The impact of variation in leisure time and returns to skill on wage data: A comparison of selected settler economies between 1870 and World War I.

Martin P. Shanahan and John K. Wilson
University of South Australia

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Abstract

Settler economies of the late 19th century tended to have similar resource characteristics. Land was abundant, while labour was relatively scarce. Initially their populations were drawn from old world countries. Several authors have explored wage convergence and labour market integration between the old and new world. While there is evidence for convergence between some settler economies and the old world (O’Rourke and Williamson 1999), there is also some doubt about the extent of labour market integration (Allen 1994; Greasley, Madsen and Oxley 2000).

This paper examines some of what we know about wage convergence in the 19th century and addresses two assumptions. Previous studies have generally assumed hours of work remained constant over the late 19th century. Second, in order to make meaningful comparisons, ‘standard’ occupations, frequently bricklayer and labourer have been used as representative occupations in each region. This paper re-examines both of these assumptions.


Second, we examine new Australian wage series calculated for occupations other than bricklayer to determine the impact variation in occupations may have on currently accepted skilled/unskilled wage ratios.

We find international comparisons of wage convergence and labour market integration have provided important insights into the development of global trade and migration, but there is still much to be learned at the national level about labour markets in settler economies.

Our analysis forms part of a larger, more detailed study examining the links between international trade, development and inequality in Australia.

WORK IN PROGRESS: PLEASE DO NOT CITE
Introduction

This paper examines one aspect of some of the settler economies settled in the 19th century- their labour markets, and more particularly, wage outcomes. Our intention is to examine in more detail, the limits of what we know about wage outcomes in settler economies, and by examining two current assumptions in the literature, seek to ensure that current generalisations regarding wage trends do not obscure important issues identified with settler economies.

The motivation behind this paper stems in part from the plethora of broad-based studies examining international wages and wage inequality. In particular, the comparative work of Allen (1994), Anderson (2001), Greasly, Madsden and Oxley (2000) and Greasley and Oxley (2004), Betrán and Pons (2004), and most extensively Williamson (1996, 1997), Hatton and Williamson (1998), and Williamson and O’Rourke (1994, 1997, 1999), who, together with other colleagues have in recent years greatly increased our understanding of factor price convergence, 19th century international labour markets and the transmission of price information around the globe.

A second motivation behind this paper takes its inspiration from a key idea in Hartz’s *The Founding of New Societies* and critically analysed in the Australian case by Martin (1973). In his comparative study, Louis Hartz noted the importance of the ‘fragments’ brought to a new society from the old world. The ‘fragments’ Hartz focuses on, are not just the formal European institutions of government, markets and community, but the ideas, attitudes and philosophies underpinning these. Crucial in explaining variation between new societies, argued Hartz, is the timing of the separation from the old world. Whether a new society is founded on a feudal, liberal or radical tradition is influenced by the timing of the separation and the settlement, and the speed (and manner) of growth of the new society. Thus, while there were many similarities between the countries studied by Hartz, there were also important differences between their political and institutional development and the values each held.

We too think differences matter; but the object of our study is not nearly as expansive as that explored by Hartz. Our focus is on labour market outcomes and what attention to differences in outcomes; between occupations, between regions within countries, and between countries may tell us about the development of the labour market and the economy generally, and settler economies in particular.
This paper reviews some of what we currently know about labour markets in some settler economies and discusses in general terms, some of the limitations to our knowledge. We tackle two areas where our current knowledge is limited, working hours and selection of representative occupations, with a view to assessing whether variations in these factors impacts on our overall understanding of settler economies in the late 19th century.

What we know about some labour markets in some settler economies.

Settler economies are those established by migrants who bring institutions from another economy rather than adapt to pre-existing social and economic institutions in their new location….Within Western economic history, the term *settler economies* had been primarily applied to the European settled portions of the Americas, Australasia and Africa….Settler economies are likely to have specific features of initial high-income levels, which may be brought back into line with origin country incomes by further labor migration, and of age structures associated with high participation rates and, possibly, high savings rates. (Pomfret, 2003: 469-470).  

This paper too examines the labour market outcomes of some of the European settled portions of the Americas and Australasia (but not Africa). Our aim is to determine whether what we know in general terms about these regions’ labour markets remains valid when subjected to closer scrutiny. In particular, we wish to determine whether findings based on constant labour hours, or on one or two occupational groups, remain relatively stable when new information on these factors are introduced.

Section 1

Economist’s interest in growth has a long history. Over the past 25 years, as new data sets have improved and been extended, so the debate has shifted. For economic historians in particular, Maddison’s long-term work enabled important discussion on

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2 See also Sutch 2003, who provides a more dynamic definition. He outlines the general characteristics of a settler economy to include: the settlers are long-distance migrants (generally international often intercontinental); the settlers intent to, and mostly do become permanent residents, and their offspring inherit that ‘new world’; most settlers are voluntary and motivated by economic, religious or political reasons (including criminals in this latter group); the destination has under-utilized natural resources (usually land); the settlers come to dominate the society; the settler society becomes self-sustaining.
issues of convergence in GNP and GNP per-worker hour, while around 10 years ago Williamson posited purchasing-power-parity adjusted real wages per worker as another vehicle of analysis (Maddison, 1982, 1995, 2001; Williamson 1995). This in turn has initiated a large number of studies comparing the wages of comparable occupations, adjusted for price and purchasing-power. As these studies have emerged, so the debate has also shifted.

The key findings of Williamson’s large, and on-going, body of work together with that of several collaborators was brought together in O’Rourke and Williamson (1999). Their book examined factor-price convergence in the 19th century Atlantic economy but it also included new world countries that lay outside the Atlantic economy. Using a Hecksher-Ohlin (HO) trade model ‘lens’ they examined the importance of global forces on producing convergence between the old and new world. While summarising such an extensive research agenda must oversimplify the authors’ results, their findings can be stated reasonably briefly. Through the nineteenth and early twentieth century, lowered transportation costs opened up commodity trade and the exportation of commodities based on the new world’s abundant resource, land. This resulted in a redistribution of land rents from the old to the new world. Initially, the scarce factor of production in the new world, labour, received comparatively higher wages than in the old world. The wage differential between old and new world saw a migration of people from labour abundant to labour scarce regions. Capital too flowed from regions of low return to areas of higher return. While these flows to a degree offset some predicted wage shifts, and there were particular regional exceptions (eg. the US, and Canada) where international trade alone could not explain factor price movements, they concluded that the integration of factor markets was a real and measurable phenomenon and that the evidence on factor prices was in line with theory.

One response to this work has been to look more widely in an effort to determine whether the insights from HO models were applicable to still more countries. Thus, Bértola and Williamson (2003) examined settler areas of Argentina, South East Brazil and Uruguay, while Bértola and Porcile (2001) examined convergence between the ‘Southern Cone’ (the countries above, plus Australia and New Zealand) relative to France, Germany, UK and USA. Greasley and Oxley (2004) examined real wages in New Zealand.
Other researchers, rather then seek evidence from new countries, have examined factors other than the trade and migration emphasised in the HO model, and sought a more nuanced theoretical picture. For example, some have suggested that O’Rourke and Williamson’s conclusions rely on a static rather than a dynamic analysis, and that more cognisance of technological change or differences in economic structures, such as the size of the service sector is required (Harley, 2000). Others have turned their attention to elements other than factor markets. Greasley, Madsden and Oxley (2000), for example, examined productivity issues for Australia and Canada, concluding that their real wages did not converge and that productivity differentials were an important explanatory for Canada’s wage growth. Differentials in productivity were themselves, in part, underpinned by differences in social capability for productivity growth and labour market institutions and different responses to migration. Bértola and Porcile (2001) found that when comparing certain Latin American countries against Australia and New Zealand, asymmetric productivity growth tended to dominate Heckscher-Ohlin factor price equalisation. Betrán and Pons (2004), in their review of economic integration and the differential between skilled and unskilled wages concluded that migration and trade only explained some of the skill premium in selected industrial sectors, and that technological and structural changes were also important.

With regard to Australia, Pope and Withers (1994) were more equivocal than Hatton and Williamson (1992) and O’Rourke, Taylor and Williamson (1993), finding the evidence for wage convergence between Australia and Britain doubtful. Indeed they found, contrary to the US case, Australia’s particular mix of scale economies, technology, capital inflow, and terms of trade when combined with the skill set of migrants worked to increase rather than decrease wages. The particular skills of incoming migrants to Australia did impact on pay relativities, narrowing wage relativities between 1877 and 1900. Greasley and Oxley (2004) focusing on real wages in New Zealand found little evidence of wage convergence with near neighbour Australia.

It is clear, therefore, that there is ongoing debate the nature and extent of labour market integration in the 19th century. Despite the integration of several theoretical strands, the evidence regarding wage outcomes in settler economies does not appear to lend itself to simple explanation. Regional differences in productivity, distance from sending region, institutions, culture etc when mixed with different rates of factor market integration, suggest there is unlikely to be one simple generalisation about settler
economies’ labour market outcomes. A further complication, and one we partially address here, is that there is still considerable work to be done to ensure that the data used when making international comparisons is sufficiently robust to support international comparison.

Section Two
There are a number of areas where our information about labour markets and wage outcomes in settler economies is deficient. For example, we can still learn much more about differences in occupational structures and wages in different countries. Variation in the returns to human capital investment, both in absolute and relative senses for different countries remains to be explored in detail for a broad range of countries. The impact different age structures have on overall wage measures is not well documented. The quantitative effect of differences in institutions and policy regimes is imperfectly understood. This paper partially addresses two areas: differences in labour hours and the impact on international comparisons using different occupational categories.

Labour Hours.
It is difficult to produce internationally comparable data, particularly on something as complex as wages. Simplifications and standardisations must be made. The need to develop data that covers as many countries and as long a period as possible means that frequently the lowest common denominator, or its proxy must substitute if anything is to be produced at all. Thus when Williamson (1995) first published produced wages series that covered 17 countries and 153 years, the scale and scope of the exercise was breath-taking. Apart from the logistical problems associated with such an exercise, the definitional difficulties with job descriptions, hours of work, institutional differences etc had all to be met and overcome. Given the lack of data on working hours it is unsurprising the wage data did not adjust for changes over time.

In research published in 1994, Allen examined the degree to which labour markets were integrated between the new and old worlds in the late nineteenth and early twentieth century. His international comparisons were tightly defined, focussing on three selected occupations (bricklayers, building labourers and least satisfactorily, manufacturing workers) in six major cities around the globe between 1879 and 1913;
the cites being Manchester, Chicago, San Francisco, Toronto, Vancouver and Sydney.³ A principal advantage of this approach was that it allowed a close match of information sources on prices and the composition of consumption (all urban based), and a clear definition of some occupations (eg agricultural and industrial labourers were unlikely to be conflated in data series as ‘labourers’). Allen was thus able to construct an interurban-inter-temporal consumer price index, and compare the relative wages of the members of three select occupations. Unfortunately, like Williamson, Allen had only limited data on labour hours.⁴ His findings on the relative wages of bricklayers, labourers, and manufacturing workers’ wages are reproduced below in Figures 1-3.

Allowing for transportation and other differences, it was anticipated (following Williamson 1992) that wages should be lower in the U.K while the newly settled regions, including the US, Canada and Australia should have relatively comparable wage levels. Figures 1, 2 and 3 are adapted from Allen’s original paper and reproduce his findings on the real wages of bricklayers, labourers and manufacturing workers in the cities of settler economies, expressed in 1896 Manchester pence per day.

Figure 1, showing comparative wages series for bricklayers in five cities reveals that in the 1880’s bricklayers in Sydney earned a wage roughly equal to those in San Francisco or Chicago. By the beginning of the new century however, the wages of bricklayers in those American cities were almost double those of their Sydney counterparts, while bricklayers in Vancouver and Toronto earned wages substantially more than those in Australia.⁵

Figure 2 describes real wages of labourers. This suggests that Australian labourers were earning approximately 1.9 as much as their American counterparts in 1880, but that this margin was steadily eroded over the century until their wages were surpassed by labourers in San Francisco and Chicago just after the turn of the century. Canadian labourers, however, already earned the same or more than labourers in Sydney in 1900- and this margin increased over the next decade.

³ Allen also included regional data, for New South Wales, British Columbia and Ontario when comparing manufacturing labourers’ wages.
⁴ As Allen notes (1994, p.118) “This is an imperfect test…. differences in unemployment and in the length of working year also affected annual labour income.” From the details given (Appendix p 136-137) Allen held hours constant when calculating labourers’ wages in the USA. While he does not mention hours for the other countries, it would appear safe to assume he took a similar approach.
⁵ For the period 1900-1913, Chicago and San Francisco bricklayers earned 1.71 and 1.77 times their Australian counter-parts wage. Wages for the same occupation in Toronto and Vancouver were 1.35 and 1.47 times greater than in Sydney. The greatest difference between wages was in 1906 when Chicago, San Francisco, Toronto and Vancouver bricklayers earned 1.85, 2.08, 1.52 and 1.65 that of bricklayers in Sydney.
Diagram 3 reflects manufacturing workers wages however, it is constructed by dividing total wage payments in census of manufactures by the total number of wage earners. It is thus the least satisfactory of Allen’s series. This series reflects a similar overall trend, with workers in NSW originally earning more than contemporaries in other countries,
but the gains of manufacturing workers in America, whereby they overtook Australian somewhere between 1890 and 1900, are not as spectacular. The wages of Canadian based manufacturing workers and those in NSW are roughly equal in the first decade of the 20th century. These results would appear to be in line with the general economic history of the three countries over this period.

**Figure 3 – Manufacturing Wages**

![Graph showing manufacturing wages from 1880 to 1920 for NSW, Chicago, San Francisco, Ontario, and British Columbia.](image)

Source: Adapted from Figure 6.3 Real wage, bricklayers (1896 Manchester pence per day) Allen, 1994 p 119.

On the basis of his comparisons Allen rejected the finding that labour markets were well integrated internationally. While he concluded that in all measured occupations, Britain ranked lowest in wages, he also found that among the receiving nations, wages differed widely for the same occupation. Further the differences changed over time in a way that did not appear explicable with lowering transportation costs. He concluded that national as well as international factors mattered in explaining wage outcomes.

In a recent paper, Michael Huberman (2004) presented new international evidence on work time for the period 1870-1913. This evidence, based on previously unexploited reports of British trade offices and the US Department of Labor is a substantial improvement on Maddison’s (1964) assumption that all workers prior to 1913 worked the same number of hours as workers in Britain. Across the period, he

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6 Wages for Great Britain are not presented here. For an overview and more complete discussion, see Allen (1994).
found evidence of convergence between North America and Europe, but that overall there was little evidence of convergence in work time.

Table 1 reveals changes in average weekly work hours for the four countries examined by Allen for the years, 1870 and 1913.\(^7\)

<table>
<thead>
<tr>
<th></th>
<th>1870</th>
<th>1875</th>
<th>1880</th>
<th>1885</th>
<th>1890</th>
<th>1895</th>
<th>1900</th>
<th>1913</th>
</tr>
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<tbody>
<tr>
<td>Australia</td>
<td>56.18</td>
<td>54.70</td>
<td>53.26</td>
<td>51.86</td>
<td>50.50</td>
<td>49.17</td>
<td>48.14</td>
<td>44.70</td>
</tr>
<tr>
<td>Canada</td>
<td>57.24</td>
<td>58.13</td>
<td>59.04</td>
<td>59.96</td>
<td>60.90</td>
<td>61.85</td>
<td>62.63</td>
<td>57.90</td>
</tr>
<tr>
<td>United States</td>
<td>62.03</td>
<td>61.50</td>
<td>60.98</td>
<td>60.47</td>
<td>59.96</td>
<td>59.46</td>
<td>59.06</td>
<td>58.30</td>
</tr>
<tr>
<td>Great Britain</td>
<td>56.59</td>
<td>56.73</td>
<td>56.57</td>
<td>56.42</td>
<td>56.27</td>
<td>56.12</td>
<td>56.00</td>
<td>56.00</td>
</tr>
</tbody>
</table>

Source: Adapted from Huberman (2004) page 977, Table 4.

Huberman’s results reveal that new world workers worked fewer hours on average than those in the old world.\(^8\) As Table 1 reveals, however, the experiences of the US, Canada and Australia with respect to changes in labour hours was far from uniform. Of the countries in the table, Australia stands out as consistently recording fewer average weekly work hours than the others. Furthermore, between 1870 and 1913 the average falls more than for any other country. Indeed average hours increase in Canada and decline only marginally in the United States while remaining virtually static in Great Britain.\(^9\)

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\(^7\) Huberman’s actual estimates span the period 1879-1899. For 1913, he obtained where possible alternative estimates for labour hours. These are italicised in Table 1. As data were unavailable for Australia, Huberman extrapolated the data using his 1879-1899 series.

\(^8\) Based on annual hours worked. Interestingly, Great Britain is somewhat of an outlier, with working hours similar to those in Canada and the US in 1870.

\(^9\) From the available data, it would appear that changes in the average number of weeks worked were not sufficient to offset these changes. For example, between 1870 and 1890 the average number of weeks worked in Australia and Canada fell from 49.7 to 49.5, while for the United States the average fell from 49.9 to 49.8. Great Britain, with 48.4 weeks of work per year in 1870 had the largest fall, to 47.4 in 1890. (Huberman 2004, page 978 Table 5).
The variation in labour hours in a particular country was not uniform across all sectors of the economy. Not all sectors in the economy benefited equally from reduced labour hours. For example, according to Huberman, weekly work hours in the service sector in Australia in 1870 averaged 54.95 hours, and by 1900 these had fallen to 49.32. In mining and construction, however, average weekly hours had fallen from 54.85 to only 44.55. (Huberman p.976 Table 3).

Adjusting Wages for Hour Worked

Allen’s calculations provide a picture of wages in various cities and regions for the period 1870-1913. A potential shortcoming of his approach, however, is if the daily hours worked vary between countries or if these hours changed at different rates between countries. For example, suppose the real wage of a bricklayer in Canada and Australia (in par exchange values) were equal in a given year, but workers in the former country worked twice as long. It would not be reasonable to assert that Canadian bricklayers were as well-off as their Australian counterparts.

Huberman (2004) presents estimates of wages in various countries for the period 1870-1900. To our knowledge, this is the most comprehensive and up to date estimate of working hours in old and new world countries for the period in question.

Daily wage data, such as those provided by Allen (1994) can be adjusted in several ways to allow for these regional differences in hours worked. One option is to convert all wages to an hourly wage. This allows direct comparison between regions in terms of possible wage convergence. A second and perhaps preferable strategy is to make an adjustment to the daily wage so as to incorporate the monetary value of gains or losses to changes in the length of the working day. This type of approach is adopted by Huberman (2004) in revising estimates of GDP of various countries for the period 1870-1913. In this paper we utilise Huberman’s estimates of labour hours in Canada, Australia and the US to adjust the wage rates compiled by Allen. The basis of the approach is to quantify, in terms of the real wage earned in a given period, gains or losses in leisure time, relative to some base year. Intuitively, the leisure adjusted wage will be greater (lower) than the unadjusted wage where working hours are lower (higher) than those in the base year. For simplicity of exposition, we use 1879, the

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10 Crafts (1997) uses labour hours provided by Maddison (1995) to adjust GDP data for leisure gains. Drawing on Beckerman (1980), it is pointed out that such adjustments may actually underestimate these gains as increased leisure time may increase the productivity of leisure type activities.

11 We are grateful to Michael Huberman for providing us with these data.
starting point of Allen’s series, as the base year for hours worked. The adjustment is undertaken according to the following rule:\[12\]

\[ W_t = W_t \left( \frac{H_0}{H_t} \right) \]  

(1)

Where:

\( W_t \) = leisure adjusted wage  
\( W_t \) = observed wage in year \( t \)  
\( H_0 \) = hours worked per week in base year  
\( H_t \) = hours worked per week in year \( t \)

The Allen wage data span the period 1879-1913. Huberman’s estimates of hours worked are only available on an annual basis to 1900. To extend his data series to 1913, Huberman obtained data for 1913 from alternative sources and interpolated values between 1900-1912. In the case of Australia, no such data were available and linear extrapolation of the series was undertaken. We follow a similar approach, but also incorporate two additional methods of extrapolation for the purpose of sensitivity analysis. The results of the adjustment for changes in working hours do vary, depending on the method by which this extrapolation was undertaken.

Our first approach is to assume that the trends present up to 1900 would continue. As such, the data could be extended to 1913 by direct linear extrapolation. A second strategy was to assume that hours worked remained static from 1900-1913. Finally, we follow an approach similar to that undertaken by Huberman (2004). Using 1913 observations for average hours worked across all sectors in 1913 we interpolate for the intermediate years.\[13\] Of the three methods, the results obtained using the linear extrapolation yielded the greatest deviations from the original Allen series. This however, is perhaps the most suspect method due to the introduction of legislation

\[12\] This adjustment is equivalent to \( W_t = W_t + \left( \frac{H_0 - H_t}{H_t} \right) W_t \) as described in Huberman (2004). Note also that only weekly hours worked were available on an annual basis. Our specification relies on a ratio of weekly hours worked in a given year compared to those of the base year. In this context, the use of weekly hours instead of daily hours can be considered reasonable.

\[13\] Refer to Huberman (2004, p41) for details of the data sources. The values reported were averages across all sectors. In our calculations, we used sector specific data. As such, the 1913 data were adjusted in line with the ratio of the relevant sectorial wage to the overall average in 1899. Interpolation was then undertaken to obtain observations for 1900-1912.
relating to working conditions in many countries after 1900.\textsuperscript{14} The results obtained using the remaining methods (static hours after 1900 and average hours in 1913) also generate substantial differences, though not of the magnitude of the direct extrapolation method.

Figures 4-6 present wage series adjusted for working hours for bricklayers, labourers and manufacturing workers. In deriving these data the “average hours” method was used to interpolate data for the period 1900-1912. To reveal the sensitivity of the results to the method of extrapolation of the labour hour series, our discussion focuses on the range of values according to the method used to extrapolate the data.\textsuperscript{15}

\textbf{Figure 4} – Bricklayer Leisure Adjusted Wage

\textsuperscript{14} See for examples, Coghlan (1969); Rae (1891).
\textsuperscript{15} The upper bound on this range stem from the linear extrapolation method while the lower bound is the average hour method. There was little difference between values obtained using the ‘static’ and ‘average’ methods.
Figure 5 – Labourer, Leisure Adjusted Wage

Figure 6 – Manufacturing, Leisure Adjusted Wage

For each occupational category there appears to be far greater convergence in wages, particularly in the latter part of the period, than suggested in the original Allen data. For example, in 1905 labourer wages in Toronto were 1.21 time higher than those in Sydney. However, allowing for changes in hours worked, this falls to a factor
between 0.95-1.01. Similarly, Vancouver wages were suggested in the original data to be a high as 1.5 times greater than those in Sydney. Our new estimates suggest a range of 1.14-1.25, indicating that the gap may have been overestimated.

A similar story can be told for the bricklayers. In 1906, bricklayers were shown by Allen to be earning more in Canada and the US than in Australia. Adjusting for hours worked does not overturn this result, however, the magnitudes may have been much lower. For example, San Francisco wages may have been closer to 1.88-1.9 times greater than those of Sydney, rather than 2.1 times as suggested in the original data. Bricklayer wages in Toronto and Vancouver fall from 1.72 and 1.52 times those of their Sydney counterparts to between 1.28-1.43 and 1.19-1.23 respectively with leisure adjustments.

Manufacturing wages, which span the entire period for all included cities, also appear to be much closer together. Again, incorporating a value for leisure gains/losses relative to 1879 increases the relative wage of Australian manufacturing workers and decreases those in Canada. Wages in Ontario and British Columbia were reported as 1.24 and 1.17 times those in NSW respectively. The results of our adjustments suggest the ratio was close to 1 (1-1.06 and 0.94-1 for Ontario/NSW and British Columbia/NSW respectively).

These results, in effect lend support to Williamson’s original argument that wages tended to converge prior to World War I. They also support the view that the US was somewhat different to other countries in its wage and economic experience. Adjusting for labour hours worked impacts more on the wages in settler economies of Canada and Australia than in the US.

Representative Occupations
Valid international comparisons of particular occupation’s wages also require that the recorded price represents, as accurately as possible, the price paid for the same type of job; the use of ‘bricklayers’ and ‘labourers’ in the previous section is one such example. These provide us with useful international comparisons because it is likely that the skill set and tasks required of these occupations were fairly homogenous between regions. Further, such occupational categories have increasingly become accepted as representative of particular skill types. For example, in 19th century comparisons, skilled workers are typically represented by bricklayers.
Nonetheless, it is also true that wage differences do occur between and within occupations in a single country. Wages for the same occupation can vary with firm size, while more subtle distinctions between similarly named occupations can erode the usefulness of international comparisons. One strategy ‘around’ this is to examine a series of occupations to determine whether the trends in one occupational type are followed in others.

In their work on international factor markets, O’Rourke and Williamson (1999) relied heavily on the initial data base of Williamson (1995). There he details his construction of a data base for ‘unskilled’ labour. For the four ‘settler economies’ of interest in this paper, and for the time period from the mid-nineteenth to early twentieth century, these data are derived from a variety of sources and regions within each country. Allen (1994) also used the wage rates of three representative occupations; bricklayers, labourers and ‘average factory worker’, across four countries (of which three, US, Canada and Australia are of interest here). Again problems with continuity of data meant that time series data were constructed from a variety of sources and a variety of occupations.

This section presents ratios for a variety of Australian based occupations where some of these problems have been overcome, and compare with those derived from Allen (1994). Moreover, in calculating the ratio of wages of workers from different occupational sectors, we are able to examine sectorial differences in working hours based on the Huberman series discussed in the previous sector. The ratios here are

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16 See Williamson 1995 Appendix 1. To give a flavour of the difficulties involved, and focusing here only on occupational titles, Williamson outlines the occupations that served as the base of his wage rates as follows (pp 163-176). Argentina: the average monthly wages of porteros (doormen), and peones (cleaner/labourer), spliced with the average monthly wages of peones de policia (labourers of police) and daily wages of peones albahiles (bricklayer/labourer). In Australia he combined the weighted average daily wages of seven occupations (farm labourers, shepherds, workers in building trades, blacksmitshs, female servants, general labourers and gold-miners) spliced with money wages of urban general labourers and money wages in Industry (from B.R. Mitchell). For Canada he used the wages of construction workers together with average daily wage of labourers in building trades and spliced these with the weighted average by provincial population, of hourly wages of labourers in the building trades. For the USA the unweighted average of wages of civilian common labourers and teamsters at army forts in the north-eastern US were combined with wages of non-farm common or unskilled labour spliced with wages of urban unskilled workers.

17 Due to a lack of continuity of data, Allen too merged different occupational wage rates. For example, over different time periods for Chicago wages building labourers’ wages were merged with labourers in foundries and machine shops and blacksmith’s helpers in railroad shops. The average annual wages of manufacturing workers was calculated by dividing total wage payments in census of manufactures by the total number of wage earners. Allen (pp 118-199) highlights the limitations of this approach.
based on urban male adult workers in particular occupations. In all cases the occupations underlying these wage rates remains ‘constant’.\textsuperscript{18}

We begin by examining the ratio of earnings for bricklayers and labourers in Melbourne and Adelaide over the period 1879-1913. For South Australia, the wages of workers titled ‘day labourers’ was used as representative of labourers’ wages, while in Victoria, ‘building labourers’ wages were used. The first group appears to be a much broader definition than just urban labourers and may incorporate some rural wages, while the Victorian category is obviously specific to the building industry.

Figure 7 depicts the wage ratios of bricklayer to labourer ratios derived from Allen (1994).

\textbf{Figure 7 – Bricklayer Skill Premium}

![Graph showing wage ratios of bricklayer to labourer in various cities over time]

Wages for bricklayers in Chicago and San Francisco were shown in the previous section to have been among the highest in the world, while the wages of labourers were among the lowest. It follows that skill premium using these two measures reveal a large disparity between the US and Australia/Canada. As Allen (1994) notes, one reason for this may have been the rapid industrialisation of the US coupled with high levels of migration, particularly of low skill workers. Such an explanation is consistent with

\textsuperscript{18} This statement is true only to the extent that the government officials who collected and collated these data did not alter their definitions of an occupation. Over the time period concerned we have assumed (and have no contrary evidence) that occupational definitions and data selection remained consistent.
standard supply and demand theory and the insights provided by Harley (1974) and Williamson (1985).

It also supports the speculation that perhaps Australia and Canada, over the period of observation, were still essentially ‘pre-industrial’ (relative to the US) and that they had not yet entered that phase of development where the premium for skill rose (Allen, 1994, p125). In short, ‘timing matters’. While such a speculation may be plausible for Australia, it appears less reasonable for Canada, especially since one would expect great equalisation of wages between the US and Canada given their proximity.

Taking the case of Australia, an alternative explanation could be that Sydney was not representative of the country as a whole. A useful exercise is thus to compare the ratio for Sydney with similar data for Melbourne and Adelaide. These ratios, plotted along with those obtained using the Allen data for Sydney are presented below.

**Figure 8 – Bricklayer Skill Premium**

![Figure 8 – Bricklayer Skill Premium](image)

On face value, these data reveal that the trends in the skill premium are reasonably common to each of the cities examined. Relative to those in Adelaide and Sydney, the skill premium in Melbourne was lower for almost all of the period after 1890. The skill premium in Adelaide after 1897 appears higher than that of Sydney, but not to a large extent. Indeed, the Sydney series appears to lie somewhere in between Adelaide and Melbourne for a substantial portion of the entire period. It would thus
appear that the data from Sydney are reasonably representative, at least of the three cities here.

Having ruled out large differences between the colonial capitals, another possible option is to ask whether the wages of either bricklayers or labourers is really representative of skilled and unskilled occupations, and whether consideration of a wider class of occupations would produce similar trends. In order to pursue this, we examine wage ratios of other occupational categories. Wage series for several skilled occupations are available from the Parliamentary Papers for both Victoria and South Australia. To provide an alternative measure to bricklayers, we use carpenter, cooper, and blacksmith wages. Finding alternatives for unskilled labour, however, was more problematic, and we rely on data for miners in South Australia.\textsuperscript{19} An obvious possible bias may arise when comparing occupations from different sectors due to changes in working hours which are sector specific. Huberman (2004) again provides estimates of sectorial hours and it is possible to make these adjustments when comparing wages for different sectors. His results suggest that the building and mining sector had greater gains in terms of leisure time than any other sector.\textsuperscript{20} We thus ensure that blacksmith and cooper wages are adjusted for these changes to provide a true representation of the skill premium for these occupations.\textsuperscript{21}

Table 2 presents some descriptive statistics of the ratio various skilled wages to that of unskilled workers. As is evident, the results for Australia do not appear to be highly sensitive to regional or occupational changes. Only the ratio of blacksmith to labourer wages in Melbourne over the period is somewhat above those of other regional and occupational categories. Indeed, this ratio appears remarkably similar to that of Vancouver over the same period.

\textsuperscript{19} Victorian data offered several possible unskilled occupations including clay labourers, miners and farm labourers, however, the series in each of these was incomplete.

\textsuperscript{20} In 1913, for those in this sector, the working day was 77.9% the length of that in 1879. The equivalent calculations for the ‘service’, ‘manufacturing’, ‘textiles’ and ‘metals’ sectors are (respectively) 87.8%, 80.9%, 79.8%, and 86.7%.

\textsuperscript{21} Blacksmiths hours were taken to be those of the ‘metals’ sector. Coopers were categorised as in the ‘manufacturing’ sector.
Table 2 – Wage Ratios (skilled / unskilled labour)

<table>
<thead>
<tr>
<th>Wage Ratio</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adelaide blacksmith/labourer</td>
<td>1.37</td>
<td>0.12</td>
<td>1.2</td>
<td>1.58</td>
</tr>
<tr>
<td>Melbourne blacksmith/labourer</td>
<td>1.61</td>
<td>0.13</td>
<td>1.37</td>
<td>1.77</td>
</tr>
<tr>
<td>Adelaide cooper/labourer</td>
<td>1.36</td>
<td>0.09</td>
<td>1.09</td>
<td>1.48</td>
</tr>
<tr>
<td>Melbourne cooper/labourer</td>
<td>1.31</td>
<td>0.11</td>
<td>1.18</td>
<td>1.52</td>
</tr>
<tr>
<td>Adelaide carpenter/labourer</td>
<td>1.40</td>
<td>0.10</td>
<td>1.21</td>
<td>1.54</td>
</tr>
<tr>
<td>Melbourne carpenter/labourer</td>
<td>1.38</td>
<td>0.13</td>
<td>1.08</td>
<td>1.62</td>
</tr>
<tr>
<td>Adelaide bricklayer/miner</td>
<td>1.45</td>
<td>0.14</td>
<td>1.20</td>
<td>1.80</td>
</tr>
<tr>
<td>Bricklayer/labourer (Allen, 1994):</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sydney</td>
<td>1.48</td>
<td>0.10</td>
<td>1.25</td>
<td>1.61</td>
</tr>
<tr>
<td>Chicago</td>
<td>2.95</td>
<td>0.22</td>
<td>2.59</td>
<td>3.51</td>
</tr>
<tr>
<td>Vancouver</td>
<td>1.68</td>
<td>0.13</td>
<td>1.45</td>
<td>1.88</td>
</tr>
</tbody>
</table>

Overall, there remains an impressive gap between the premium paid for skilled labour in US cities and those paid in Sydney, Melbourne and Adelaide. Moreover, the results are not particularly sensitive to variations in the region or occupational category within Australia.

Finally, we have access to data for Adelaide that span the period 1841-1913. Given the relatively low skilled ratios for the latter part of this period (and reproduced above), it is interesting to examine the preceding period. The colony of South Australia was first settled in 1836, and it would be expected that premiums for skilled labour, especially in the building trades, may have been large in these formative years. Figure 9 presents data for carpenter and bricklayer wages as a ratio of labourer wages for the period 1841-1913.

The data reveal that the premium for skilled labour was indeed higher during the early years of settlement. While we do not have a direct comparison to the relevant US data, nonetheless, the skill premium in the 1840s in Adelaide still remains significantly below the US data from some 30 years later. Overall this suggests that in terms of wage inequality, across the late 19th century, Australia may have been more equal than the US, or indeed Canada. This is an interesting result which requires further investigation. For example, how does wage inequality between regions compare with other measures of inequality, over the same period?
Conclusions

Examining factor market convergence and the impact of globalisation across the nineteenth and early twentieth century has given us powerful insights into some of the economic fundamentals that influence economic development. Similarly, studies that have compared wage outcomes in particular cities over time provide strong evidence about the extent of international labour market integration. Work that has examined some of the returns to skills in particular industries has further added to our understanding of the forces influencing wage markets.

This paper, by reviewing some of the limits of our knowledge and examining in more detail some of the complexities of labour markets in one settler economy has highlighted the importance of maintaining an awareness of individual differences between settler economies. Differences in hours of work between regions need to be considered when making international comparisons. Care needs to be taken when selecting ‘representative’ occupations. Ideally we need much richer detailed information about a large number of countries’ labour markets and occupational structures – both to identify similarities and also to highlight differences.

While broad-brush factors such as technological change, movements in commodity prices and factor prices ‘feed into’ and help shape countries development and living standards, so too the ‘timing’ of these events matters. The interaction
between a country’s stage of economic development and the ‘opportunities’ presented to it by world markets are grasped differently by different regions with different endowments of resources, culture and heritage.

A more detailed understanding of the differences in labour markets and their outcomes, over an extended period between say, Australia, Canada, Argentina or New Zealand, to name but four countries, would assist in identifying more precisely the factors associated with long-term differences in living standards and economic growth.
References


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