Patterns in British Height: 1770-1845

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Abstract

This ECON 210A paper investigates the long-run evolution of British heights as a proxy for health and well being. I find that the precipitous decline in heights in the 1780s noted elsewhere (Nicholas and Steckel, 1991) are exclusively a *male* phenomenon, and thus not well explained by food insecurity during the Napoleonic wars. Moreover, I find no evidence of the secular decline in prisoner heights from 1815-1845 documented elsewhere for habitual criminals (Johnson and Nicholas, 1995), bolstering the "optimistic" case for standards of living during the early parts of the Industrial Revolution.

1 Introduction

This term paper uses criminal records from the Digital Panopticon project to study the long run development of British height during the early part of the Industrial Revolution. Specifically, we download the subsample of criminal records for all prisoners transported during the nineteenth and late eighteenth centuries. These prisoners were provided with "indents," like passports for their journey, which contained data on place of birth, occupation, and height. I expand upon previous work considering the height of men between 1770 and 1815 (Nicholas and Steckel, 1991) transported to New South Wales along all three dimensions: here we also consider women, extend the analysis forward thirty years to 1845, and consider a sample of convicts shipped to Western Australia, Tasmania, and other colonies in addition to New South Wales. Figure 1 presents the precise distribution. We confirm the result that height declined from 1770 to 1815 for both men and women, but document slight recovery from 1815 to 1845 for men, and stagnation for women. However, examining the long-run trend of female heights reveals that a key feature in both data sets - the abrupt decline in male height during the early to mid 1780s - is a uniquely male phenomenon. I argue here that this decline almost certainly reflects the enormous military recruiting push between 1800 and

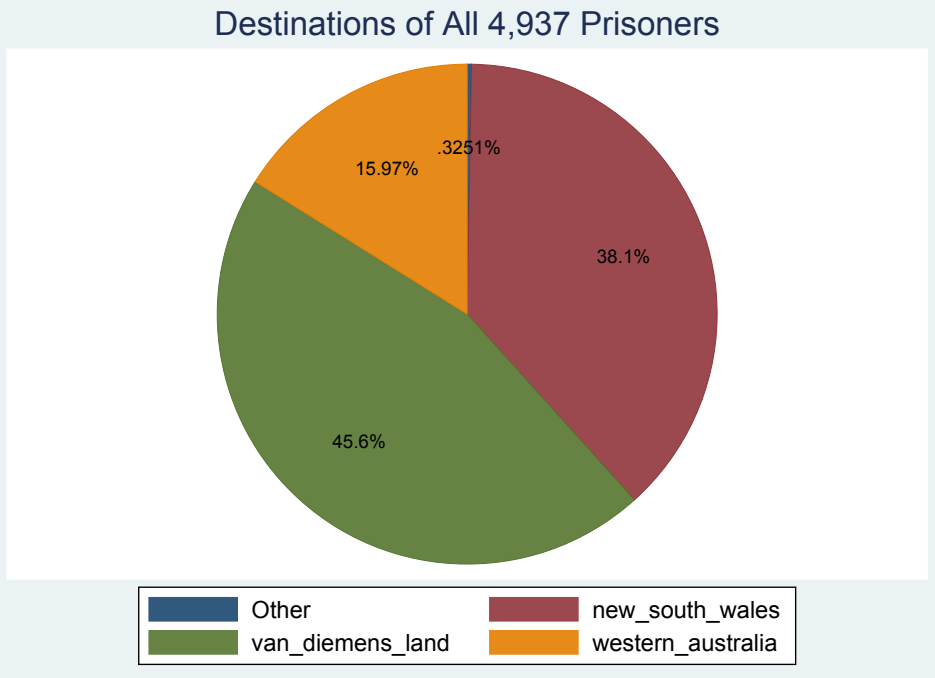

Figure 1: Destinations of whole sample; other includes South Africa, Gibraltar, and Moreton Bay (Australia).

1815, which through minimum height requirements effectively siphoned off the tallest men into the military to die fighting Napoleon, rather than other postulated explanations having to do with food prices from bad harvests, which presumably would have affected the entire population. Thus, this term paper also serves to highlight the pitfalls of only considering male data.

2 The Digital Panopticon "Height" Data

The Digital Panopticon Project[1] is an online database of linked historical criminal records from around fifty different data sets, and includes information on 90,000 convicts. The project was produced as a collaboration between professors from the Universities of Oxford, Liverpool, Sheffield, and Tasmania. As these scholars appear to have mainly been sociologists, criminologists, and historians, their interest in and collection of height data appears to have been incidental. Although I am not the first to examine the height of British prisoners (Johnson and Nicholas, 1995), I am to the best of my knowledge the first to exploit this particular data set for use in the study of long-run heights.

In particular, I download a subsample of their data for prisoners that were at one point

[1]Full name: *The Digital Panopticon: Tracing London Convicts in Britain and Australia, 1780-1925*

transported to the colonies.[2] After removing all individuals whose stated place of birth was not in England, Scotland, or Wales, and removing all individuals with no listed height, we obtain a sample of 6,651 people, which includes 1,714 "children" whose height was measured at less than twenty years of age. Thus, our main sample of interest includes 4,937 people whose height was measured at twenty years of age or older, with dates of birth between 1758 and 1847 (on average, 56 persons per year).

But how representative of the actual population was this sample? Nicholas and Steckel (1991) argued that "the convicts were employed people who supplemented their income by theft in times of distress." They code occupational data (when available; only about a fifth of my sample has data for occupation) and find that although their data skews towards lower skilled occupations, it is not excessively skewed. Indeed, casual inspection of some of the occupations listed in my data source reveal not just relatively unskilled occupations (laborers, servants, and sailors for example) but also lawyers, clerks, printers, and - in one particularly unusual case - a self proclaimed ship's captain. Moreover, unlike other studies of habitual criminals (Johnson and Nicholas, 1995) the transportees are largely first-time offenders. Indeed, only six percent of the sample has committed more than one offense (and of those, 88% committed two) and the offenses listed are overwhelmingly cases of petty theft and fraud, which comprise 95% of the sample. These facts accord well with the tenor of parliamentary debate surrounding transportation in the nineteenth century. Supporters of transportation in Parliament remarked that transportation prevented the creation of habitual criminals, as first-time offenders would otherwise learn about crime while in jail, and even emphasized the supposedly beneficial effects transportation had on the colonies, referring to prisoners as the "pioneers of civilization" Fetter (1980).

However, such high praise raises the specter of selection bias. Indeed, many existing studies of both prisoner and military recruiting data may overstate the decline in height that occurred during the Industrial Revolution due to selection bias (Bodenhorn, Guinnane, and Mroz, 2014) as improving economic conditions caused taller and more productive individuals to self-select out of crime (or the military, respectively) as economic conditions improved. On the other hand, in our current sample of transported prisoners, we may worry that taller and more productive individuals might have selected *into* crime, in the hopes of being chosen to become one of the aforementioned "pioneers." Indeed, at least one member of Parliament voiced the concern that transportation could prove an inducement to crime (Fetter, 1980). As a simple test for such selection bias, Bodenhorn, Guinnane, and Mroz (2014) suggest

[2]Since some of the data sources used in construction of the database were proprietary (e.g. Ancestry.com) their terms of service only enable the user to download less than 1,000 records at a time, and I believe that attempting to download the entire data set using automated queries may violate their terms of service.

running a regression of height on both year of birth fixed effects and "year of entry into the sample" fixed effects, which will capture the effect of, for example, poor macroeconomic performance in one year driving taller people into crime, and entry into the sample. Using my preferred date of entry into the sample[3] our data passes the simple test: year of entry is not significant generally, but the year born is.[4] This gives us some reassurance that selection bias is not the driving force behind our long-run height trends in the data.

Unfortunately, the sample does have some deficiencies. First, the sample is 77% male. Additionally, the men and women present tend to be in their early twenties. Figure 2 demonstrates the severity of this heaping, where we can see that around a third of the male sample is between the ages of 20 and 22! This represents a slight problem, as in this period terminal height is generally only reached by 25 (Voth, 2004). Indeed, we verify this by examining the development of males and females in our sample, taking the average height by age and sex, plotted in Figure 3. We obtain results very similar to those of Nicholas and Steckel (1991); see their Figure 2. Those authors compromise and assume adult height is reached at age 23. I compromise here by considering adult height to be reached at age 20; since most growth appears to have been accomplished by this time, this does not appear too severe an assumption, and it dramatically increases the size of the sample available for analysis.

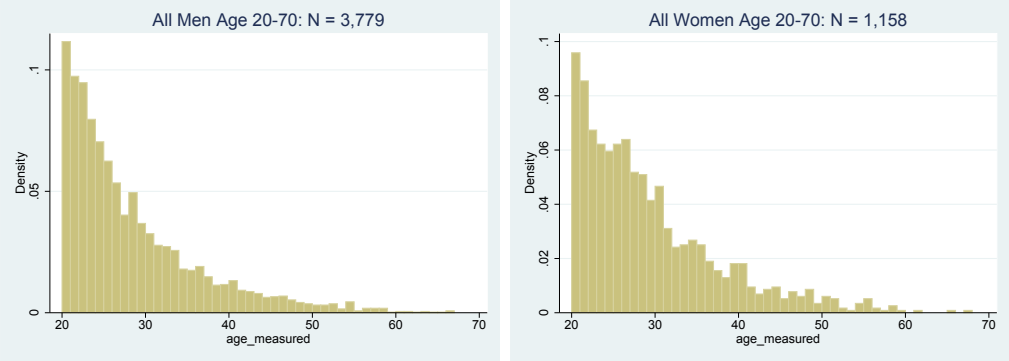

Figure 2: Distribution of Age at Time of Measurement (i.e. Date Transported.)

[3]The year transported, rather than the year first arrested, which accords well with the fact that heights were measured at or just before the time of transport, and not generally at the time of arrest; see the text of the Transportation Act of 1824 in Archbold and Peel (1835) which mandates medical inspection before embarking. This is also the variable I use to calculate age at measurement for the entire sample.

[4]Note that this is not true if one uses the date of each individuals first arrest as the time of entry into the sample. However, I believe the date of transportation is more appropriate for the reasons stated in the previous footnote. Moreover, I am worried that using the date of first arrest might result in spurious results, since I also use the date of first arrest, in combination with the age reported at first arrest, to estimate date of birth (and hence year born, one of the other regressors in these tests) for several hundred individuals missing data on their year of birth. If we run regressions using year of first arrest on the sample of 4,368 individuals *without* these estimated birthyears, the regressions again pass the test: year of entry measured by year of first arrest does not predict height, controlling for year of birth.

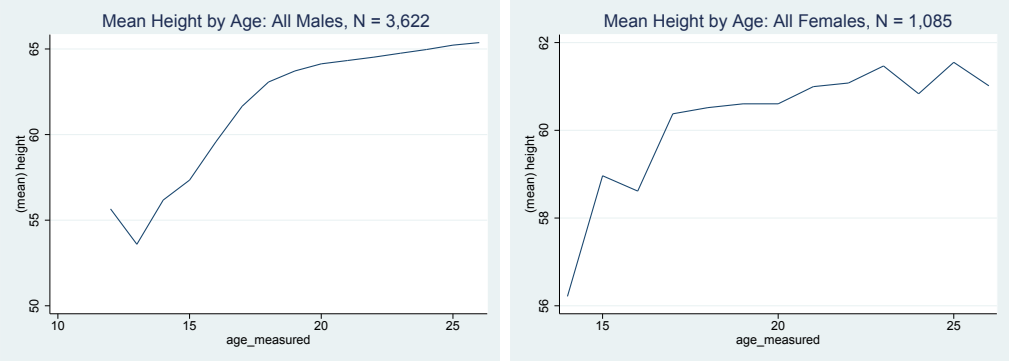

Figure 3: Average Height by Age and Sex

The only significant barrier to analysis here is that the data is not distributed evenly by birth year. As Figure 4 shows, the overwhelming mass of our sample was born between 1790 and 1840, with some "missing mass" in the late 1770s and early 1780s, in particular for men (note the difference in scaling of the vertical axis for the two histograms). Thus, we should be much more skeptical of estimated mean heights for years outside of these dates, particularly when we attempt to replicate Nicholas and Steckel (1991) below, and consider only men aged 23 to 49 separated by birth place into urban and rural subsamples. The missing mass will be further discussed when we consider the impact of recruiting during the Napoleonic wars.

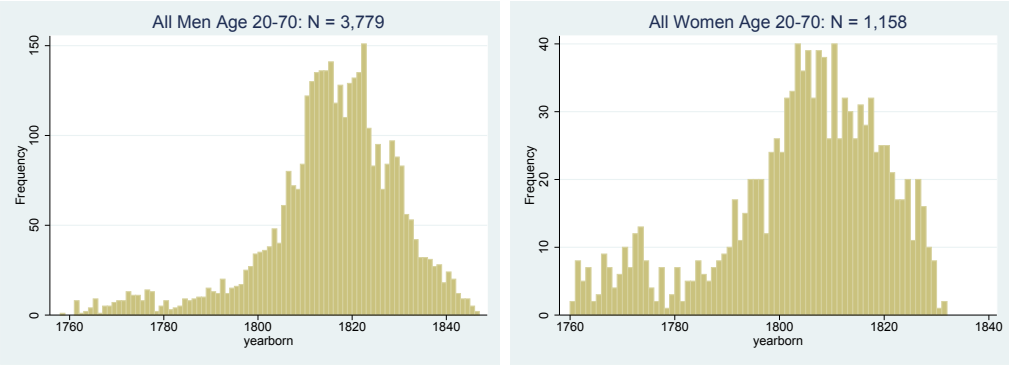

Figure 4: Distribution of Transported Prisoners by Birth Year

3 General Trends

Figure 5 presents five-year moving averages for the height of all men and women in our sample over time. There appears to be a modest long-run trend decline of perhaps an inch for both men and women from the 1760s up until the end of the Napoleonic wars in 1815, at which point the downward decline is arrested for women, and perhaps very slightly reversed

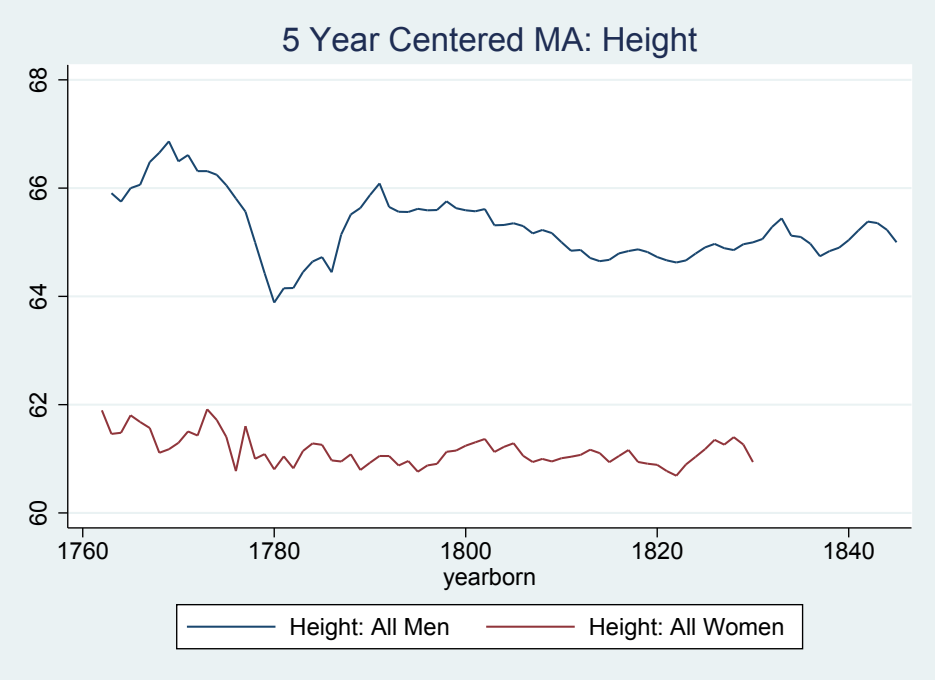

Figure 5: Long Run Height Trends: Men and Women Age 20-70

for men. However, there appears to be a large drop in average height of more than an inch for men born in the early 1780s, when height hits its lowest in sample at just under 64 inches in 1780 up until a partial recovery to 66 inches in 1791, at which point the secular decline continues. There is a similar pattern in Nicholas and Steckel (1991), who note a broad decline in both urban and rural height starting in 1780, with a partial recovery and stabilization in 1790, particularly for their rural sample. They also record a fall of similar magnitude: from 66.5 inches in the 1770s (which is roughly what we have in our sample for this decade), to 65.5 inches, although this drop is much more dramatic in their urban sample than in their rural sample (we will further discuss the urban-rural breakdown in our data below). Thus, our fall in the 1780s is greater in magnitude than theirs, but recovers faster; the larger variation is most plausibly explained by our smaller sample size for this period. But the point remains that in both samples heights suffer a precipitous drop in the 1780s, which does not fully recover. Those authors posit some "environmental insult" such as deficient food inputs, reflecting higher prices of food due to wartime shortage and poor harvests.

However, examining female height, which exhibits the long run trend decline, but not the precipitous drop, forces us to decisively reject this hypothesis. Women need to eat too. Thus if food prices and poor harvests during the 1790s were the primary cause for this drop, we should expect to see the same patterns for both sexes. Note the difference in patterns

is also not due to any obvious difference in class or place of birth. Female convicts are not overwhelmingly more likely to be rural than male convicts in our sample, which would have the effect only of attenuating the decline: in fact, they are more likely to be *urban*. Out of an entire sample that is 57% urban, the female subsample is 65% urban born. In terms of crime committed, we can confirm that the first offense was some sort of theft or fraud for 92% of the female sample. More formally, a regression of height on dummies for urban born, London born (a subset of urban born), young adult (dummy for age of less than 25), and year of birth, run on male and female subsamples separately, confirms our casual impressions: controlling for such composition effects, the two worst years to be born for men are in 1782 and 1780 (costing men 2.8 and 2.3 inches, respectively, significant at the 1% level) while for women the two worst years to be born were 1774 and 1769 (costing them almost 5.75 inches in each case, significant at the 1% level). These (enormous) regressions are reported in the Appendix, and are presented only to formally confirm what the eye can clearly see in Figure 5.

What was happening to men in the 1780s? To answer this, we first analyze the missing mass evident in Figure 4 by creating a histogram of men born in the 1780s by the age at which they were transported. The results, presented in Figure 6, look considerably different from the age distribution of the sample as a whole. All of our knowledge here about the heights of men born in the 1780s comes from men who were transported at age 40 and above. In other words, we are only seeing survivors of the Napoleonic wars, or those too short to have enlisted. We dont see any man in their early twenties from this cohort, because that would have required them to have been transported between 1800 and 1815, precisely when Britain was heavily engaged in war with France. Indeed, the few young men we do see measured are extremely short, averaging 61.5 inches, and all but one falls short of the 66 inches required to enlist in the infantry as of 1807 (War Office, 1807). Given that many of the men who were tall enough from this cohort joined the military and died in the Napoleonic wars, it is unsurprising that the survivors turning up in our sample tend to be short. Indeed, the seminal estimates from military recruiting data of Floud, Wachter, and Gregory (1990) show no evidence of decline during the 1780s. Specifically, estimates of mean height by five-year birth cohort for recruits aged 18 to 29 shows no decline in heights for the birth cohort centered on year 1782.5, which contains the two worst years for male height in our sample. Indeed, at younger ages, this is a local peak for estimated mean height! (See their table 4.1 for details.) Thus, the low observed heights from this decade in the data on male transported prisoners may reflect the fact that tall men were recruited into the Army from this decade very heavily, and then killed.

Is it possible that the Napoleonic wars killed enough tall people to impact the distribution

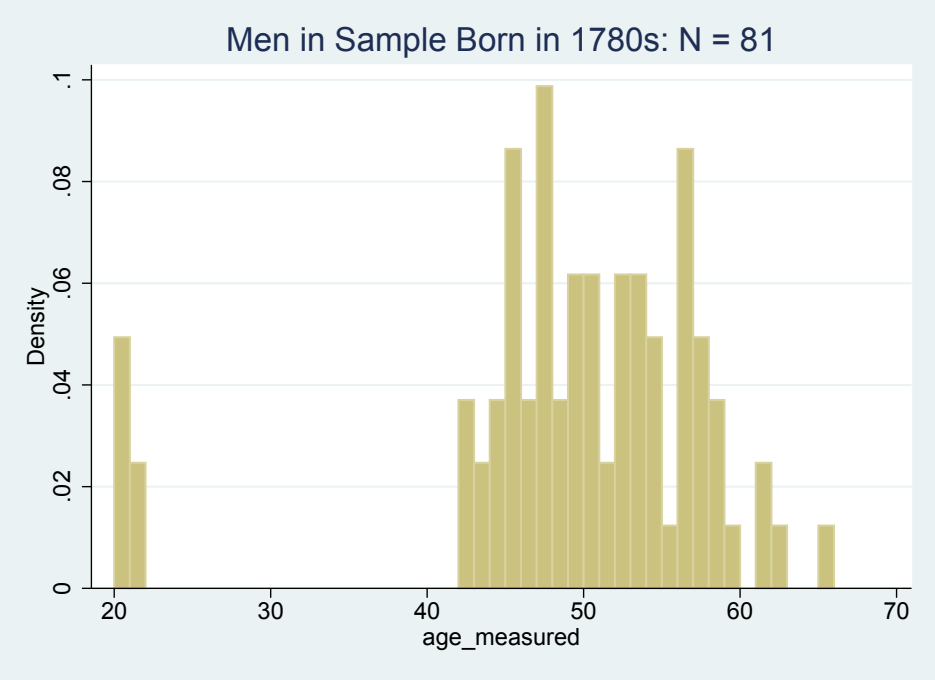

Figure 6: Men by Age Measured born in 1780s (mean height in sample: 64.8")

of heights for the birth cohort of the 1780s? Plausibly.[5] During the Napoleonic wars, Britain intensified its recruiting for the Army (and to a lesser extent the Navy) starting in 1793, when it increased the size of the standing army from 56,000 men to 157,000 men (the first increase of many), and began a recruiting spree that would eventually draw over *half a million* new recruits into the Army between 1793 and 1815. A man unfortunate enough to be born in 1780 would have been 13 in 1793, and thus just reaching the age at which he might be eligible for recruitment: "growing lads" under the age of 16 were permitted to join the Army, so long as they mean met reduced height minimums, to account for the fact that they would grow further while in service (War Office, 1807). Further, such a man would not age out of the possibility of joining the Army until he reached age 30 in 1810. Since joining the military was technically voluntary during this period in British history, we can get a greater sense for how tight the labor market was for recruits by looking at the size of the signing bonus paid during this period. In peacetime in the late eighteenth century, this stood at about three pounds, but by 1805 recruits were able to get as much as 76 pounds: a huge sum by contemporary standards.

Thus, it is highly probable that many men from this cohort joined the military. How

[5]The following facts and figures are taken from Chapters 2 and 3 of Floud et al. (1990), or calculated from the tables provided there, unless otherwise stated. In particular, the recruiting data patches together the actual numbers from 1793 to 1815 with those authors estimated number of recruits for the year 1802, the only year in Table 2.7 for which actual data is not available.

many of them died it is not possible to say with perfect accuracy, but the number is likely to be sobering. Although data on the number of war dead is limited, statistics are available for the notoriously deadly West Indies garrisons between 1793-1798, where an estimated 80,000 men died from war and disease (Buckley, 1978) and comprehensive data for the whole army in 1802 provided by Floud et al. (1990) comes in at a staggering 137,000 for 1802-1815. The total of 217,000 deaths provided here is best viewed as an extreme lower bound that does not include deaths outside of the West Indies for the period 1793 to 1798, or any military deaths between 1798 and 1802. Moreover, none of this takes into account Naval recruiting and deaths, which also increased at this time. For reference, most estimates of the population of Britain (less Ireland) in 1800, which provided around two thirds of all recruits during this time, are around 10 million people (Broadberry, Campbell, Klein, Overton, and van Leeuwen, 2015) or slightly less (Deane and Cole, 1967). In short, the Napoleonic wars may have taken a particularly large toll on tall men and boys born in 1780s, who were eligible to join, which would explain the apparent decrease in heights from men relative to women born during this time.

4 The Urban Rural Divide

We now discuss, to the extent the data allow, differential trends in height amongst urban and rural born workers. The coding of place of birth and results are described below, but before going further I will discuss the main assumption in this section, which is that most people were brought up in the place they report having been born. There are three facts that support this assumption. The first is that labor mobility and movement may not have been high in preindustrial Britain (Williamson, 1987), and to the extent that people did move the distance moved was often modest before 1860, as migrants rarely moved more than 15 to 20 miles from their place of birth (Tranter, 1981). Second, Nicholas and Steckel (1991) test this assumption somewhat directly in their data because they observe the discrepancy between the county in which a convict was tried, and the county in which they were born. They note, in accordance with the first fact, that only about one third of their convicts were tried in a county other than that in which they were born. For these convicts, it is unclear whether or not that move occurred before maturity. However, they claim that considering only convicts who were tried in the same county as their place of birth, and presumably never moved, does not markedly change their results. Finally, some indirect evidence for my own sample comes from my close study of the responses people actually provided, which indicates that the question "where were you born" was generally understood to have meant "where were you raised," much as many native English speakers would interpret the question

today. Accordingly, the data is full of clarifications: for example, one convict reported he was born in "wales, brought up in London" or, to take another example, "essex, brought up in the city." Thus, the variable "place of birth" appears to capture a persons *identity*, rather than the physical location of their birth, which is most likely correlated with where they spent the majority of their time during childhood and adolescence.

4.1 Defining "Urban"

That said, even if we know exactly where, geographically, somebody was brought up, classifying a particular place as "urban" involves a judgment call on the part of the researcher. Ideally, one would carefully research each location reported in the sample, and ascertain its level of development at the time of the individuals upbringing, and then use some sort of objective measure of urbanization to classify that location as urban or rural. Unfortunately, given thousands of place names in unstandardized and typo-ridden prose, this approach is not workable in a reasonable time frame. As such, I do my best to copy Nicholas and Steckel (1991), who consider as urban any individual who lists their birthplace as a city or town.

My approach was the following: I sorted my entire sample of place names by the number of individuals who listed that particular place name as their place of birth, and worked my way through starting with the most common place names. By default, I assumed every individual in the sample was rural, unless they gave their birthplace as a city or town, which meant I worked my way through this list and researched individual place names to come to a reasonable guess as to whether or not it would have qualified as the city or town 150 years ago. I was able to make my way through the first hundred or so most common place names, until I reached the place names that only had two or fewer people reporting. I then stopped in the interest of time, figuring that even if any of these locations were towns, they had a high probability of being extremely small, given the few people reporting them as places of birth, and thus best classified as rural in any case. The most important part of this process was determining which place names actually referred to locations in London: many people, for example, listed streets, neighborhoods, or churches in London as places of birth. Finally, I made sure to at least read through the list to get rid of any individual who was obviously foreign-born, including those from Ireland. Finally, it bears mentioning that this procedure classifies as rural all 1,029 individuals for whom no place of birth is given.

4.2 Trends in Height in Urban and Rural Populations

Having classified the data, we proceed with the following two exercises. First, we attempt to exactly replicate Figure 3 of Nicholas and Steckel (1991), with limited success. The results

are compared side-by-side in Figure 7. The reason for this limited success, as mentioned before, is that our eighteenth century data is simply too sparse for this to be a reasonable exercise for the early part of their sample. To illustrate this point, we provide a histogram of the sample used in this replication exercise, which includes only men of age 23 to 49, presented in Figure 8. However, we succeed in replicating their results for the period after 1800, where our sample is more dense, complete with convergence between urban and rural heights near the end of the Napoleonic wars between 1810 and 1815.

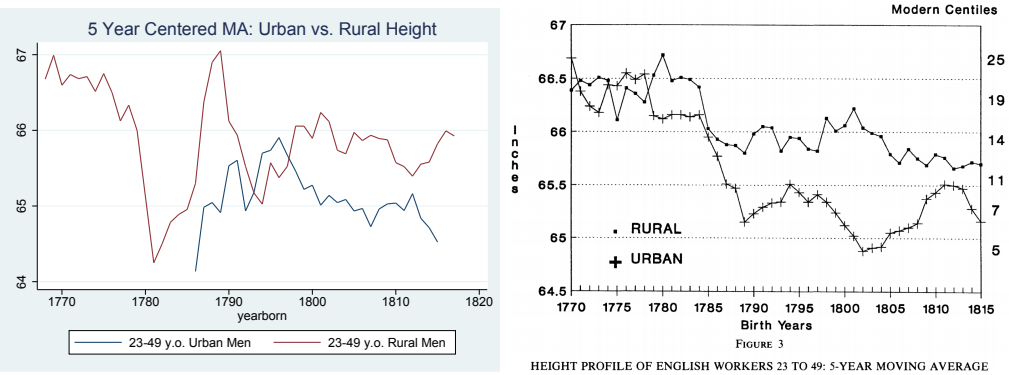

Figure 7: Recreating Nicholas and Steckel's 1991 Graph

Next, taking advantage of the density of our sample during later periods, we extend this exercise 30 years into the nineteenth century, and include our preferred sample of all men from age 20 to 70. The results are depicted in Figure 9. Even with the expanded sample, the period before 1800 is still fairly noisy. However, the period between 1800 and 1830 documents the fact that the gap between urban and rural heights persisted through the period of early industrialization.

4.3 Tentative Explanations for the Postwar Gap in Urban and Rural Heights

Explanations of the urban-rural divide in height for this time period generally focus on the poor quality of life inherent in cities and towns, which suffered from overcrowding and poor sanitation during the early parts of the nineteenth century (Voth, 2004). However, one possibility is that the increase in regressive taxation during this period contributed to some of the decrease in height. Notoriously, Britain funded a large part of the French wars against Napoleon through taxes rather than debt Bordo and White (1990). These taxes were mostly excise taxes on transactions, which fell disproportionately on citydwellers, and remained high

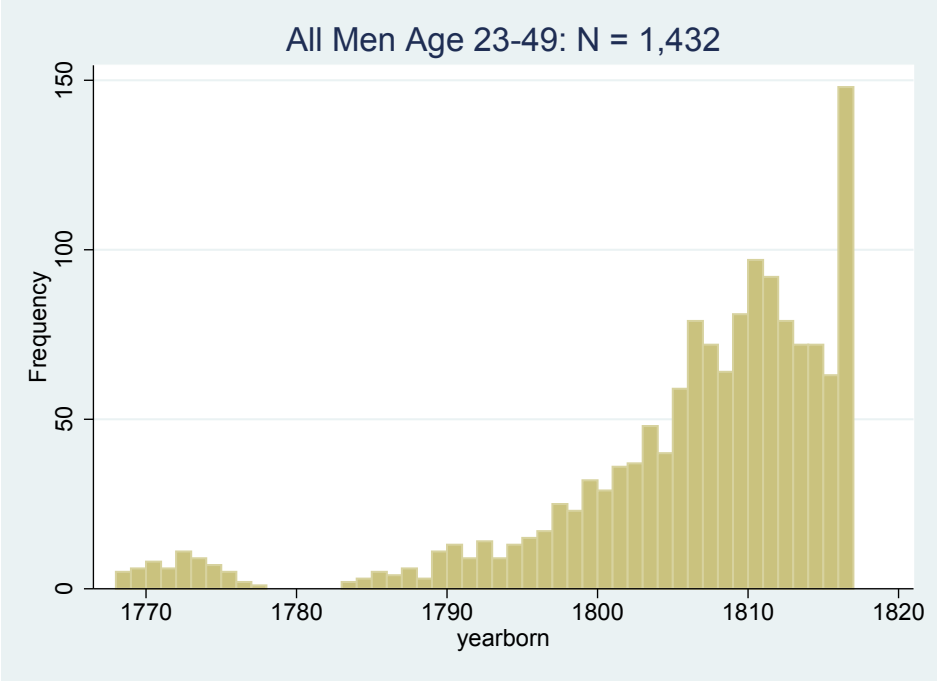

Figure 8: Histogram of All Data Used in Recreating Nicholas and Steckel's 1991 Graph

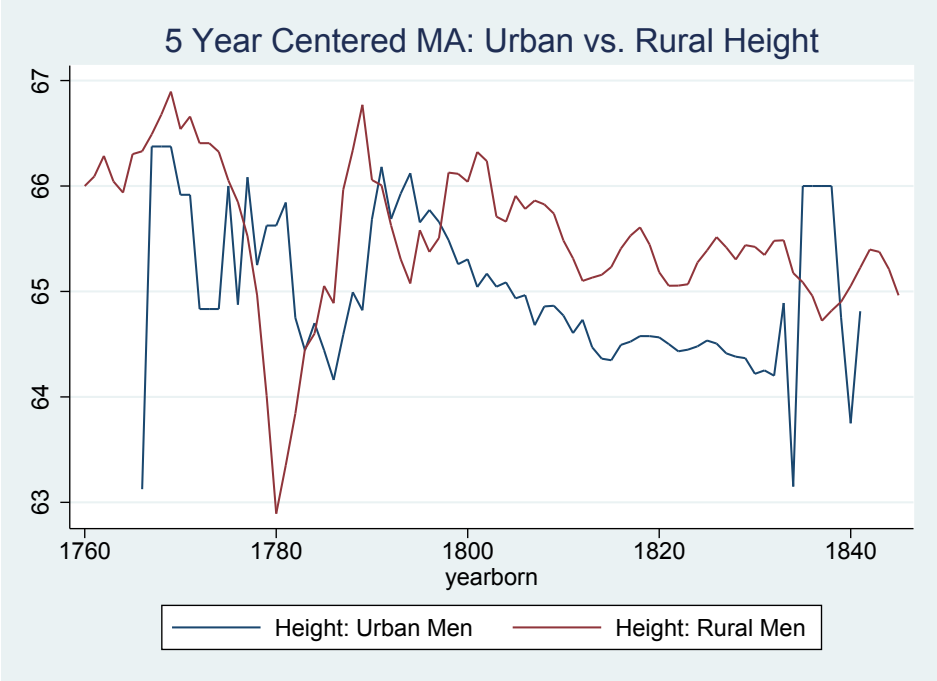

Figure 9: Urban vs. Rural Data: Our Preferred Sample of Men Age 20-70

long after the war was over O'Brien (2007).[6]

There is some anecdotal evidence to support this claim. The concept of tax incidence was not well understood by policymakers in this era, who naively assumed that taxes were paid by the party physically delivering money to parliament (O'Brien, 2007). Between 1792 and 1814, the taxes which saw some of the highest increases were on alcohol sales (anywhere from 25 to 200 percent increases), raw materials for construction of new buildings, leather, salt and raw cotton (increased between 100 to 900 percent) as well as on the use of public stage carriages (300 percent) and the keeping of servants. These taxes would have been particularly felt in cities and towns, where tax collection is much easier (Voigtlander and Voth, 2013). Evasion was most likely rampant in the countryside (Mitchell and Deane, 1962) where records were poorly kept and transactions were often not settled in cash (Finn, 2003). These taxes were indeed felt to be burdensome, reflected in the increasing number of riots due to taxation during this time (Tilly, 1995). Thus, it is possible that some of the persistent gap in urban and rural heights during this period was due to redistribution or the consequences of regressive taxation unequally applied in cities and in the countryside.

Additionally, a cause of the gap could be industrial pollution, which is known to have adverse health outcomes in the modern day. Our sample allows a simple test of this hypothesis, given that 39% of our sample was born in London, which experienced enormous industrialization and an increase in coal imports to fuel it during this time period. Using estimates of coal imported into London annually (Mitchell and Deane, 1962), we instrument for the effect of increased coal imported on height using several weather-related variables constructed from daily observations of temperature in London (Parker, Legg, and Folland, 1992). The idea is that unusually cold temperatures will cause an increase in coal burning and coal imports, as people seek to heat their homes, which will result in poor air quality during childhood. Since one threat to the excludability assumption here is that cold temperatures might also affect food prices, and thus the ability of families to feed their children, we also include a measure of real wages as an endogenous variable (Clark 2004, 2006). We present the results in Table 1 for two regressions: one that only looks at the impact of coal imports and real wages in year of birth, and another that looks at the effect in each year of the first five years of life. The results are clearly mixed. Though the net effect of coal imports over the first five years of life appears to go in the expected direction (summing the coefficients - an admittedly arbitrary procedure - yields a net negative result) the opposite

[6]This explanation will unfortunately remain unexplored quantitatively in this paper, as it is not possible to patch together nineteenth and eighteenth century data on taxation as made clear in Mitchell and Deane (1962), the source of (Bordo and White, 1990). Bordo and White neglect to mention how they overcome the issues with such concatenation pointed out by the authors of their data source. Since I can see no way around this, I make no attempt to analyze this data here.

appears true of wages, as our best guess is that higher wages during the first five years of life actually results in *decreased* height. Wald tests (not presented) for the five coefficients on coal imports and wages, respectively, reject the null hypothesis that all coefficients are zero at the 5% level.

Table 1: IV Regression Results: Effect of Coal Imports on Adult Height

	(1) height		(2) height	
CoalLondon_0	0.000843	(0.39)	0.000348	(0.64)
Wagebldglaborer_0	-0.0403	(-0.86)	-0.154**	(-3.17)
male	3.815***	(26.64)	3.756***	(31.98)
young	-0.470***	(-3.77)	-0.487***	(-3.96)
yearborn	0.000207	(0.00)	0.0226	(0.38)
CoalLondon_1			-0.00150*	(-2.54)
CoalLondon_2			-0.000358	(-0.41)
CoalLondon_3			0.0000929	(0.11)
CoalLondon_4			0.00120	(1.36)
Wagebldglaborer_1			0.137*	(2.00)
Wagebldglaborer_2			0.0507	(0.67)
Wagebldglaborer_3			-0.115	(-1.59)
Wagebldglaborer_4			0.0779	(1.50)
_cons	60.19	(0.62)	20.16	(0.19)
N	1928		1928	

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

The estimates of the instrumental variables regression presented in Table 1 should be taken with a grain of salt. In addition to the puzzling results reported above, the instruments are unfortunately weak: the F-statistic from a regression of coal imports on my weather instruments is only a little over three, though the F-statistic of the same regression for wages exceeds ten. Thus the relevance assumption is not really satisfied. Additionally, the excludability assumption may not be satisfied either, as extreme temperatures may directly impact height by increasing calories required (Voth, 2004).

5 Conclusion

Using new evidence from the Digital Panopticon project, this term paper has shed light on the precipitous drop in male height during the 1780s demonstrated by Nicholas and Steckel (1991). Comparison with female heights reveals that any explanation proposed for this drop must operate through a channel which only affects men. This challenges the hypothesis that

harvest failures and high food prices were behind this decline, leaving the effect of military recruiting as the most plausible direct cause of the decline in heights during this decade. We also extend forward the analysis of the heights of transported convicts by 30 years after the war, up to 1845, revealing stagnation to slight recovery in heights for men between the end of the Napoleonic wars and the end of our sample. This is more optimistic than other criminal studies, which demonstrate a decline in heights for criminals during the same period (Johnson and Nicholas, 1995), and may reflect the fact that our sample of specifically transported convicts is less prone to the sort of selection bias pointed out by Bodenhorn et al. (2014).

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6 Appendix: Height Regressions for Male and Female Convicts

Table 2: British Adult Height by Sex

	(1)		(2)	
	Male height		Female height	
young	-0.752***	(-7.12)	-0.294	(-1.83)
urban	-0.116	(-0.69)	-0.232	(-1.11)
london	-0.805***	(-5.46)	-0.935***	(-4.68)
1758.yearborn	0	(.)		
1761.yearborn	2.43e-11	(0.98)	-3.250***	(-1.80e+12)
1762.yearborn	2.43e-11	(0.98)	-4.900***	(-2.71e+12)
1763.yearborn	0.500***	(2.02e+10)	-2.714***	(-1.50e+12)
1764.yearborn	0.168***	(6.23)	-8.500***	(-4.71e+12)
1765.yearborn	-0.333***	(-1.35e+10)	-4.833***	(-2.68e+12)
1766.yearborn	-2.000***	(-8.07e+10)	-3.278***	(-1.82e+12)
1767.yearborn	1.034***	(48.00)	-3.357***	(-1.86e+12)
1768.yearborn	0.500***	(2.02e+10)	-2.750***	(-1.52e+12)
1769.yearborn	1.624***	(67.59)	-5.722***	(-152.58)
1770.yearborn	0.125***	(5.04e+09)	-5.850***	(-3.24e+12)
1771.yearborn	1.376***	(52.08)	-2.601***	(-113.57)
1772.yearborn	-0.228***	(-12.30)	-3.277***	(-61.33)
1773.yearborn	1.137***	(59.18)	-2.710***	(-27.00)
1774.yearborn	0.0110	(0.51)	-5.759***	(-71.86)
1775.yearborn	0.407***	(10.28)	-2.967***	(-24.68)
1776.yearborn	1.019***	(15.01)	-3.395***	(-24.43)
1777.yearborn	-0.517***	(-5.79)	-4.406***	(-45.14)

1778.yearborn	-0.191*	(-2.15)	-3.500***	(-1.94e+12)
1779.yearborn	-1.602***	(-19.67)	-3.089***	(-44.41)
1780.yearborn	-2.338***	(-45.80)	-4.648***	(-33.27)
1781.yearborn	0.366*	(2.18)	-2.083***	(-9.26)
1782.yearborn	-2.811***	(-53.22)	-4.720***	(-22.80)
1783.yearborn	-0.177***	(-5.26)	-3.074***	(-26.61)
1784.yearborn	-1.563***	(-32.64)	-4.282***	(-25.29)
1785.yearborn	-1.407***	(-19.70)	-3.684***	(-57.34)
1786.yearborn	0.0491	(0.69)	-2.867***	(-63.70)
1787.yearborn	-1.427***	(-16.22)	-4.993***	(-45.34)
1788.yearborn	-1.622***	(-19.99)	-4.063***	(-24.07)
1789.yearborn	0.886***	(16.38)	-3.949***	(-21.83)
1790.yearborn	0.521***	(6.04)	-3.207***	(-23.87)
1791.yearborn	0.516***	(9.67)	-4.609***	(-45.22)
1792.yearborn	-0.144**	(-2.70)	-4.032***	(-42.85)
1793.yearborn	-0.167***	(-3.51)	-3.535***	(-24.63)
1794.yearborn	-1.152***	(-27.01)	-4.297***	(-44.78)
1795.yearborn	-0.119	(-1.83)	-4.145***	(-29.43)
1796.yearborn	0.306**	(3.39)	-4.034***	(-34.48)
1797.yearborn	0.0502	(0.70)	-5.353***	(-36.78)
1798.yearborn	-0.218**	(-2.73)	-3.454***	(-31.14)
1799.yearborn	-0.501***	(-7.00)	-3.872***	(-24.64)
1800.yearborn	0.603***	(9.87)	-3.087***	(-22.99)
1801.yearborn	-0.284***	(-4.57)	-3.870***	(-27.94)
1802.yearborn	0.0730	(0.90)	-3.976***	(-32.04)
1803.yearborn	-0.272***	(-4.29)	-3.202***	(-24.50)
1804.yearborn	-0.216**	(-3.18)	-3.537***	(-27.44)
1805.yearborn	-0.645***	(-10.01)	-4.338***	(-29.59)
1806.yearborn	-0.277***	(-4.31)	-3.218***	(-21.31)
1807.yearborn	0.00620	(0.10)	-3.301***	(-18.42)
1808.yearborn	-0.359***	(-5.29)	-4.040***	(-21.33)
1809.yearborn	-0.790***	(-12.48)	-4.177***	(-31.67)
1810.yearborn	-0.165*	(-2.29)	-4.213***	(-31.43)
1811.yearborn	-0.168*	(-2.41)	-3.306***	(-23.01)
1812.yearborn	-0.424***	(-6.04)	-3.011***	(-17.50)

1813.yearborn	-0.822***	(-13.01)	-4.077***	(-22.98)
1814.yearborn	-0.397***	(-6.10)	-3.872***	(-26.65)
1815.yearborn	-0.648***	(-9.78)	-3.620***	(-21.68)
1816.yearborn	-0.414***	(-5.64)	-3.358***	(-16.99)
1817.yearborn	-0.341***	(-5.12)	-3.771***	(-23.11)
1818.yearborn	-0.261**	(-2.97)	-3.525***	(-21.17)
1819.yearborn	-0.149*	(-2.18)	-3.205***	(-19.90)
1820.yearborn	-0.470***	(-6.24)	-4.750***	(-27.65)
1821.yearborn	-0.549***	(-6.65)	-3.678***	(-19.51)
1822.yearborn	-0.507***	(-6.46)	-4.131***	(-28.94)
1823.yearborn	-0.584***	(-9.18)	-3.984***	(-20.62)
1824.yearborn	-0.295***	(-4.74)	-3.312***	(-18.03)
1825.yearborn	-0.609***	(-11.82)	-4.010***	(-20.99)
1826.yearborn	-0.215***	(-3.93)	-2.932***	(-13.56)
1827.yearborn	-0.669***	(-10.51)	-2.795***	(-12.71)
1828.yearborn	-0.511***	(-10.26)	-3.006***	(-13.77)
1829.yearborn	-0.502***	(-6.73)	-4.107***	(-21.19)
1830.yearborn	-0.756***	(-14.67)	-3.040***	(-10.94)
1831.yearborn	0.753***	(16.61)	-3.040***	(-10.94)
1832.yearborn	-0.875***	(-67.02)	-4.790***	(-17.23)
1833.yearborn	-0.726***	(-288.65)		
1834.yearborn	-0.226***	(-22.85)		
1835.yearborn	-1.218***	(-92.26)		
1836.yearborn	-0.735***	(-24.57)		
1837.yearborn	-1.086***	(-41.80)		
1838.yearborn	-0.856***	(-12.60)		
1839.yearborn	-1.096***	(-20.75)		
1840.yearborn	-0.729***	(-55.19)		
1841.yearborn	-0.316***	(-21.88)		
1842.yearborn	-0.145***	(-4.12)		
1843.yearborn	0.0901	(1.36)		
1844.yearborn	-0.374***	(-6.37)		
1845.yearborn	-1.148***	(-10.86)		
1846.yearborn	-0.998***	(-9.44)		
1847.yearborn	-1.248***	(-11.81)		

1760.yearborn			0	(.)
_cons	66.00***	(2.66e+12)	65.50***	(3.63e+13)
N	3779		1158	

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$