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AUSTRALIAN EXCEPTIONALISM?
INEQUALITY AND LIVING STANDARDS 1821-1871

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**Australian Exceptionalism?
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Abstract

Although the Australian historical literature covering the colonies' first century from 1788 to 1871 is packed with assertions about Australian living standards and inequality exceptionalism, there has been very little evidence offered to confirm them. This paper establishes the Australian facts about living standards and inequality trends between the 1820s and the 1870s. We first explore the end-period benchmark, 1871, where previous literature has reported a big Australian income per capita and living standard lead. We ask whether 1871 is a poor choice for making these comparisons, and whether 1861 would be better. The US had just fought a Civil War, underwent a "lost growth decade" and southern destruction. In addition, both countries had to deal with a mineral rent bust. The revised calculation for 1861 reports a smaller Australian living standard lead, but a significant lead nonetheless. Next we ask whether Australia was born (relatively) rich or grew (relatively) rich by (relatively) fast growth. It was the latter, a conclusion reached in two ways. First, our new purchasing-power-parity estimates Australian town living standards below London and US cities in the 1830s. Second, when measured properly we report an exceptionally fast growth performance between 1821 and 1871. In addition, we ask whether convicts had similar living standards as free urban unskilled in the 1830s when convicts were still nearly half of the labor force. We follow this by documenting inequality trends between the 1820s and 1870s. Here we find exceptionalism since there is little evidence supporting rising income inequality prior to 1871.

Keywords: Colonial Australia, living standards, inequality, growth, exceptionalism

JEL: N17, N37, O47, O56

“[P]opular sentiment has placed as much hope in fashioning a future different from the past; where an egalitarian ethos is charged with a responsibility to overcome market inequalities, and government policies are expected to offset economic injustice.” (Shanahan 2015, p. 490)

1. Motivation¹

Although the Australian historical literature from the first convict settlement in 1788 at Botany Bay to the post-gold rush census of 1871 is packed with assertions about Australian exceptionalism, there has been very little evidence offered to confirm them.²

First, the frequent claims that Australia was the richest country in the world by the 1860s draw on GDP estimates based on Maddison data (McLean 2007, McLean and Taylor 2001) or on guesstimates constructed following a procedure à la Maddison (Madsen 2015), which have been subject to recent criticism.³ Second, very little evidence is available about living standards during the early colonial period. Indeed, while it is well established that Australia had a higher GDP per capita and family

¹ We should make it clear at the start that this paper is about European settlers in Australia. While we have estimates of aboriginal populations, we know very little about their market work (except as shepherds, stockmen and domestics on stations), almost nothing about their wages and days worked, or about the value of their home-provided consumption and housing. See, for example, Seltzer (2015: pp. 179-180), Hunter (2015), and Lloyd (2010: Ch. 1). However, the same is true of the British North American colonies and the United States, with which we make most of our comparisons. See Lindert and Williamson (2016a).

² For a comprehensive overview, see Coleman (2016).

³ See, for example, Lindert (2016).

living standard levels than any other country in 1871, even the United States, living standard estimates are scarce or even absent for the decades before then. Specifically we do not know whether Australia's living conditions were already high shortly after the penetration of the Blue Mountains in 1815, which granted access to an immense pastoral interior triggering soaring labor scarcity and highly skewed land-labor ratios (Coghlan 1918, vol. 1: pp. 155-72; Perry 1963, pp. 29-30; Meredith and Oxley 2015, pp. 111-12; Seltzer 2015, p. 178); or whether Australia had to wait for a half-century before exceptionally fast income per capita growth carried her to leadership in 1871. Third, most literature investigating the distribution of the gains from Australia's growth during the nineteenth century is of a qualitative nature only. The most egalitarian (measureable) place on the planet in 1800 was a very unequal United States, but by 1860 it had joined the unequal European "club". Was 1815 Australia as egalitarian as 1800 America, even though both had a huge share of their labor force coerced, America with its southern slavery (20 percent of the labor force in 1860), and Australia with its convicts (55 percent of the 1825 labor force, but only 10 percent in 1850)? Did Australian inequality also rise steeply between 1815 and 1871, following the same trajectory as the United States between 1800 and 1860? The historical literature which stresses the rise of landed wealth says yes, but it fails to note that the ratio of land rents to wages dropped considerably as labor scarcity was augmented by exceptionally fast land growth. The argument put forward by the same literature to explain Australia's alleged unequal distribution of earnings and income and its persistence over time stresses the existence of a lagging supply of skills throughout the nineteenth century. Such speculation is vulnerable to two criticisms. First, long distance, high transportation costs and government subsidies which favored the best and brightest, selected more skilled migrants to go to Australia than

elsewhere, such as the US. Second, skill scarcity implies skill premiums and incentives to invest more in those skills. On the other hand, the demand for skills could have grown faster than supply, as it did in the US, hence augmenting inequality. However, such arguments do not stand on very strong ground, as the Australian economy did not undergo a dramatic industrial revolution – certainly not up to 1871. Rather, a high demand for farm workers was the central force driving labor markets, not a demand for urban-industrial skills.

Given the lack of systematic evidence on these dimensions of Australian economic performance, we contribute to the literature in three ways: by providing a quantitative measurement of living standards in the 1820s and 1830s; by documenting trends in earnings inequality from the 1820s to the 1870s; and by utilizing such measures to relate Australia's living standards, growth, and inequality to those of other countries, hence offering a new perspective on extent to which the Australian experience was exceptional.

By the word “exceptionalism” we mean a comparison with other New World frontier societies, and, in particular, with the United States. Until now, the comparison has been limited by the absence of empirical evidence. But now our quantitative knowledge of young United States' growth, living standards, and inequality is extensive, covering the two centuries from colonial times in the late seventeenth century to 1870 and the middle of its dramatic industrial revolution.

To be clear, this paper represents the first attempt to establish the Australian facts about living standards and inequality trends between the 1820s and the 1870s. This will allow us to answer questions about Australia's experience in comparative perspective: Where do we find exceptionalism, especially relative to the United

States, and where not? Can exceptionalism be readily explained by the fact that the US was undergoing a dramatic industrial revolution while Australia was following its commodity-exporting comparative advantage?

We start in the next section by exploring the end-period benchmark, 1871. Here we ask whether 1871 is a poor choice for making living standard comparisons, and whether 1861 would be a better choice. After all, the US had just fought a Civil War and underwent a “lost growth decade” as a result. In addition, both countries had to deal with a mineral rent bust, but mineral-rich Victoria was a far bigger share of the Australian economy than mineral-rich California and Nevada were of the US. The result for 1861 is a smaller Australian living standard lead, but a significant lead nonetheless. Next we document Australia’s growth and assess her living standards in the 1820s and 1830s by computing purchasing-power-parity estimates of the working class. In addition, we ask whether the convicts enjoyed a similar advantage in the 1830s (as did southern slaves in 1774 America relative to the working poor in England). We follow this by illustrating Australia’s inequality trends by exploiting proxies. Here we find exceptionalism since there is little evidence supporting rising income inequality over the half-century prior to 1871.

2. Who Was Richest in the 1860s, Australia or the United States?

The literature dealing with the question “was Australia richest in the late nineteenth century?” has a long tradition. It starts with Michael Mulhall who more than a century ago estimated that Australian 1891 per capita income (in £ sterling) was 3.1 percent above the United States and 19.3 percent above the United Kingdom (Mulhall 1892, p. 320). Since then, the literature has improved the quality of the estimates (Butlin 1970; Maddison 1995, Sinclair, 2009), including showing how high

prices of non-tradables (the Balassa-Samuelson effect as well as grain and other food price convergence in globalizing world markets), and thus purchasing-power-parity (PPP) assessments reduce the Australian 1891 lead at least over the United Kingdom (Haig 1989; Thomas 1995),⁴ but probably not over the United States in 1871. A recent article by Haig (2008), which responds to Broadberry and Irwin's (2007) comparative study on the British and Australian economies, has revived the debate on the extent of Australia's exceptionalism. In particular, it has called back into question the measurement of Australia's income and living standards relative to other countries.

This paper contributes to this debate by comparing Australia's experience to that of other countries, particularly the US. Using Angus Maddison's data (Maddison 1995), Ian McLean reports that "Australian incomes averaged 51 percent above American incomes" in the 1870s and 1880s and about 45 percent higher in 1870/71 (McLean 2007, p. 638). We will use this 1870/71 45 percent estimate as our benchmark in what follows.⁵ However, comparing Australia with aggregate US may be inappropriate for two reasons: American regions differed so radically in per capita incomes in 1870, as they included a recently slave-based poor American South, which had been destroyed by the Civil War; and the relative weight and size of Australia's and America's mining states differed profoundly, especially after their gold (and silver) booms. In fact, mining-dominated Victoria covered 46.5 percent of Australia's

⁴ See also Allen (1994).

⁵ We are confident that the use of a 1870s specific PPP would reduce the Australian 1871 advantage over the UK from the McLean (2007) 45 percent estimate as it does for 1891. We also note that a Human Development Index calculation (Shanahan 2015: Table 22.3, p. 501) places Australia only 2 percent over the US in 1871 (0.516 vs 0.506) and only 3 percent over the UK (0.516 vs 0.500). All of these estimates have Australia in the lead and the squabble over magnitudes is irrelevant to the issues raised in this section.

1861 population while the American West represented only 2 percent of the 1860 US population. What happens to the GDP per capita comparison when we exclude those mining-based regions, the slave-based and relatively poor US South, and make the comparison in 1860/61 before the Civil War?

Consider first the impact of the Civil War on the US economy (Lindert and Williamson 2016a: Ch. 6; 2016b). Table 1.B totes up the damage across the 1860s. After six decades of income per capita growth at 1.4 percent per annum, the growth rate across the Civil War decade dropped to almost zero. The big loser was the South (with 35.5 percent of the 1860 population), where per capita income fell by 21.4 percent. The mining regions in both countries also suffered, as the gold and silver lodes petered out and the super-rents slowly evaporated. The decade fall in income per capita in the American West was 38.1 percent and in Victoria 24.1 percent. While the American West took the biggest hit, its population was only a tiny share of the national total while Victoria's share was huge. Surprisingly, the aggregate per capita income damage from war and mineral rent collapse was similar in the two countries: the 1871 45 percent gap was certainly smaller in 1860/61, but it was still big (38 percent).

Consider now what the 1870/71 leadership gap looks like when we compare America without its South and West (that is, New England, Middle Atlantic, East North Central, and West North Central) with Australia without Victoria – the 1871 gap drops from 45 to 33.6 percent, and the 1861 gap to 27.9 percent.

We conclude from this exercise that the income per capita gap favoring Australia in 1871 is certainly reduced by ignoring the mineral-rich regions in both

countries, and also by ignoring the American South which was so badly damaged by the Civil War. Even so, Australia's GDP per capita leadership persists.

3. Exceptional Growth

Were Australian living standards already high in the 1820s or did relatively fast commodity-export-driven growth, pushed by some staple theory dynamic (Sinclair 1976), get Australia to her 1871 standard of living leadership position? We search for an answer in two ways – directly and indirectly – hoping for consistent results. This section uses the indirect approach (championed by Angus Maddison 1995 and his followers), exploring comparative income per capita and per worker growth rates over the half-century or so before 1871. Did Australia grow exceptionally fast compared with the United States, the United Kingdom, and the rest of Western Europe? A positive answer would provide support for the hypothesis that Australia was not born rich but rather grew to be the richest by exporting wool and minerals. A negative answer would imply that Australia's living standards were already higher than those of other leading economies at the beginning of the nineteenth century, as suggested by Madsen (2015, pp. 36-37). In the next section, we use the direct approach (championed by Ward and Devereux 2003, 2006, 2016; Allen 2001; Lindert 2016; Lindert and Williamson 2016a) by calculating purchasing-power-parity measures of working class living standards in the 1820s and 1830s. Income levels comparable to those in the US and the UK would imply that Australia was already the high income leader a half-century before 1871, thus confirming the born rich thesis. The opposite would confirm the fast growth thesis.

Table 2 reports the results based on the real GDP per capita estimates in M. Butlin *et al.* (2015). Like most commodity exporters (including colonial America:

Lindert and Williamson, 2016a, Chapter 3), Australia's performance (mainly of New South Wales and Tasmania) over the seven decades before the 1870s was highly volatile.⁶ Annual per capita GDP growth during the 1810s and 1870s was close to the period average, the 1830s (2.86 percent) and 1850s (2.99 percent) were boom decades, and the 1820s (-2.81 percent), the 1840s (-0.02 percent), and the 1860s (0.38 percent) were bust decades. The average GDP per capita growth rate from the 1820s to the 1870s was 1.3 percent per annum, slightly below the US (1.42 percent), so it appears that there is no evidence to support Australia growing sufficiently fast to take over standard of living leadership. At the same time, like the US, Australia did grow faster than the United Kingdom and Western Europe, thus widening the per capita income gap with the Old World.

However, these per capita GDP growth comparisons grossly understate the Australian performance. While there was no dramatic change in the labor participation rate in her two competitors, there was a massive drop in the Australian rate over these six decades. Between the 1820s and the 1870s, the labor participation rate dropped from 61.5 to 40 percent reflecting an enormous fall in the (adult) male population share:⁷ the share of the Australian population male fell from 76.7 percent in 1825 to 54.2 percent in 1875, and the male/female ratio fell from 3.2 in 1828 to 1.2 in 1871 (Seltzer 2015: Table 8.2, p. 180). Since the living standard estimates for the

⁶ See also Seltzer (2015, p. 119 and his Figure 5.7).

⁷ Butlin *et al.* (2015) report labor force only from 1840 onwards, but we project it backwards to 1820 based on trends in the male population share. The share of convicts in the population reached a peak in 1825 and then fell dramatically to 1850 (Meredith and Oxley 2015, p. 114). Males accounted for 85 percent of the convicts in New South Wales and 80 percent in Van Dieman's Land (Meredith and Oxley 2015, p. 102). Convict men had a labor participation rate of 100 percent while female convicts had a rate of 60 percent (Butlin 1994, p. 43).

1820s, 1830s, and 1870s are based on earnings per worker, the growth rates that matter should be GDP per worker. And these are *much* faster than the growth rates of GDP per capita. While the latter was 1.3 percent per annum, the former was 2.44 percent per annum, far exceeding her competitors' growth rates.

From this analysis it emerges that Australia was well ahead of the United States in 1871 mainly because it grew so much faster. And it grew faster in part because Australia did not fight for independence (US per capita income fell by around 20 percent between 1774 and 1800: Lindert and Williamson 2016a: Ch. 4). Nor did the Australian colonies engage in an equally destructive Civil War. But most important, Australia grew faster because of booming wool and mineral exports.

4. How Rich Was Australia Before the Gold Rush?

Constructing Purchasing Power Parity for the Young Colonies

4.1 Free Labor Living Standards in the 1820s and 1830s

This section provides the first clear image of living standards in early colonial Australia and the first comparative assessment of living standards at the dawn of Australian economic and political development. We choose the 1820s as our starting point after which Australia quickly evolved from a mixed convict-free colony (in 1828, convicts were 57 percent of the labor force) into a more conventional “free” economy (in the late 1840s, convicts were only 10 percent of the labor force).⁸ During this transition period the convict (public) sector coexisted with a much faster growing private sector and the free and convict labor markets flourished side by side

⁸ We estimated convicts labor force participation using data on convicts' labor force, excluding children younger than 14, from Butlin et al (1986) and total labour force from Endres (1984). Similar estimates are provided by Meredith and Oxley (2015: p. 114).

(Coghlan 1918, vol. 1, pp. 173-199; Butlin 1994, pp. 2-3; Meredith and Oxley 2005; Seltzer 2015).⁹ This exercise makes it possible to locate Australia's experience within the growing literature measuring living standards and the related debate about the Great Divergence (Arroyo Abad *et al.* 2012; Allen *et al.* 2001).

Our goal is to provide an estimate of the relative purchasing power of an average Australian household. We started by collecting prices and wages for New South Wales (NSW) and Van Diemen's Land (VDL, to become Tasmania in 1856) for the two decades between 1820 and 1839, allowing us to estimate the average yearly expenditure of a typical family at different points in time.¹⁰ Following common practice (Allen 2001 and 2009; Broadberry *et al.* 2015), we first construct a "bare bones" basket, including basic necessities, and a "respectable" basket adding additional goods to embody a more comfortable living standard.¹¹ We then use the price data to cost the basket thus to construct deflators for annual earnings.

⁹ By the end of the 1820s, Australia's population had reached 70,000, of which more than 50,000 were part of the workforce (Butlin, 1994, pp. 34 and 43).

¹⁰ NSW and VDL included the overwhelming majority of Australia's settler population between 1820 and 1839.

¹¹ Following Allen (2001; 2009) we consider an average working class family to be made up of four members, turned into "adult equivalents" by multiplying the cost of a basket for one person by three and then adding an allowance for rent equal to 5 percent of the "bare bones" budget and 11 percent of the "respectable" budget as suggested by Coghlan (1918, vol.1) and McLean and Woodland (1992). While the four-member-family assumption ensures that comparisons between countries and times standardize family size, it may understate Australian living standards in the 1820s and 1830s since, given male dominance, families were less numerous and single person households more common. Family size information for this period is scarce, but we are still looking.

Alternatively, these estimates are used to generate welfare ratios.¹² These ratios represent the number of “bare bones” or “respectable” baskets the average family could purchase, thus capturing differences in purchasing power parities across time and space.

We prefer this direct methodology over the indirect alternative which relies on existing guesstimates of real GDP back-casted using an indirect ‘projection’ approach à la Maddison, which invokes the implausible assumption that consumption patterns and relative prices today are similar to those of the early nineteenth century (see Lindert 2016 for an overview of this method and its shortcomings). Instead, we

¹² We assume that those with monthly and annual contracts (like male farm labor and female domestics) worked full time. Thus, if they were paid monthly, we assume they worked 12 months per year. These workers on farms and stations were also paid food and (extremely poor) housing in kind. Coghlan reports detailed commentary on the composition and value of these in-kind payments and we include them. There is a large literature on nineteenth century US and Britain that supports our working days assumptions for Australia. On the US, see Lebergott (1964). We assume that those with weekly contracts also had more stable employment, working 50 weeks per year (with two weeks of vacation). The urban working class majority worked on day rates. According to Baxter (1868, pp. 46-9), the British working class in the 1860s worked 10-20 percent less than full-time. The 20 percent applied to “casual” employment as common labor, navies, wharf laborers, and pick, shovel, and carting workers on construction sites. The 10 percent referred to skilled in the building trades, metal trades, artisans, and other skilled workers. Writing a half century later, Bowley (1919, pp. 28-30) agreed with Baxter. An excellent and comprehensive survey can be found in Boyer (2016, pp. 3-12). Lindert and Williamson (2016a) argue the same when constructing their social tables for the United States in 1800, 1850, and 1860. It seems to us that there is little reason to expect that the Australian working class was any different. Thus, taking a full-time year as 313 days (with only Sunday at rest), we estimate the following: Baxter's 20 percent = $0.2 \times 313 = 62.6$ implying 250 actual days worked per year for unskilled common labor on daily rates; Baxter's 10 percent = $0.1 \times 313 = 31.3$ implying 280 actual days worked per year for more skilled workers also on daily rates.

exploit the available primary and secondary sources which reflect the prices and consumption patterns at the time of early settlement. This is particularly important because in this way we are able to incorporate the large share of non-tradables included in the consumption basket of an average household, hence providing more accurate estimates of living standards.¹³ Indeed, before the first globalization wave, consumer staples were not traded over great distances, hence prices reflected domestic relative factor endowments, rather than being dictated by exogenous global factors. In Australia, like the rest of the New World, land was abundant relative to labor and capital, hence food and fuel were cheaper than in the Old World, thus providing an advantage in terms of purchasing power.

Our choice of the basket draws on Allen (2009) and reflects consumption patterns of Australian settlers. The core idea behind this methodology is simple: being able to construct daily diets delivering a subsistence level of about 1,940 kilocalories for the “bare bone” basket and 2,420 for the “respectable” basket. The “bare bone” basket embodies the needs of an average consumer delivering the necessary daily nutrition at lowest costs, given available local supply.

The main staple foods eaten in Australia were potatoes and meat; the most consumed grain was wheat, the latter included in the “bare bones” basket, but replaced by bread in the “respectable” basket. Other sources of protein and fat were milk, butter, beans (and cheese for the “respectable” basket); tea and rum (“respectable” basket only) were the main drinks. Soap, linen, candles, lamp oil, fuel and rent constituted the remainder of working class expenditures (see Table 3). Our

¹³ Other studies, such as Lindert and Williamson 2016a, Allen *et al.* 2012, and Arroyo Abad *et al.* 2012, have already shown the superiority of this methodology.

main departures from the British basket used in Allen (2009) are: 1) we substitute potatoes and wheat for oats; 2) we increase the share of meat; and 3) we use rum instead of beer as the main alcoholic beverage.¹⁴

The wage data used to compute annual earnings include skilled and unskilled urban labor and farm labor.¹⁵ The 1830s sources also show a breakdown by gender. Most data are from Coghlan (1918, vol. 1) and Barnard's *Statistical account of Van Diemen's Land* (1856).

The welfare ratios – measuring how many baskets a worker could buy – are presented in Figures 1A and 1B. They show that welfare ratios were on average slightly higher in Tasmania than in New South Wales during the 1820s, especially for skilled working class occupations, but this advantage had disappeared in the 1830s.¹⁶ There was a small decline in average living standards between the 1820s and 1830s in both colonies (consistent with the negative GDP per capita growth estimates for the 1820s reported in Table 2), but more pronounced in Tasmania. However, in New South Wales this was driven by the lower premium earned by skilled occupations, thus pointing to a narrowing of inequality explored below.

Further evidence on the narrowing gap between skilled and unskilled workers real wages in New South Wales between the 1820s and the 1830s is presented in Table 4, which compares Australia's living standards to those of Europe, the United

¹⁴ We converted beer into rum based on the alcohol content of each beverage: 182 liters of beer used in the British basket correspond to 14.56 liters of rum.

¹⁵ See footnote 12 above where we explain at length what we assume about days worked per year by occupation.

¹⁶ Skilled working class occupations include artisans, skilled in the building trades, skilled in the metal trades, and mechanics.

States, Latin America and China. The data suggest that Australians enjoyed higher living standards than most other countries, with the exception of London (3.85) and the United States (4.47), where per capita purchasing power was higher than in Australia (2.66).¹⁷ Also worth noting are the higher real incomes received in both the New South Wales (3.60) and Tasmanian (3.47) countryside by the 1830s. Using this direct approach to compute living standards yields different results relative to available aggregate measures based on back-casting. In fact, the trends in our PPP-based estimates differ from the international GDP per capita comparison proposed by Madsen (2015, pp. 36-37), which place Australia as the richest world economy since 1800, above both other settler colonies and the UK.

To provide a different perspective on living standards we also compute real purchasing power by deflating Australia's nominal income, using existing New South Wales GDP estimates (Sinclair 2009) with a price deflator derived from our "bare bones" expenditure. We use these estimates to draw a comparison with American and British purchasing power per capita (Lindert and Williamson 2016a, Chapters 2-6 and Appendices A-G). We rely on Broadberry *et al.* (2015) nominal income estimates for Great Britain, deflated by the cost of its "bare bone" subsistence bundle using Allen's prices.¹⁸ Table 5 confirms the welfare ratio findings: Australia had a lower purchasing power (4.28) than Britain (8.41) and the United States (9.76) in the 1820s. By the 1830s, real GDP per capita was still lower in Australia, but the gap with Britain had

¹⁷ Our estimates on American living standards are based on Lindert and Williamson (2016a, Table 10.1). We have interpolated the reported purchasing power of American income per capita for benchmark years 1800, 1850 and 1860 to get estimates for the 1820s and 1830s.

¹⁸ When Allen's prices were not available, we used Clark's prices (2006). Both are available from the Global Price and Income History Group database www.gpih.ucdavis.edu.

diminished considerably from 49 to 27 percent, and from 56 to 40 percent with respect to the United States, pointing to the start of a very fast catch up and overtake growth process.

4.2 Assigned Convict Living Standards in the 1830s

We now turn our attention to convict living standards, who represented around 56 percent of Australia's workforce in 1830 and around 36 percent in 1840.¹⁹ It is what was called "assigned" convict labor that interests us (in 1827, 72 percent were assigned, and in 1835 the figure was 66 percent: Coghlan 1918 vol. 1: pp. 180-181). The rest of the convicts were employed on public works or incarcerated. The assignment system was introduced to encourage private sector development by having convicts hired out or "assigned" to private employers.²⁰ The assignment system was introduced to reduce labor scarcity in the private sector, to lower the financial burden on the colonial public purse and to encourage free migration to Australia (see, for example, Coghlan 1918. vol. 1: Pt. II, Ch. II; Butlin 1994: pp. 46-55; Meredith and Oxley 2015). Specifically, the system assigned non-violent convicts to work for private sector masters at all skill levels and occupations. The colonial government published requirements about "payments" under the system, and they allow us to assess the amount of their marginal product that convicts were allowed to retain as income for their own consumption and to compare their "earnings" with those of free labor. Furthermore, estimating convict "retained" income invites a comparison with

¹⁹ See footnote 8 on the construction of convicts labor force participation shares.

²⁰ 1821 marks the colonial government's determination to give priority to the private (over public) employment of convicts.

slaves in the American South,²¹ as well as the role of cheap labor in subsidizing the surge in pastoral settlement.²²

The term “retained” earnings refers to the subsistence portion of the market wage: the masters were required to support their convict servants with food (rations), lodging, clothing and incidentals. In addition, the convict could earn additional income by hiring out for wages after his or her assignment hours (after 3pm), either in the labor market (competing with free labor) or for his or her master (who had first claim). The after-3pm financial payments ranged from 10 to 15£ per annum (Coghlan, 1918 vol. 1: p. 60). It seems that most masters fulfilled their obligations and that the life of an assigned convict was fairly comfortable, but:

“it is impossible from the evidence now available to conclude that domestic assigned servants were well fed and clothed. Since the system smacked too much of slavery, especially when anti-slavery was dominant in the UK, the system was discontinued in 1838, implemented in 1839 and

²¹ Lindert and Williamson (2016a) calculated slaves’ retained income in the American South between 1774 and 1860 and they reached two conclusions: first, slaves retained in “rations”, clothing’ and lodging about 50 percent of what a free farm laborer got; and second, that their living standards were a bit higher than England’s bottom 20 percent.

²² The assignment system ended in 1838-1839, and it hurt the owners of those huge sheep walks, especially the squatters who were the main source of the post-1815 boom: “One of the primary factors in explaining the vulnerability of the squatters ... was the demise of the assignment system, and the consequent end of cheap labor after 1838.” (Thomas 1991, p. 160).

there were no more convicts assigned after July 1840.” (Coghlan 1918, vol. 1, p. 184)²³

In order to estimate convict living standards in the 1830s, we reconstruct their yearly consumption of food, clothing, and incidentals as reported in Coghlan (1918, vol. 1: p. 182-183). We then price the assigned convict consumption basket to generate an assigned convict’s annual expenditure and add extra income from overtime work. Table 6A reports that the food rations were very generous, certainly when compared with the “bare bone” basket in Table 3. However, our findings do not support Meredith and Oxley’s more rosy narrative (2015: p. 109):

“The principal feature of the convict ration was the amount of meat it contained: 1-1 1/2 lbs *per day*. With flour and vegetables this ration supplied daily energy of between 3900 and 4900 calories. This was definitely not the norm for the British working class at this time ... It [also] seems likely that accommodation, clothing and medical care were superior to the average experienced by working people in the United Kingdom.”

We have already reported that free urban common labor in Australia had PPP-adjusted living standards a bit below those in London, and we report below that assigned convicts had living standards only a bit more than half of that. Thus, we cannot agree with the Meredith and Oxley assertion that assigned convict living standards “were superior to the average experienced by working people in the United Kingdom” although their rations were clearly better.

²³ This statement refers to New South Wales, then including what became Victoria and Queensland.

However, Tasmania continued a modified system—called passholder—between 1840 and 1857.

Table 6B compares assigned convict income with that of free labor where we see that males retained 59 percent of free urban common labor income and 63 percent of farm worker income.²⁴ This retention rate is a bit higher but not unlike what slaves in the American South obtained from their rations, clothing and lodging (Lindert and Williamson 2016a, pp. 287-303). Our estimates are also consistent with the claim that the assignment system greatly subsidized landowners, especially those operating large sheep walks.

5. How Were the Gains from Growth Distributed Along the Way?

British colonial policy during the decades before the 1870s was dominated by Edward Gibbon Wakefield's thinking:

"Wakefield's theory rested upon an understanding of the necessary social structural conditions for capitalist/bourgeois society to prosper [reflecting] the liberal view of the necessary triumph of capitalism and democracy over the old order of privilege and corruption. Wakefield's ... policy for attracting immigrants to the empty lands [and to control] the availability and price of land to ensure an ordered class society."

Llyod 2015: p.

We take "ordered" to mean a much more egalitarian and meritocratic society than the unequal and privileged one which existed in England. Not only did it mean controlling the rate and distribution of Crown Lands sold, but also alleviating labor

²⁴ Similar results appear for Tasmanian convicts under its passholder system. Between 1848 and 1856, they on average earned 61 percent of free labor's earnings (Meredith and Oxley 2005, Table 7, p. 64).

scarcity by immigration. Did these policies work? An answer will only emerge when we can measure income distribution in the 1820s – compared with an egalitarian United States in 1800, and its distribution in the 1870s after the Australian half-century growth “miracle” – compared with by then an unequal United States in the 1860s and 1870s. Thus, we want to know whether Australia was egalitarian in the 1820s when it began to emerge from its convict era, and whether it was unequal a half-century later. Or was it the other way round? That is, was there an egalitarian redistribution over the half-century before the 1870s?

While there are strong opinions in the literature, there is no evidence to support them.²⁵ As we do not have the data to reconstruct Australia’s size distribution of income for the 1820s or the 1870s (yet), in what follows we will use a set of proxies to measure the likely inequality trends from early settlement up to the 1870s.²⁶

5.1 Skill Premiums: Did Skill Supply Outstrip Demand or vice versa?

Claudia Goldin and Lawrence Katz (2008) have shown for twentieth century America that the skill premium – the reward for schooling, literacy, and numeracy – is driven by supply and demand. When the supply of those skilled and schooled grows slowly and the demand grows fast, the reward to scarcer skills goes up and so does earnings inequality. When instead demand grows slower than supply, the skill premium falls and so does earnings inequality. Demand always seems to race ahead

²⁵ Although see the courageous and clever efforts of Andrew Leigh (2013).

²⁶ The authors are working on constructing social tables for 1871 and 1911 in order to provide estimates of total income by occupation and location and thus to be able to have reliable measures of income distribution.

of supply during the early years of modern economic growth and thus we expect the skill premium to rise, the wage structure to widen, and earnings inequality to increase, thus following the upswing of some Kuznets Curve. This certainly was the case in the United States between 1800 and 1860 when earnings inequality rose so steeply (Lindert and Williamson 2016a: Ch. 5). Do we expect the same for young Australia? Perhaps not. After all, we associate the demand for skills with cities and industry. And Australia was certainly not undergoing any dramatic industrial revolution before the 1870s: the manufacturing share of economy-wide GDP was a trivial 4 percent in 1821 and was still only 9 percent in 1871 (M. Butlin *et al.* 2015: Table A1, pp. 556-7). Furthermore, while Australia had higher levels of urbanization at the start, the share living in the top five cities – Sydney, Melbourne, Adelaide, Perth, and Brisbane – *fell* from 52 percent in 1810, to 23 percent in 1841, and remained stable up to 1871 (24 percent). And while the share in towns equal to or greater than 2,500 in 1851 was 40 percent in Australia and only 14 percent in the US, the former *fell* to 37 percent in 1871 while the latter *rose* to 26 percent (Frost 2015: Tables 11.1 and 11.2, pp. 249 and 250).

While modern economists explore this issue across the whole skill and schooling income range, economic historians have more limited evidence. Indeed, typically they have measured the premium by using the wage rates of skilled in the building trades – masons, carpenters, joiners, painters, bricklayers, ship riggers, wheelwrights, smiths and such – relative to non-farm common labor.²⁷ Such measures do not, however, speak to the value of schooling, literacy, and numeracy, but rather only to age and experience. Fortunately, the Australian Colonial Blue Books report white collar pay by occupation which arms us with better evidence, since they allow

²⁷ The tradition is perhaps best illustrated by Phelps-Brown (1968). See also Williamson (1980, 1985).

us to document the premium that literate and numerate white-collar employees got relative to illiterate and less numerate unskilled labor.²⁸ What we offer in this section is documentation of the behavior between 1828 and 1867 of both the conventionally measured skill premium, that is what skilled workers in the building trades received relative to urban common labor, and the premium that white collar clerks and professionals got relative to those skilled in the building trades. Thus, our data speak to trends in the gaps between the middle and bottom income ranks of employed workers, as well as between the middle and the top paid employed workers.

Table 7 shows clearly that Australia was exceptional. First, mechanics, artisans, and skilled workers in the building trades earned a much higher premium over common labor in 1828 (2.75 times higher) than in 1867 (1.57 times higher).²⁹ This quantitative evidence is consistent with the qualitative literature which reports the complaints of employers and officials that skilled mechanics and artisans were hard to find in New South Wales and Tasmania in the first three decades of the nineteenth century (Seltzer 2015: p. 181). So, no rising earnings inequality on that account. Second, the wage gap between farm labor and urban common labor (the

²⁸ Katz and Margo (2013) use the wages of male clerks hired at Army posts as their proxy for US white-collar earnings. By so doing, they assume there was a Law of One Wage prevailing between military posts and the private economy (that the two labor markets were completely integrated). We assume the same between government and private sector jobs. The assumption seems plausible in the Australian case since the government shares in total employment were so small in those early years. Finally, we do not have to adjust for differences in days worked per year (higher for white collar), since, by assumption, we take them to have been constant within occupations overtime.

²⁹ We are aware of only one other study that explores the mid-nineteenth century premium of mechanics over common labor in Australia, Mark Thomas (1991: Figure 6.1, p. 168). While Thomas uses only pay ratios between urban skilled working class and common labor, for a smaller sample and for only for 1840 onwards, he also finds no evidence of rising skill premiums in Australia.

former including payment in kind) narrowed over those five or six decades, from 0.71 to 0.86.³⁰ No evidence of rising earnings inequality here either. Third, the premium received by clerks relative to skilled in the building trades was stable over the half century, 2.13 in 1828 and 2.18 in 1867. Again, no evidence of rising earnings inequality. Fourth, and most striking, the premium received by top paid professionals – like surgeons, surveyors, judges and colonial officials – fell dramatically from 9.32 to 4.12.

Earnings inequality rose steeply in the United States over the six ante bellum decades between 1800 and 1860, but it did not rise in the Australian colonies between the 1820s and the 1870s. Indeed, it appears to have fallen. Exceptional indeed.

5.2 Labor Scarcity and Land Abundance: Wage-Land Value Ratios

So far we have documented a decline in income inequality, focusing only on labor earnings. Now we turn our attention to another key source of inequality by looking at changes in relative factor returns: specifically, to the relationship between land and labor. The traditional literature devotes considerable attention to the rise of landed wealth in colonial Australia, as well as the increasing concentration of land holdings (Roberts 1935; Rose *et al.* 1933; Hartwell 1955; Thomas 1991; Leigh 2013, pp. 20-27). Certainly any attempt to assess trends in the rewards to land (income received at the top) versus labor (income received by the rest) makes sense for a

³⁰ This wage gap favoring rural farm labor is exceptional. Most economies, especially modern developing nations report wage gaps favoring the urban worker (Williamson 1988), thus encouraging migration to the cities. The Australian exception may be explained by a far higher cost of living on isolated farms and stations. Observers often remarked about the higher cost of living in rural areas (Coghlan 1918: vols. 1 and 2), and some have estimated that the cost of living difference in the 1890s may have been as high as 50 percent (Haig 1989; Thomas 1995, p. 20). We do not have the evidence for the 1820s and 1830s to deal with this issue.

nineteenth century economy which, especially before the gold rush in the 1850s, specialized in pastoral activities and the export of wool. But instead of thinking about who held the land,³¹ or squatted on it, and thus on the distribution of those land rents, we focus instead on the ratio of land rents, or land values, per acre relative to labor income of an unskilled worker. A complementary way of looking at land inequality is by observing trends in the ratio of land values (and thus rents) to gross domestic product per worker.³² That is, what about the impact of land/labor ratios and productivity growth on wage-rental ratios or average GDP per worker relative to average land rents? While the distribution of land holding, and thus rental incomes, is informative about the distribution of property incomes at the top, the wage-rental ratio tells us much more about the property income share (Piketty 2014) and the overall distribution of income.

Table 8 documents the trends, and the story is clear. Land values per acre (V) grew much more slowly than either annual earnings of unskilled labor (w) or GDP per

³¹ As does Andrew Leigh who notes that “In 1844, the top 0.1 per cent owned a whopping 17 per cent of the land and 11 per cent of the livestock” (Leigh 2013, p. 22). Earlier, Mark Thomas (1991, pp. 157-165) documented the spectacular rise in land concentration between 1821 and 1838. However, and like us, he cannot convert the acreage distribution in to land value distribution, a problem we hope to resolve in the future.

³² We assume here that rents and land values per acre were very highly correlated. In simplest terms, land values per acre (V) equal land rents per acre (r) divided by real interest rates (i). If Australia’s capital markets were well integrated with British capital markets, it can be assumed that i was exogenous and that it behaved like the British (real) interest rate. If instead, the integration only proceeded slowly over those five decades, convergence of (high) Australian interest rates on to (low) British interest rates implies upward pressure on Australian land values independent of the impact of productivity and land-labor ratios. Thus, any observed rise in w/V understates the rise in w/r (our variable of interest).

worker (y): w/V rose by 2.12 times and y/V by 2.41 times.³³ Once again, we find no evidence of rising inequality.

5.3 Changing Gaps between the Middle and the Bottom

One index of changing inequality – when better data are absent – is to compare trends in GDP per worker (the middle of the income distribution) with trends in the annual earnings of unskilled workers (near the bottom of the income distribution).³⁴ Table 9 reports the evidence for New South Wales over the five decades from the 1830s to the 1870s. The table suggests that very little happened to the distribution of income in Australia during these years of wool boom and gold rush. The average unskilled earnings (non-farm unskilled = urban common labor and all unskilled = urban common labor + farm labor + domestics) are taken from Coghlan (1918) and refer to New South Wales. The “Australian” GDP figures are from Matthew Butlin and his collaborators (Butlin *et al.* 2015) when for the 1830s New South Wales included what became Victoria (in 1850) and Queensland (in 1859). The table reports nominal and deflated figures, and those deflators require some discussion. It should be stressed that the implicit price deflator for GDP is likely to rise faster over time than the CPI for ordinary workers. In fact our Coghlan-based

³³ It appears that this downward trend in V/w turned around after the 1860s when it rose steeply to about 1905 (Leigh 2013: Figure 3, p. 27).

³⁴ This index was proposed and used by Williamson (1999, 2002), applied to Latin America a few years later (Prados de la Escosura 2007) and it has been used frequently since. It must be said that until this paper, it has been used to compare real GDP per capita performance with real unskilled wages. Since the Australian labor participation rate fell quite dramatically over time, from 0.54 in the male-dominated 1830s to 0.40 in the more female-friendly 1870s, income per capita growth understates the rise in incomes per income earner at the middle.

CPI is dominated by commodities since service prices are very hard to find for these decades. Even if we had the prices of services, the urban unskilled had a budget dominated by commodities.³⁵ Those with higher incomes in the middle of the distribution had market baskets with higher proportions spent on services. Since services were then labor-intensive, and since labor scarcity was on the rise in Australia, the GDP deflator should have risen faster than the CPI for the unskilled. And so it did. The Coghlan commodity price data imply a fall in the CPI by 14.6 percent between the 1830s and 1870s, while the GDP deflator rose by 7.2 percent (M. Butlin *et al.* 2015: Table A7). In short, while there is much to be done to improve these class-specific price deflators, we prefer the real series in Table 6.

In any case, what does Table 9 tell us? Real nominal earnings of the unskilled rose by 2.51 to 2.74 times over the five decades while real GDP per worker rose 2.51 times. No evidence of rising inequality by that account. While nominal GDP per worker rose a bit faster than nominal unskilled earnings, 2.7 times versus 2.17 to 2.37 times, we think the deflated figures do a better job controlling for the likely bigger rise in the CPI for the middle income group than the CPI for those at or near the bottom.

5.4 Regional Inequality: Reversals of Fortune and New Entrants at the Bottom

So far, we can find very little evidence suggesting there was rising inequality in Australia between the 1830s and the 1870s, an exceptional experience at least

³⁵ Services loom large in GDP. In 1825, services were 46 percent of Australian GDP, and in 1865, the figure was 57 percent (M. Butlin *et al.* 2015: Table A1, pp. 556-7). Furthermore, much of it involves intermediates like transportation, retail trades, and wholesale trades. In contrast, nineteenth century working class budgets contained only house rents, haircuts, and the occasional funeral – perhaps only 15 percent of total expenditures.

compared with the United States and with the predictions of some Kuznets Curve. But what about income gaps between Australian colonies?

Wage and earnings gaps between colonies might inform us about regional income per capita gaps, perhaps one important source of national inequality, and changes in those gaps might have influenced aggregate Australian inequality trends. Robert Barro and others (Barro and Sala-i-Martin 1991; 1992; Mitchener and McLean 1999) have shown how poor regions converge on rich ones during mature stages of modern economic growth. Following that lead, Paul Cashin (1995) documented the same for Australia from 1861 to 1991. The poor colonies in 1861 were the three recently settled, still agrarian, and poor new entrants – South Australia, Western Australia, and Queensland – plus the older Tasmania, and the rich ones were New South Wales and Victoria. While Barro identifies unconditional convergence in the US from 1870 onwards and while Cashin shows the same for Australia from 1861 onwards, they both fail to deal with the decades prior to Cashin's 1861 and Barro's 1870 starting points. Did either Australia or the United States undergo a regional Kuznets Curve (Williamson 1965) and, if so, did Cashin, Barro and others ignore the upswing of that curve? How was it that the poor colonies in Australia and the poor states in the US South got relatively poor? Did the rich regions just grow faster – driven either by resource booms or by growing urban-industrial agglomerations – or did the poor regions somehow fail?

In the American case, it was both. By 1860, and before the economically devastating Civil War, average household income in the South Atlantic was only about 67 percent of the industrial Northeast, while its wage rates were only 62 percent of the Northeast (Lindert and Williamson 2016a: Table 5-7, p. 116 and Table 5-10, p.

126).³⁶ And the South's relatively poor economic achievement was both due to rapid urban-industrial growth up North and to a century long "reversal of fortune" down South. At least judging by Tasmania's performance (the only poor Australian colony in 1871 that we can document over the previous five decades), a large regional gap had emerged long before 1871. Relying extensively on Coghlan's wage, annual earnings and price data, Table 10 reports annual earnings in 1830s prices for unskilled (both farm and non-farm, including in-kind payments) and all laborers, including skilled artisans and mechanics, both weighted by occupational employment.³⁷ What we find is another example of reversal of fortune.³⁸ In the 1830s, real annual earnings of unskilled workers in Tasmania were 17.2 percent higher than New South Wales, while skilled labor earned 36.5 percent more. Four decades later, the Tasmanian advantage had evaporated and become instead a disadvantage: annual earnings for unskilled workers were 36.5 percent *below* New South Wales in the 1870s, and the figure for all workers was 41.6 percent *below*.³⁹ And that Tasmanian reversal of fortune was not just driven by fast per worker growth in New South Wales (2.23 percent per annum), but also by very slow or no growth in Tasmania (0.09 percent per

³⁶ These US comparisons involve the original thirteen colonies only. Thus, the South Atlantic census region contains Delaware, Virginia, North Carolina, South Carolina, and Georgia while the Northeast contains New England (Vermont, New Hampshire, Maine, Massachusetts, Rhode Island, and Connecticut) and the Middle Atlantic (New York, New Jersey, Pennsylvania, and Maryland).

³⁷ We assume that those with monthly and annual contracts (like farm labor) worked full time. See footnote 12 for details.

³⁸ We refer here to the language of Acemoglu *et al.* (2002).

³⁹ We have not yet fully exploited earnings data for white collar employees and managers, evidence available in the early Colonial Blue Books. In the future, we intend to merge the white collar earnings data with the working class earnings data reported here, weighted by the occupation employment data reported in the colonial censuses.

annum). No doubt, part of this was because Tasmania had no mineral boom in the 1850s. But British convict transport policy also played an important role. During the depressed 1840s, and while British convict transport to New South Wales ceased, it continued at an increasing rate to Tasmania. There was significant out-migration of Tasmanian free labor to South Australia and New South Wales during these years, but even convicts with passes could not leave the colony. As Coghlan elaborates at length, the policy induced a labor glut in Tasmania for more than a decade (Coghlan 1918, vol. 1, Chp. VI).

Tasmania was large enough to have been a significant force serving to raise “national” inequality up to the 1870s (39.2 percent of the combined New South Wales and Tasmanian labor force in 1841/42 were in the latter), but rising regional inequality was reinforced by the addition of three younger and much smaller (and still agrarian) colonial settlements – South Australia, Western Australia, and Queensland.

6. Early Findings and an Agenda for the Future

This early exploration of Australian living standards, growth and inequality between 1821 and 1871 reveals that there is considerable archival evidence available for the task. While much remains to be done, we have documented that free labor living standards in Australian towns during the 1820s were below those of London (31 percent lower) and the United States (49 percent lower). By including assigned convicts in some broader “working class” measure, the figure would have been even lower. The United States was the leader over both in the 1820s. But Australia was well ahead of both by the 1870s. Living standards in Australia were not as high as those of the world leading economies in the 1820s-1830s, but she grew into her leadership position in the 1870s by exceptionally fast growth. We have also

documented that assigned convicts had living standards only 59 percent of free labor, confirming that landowners and capitalists enjoyed an immense cheap labor subsidy, at least up to the early 1850s. In sharp contrast to the United States, we also see no evidence of rising earnings inequality in Australia across the half-century, although income inequality may be another matter.

Our agenda for the future is clear. For the pre-1871 decades, we need to document what happened to land rental incomes. We know that average land values per acre fell relative to wage earnings per farm worker, but what about land values and land rents per *owner* relative to wage earnings per farm worker? In addition, convicts accounted for more than half the labor force in the 1820s, but were completely emancipated by the 1870s. Like the US South in 1864, the Australian emancipation implies a massive redistribution from landowners and capitalists to ex-convicts. How big was that redistribution? Regarding the 1871-1911 decades, we already know that the earnings evidence is there to construct social tables for the benchmark years 1871 and 1911. Trends in these measures of earnings inequality could then be decomposed into the roles played by changes in skill premiums, urban-rural gaps, income gaps between colonies, hollowing out in the middle, the spread between the middle and the bottom, and other forces thought to be main drivers of overall inequality. Our key challenge for both the pre-1871 and the post-1870 episodes will be documenting property incomes and assigning them by occupational groups and by location.

There is much to be done, but so far, it does indeed appear that Australia was exceptional compared with other New World societies, including the United States.

Appendix

Note: The Excel files listed below are available on request.

A1. Sources and methods for constructing the living standards for free labor in New South Wales and Tasmania in the 1820s and 1830s

At these dates, New South Wales (NSW) included what became the separate colonies of Victoria and Queensland. Also, Tasmania (TAS) was called Van Diemen's Land (VDL) at that time.

The prices used to construct the cost of the household “bare bones” and “respectable” consumption baskets are from the following sources (where we average within occupation across each decade and source):

Lindert and Sansani (2016): potatoes, eggs, bread, wheat, butter, cheese (NSW, 1820s & 1830s).

Coghlan (1918, vol. 1: pt. ii, Ch. VIII; pt. iii, vii): sugar, milk, tea, meat, butter, cheese, fuel, bread (NSW 1820s & 1830s). Excel: Pre-1830s w & p.xlsx; 1830s w & p data.xlsx.

Barnard (1856). Statistical account of Van Diemen's Land, from the date of its first occupation by the British nation in 1804 to the end of the year 1848: potatoes, wheat, sugar, milk, tea, meat, butter, beans, soap, candles, rum, lamp oil, bread, cheese (TAS 1820s & 1830s). Excel: Tasmania p & w 1804-1841.

House of Commons Sessional Papers, Command Papers, n. 53 XLIL.693: salt (NSW & TAS 1830s).

When different commodity prices were provided by different sources, we created an average price. Due to the lack of data on cloth prices for both New South Wales and Tasmania, we used British prices reported in Allen (2001). Beans, soap, candles, rum

and lamp oil prices were not available for New South Wales, hence we utilized those for Tasmania.

Rent was taken as 5 percent of total expenditure for the “bare-bone” basket following Allen’s method (and consistent with the small huts in which the Australian poor lived) and hence to allow for comparability with living standards in other countries. For the “respectable” basket, rent equals 11 percent of total expenditure, as reported for 1861 in McLean and Woodland (1992). While the “respectable” rent share refers to 1861 Australia, it appears that a unitary elasticity best describes house rent expenditure across late nineteenth century Australia and thus supporting our expectation that the expenditure share was stable over time.

A2. Sources and methods for constructing the living standards for assigned convicts in the 1830s.

The consumption basket for assigned convicts is reported in Coghlan (1918: vol. 1, pp. 182-3) and we apply 1830s prices (see above) to the quantities consumed. Excel: Pre-1830s w & p.xlsx; 1830s w & p data.xlsx.

A3. Sources and methods for constructing estimates of wages and annual earnings.

The wage data for various occupations are from the following sources (where we average within occupation across each decade and source):

Coghlan (1918, vol. 1, pt. ii, Ch. III): common labor, skilled in the building trades (NSW town, 1820s & 1830s); mechanic, domestic (male), mason, cook (male), wharf labor, skilled mechanic, blacksmith, wheelwright (NSW town, 1820s); farm labor, artisan, female labor (NSW town, 1830s); common mechanic, domestic (male), mason, skilled mechanic (TAS town, 1820s); common labor (male and female) (TAS town, 1830s); farm labor (NSW countryside, 1820s & 1830s; TAS countryside

1830s); leading hand, bailiff, dairywoman (NSW countryside, 1820s); artisan, skilled in the building trades (NSW countryside, 1830s & TAS town, 1830s). Excel: Pre-1830s w & p.xlsx, 1830s w & p data.xlsx.

Barnard (1856). Statistical account of Van Diemen's Land, from the date of its first occupation by the British nation in 1804 to the end of the year 1848: bricklayer, carpenter, mason, plumber (TAS 1820s & 1830s). Excel: Tasmania p & w 1804-1841. For daily and weekly workers who received food rations and lodging (when specified by the original source) we increased their annual income by: weekly food rations, comprising (as reported by Coghlan) flour (10 lb); meat (10 lb); tea (2 oz); sugar (1lb); soap (2 oz) and salt (2 oz) priced according to the sources specified above; and lodging equal to 11 percent of total income, following McLean and Woodland (1992, p. 20).

For the calculation of annual incomes, we assumed that those with monthly and annual contracts (like male farm labor, shepherds, and female domestics) worked full time. Thus, if they were paid monthly, we assume they worked 12 months per year. We also assumed that those with weekly contracts also had more stable employment, working 50 weeks per year (with two weeks of vacation). Furthermore, the urban working class majority were on day rates. Adopting Baxter's method (see footnote 12 in the main text for details), we let the working class work 10-20 percent less than full-time: the 20 percent applies to "casual" employment as common labor, navies, wharf laborers, and pick, shovel, and carting workers on construction sites. The 10 percent applies to skilled in the building trades, metal trades, artisans, and other skilled workers. Thus, taking a full-time year as 313 days (with only Sunday at rest), we estimated the following: Baxter's 20 percent = $0.2 \times 313 = 62.6$ implying 250 actual days worked per year for unskilled common labor on daily rates; Baxter's 10 percent

= $0.1 \times 313 = 31.3$ implying 280 actual days worked per year for more skilled workers also on daily rates. Excel: Pre-1830s w & p.xlsx, 1830s w & p data.xlsx.

A4. Sources and methods for the inequality proxies.

Skill premiums: see above for working class wages and earnings data, while the white collar earnings data are taken from NSW and TAS Blue Books. Excel: 1830s to 1870s summary.xlsx

Labor scarcity and land abundance: see above for working class wages and earnings data, while the land values are from Soos (2016) at Philip_Soos_Australian_Land_Values_Datasets_v2.xlsx. Excel: Wages vs land values 1830s-1870s.xlsx

Changing gaps between middle and bottom: Real GDP from M. Butlin *et al.* (2015), Table A1, pp. 555-8. Labor force 1841-1881 from M. Butlin *et al.* (2015), Table A2; 1828-1841 for NSW from Withers & Perry (1985), linked to Butlin *et al.* (2015) at 1841; see above for earnings, while CPI is built from the prices in Coghlan (1918, vols. 1 and 2). Excel: 1830s to 1870s summary.xlsx

Regional Inequality: Based on real earnings, weighted by occupation employment figures. See above for wages and prices for the 1830s, the 1850s are from Coghlan (1918: vol. 2), and the 1870s from Coghlan (1918: vol. 3). The CPI uses the 1861 NSW budget weights in McLean and Woodward (1992, Table 2, p. 20). Coghlan's 1850s prices are linked to McLean and Woodward (1992) to cover the years 1850s-1870s. The occupational employment data are from the colonial censuses. Excel: 1830s to 1870s summary.xlsx

A5. Employment by Occupation

The employment data by occupation are taken from the NSW census (1841, 1871), the VIC census (1841, 1871) and the TAS census (1842, 1871). We distributed the

detailed occupation employment figures to five categories corresponding to our wage data: white collar, artisans & mechanics, domestics, non-farm common labor (including miners), and farm labor. We exclude paupers and not classified from our totals in calculating shares of the labor force. In the very early pre-1841 censuses, the “not classified” numbers are huge, even though it seems like most were common labor or miners. Thus, we have not tried to construct occupational shares for 1821 and even 1831. Excel: Occupation data 1800-1870.xlsx.

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Table 1A. Australian Real GDP per capita 1861 & 1871

	1861			GDPpc Relative to AUS	1871			GDPpc Relative to AUS	GDPpc 1871/ 1861
	GDP	POP	GDP pc		GDP	POP	GDP pc		
<i>Tasmania</i>	3282	90	36.47	73.01	4391.9	100.3	43.79	94.78	1.201
<i>Western Australia</i>	546.1	15.6	35.01	70.08	1029.1	25.3	40.68	88.04	1.162
<i>Victoria</i>	31540.5	539	58.52	117.15	32656	735.2	44.42	96.14	0.759
<i>New South Wales</i>	15121.3	353	42.84	85.76	23050.3	507.3	45.44	98.35	1.061
<i>South Australia</i>	5625.2	128.2	43.88	87.84	9285.6	186.6	49.76	107.71	1.134
<i>Queensland</i>	1835.6	34.4	53.36	106.83	7035	121.7	57.81	125.12	1.083
<i>Australia</i>	57950.7	1160.2	49.95	100.00	77447.9	1676.4	46.20	100.00	0.925

Source: Sinclair (2009).

Notes: All GDP figures in £s sterling at constant 1910 prices. Population and GDP in 000s.

Table 1B. United States Real GDP per capita 1860 & 1870

	1861			GDPpc Relative to US	1871			GDPpc Relative to US	GDPpc 1871/ 1861
	GDP	POP	GDP pc		GDP	POP	GDP pc		
<i>North</i>	3358.5	19801	169.61	102.02	4572.9	25179	181.61	111.83	1.071
<i>South</i>	1602.5	11134	143.93	86.57	1387.5	12257	113.20	69.70	0.786
<i>West</i>	284.7	618	460.68	277.10	277.3	973	284.97	175.47	0.619
<i>United States</i>	5245.7	31553	166.25	100.00	6237.6	38409	162.40	100.00	0.977

Source: Lindert and Williamson (2016a): Tables 5.2 and 6.1. Deflators from Historical Statistics of the United States: Part 1 (1975), E52.

Notes: All GDP figures in millions \$ at constant 1860 prices. Population is in 000.

Table 2: Exceptional Growth? Australia, the US, and Western Europe Compared (% p. a.)

<i>Decade</i>	<i>Australian GDP per capita</i>	<i>Growth Comparisons</i>	
1810s	1.34	<i>GDP per worker:</i>	
1820s	-2.81	Australia 1820s-70s	2.44
1830s	2.86	<i>GDP per capita:</i>	
1840s	-0.02	Australia 1820s-70s	1.30
1850s	2.99	US 1800-60	1.42
1860s	0.38	UK 1820-60	1.06
1870s	1.61	Western Europe 1820-60	1.08

Sources: Australia from M. Butlin et al. (2015: Table A1, pp. 555-7, Table A2, pp.562-3; United States from Lindert and Williamson (2016a: Table 5-3, p. 102); United Kingdom and Western Europe from Lindert and Williamson (2016a: Table 5-4, p. 104).

Note: US data refer to GDI per capita while the rest to GDP per capita.

Table 3. Australian baskets at the bare bone and respectable level

Goods	<i>Bare bone basket</i>			<i>Respectable basket</i>		
	Quantity (yearly)	Kcal per day	Proteins per day (gr.)	Quantity (yearly)	Kcal per day	Proteins per day (gr.)
Potatoes	200 kg	667	10.25	165kg	394	8.5
Wheat	95 kg	882	35.6			
Bread				110 kg	711	30
Sugar				16.5 kg	171	0.2
Milk	17 kg	30	1.5	45 kg	79	4
Tea				9.8 lb		
Beans/peas	17 kg	159	11.9	40 kg	370	28
Meat	20 kg	136	12	60 kg	408	36
Butter	3 kg	60	0.1	2.6 kg	104	0.1
Cheese				2.6 kg	54	1.5
Eggs				52 each	11	1
Rum				14.56 lt	118	
Soap	1.3 kg			2.6 kg		
Linen	3 m			5 m		
Candles	1.3 kg			2.6 kg		
Lamp oil	1.3 lt			2.6 lt		
Fuel	2.0 M			5.0 M		
	BTU			BTU		
Total		1934	71	2,420	2420	109.3

Source: Adapted from Allen (2009).

Table 4: Australia's welfare ratios in comparative perspective, unskilled workers (using bare-bone basket)

	<i>1820s</i>	<i>1830s</i>
New South Wales		
<i>urban</i>	2.66	2.88
<i>rural</i>	2.28	3.60
Tasmania		
<i>urban</i>	2.67	2.19
<i>rural</i>		3.47
United States	4.47	5.10
Amsterdam	3.57	2.70
Florence	0.90	0.85
Leipzig	2.21	1.92
London	3.85	4.05
Beijing	0.79	0.70
Chile	2.26	
Mexico	1.29	
Colombia	1.51	

Sources: NSW and TAS: see text. European cities and Beijing: Allen, 2011; Latin America: Arroyo et al. United States: authors' calculations based on Lindert and Williamson (2016a, Table 10.1).

Note: NSW and TAS unskilled include: urban common labor and farm labor.

Table 5: Real income per capita: New South Wales, Great Britain and America, 1820s-1830s

<i>Country</i>	<i>Year</i>	<i>Nominal GDP per capita (£)</i>	<i>Bare bone expenditure (£)</i>	<i>Real GDP</i>
Great Britain	1820s	29.13	3.47	8.41
New South Wales	1820s	28.80	6.73	4.28
America	1820s			9.76
Great Britain	1830s	27.50	3.28	8.38
New South Wales	1830s	40.93	6.7	6.11
America	1830s			10.54

Sources: see text.

Table 6A: Convicts rations and living allowances under the assignment system (1830s)

Goods	Yearly quantity	Unit price (s)	Yearly expenditure (£)
Wheat	620.5 lb.	0.121	3.75
Beef	273.75 lb.	0.444	6.08
Flour	1460 oz.	0.014	1.01
Salt	730 oz.	0.002	1.46
Potatoes	547.5 lb.	0.094	2.57
Soap	730 oz.	0.023	0.83
Linen	3 m.	7.93	1.19
Shoes	3 pairs	10	1.50
Hat or cap	1	35	1.75
Blanket	1	2.6	0.13
Lodging			2.33
Total			22.6
'Overtime' working income			12.50
Total			35.1

Sources: Basket: Coghlan (1918); Prices: Lindert and Sansani (2006); Coghlan (1918); House of Commons Sessional Papers, Command Papers, n. 53 XLIL.693; *Statistical account of Van Diemen's Land* (1856). Imported linen prices based on Allen 2001.

Note: Lodging equals 11% of yearly expenditure (McLean and Woodland, 1992).

Table 6B: Convicts retained earnings relative to free labor

Occupation	Yearly earnings (£)	Convicts' earnings relative to free labor	
		Including overtime	Excluding overtime
Unskilled urban labor	59.15	59%	38%
Farm labor	55.5	63%	41%
Female labor	28.43	123%	79%
Skilled urban	107.16	33%	21%

Sources: Free labor annual earnings: Coghlan (1901, vols. 1 & 2); convicts retained income: see Table 6A.

Table 7. Skill Premiums 1828-1867

<i>Annual Earnings ratios</i>	<i>1828</i>	<i>1867</i>
Professionals/skilled in building trades	9.32	4.12
Clerks/skilled in building trades	2.13	2.18
Skilled in building trades/common labor	2.75	1.57
Urban common labor/farm labor	0.71	0.86

Sources: Coghlan (1918, vols. 1 & 2) and Colonial Blue Books

Notes: Rows 1-3, skilled in the building trades = carpenters. Row 4 = employment weighted average. Professionals = average of surveyors & surgeons. Common labor is non-farm.

Table 8. Relative Land Values Trends 1830s-1870s

	<i>Annual Earnings Common Labor (w)</i>	<i>GDP per worker (y)</i>	<i>Land values per acre (v)</i>	<i>w/v</i>	<i>y/r</i>
<i>1830s</i>	100	100	100	100	100
<i>1870s</i>	237	270	112	212	241

Sources: The land value data is from Soos (2016).

Notes: Land values per acre are a weighted average of VIC & SA. Annual urban common labor earnings are from NSW. The GDP figures are for "Australia".

Table 9. Measuring the Gap between the Middle and the Bottom 1830s-1870s

	<i>New South Wales</i>				<i>Australia</i>	
	Nominal Annual Earnings Unskilled		Real Annual Earnings Unskilled		Real GDP Pc	Nominal GDP Pc
	Non-farm	All	Non-farm	All		
1830s	100	100	100	100	100	100
1870s	237	2.17	274	251	251	2.70

Sources: Real GDP from M. Butlin et al. (2015), Table A1, pp. 555-8. Labor force 1841-1881 from M. Butlin et al. (2015), Table A2; 1828-1841 for NSW (Withers & Perry 1985), linked wages and CPI from Coghlan (1918, vols. 1 and 2).

Table 10. Annual Earnings (£) in 1830s prices

	<i>Unskilled workers</i>		<i>All workers</i>	
	1830s	1870s	1830s	1870s
Tasmania	47.0	63.9	61.7	63.9
Relative to NSW	117.2	63.5	136.5	58.4
New South Wales	40.1	100.7	45.2	109.4
	100.0	100.0	100.0	100.0

Sources: Wages and prices for the 1830s are gleaned from Coghlan (1918: Vol. 1), the 1850s from Coghlan (1918: vol. 2), and the 1870s from Coghlan (1918: vol. 3). The CPI uses the 1861 NSW budget weights in McLean and Woodward (1992, Table 2, p. 20). Coghlan's 1850s prices are linked to McLean and Woodward (1992) to cover the years 1850s-1870s. The occupation data are from the colonial censuses.

Notes: Unskilled earnings include in-kind payments, and cover farm labor plus urban common labor, weighted by occupation weights. Skilled labor includes artisans, mechanics and those in the building trades.

Figure 1A: Welfare ratios, “bare bone” basket



Figure 1B: Welfare ratios, “respectable” basket



Sources: Lindert and Sansani (2006); Cogley (1918); Statistical account of Van Diemen's Land (1856). Imported linen prices based on Allen (2001).

Note: Other skilled labor includes blacksmiths, plumbers and artisans.