Panel 1 of Figure 3 shows no gains in costs in 2008 (though we estimate a flatlining to 2008, whereas Econtech estimate a slight deterioration, based presumably on the slight differences in definitions). The situation is broadly similar across the states, with small deteriorations in Perth, Melbourne and Brisbane and small improvements in Sydney and Adelaide. Notably, the cost differential is worse in 2008 than in any year prior to 2004 for which we have data. Thus there is no evidence of any gains from the existence of the ABCC.

Figure 3: Comparison of Econtech data and state-weighted original Rawlinson data, six items (excluding zinc roofs and brick walls) and five items (also excluding formwork), Australia, 1995-2008

Panel 1: six items





What is even more notable is that the Econtech data do not go back to this earlier period. Whereas, in the 2007 report, much was made of the comparison between the most recent cost differential and the average over the decade before 2002, now the data before 2004 have disappeared from the report. It just so happens that these data, which were advantageous to the ABCC in the 2007 report, would now be embarrassing if included in the 2008 report.

The exclusion of the pre-2004 data is explained as being to:

[R]emove the effects of an apparent break in some of the data series from 2003 to 2004. For example, in Queensland at the time of this apparent series break, the reported unit

cost of formwork to a suspended slab spiked from \$53.25 to \$97, which is out of character with the historical behaviour of this time series, which shows steady, moderate increases. More generally, there appears to be a discontinuity in some of the data collected up to 2003 and the data collected from 2004 onwards.

We note that the change in the base year to 2004 has no impact on the disappearance of an ABCC effect between January 2006 and January 2008. But we also investigate this 'break in the series'. The term refers to situations where the way something was measured changes, so that an observation one year cannot be directly compared to an observation in the previous year. A 'spike' might signify a break in the series – or a genuine increase in the price.

That said, let us accept at face value that a spike means a change in measurement. For how many series does this apply? Figure 4 shows the cost differentials for each task. There is only one series for which any spike is apparent in 2004, that for formwork. So we develop a five-task index using the same principles as previously. The result is in Panel 2 of Figure 3.

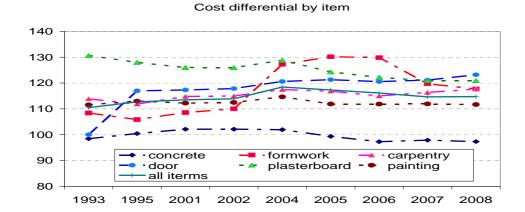


Figure 4: Testing for series breaks in cost differentials by task, 1993-2008

The data show a slightly less adverse picture post 2002 than does the index with six tasks. Still, the national cost differential in 2008 (at 14.2%) is virtually the same as it was before the introduction of the building industry task force, slightly lower than in 2002 (14.7%) and 2001 (14.5%) and slightly higher than 1995 (14.01%). There is no indication of any gains from the ABCC, with the cost differential higher in 2008 than in 2007 (13.4%).

Despite all this, Econtech claims:

[S]ignificant improvements in labour productivity since the introduction of the ABCC (in conjunction with the supporting regulatory framework) ... Using Rawlinson's data to 2008 on the evolution of the cost gap between non-residential and residential building for the same building tasks, the relative productivity gain for non-residential construction is conservatively estimated at 7.3 per cent (Econtech 2008, p9).

This estimate is made by comparing the estimated cost differential in 2008 (15.2%) with the peak year, 2004 (19.0%). This 3.9% change is then roughly doubled, on the bold assumption that the only source of these alleged gains is labour costs, which make up just 53% of total costs for the tasks. It is a classic case of selecting the base year that produces the best result: the very poor performance during the period of the ABCC is ignored, and data from prior to 2004 are conveniently suppressed, avoiding consideration of the fact that the cost differential is not significantly less now than it was five or ten years ago. It also omits to mention that,

using the same methodology as the 2007 report, this would translate to an alleged gain of merely 3.9% across the construction industry as a whole compared to 2004, or a *deterioration* against the 2007 Report's benchmark ten year average. Or that construction productivity growth has been among the lower end of industries since 2002-03 (Figure 5).

Figure 5: Gross value added per hour worked, by industry, 2003-2008 Agriculture, forestry and fishing 160.0 Mining Manufacturing 140.0 ndex (2002-03=100) Electricity, gas and water supply Construction 120.0 Wholesale trade Retail trade 100.0 Accommodation, cafes and restaurants Transport and storage 80.0 Communication services Finance and insurance Health and community services 60.0 Cultural and recreational services Jun.2003 Jun.2004 Jun.2005 Jun.2006 Jun.2007 Jun.2008

Source: ABS 5204.0 Australian System of National Accounts, 2007-08, Table 15. Labour Productivity and Input, Hours worked and Gross Value Added (GVA) per hour worked - by Industry

Conclusion

The great gains for construction industry arising, it was said, from the near equalisation of costs in the commercial and domestic residential sectors that was attributed to the ABCC have disappeared, like a mirage on the horizon. If there have been any savings made through higher productivity in the commercial sector, they have not been passed on into lower relative costs, which would suggest that they have been taken as higher profits rather than lower prices. Much more likely, however, is the likelihood that there are no productivity gains attributable to the ABCC, just as there are no savings in relative costs. The boost to GDP, savings to the CPI and national welfare gains in both the 2007 and 2008 Econtech reports, estimated as they were 'from the recent closing of the cost gap between commercial building and domestic housing', have disappeared as the 'closing of the cost gap' has also vanished.

This close analysis of the Econtech data raises serious questions about the nature of regulation in the building and construction industry. Alleged economic benefits, used to justify denial of basic rights to employees in the industry – rights which everybody else is, at least at present, entitled to enjoy – are based on discredited cost data. In short, there do not appear to be any significant economic benefits that warrant the loss of rights involved in recent arrangements.

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ⁱ The views in this paper are those of the authors and do not necessarily reflect the views of their employers or the Queensland government.

ii Source: email communication, 31/10/08.

 $^{^{\}rm iii}$ The weights provided by Econtech were: NSW - 34%, VIC - 24%, QLD -23%, WA -13%, SA -5%. As these only added to 99% we then made a pro-rata adjustment to each.