Convict Labor and the Costs of Colonial Infrastructure: Evidence from Prisons in British Nigeria, 1920-1938*

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Abstract

There is a small, but growing literature on the role of domestic labor coercion in colonial revenue raising activities in Africa. This paper seeks to understand the role of labor coercion in fiscal capacity building in Europe's African colonies. We estimate the value gained by authorities from labor coercion and compare this to other colonial expenditure. We estimate this using evidence from British colonial Nigeria. We use historical datasets on wages, prisoners, and convict labor from 1920 through 1938 to examine the evolution of value gained from labor coercion during the period. Our results show that coerced convict labor made up a significant part of colonial revenues and expenditures. The results provide insight on the costs of colonial infrastructure and the effects of the colonial revenue imperative on African populations.

JEL classification: H2, J47, O10, O43, N37

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1 Introduction

“The Prison at Port Harcourt has been considerably developed and at the close of the year there were 829 prisoners in custody and these are employed by the Eastern Railway. The Engineer in charge at Port Harcourt is highly pleased with the way the prisoners are worked; they have given no trouble and have been of great assistance in developing that station. It was my intention to have 1,000 prisoners stationed there before the close of the year, but this was impossible as two prisons...which should have supplied the drafts to make up the number, had an outbreak of chicken-pox...”

- E. Jackson, Acting Inspector of Prisons, *Lagos, 23rd April, 1915*

Following a slew of academic and political work in postcolonial studies with anti-colonial theses in the mid to late twentieth century, there has been a recent resurgence of political, journalistic, and scholarly literature citing and debating the benefits of European colonialism and British empire in particular for the economic development of former colonies (Ferguson, 2008; Said, 1978). While much of this work has focused on evaluating the supposed benefits of education and infrastructure projects spearheaded by British missionaries and colonial officials in former colonies, there is relatively little work focused on investigating the costs of this infrastructure, particularly relating to the contribution of indigenous unpaid labor. Although recent research has begun estimating the contribution of “labor taxes” or forced indigenous labor to the construction of public works projects like the railroads and roads in the colonies, the literature remains thin regarding the use of another source of forced labor, convict labor, in Europe’s colonies, particularly in the British context (van Waijenburg, 2018; Hynd, 2015; Abiodun, 2017; Bernault, 2007).

This is a significant gap in the economic history literature, particularly given that an often explicitly stated strategy to fulfill the colonial government’s revenue imperative and reduce costs associated with public works expenditure was to use convict labor, as shown in the above 1915 quote from Jackson in his capacity as the Acting Inspector of Prisons in Nigeria (Foreign and Office, 1937). A primary aim of this paper is to provide new information that allows us to evaluate the importance of convict labor to the colonial regime. We do this by providing quantitative estimates of the share of labor coercion in colonial revenues and public works expenditure using evidence from prisons in British colonial Nigeria between 1920 and 1938. To our knowledge, this is the first paper to provide estimates on the value of convict labor for colonial fiscal capacity in Britain’s African colonies.

Much of the work on convict labor and its use in industrial activities of ruling governments has focused on the role of convicts as “forced laborers”, performing legally unpaid, unfree work in contrast with their wage labor peers (De Vito and Lichtenstein, 2013; van der Linden, 2008; Adamson, 1984). The use of convict labor by government regimes extends as far back as the 15th century with examples ranging from the Roman empire to the French and Ottoman empires of the 16th and 17th centuries (De Vito and Lichtenstein, 2013; Brown and Dikotter, 2007). The 18th and 19th centuries have been cited by historians like De Vito and Lichtenstein (2013) as marking periods of significant increase in the use of convict labor, largely driven by increased labor demand for industrial projects. This increased demand for convict labor is described as occurring alongside the increased demand for free labor, particularly in European colonies in Africa, Asia and the Americas (De Vito and Lichtenstein, 2013).

One of the most well-known historical cases of the use of convict labor for industrial projects is the United States in the 18th and 19th centuries, where laws like the Black Codes and convict labor were part of a state-led effort to criminalize Black populations

following the abolition of slavery in 1865 (Fogel and Engerman, 1995; Myers, 1998; Worger, 2004; De Vito and Lichtenstein, 2013; Browne, 2007). The US case shared many of the same features of labor exploitation of indigenous populations for public works and private industry consumption with American, African and Asian colonies under European control (De Vito and Lichtenstein, 2013; Brown and Dikotter, 2007; Arnold, 1994; Paton, 2004; Worger, 2004).

In Britain's African colonies, as in the French case outlined by Bernault (2007), convict labor in the 19th through the mid 20th centuries, was a significant source of labor for public works and industrial projects with work on road and railway projects, like the Eastern Railway in Nigeria, in some cases almost entirely manned by prison labor (Hynd, 2015; Akurang-Parry, 2000; Abiodun, 2017; Foreign and Office, 1937). The revenue imperative of the British colonial effort, motivated largely by a concern with stabilizing fiscal capacity and minimizing costs to the regime, and faced with chronic labor shortages in Africa, viewed prison labor as an essential part of maintaining fiscal solvency, alongside direct and indirect taxation in the colonies (Hynd, 2015; Akurang-Parry, 2000; Abiodun, 2017; Foreign and Office, 1937; van Waijenburg, 2018; Gardner, 2012).

Labor shortages, driven in part by rising demand for labor for industrial activities like railroad construction, viewed as necessary for minimizing the costs of transporting commodities to the coast for tax revenue and extending control over indigenous populations, translated to high market wages that colonial officials were often unwilling to pay in efforts to minimize costs (Gardner, 2012; Frankema, 2011). Like the Black Codes employed against Black populations in the United States, one way in which colonial governments responded to these labor demand pressures was to employ a number of coercive institutions including vagrancy laws, labor registration and pass laws that criminalized indigenous populations, and Native Authority Ordinances that mandated the conscription of African laborers to work on colonial public works projects (Hynd, 2015; Akurang-Parry, 2000; Thomas, 1973).

To estimate the contribution of convict labor to Britain’s fiscal resources and public works expenditure in colonial Nigeria, we adapt the empirical strategy from van Waijenburg (2018), and estimate the share of unpaid wages to prisoners in colonial revenues and expenditures. We assemble a new dataset on prisoners, wages, and fiscal spending from British colonial records over 1920 to 1938. We use this to estimate the value of unpaid wages to prisoners or the value of labor coercion in colonial revenues and public works expenditure. The results reveal a significant share of convict labor in public works expenditures in particular, ranging between almost 40% and 140% of public works expenditure through the period of study. The imputed wages assigned to prisoners’ labor from colonial officials is also significantly below the market rate, with prisoners’ labor valued between 60 to 80% below market rate over 1919 through 1925 years of available data.

These findings add to the growing literature on the significance of domestic labor coercion in fiscal capacity building in Europe’s African colonies, and help fill the gap in the knowledge of the role of convict labor in funding colonial public works projects (Frankema, 2011; Hynd, 2015; Jumare, 1998; van Waijenburg, 2018; Hynd, 2015; Akurang-Parry, 2000; Thomas, 1973). Given the ongoing debate on the effects of European colonialism on development in Africa and Asia, the paper presents quantitative estimates, supplemented by qualitative sources, on the costs of colonial infrastructure by examining the contribution of the unpaid work of indigenous prisoners in these regimes.

The rest of the paper is organized as follows: Section 2 provides historical background on the use of convict labor generally and in British colonial Nigeria. Section 3 describes the data and outlines our empirical methodology. Section 4 discusses our results estimating the share of labor coercion in colonial revenues and expenditures using the prisons data. Section 5 outlines our robustness checks using alternate measures of wages and the value of labor coercion and measuring the bias in our estimates. Section 6 discusses some of the wage

trends in our results with implications for our measure of coercion. Section 7 concludes.

2 Historical Background

2.1 Prisons and the Use of Convict labor

Of the many forms of forced labor, from indentured servitude and “labor taxes”¹ to slavery, that have received scholarly attention in economic history in recent years, the use of the labor of incarcerated individuals in domestic contexts, remains relatively understudied in the literature (Nunn and Wantchekon, 2011; Acemoglu and Wolitzky, 2011; van Waijenburg, 2018; Bernault, 2007).

While there are multiple views regarding the classification of convict labor as discussed in De Vito and Lichtenstein (2013), we focus here on convicts who are “forced laborers”, performing officially unpaid, unfree work for a polity, in contrast with their wage labor counterparts². Recorded histories of the use of convict labor by state authorities extend as far back as the 15th century, from regions as varied as the Roman Empire in the 15th century with convicts working aboard galleys in maritime transport and naval combat, the 16th century Ottoman empire’s naval galleys, and the 17th century French naval galleys (De Vito and Lichtenstein, 2013). In the Ottoman empire, the use of prisoners extended from galleys in the 16th century, to work in agriculture and small-scale industry by the beginning of the 19th century in Egypt (De Vito and Lichtenstein, 2013; Brown and Dikotter, 2007). De Vito and Lichtenstein (2013) describe the rise of the use of convict labor for industrial projects in the 18th and 19th centuries as going hand in hand with the increased demand for free labor, particularly in the colonies in Africa, Asia and the Americas under European control.

¹Including van Waijenburg (2018)’s recent work on the French *corvée* system of forced labor in the 19th and 20th centuries in African colonies.

²Further discussion of Marxist conceptions of wage labor in capitalist settings as unpaid work are well-noted, though beyond the scope of this paper. For more on this literature, refer to De Vito and Lichtenstein (2013); van der Linden (2008); Adamson (1984)

One well-known case of the use of convict labor for industrial projects was in the 19th century in the United States of America, where laws, punishment and convict labor were part of a regime of the criminalization of Black populations following the abolition of slavery (Fogel and Engerman, 1995; Myers, 1998; Worger, 2004; De Vito and Lichtenstein, 2013; Browne, 2007). The use of primarily Black prison labor to work on public works projects like the roads or the railroad in the US South has been well documented in the historical literature (Fogel and Engerman, 1995; Myers, 1998; Worger, 2004; De Vito and Lichtenstein, 2013; Browne, 2007). The US case shared many of the same features of labor exploitation of domestic populations for public works and private industry consumption in the 18th, 19th and 20th centuries with American, African and Asian colonies under European control; including the “agricultural penitentiaries” of French north Africa and the exploitation of convict labor in De Beer’s Mining Company in South Africa (De Vito and Lichtenstein, 2013; Brown and Dikotter, 2007; Arnold, 1994; Paton, 2004; Worger, 2004).

The use of convict labor was often a significant part of the empire-building efforts of European colonizers, with well-documented examples from periods of British, French and Portuguese rule in the 19th and 20th centuries (De Vito and Lichtenstein, 2013). The literature documents the transport of thousands of convicts to work on plantations and industrial projects in British colonies in New South Wales, Australia and from British India to penal colonies in the Malay Peninsula, Burma, Mauritius and the Andaman Islands (De Vito and Lichtenstein, 2013; Arnold, 1994). So significant was convict labor to colonial empire building that De Vito and Lichtenstein (2013) write in their history of penal labor that “an account of the imperial expansions of the nineteenth-century world remain incomplete without acknowledging the centrality of penal labor to this process and penal transportation as a key aspect of imperial sovereignty”.

Two main reasons for the use of convict labor emerge in this literature. First, prisoners

were employed to work as punishment for crimes, as defined by regimes, and second, prisoners were viewed as a source of cheap labor, particularly for industrial projects during the industrial booms of the 18th and 19th centuries (De Vito and Lichtenstein, 2013; Adamson, 1984). In Europe’s colonies, penal labor was viewed as a necessary component of punishment with a civilizing effect on “native” populations who were stereotyped as lazy, and prone to avoidance of work without outside inducement (De Vito and Lichtenstein, 2013; Adamson, 1984). As a source of cheap labor, conscript work was viewed as going hand in hand with the economic development of polities, so much so that some historians cite the notable increase in prisons in the latter half of the 19th century in the US as evidence for the connection between business demand for labor and incarceration rates (De Vito and Lichtenstein, 2013; Adamson, 1984).

In the US case, a series of laws from vagrancy laws and the Black Codes that limited access to owning property, voting and laws that criminalized everything from loitering to “breaking curfew”, sometimes served to increase the prison population in periods of higher labor demand and increased labor shortages (Adamson, 1984; Myers and Massey, 1991; Fraser and Freeman, 2012). The construction of public works projects like roads and railroads in particular were sometimes entirely funded by convict labor with one example being the Western North Carolina Railroad from 1855 to 1894 in the US (Abrams, 1976). Convict labor has a long history globally and was an instrumental part of the industrial development effort of the 18th, 19th and early 20th centuries particularly in the Americas and Europe’s colonies in Africa and Asia.

2.2 Prisons and Convict labor in British Colonial Nigeria

In this section we outline a brief history of the colonial convict labor system in Nigeria, with a more detailed account provided in Archibong and Obikili (2018). van Waijenburg (2018) examines one system of forced labor in France’s African colonies, namely the *corvée*

system or so called “labor taxes” that mandated the transfer of hours of mandatory, unfree work from France’s young African subjects to colonial projects. Similar systems of labor coercion existed in Britain’s African colonies, with endemic labor shortages, the need for labor on large scale public works projects in the 19th and 20th centuries- railroads and roads in particular-, and a revenue imperative focused on minimizing the costs of administration, driving the use of forced labor in Britain’s African colonies (Frankema, 2011; Hynd, 2015; Jumare, 1998; Gardner, 2012).

In British colonial Nigeria, labor taxes and labor laws worked in concert with Masters and Servants Ordinances, vagrancy laws, labor registration, pass laws and Native Authority Ordinances that mandated the conscription of African laborers to work on colonial public works projects (Hynd, 2015). Alongside the growth of coercive laws in the colonies, was the increased use of the prison system and convict labor to work on private and public works projects, particularly in the early part of the 20th century (Hynd, 2015; Akurang-Parry, 2000; Abiodun, 2017; Bernault, 2007). Individuals who refused or were unable to pay direct or labor taxes or the fines associated with non-payment, or committed petty crimes against the colonial regime or their Native Authorities, were arrested and placed in prison, after which their labor was subsequently used to work on colonial public works projects. An example of this is presented in accounts by Ekechi (1989) and Hynd (2015) where a sizable number of the inmates in the Owerri prison in South-Eastern Nigeria were young men who had resisted mandated labor under the labor regulations, after which they were imprisoned and employed as convict labor. In Nigeria and the Gold Coast, Thomas (1973) notes that convict labor was often used to manage labor shortages in cash crop production and mining through the 1920s.

In Nigeria, as of the time of its amalgamation from two separate Northern and Southern Provinces to a single entity under the governorship of Sir Frederick Lugard in 1914, the need

for cheap labor combined with the reticence of indigenous workers to work at below market wages on often grueling industrial railroad, road construction and other public infrastructure projects, motivated Lugard to pass the 1916 Prisons Ordinances act giving, among other things, control of the use of convict labor to the Governor (Kingdon, 1923; Abiodun, 2017). The Prisons Ordinance along with the 1914 Native Courts Ordinance also outlined the functioning of Nigeria’s dual prison system, with the colonial prisons under the management of the Director of Prisons and Native Authority Prisons overseen generally by the local chiefs³ (Kingdon, 1923; Abiodun, 2017).

Colonial prisons served a dual mandate, functioning as centers of control and repression of native populations, and a source of cheap labor, allowing the regime to address chronic labor shortages by providing government administrators with a steady supply of conscript labor (Saleh-Hanna, 2017). So significant was the role of prison labor in the revenues and expenditures of the colonies, that in 1911, the Governor of Northern Nigeria remarked that “The value (calculated at 2/3 of the market rate) of prisoners’ labor in connection with public works, which would otherwise have had to be paid for in cash was 3,878 pounds. If calculated at the ordinary market rates the value of the prisoners’ useful labor would have exceeded the entire cost of the Prison Department” (Abiodun, 2017; Salau, 2015). Following Lugard’s Order in Council act on July 20, 1916, colonial prisons were classified into three types: convict prisons, with prisoners serving 2 or more years to life sentences, provincial prisons, with prisoners serving greater than 6 months and less than 2 years sentences, and divisional prisons, with prisoners serving less than or equal to 6 months sentences (Kingdon, 1923; Abiodun, 2017).

Most prisoners were unskilled laborers, with 65% to 90% of them in provincial or

³There is little historical information on the functioning of the Native Authority prisons, and we use records on colonial prisons here. This means the number of prisoners presented here represent only a fraction of the total number of people imprisoned during this period.

divisional prisons, having short sentences of less than 2 years, mainly for defaulting on tax payments, and minor offenses like petty thefts (Hynd, 2015; Foreign and Office, 1925). Popular departments for the use of prison labor were Railways and Harbors, Native Administration, Police, Public Health and Education, particularly for short-term prisoners (with sentences less than 2 years). A robust prison industry system including bakeries, tailoring, shoe-making, carpentry, printing and blacksmithing, among others, meant that longer term prisoners (with sentences greater than 2 years) were taught and tasked with learning a trade like carpentry, basket making, and cloth weaving to create furniture, uniforms etc which could be sold for cash returns that were remitted to the prison department's funds (Hynd, 2015; Foreign and Office, 1925). They were also tasked, as part of the partly punitive, partly "reformatory" motivation of prison work, with hard labor including activities like stone breaking and stone carrying.

Short-term prisoners were tasked with activities like "road construction, street clearing, grass-cutting, wood cutting, sanitation, conservancy and farm work" with the labor of short-term prisoners contributing significantly to public works projects like quarries in Abeokuta province, coalfields in Enugu, industries in Lagos, and the Eastern Railway extending from Port-Harcourt in Enugu province which used large gangs of prison labor (Abiodun, 2017; Foreign and Office, 1937). The colonial government was heavily reliant on convict labor, with many of the coal mining projects and railroad construction work in southeastern Nigeria, for example through the early to mid 20th century, staffed by prison labor (Abiodun, 2017; Foreign and Office, 1937).

The recruitment of prisoners for labor was also sometimes stated explicitly, as illustrated in Abiodun (2017)'s account of the response of colonial government officials to a request for increased funds for the employment of wage labor by a British sanitary inspector in 1923: "the officials asked the prison department to find ways to either increase the prison

population or recruit convicts from outstation prisons to complete the tasks.”⁴. This use of convict labor for colonial public works projects continued through the 1940s, and in some cases the 1950s in British colonial Africa with between 1 in 300 and 1 in 500 Africans imprisoned over 1930 through the 1950s, in contrast with 1 in 2000 British natives in Britain (Hynd, 2015). Though the historical literature has detailed the significance of convict labor for colonial revenues and public works expenditure, this is the first paper that, to our knowledge, attempts to quantify the share of forced African prison labor in British colonial revenues and expenditures.

2.2.1 Colonial Classifications of Prison Labor

To estimate the value of prison labor and receive payment to the prison department from outsourced conscript labor, prisoners’ labor was classified into three types: unskilled hard labor, skilled hard labor, and light labor. Unskilled hard labor included work for which “no training was needed”, with examples given including “coaling ship, grass-cutting, painting and refuse disposal”. Skilled hard labor included work for which “special training was necessary” including jobs like “basket-weaving, brick-making, carpentry, clerical work, cooking, laundering, mat-making, masonry and tailoring”. Light labor consisted of “easy duties suitable to the bodily or mental infirmity of the prisoner” including “cell-cleaning, lamp-trimming, sweeping and preparation of foodstuffs for cooking” (Foreign and Office, 1937). We use data on market wages assigned to free wage laborers to estimate the overall value of labor coercion in each year.

⁴NAI, CSO 26/2 09591 Vol.1 ‘Lieutenant Governor Southern Province to Resident Calabar Province: Memorandum on Prison labor’ 23rd April 1923

3 Data: Convict Labor and Colonial Public Finance

The primary source of our data for this study is the British colonial Blue Books, with supplementary data from the colonial Annual Report on the Prisons Department. The Blue Books were statistical returns that governors of British dependencies were required to submit on an annual basis. They contain data and information on a wide variety of topics such as revenue, wages, public works expenditure and, importantly for this paper, the prison population. We assemble data in the colonial Blue Books from 1920 to 1938⁵ to get a representation of how our variables of interest change over time.

The goal of our paper is to understand the evolution of labor coercion over time, specifically focusing on the use of the prison system and prisoners as labor. Our first strategy is to estimate the size of unpaid wages by the colonial prisons. Given that prisoners were used as free labor, how much would the colonial government have had to pay if they were required to hire that labor from the labor market? To answer this, it is essential to understand how wages evolved over time. We do this here using evidence from Nigeria over 1920 through 1938. A map of Nigeria with its provinces and colonial prison locations outlined is provided in Figure 1.

The Blue Books report average market wages for different types of labor, including unskilled labor. In Figure 2(a) we plot wages paid to unskilled laborers categorized alternatively as “Labourers and Carriers” and “Unskilled Labourers” in the colonial records. The data shows an overall downward trend in average annual wages over the period of study. Wages start out relatively high in 1920 at £24, increase in the following year, peaking at around £35 and then fluctuate through the 1920s period till around 1930 when wages crash and remain relatively low at around £10 through the 1930s. Repeating the exercise and

⁵The Blue Books data is incomplete between 1914 and 1920 so we start in 1920 for completeness.

plotting wages for workers categorized as “Bricklayers and Masons”, a category of workers considered as akin to skilled labor in the Blue Books classification, in Figure 2(b) shows a similar pattern; wages exhibit a general downward trend, but remaining relatively high at around £60 in the early 1920s, then fall and remain lower through the 1930s, but with a less steep slope than their unskilled counterparts.

The wages serve as a starting point for calculating the value of unpaid labor. The second important variable needed is the prison population and its transformation over time. The Blue Books also report the daily average number of prisoners in each of the colonial prisons. Figure 3 shows the evolution in the number of prisoners between 1914 and 1938. The average number of prisoners rises up until the late 1920s and then declines. Note, the Blue Books and records from the prison department explicitly state that all prisoners were required to work (Foreign and Office, 1937). The data on wages paid and the number of prisoners allow us to calculate a measure of the value of unpaid wages, and study how that measure evolves during the period of observation.

4 Results

We measure labor coercion by calculating the value of unpaid labor used through the prison population. To calculate our measure of labor coercion proxied as the value of unpaid labor over time, we adapt the strategy from van Waijenburg (2018). In essence we ask, ‘how much would the colonial state have had to pay if they had to hire all these non-remunerated prison workers for a market rate cash wage?’. This measure captures the benefits accrued from labor coercion and examines how those benefits evolved over time.

We calculate the overall value of unpaid labor in each year as;

$$Value\ of\ unpaid\ labor_t = Annual\ wages_t * Number\ of\ prisoners_t. \quad (1)$$

This gives us an overall value of benefits accruing to the benefactors of prison labor. As a measure of wages, we use the annual average market wages paid to unskilled laborers as recorded in the colonial records. These wages capture the wages for some of the types of jobs that prisoners would have been required to perform, including felling trees and breaking rocks to clear areas for road and railroad construction (Abiodun, 2017; Foreign and Office, 1937). To measure the number of prisoners we use the daily average number in prisons. This measure takes the average of the number of people in prisons throughout the year and captures the amount of labor that was available on a given day.

Figure 4a shows the progression of this estimated value of labor coercion accruing to the colonial government over the period of study. The benefits decline from a high of about £230,000 thousand a year, and on average continues to decline until our last year of observation in 1938.

To get a sense of how large the value of labor coercion which accrued to the colonial government was, we contrast it with various other expenditures by the colonial government. The Blue Books report various other pieces of information on revenue and expenditure. This information allows us to compare the relative value of labor coercion to other monetary expenditure.

Specifically, we compare the value of labor coercion to overall prison expenditure, expenditure on public works, and overall expenditure by the colonial government. Figure 4b shows the ratio of the value of labor coercion to overall prison expenditure. Two things stand out. First the value of labor coercion accruing to the colonial government is larger than the overall expenditure on prisons for most years pre 1930, with the ratio of value to prison expenditure greater than one for five out of nine years between 1920 and 1930. The ratio drops and remains below one after 1930, reaching .6 at its lowest levels. This implies, at least from a profitability perspective, that the prisons were value for money, with the indirect

returns on prisons positive once the value of labor was considered. The graph also shows the trend of the decreasing benefits of prison labor coercion continues even after taking prison expenditure into account.

Similar trends are also apparent when comparing the value of labor coercion to overall spending on public works expenditure by the colonial government in Figure 4c. The value of labor coercion is larger than overall public works expenditure in five out of the nine years pre 1930 in the sample. The general trend shows a declining value of labor coercion to public works expenditure ratio, with the ratio falling to about 40% of overall public works expenditure in the 1930s.

Finally, comparing the value of labor coercion to overall expenditure by the colonial government in Figure 4d shows that the benefits were economically significant. At its peak the value of labor coercion from prison labor was equivalent to more than 3% of overall expenditure. The relative value of these benefits decline throughout the 1930s period in particular, plateauing at around 1% of overall expenditure in 1938.

Overall the data suggests that the value accruing to the colonial government from convict labor was considerably large in the earlier years of the sample especially in the earlier part of the 1920s, relative to other expenditure. That value however appears to have had a generally decreasing trend, falling almost continuously throughout the period of observation, with notable drops in the post 1930 period.

5 Robustness Checks

5.1 Alternative Wage Measures

The value of labor coercion in Section 4 used the wages paid to laborers. Given the type of work that prisoners were typically expected to do as described in Section 2.2, unskilled

laborers are perhaps the best way to broadly categorize the value of prison labor. This measure is however likely to underestimate the true value of conscript labor as some prisoners might have accumulated skills. As a robustness check, we use a different occupation to categorize prisoners. We use the average wages paid to bricklayers, a class of skilled labor, as an alternative measure of the value of a prisoner's labor. Using the same technique, we calculate the value of labor coercion assuming that prisoners would have been paid as bricklayers if they had to be paid by the colonial government.

Wages for bricklayers were significantly higher than wages for laborers as shown in Figure 5(a). Hence, the value of labor coercion is also significantly higher if prisoners are assumed to be used as bricklayers as opposed to just laborers. The declining trend is however apparent through most of the sample.

Another alternative would be to use wages for unskilled urban labor as depicted in Figure 5(b). Urban unskilled labor would theoretically be close to the minimum wage that could be paid for workers in urban areas. This would therefore capture the theoretical minimum value of what it would have cost colonial governments assuming that laborers had no skills, although in the later years the wages for laborers is in some instances lower.

The evolution of wages for urban unskilled workers appears to closely mimic the wages for laborers. Although laborers' wages are higher in some years, there is a convergence over time. The value of labor coercion using urban unskilled labor wages are lower on average compared to when laborers' wages are used, but the underlying implications are identical. The value of labor coercion is still significantly large but declining over time.

5.2 Measuring Bias in Estimates

Using the daily average number of prisoners might not properly capture the entire sample of prisoners whose labor was appropriated by the colonial government. Those who were

charged but sent out on bail for instance would still have to commit their labor but would not be counted as being in prison.

As an alternative measure to the daily average in prison, we use the number of people committed to penal imprisonment in each year, that is the number of people who were arrested and sent to jail for one reason or another and who were expected to serve penal labor. The number of people committed to prison however does not imply that they spend the entire year there. Since the Blue Books break down sentences into three categories: those committed for over two years, those committed for between six months and two years, and those committed for less than six months, we weight the number of people committed to prison by the categories of their duration of stay. Specifically, we assume that those with more than two-year sentences spend two years in prison, those between six-month and two-year sentences spend one year and three months in prison, and those with less than six-month sentences spend three months in prison. Finally, we assume that imprisonment started at the beginning of the year hence one year in prison would run from January 1st until December 31st.

Figure 6(a) compares the daily average number in prison to our weighted average measure of people committed to prison for penal imprisonment in each year. The daily average as measured in the Blue Books tends to be much lower than our weighted average measure of those committed to prison. This is true especially in the earlier years of our sample. There however seems to be a convergence in both measures over time.

Recalculating the value of labor coercion using our weighted measure of people committed to prisons shows that using the average number in prison underestimates the value of labor coercion. At its peak the value of labor coercion is more than 60% larger when using the weighted average of people committed for penal imprisonment compared to using the average number in prison. The trend however remains the same with the value declining

over time.

5.3 Alternative Estimates of the Value of Labor Coercion

As a final robustness check, we compare our estimates of labor coercion to the colonial authority's own estimates of the value of prison labor. In some years, the colonial authorities published more detailed information on prisoners and their use of prison labor in annual prison reports. In these reports they published the total value of labor of prisoners in Nigeria. They described this as the amount of the prisoners' earnings for the prison department during the year, both in terms of cash and other estimates of labor value. This in essence was a measure of the colonial authorities own estimate of the value of the labor provided by the prisoners.

The colonial officials⁶ or directors of prisons recorded per diem estimates of the value of labor between 1916 and 1921 in the Lagos colony and southern provinces for Nigeria. Using the classification of labor into skilled hard labor, unskilled hard labor and light labor, described in Section 2.2.1, hard labor, both unskilled and skilled are given a value of 5 pence per day, with light labor given a value of 3 pence per day in 1916. Starting in 1917, skilled hard labor is given a value of 1 shilling and 6 pence or 18 pence, unskilled hard labor is assigned a value of 5 pence and light labor is assigned a value of 3 pence. The rates for unskilled hard labor stay the same from 1918 through 1921, with no reporting on the exact value assigned to skilled hard labor or light labor over this time. After 1921, the reports appear to stop including information on the per diem value assigned to the different classes of labor.

We compiled these estimates where available, and they provide us with comparable data from 1919 to 1935. Figure 7 shows our estimates of the difference in the daily market

⁶For example, W.H. Beverly, E. Jackson or W. Reeder in the southern provinces over 1915 to 1921

wage rate versus the prison rate in the Lagos colony and southern provinces for laborers or unskilled hard labor and for carpenters and joiners and bricklayers and masons, two classes of skilled hard labor. Lacking data past 1921 on the per diem prison rates, we assume, based on the past record, that the rates remain stable through 1925. As shown in Figure 7, prisoners performing unskilled hard labor, which made up the majority of the prison population (prisoners with shorter-term sentences), were assigned a value between about 60% to 80% below the market wage rate over 1919 to 1925. Figure 8 shows a comparison of our measure of labor coercion against the estimates provided by the colonial authorities of the value of prison labor. Our measure of labor coercion is significantly higher than the estimates of the colonial authorities, though there appears to be a convergence towards the later years.

6 Wage Trends and Qualitative Evidence

The overall value of labor coercion at its peak during the period of observation was significant, surpassing overall prison expenditure in most of the pre 1930 period. It was also equivalent to more than 140% of overall expenditure on public works at its peak.

We estimate our measure of labor coercion using both wages and the number of prisoners. Although both variables change significantly through our period of observation, certain patterns are apparent. First, the number of prisoners increased during the earlier years, peaking around 1927 before changing to a downward trend. On the other hand, wages for both laborers and bricklayers tended to be much higher in the earlier years compared to later years. Wages for laborers collapsed at around 1930 while wages for bricklayers showed a slower long-term decline. If we assume that wages were exogenous then one hypothesis is that the average prison population responded to lower wages.

From a theoretical perspective and from that of a party benefiting from labor coercion

of the prison population, higher market wages heighten the incentive to increase the number of prisoners whose labor can be used for free. Lower wages however decrease the incentives for use of prison labor. The trends in prison labor suggest that colonial authorities were responding to the downward trend in wages and reducing the numbers of prisoners. The trends in both the daily average number in prison and our weighted average penal imprisonment show drops from the late 1920s.

There is some anecdotal evidence that the wage dynamics were exogenous (Foreign and Office, 1925). Colonial revenues collapsed starting in 1927, only recovering after 1935 as shown in Figure 9. This was associated with the collapse in commodity prices and trade during the Great Depression which supposedly put downward pressure on wages (Frankema and Van Waijenburg, 2012). The downward trend in labor coercion through prisons could therefore be in response to exogenous wage movements during the period. On the other hand, the collapse in colonial revenues led to massive layoffs by the colonial authorities (Foreign and Office, 1925). These layoffs may have been part of fiscal consolidation, but they may also have been a means of wage repression. The drop in labor coercion from the prison population may therefore imply a change in strategy away from prisons and towards a wage driven strategy.

The patterns are however inconclusive but provide room for further research on how the colonial authorities responded to changing wage dynamics, and if there were deliberate attempts to increase or decrease the prison population in response to labor demand shocks.

7 Conclusion

In this paper we document the evolution of labor coercion through prisons in British colonial Nigeria. Specifically, we show the evolution of the value of labor coercion from the early 1920s up until 1938. We show that the implied value of labor coercion was significantly large but

declined through the period of observation. We also show that convict labor made up a significant part of colonial public works revenues and expenditures. We provide anecdotal evidence that the evolution of the prison population is correlated with the evolution of wages, with prison populations increasing when wages are high and falling when wages are low. This provides empirical evidence, in support of the historical accounts, of the prison system being used for both revenue and labor extraction in the British colonies. The paper adds to research on the use of prisons as a tool for labor coercion, and one of fiscal significance in Britain's African colonies. It also opens up opportunities for further research on understanding how the prison system influenced labor and market wages in the colonies and the long-term effects of these policies on current development outcomes of African populations.

Figure 1: Nigeria provinces with prison locations labeled and railroad network shown, 1920-1940

(a) Annual average wage - laborers.

(b) Annual average wage - bricklayers.

Figure 2: Wages in colonial Nigeria in Pounds Sterling.

Figure 3: Daily average in prisons, 1914-1938

(a) Value of labor coercion.

(b) Labor coercion as a share of expenditure on prisons.

(c) Value of labor coercion as a share of public works expenditure.

(d) Labor coercion as a share of total expenditure.

Figure 4: Relative value of labor coercion.

(a) Annual average wage - laborers vs bricklayers.

(b) Annual average wage - laborers vs urban unskilled labor.

Figure 5: Wage alternatives.

(a) Daily average in prison vs Weighted number of committed prisoners. (b) Labor coercion - alternative prison measure.

Figure 6: Prisoners - alternative measures.

Figure 7: Value of wages for different skill categories in prison and market sectors, 1919-1925

Figure 8: Labor coercion: authors versus colonial government estimates

Figure 9: Revenue - Nigeria, 1914-1938

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A Appendix

A.1 Archival Materials

- Primary data from British Online Archives, Nigeria [Colony and Protectorate] Blue Book, 1914-1940. British Foreign and Commonwealth Office
- Nigeria, Annual Report on the Prisons Department, Northern and Southern Provinces, 1914-1937
- NAI, CSO 26/2 09591 Vol.1 'Lieutenant Governor Southern Province to Resident Calabar Province: Memorandum on Prison labor' 23rd April 1923

SECTION 23.					
PERSONS IN EMPLOYMENT AND AVERAGE RATES OF WAGE					
Occupations.	Average numbers employed.	Average rates of wages, distinguishing whether monthly, weekly, daily, per hour, per task (a); including value of any payments in kind (b).	Average number of hours per week worked without overtime.	Measures to enforce conditions of labour. Regulations relating to the industry (e.g. Workmen's Compensation, Health, Protection of Machinery, Inspection of factories, boilers and plants) (c)	Notes
(A) Government employment:—					
i. (a) Established Employees...	6,540	£8 0s. 0d. p.m.	42	Cap. 56, Public Health Ordinance ...	
ii. (b) Skilled Artisans ...	12,454	£1-£7 18s. 0d. p.m.	44-48	.. 70, Master and Servants Ordinance...	
iii. Unskilled ...	46,325	£1-£2 5s. 0d. p.m.	48	.. 71, Native Labour (Foreign Service) Ordinance	
(B) Agricultural:—				72, Employment of Women Ordinance	
Agricultural ...	12,000	7d.-1s. 10d. p.d.	54	Criminal Code, Sections 340, 343 (i) and 347-8	
(C) Other industrial:—					
Rubber ...	{ 50 Skilled 3,423 Unskilled	{ £6 0s. 0d. p.m. 9d.-1s. 6d. p.d. Overseers £12 p.m.	{ 45-48	Cap. 56, 70, 71 and 72 ...	
Timber ...	4,800	£1 10s. 0d.-£1 5s. 0d. p.m. 1s.-1s. 6d. p.w.	48	Regulation relating to Industry ...	
Manufactures: ...	6 Skilled	£3 15s. 0d. p.m.			
Soap ...	41 Unskilled	1s. p.d.	42	Regulation of offensive trades. By-laws	
Building: ...	270 Skilled	4s. 0d. p.d.		Cap. 56, 70 and 72, Criminal Code, Sections 340 and 343 (i)	
Building ...	2,100 Unskilled	1s. 3d. p.d.	48	...	
Logging and Sawmilling ...	8,000	2s. 0d. p.m.	48	Regulations relating to Industry ...	
Mines: ...					
i. Coal ...	19	£24-£220 p.m.		Inspection by Mines Department, Cap. 56, Section 54, Regulations: Safe Mining	
ii. Tin ...	2,901	1s. 6d. p.d.	40	Regulations and Regulations for Govt. Collieries, Cap. 70	
	37,800	6s. 7s. per week	54		
Trading and Canteens ...	2,200	{ Varies from clerks at £16 p.m. to casual labour at 9d. p.d. Cooks' wages average £3 p.m. Stewards (i.e. House boys) £2 5s. 0d. small boys 15s. 0d. p.m. (European service)	{ 46 Whole time resident	Cap. 56, premises Cap. 70 ...	
(D) Domestic Service:—					
Domestic Service ...	...	...	...	Cap. 70 ...	

Figure A1: Wages from the British Blue Books, 1920-1938

Figure A2: British colonial officials in records from African countries under colonial rule.
Source: British online archives.

Figure A3: African laborers on a railroad c. 1930, Source: Alexander Keese, CEAUP, Porto