Numeracy of African groups in the 19th century Cape Colony: Racial segregation, Missions and Military Privilege

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Very preliminary version

Abstract

The literature on South African economic history is heavily white-centred. Especially quantitative evidence concerning the African population is scarce and hardly ever distinguishes between ethnic groups. This paper fills this gap by analysing the possibilities of investing into education for the most important native ethnic groups of the 19th century. Moreover, we show that suffering from deprivation was not always a consequence of being isolated from the white population, but depended on the type of white-native relationship. We distinguish between different types of relationships and quantify their effect on human capital outcomes. We measure the numeracy of natives who could visit missions, African tribes that cooperated militarily with Europeans, "normal" farmhands who worked on white-owned farms, and inhabitants of native reserves with only indirect contact with Europeans.

1. Introduction

The literature on South African economic history is heavily white-centred. Especially quantitative evidence concerning the African population is scarce and hardly ever distinguishes between ethnic groups. For instance, Du Plessis and Du Plessis (2012), who reconstruct real wages of unskilled workers for the 18th century, dispose of no data on the native population. De Zwart (2011) constructs real wages for the 19th century Cape Colony, but is only able to build one data series for all natives. This paper aims to fill this gap and contribute to our understanding of the differences in wellbeing among ethnic groups under colonial rule in South Africa.

Moreover, we know that 20th century policies of black segregation caused huge deprivation within the native population and probably widened the native-white gap in living standards (De Zwart 2011). But, was it always unfavourable for Natives to live isolated from the white population? Or could they also do well on their own in a capitalist economy imposed by Europeans? What sort of relationship with the colonizer was better for the native population?

Numeracy, a component of human capital, is a core factor of success not only in industrial, but also in agricultural economies (A'Hearn, Baten, and Crayen 2009; Crayen and Baten 2010.).This study will analyse the formation of numeracy development in South Africa since

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the 19th century by using the "age heaping" technique that is now widely used for historical periods. We will assess the human capital levels of different typical groups under colonial rule and we expect them to be in the following order:

1. Blacks who could visit missions.
2. African tribes which were privileged in the Cape society due to their military cooperation with the Europeans (the Mfengu)
3. Tribes that were exempt from being enslaved during the 17th, 18th and early 19th century and worked as farmhands for Europeans (the Khoisan).
4. Inhabitants of native reserves with only indirect contact with Europeans

Our expectation would be that groups 1 and 2 enjoyed a higher standard of living compared to the latter three groups, allowing them to invest slightly more in basic education. For the native tribes that were exempt from being enslaved, the Khoisan, our expectation is slightly ambivalent. It is not so clear whether they were more educated, because this tribe originally lived from herding or hunting and collecting and hence maybe put less emphasis on education, even basic education. Moreover, while not being enslaved, Khoisan in the time under study were mostly bound to work for white landowners under relatively slave-like conditions. On the other hand, the direct contact with Europeans may have allowed them to acquire basic numerical skills. For inhabitants of native reserves we could expect that they were less educated compared to the farmhands who were already in permanent contact with Europeans. Living conditions in these reserves, for which the government did not provide any infrastructure, were generally poor in the 20th century (Bundy1979). However, not so much is known about its inhabitants' standard of living in the 19th century.

This research obviously has implications beyond South Africa. Parts of the modern world are influenced by colonial encounters and the development -and survival- of indigenous cultures depended on the ability to acquire human capital (Acemoglu, Johnson and Robinson 2001, Glaeser et al. 2004). The histories of early contact that depended on military force relationships, for example, were often not considered in earlier research.

The paper will proceed as follows: the next section provides an overview of the method and data. Section three discusses the main results. In section four we provide historical background information and section five concludes.

2. Method and data sources

2.1 The method

As mentioned earlier, the method used in this paper to capture basic numeracy is the age heaping technique. This method was pioneered by Mokyr (2013) and has been used in several studies to record human capital levels in historical times.[2]

[2] For instance, in A'Hearn, Baten, and Crayen(2009); Crayen and Baten (2010), Juif and Baten (2013).

Age heaping is a phenomenon that applies to historical populations, when a substantial share of the people was unable to state their exact age when asked, for instance, by census enumerators, and hence reported a rounded age. Those who were the least educated within a society as well as those with least interaction with the state were generally less able to state their age correctly (A'Hearn, Baten and Crayen 2009).

The preferred numbers of "heapers" are multiples of five, such as "30" or "45". Age heaping is calculated as the ratio between the preferred ages and others. It can be measured by several indices, the most common of which is the Whipple Index. It calculates the proportion of people who state an age ending in five or zero, assuming that each terminal digit should appear with the same frequency in the "true" age distribution. Usually only individuals in the age range of 23 to 72 (or 62) are included because for the younger ones it is more probable that another household member reported the age and the very old persons tend to exaggerate it.

$$Wh = \left(\frac{(Age25 + Age30 + Age35 + ... + Age60)}{1/5 * (Age23 + Age24 + Age25 + ... + Age62)} \right) \times 100$$

However, in this study we use the ABCC Index, an easy transformation of the Whipple Index, because it is more easily interpretable. It takes the value of 100 if all ages appear with the same frequency, whereas it takes the value of 0 if all reported ages were multiples of 5. Thus, the ABCC yields an estimate of the share of individuals who correctly report their age:

$$ABCC = \left(1 - \frac{(Wh - 100)}{400}\right) \times 100 \text{ if } Wh \geq 100 \text{ else } ABCC = 100$$

In the graphs used in this paper, we report the ABCC index by the decade of birth of the individuals included in a census.

The Whipple and ABCC index has been proved to be a good predictor of economic development in a cross country basis, such as more modern measures of human capital, like the scores in PISA and other international tests of the quality of schooling (A'Hearn, Baten and Crayen 2009).

2.2 Sources

The sources used for the collection of age data and calculation of ABCC Indices are an immigration list and official population censuses of the 19th and 20th century. The censuses of the 19th century as well as the 1904 census classify the native population into three distinct groups (the original terms were Kaffir for Xhosa, Hottentot for Khoisan and Fengu for Mfengu). However, after the census of 1904, no distinction is made and all Natives are classified as Bantu (see also Christopher 2002, p. 404).

The summary information of all the sources used is included in Table 1.

Table 1: Summary information by source

source	Freq. (23 to 72 years)	ethnic categories incl.*	ABCC
immigrants 1820	1,330	w	91.1
missions 1849	4,104	Natives	63.1
census1865	3,655	w, x, k, o	58.9
census 1875	175	w, f, x, k, o	68.6
census 1904	866,316	w, f, x, k, m	81.2
census 1951	6,320,137	w, n, c, a	91.1

*w=White, f=Mfengu, x= Xhosa and Sotho, k=Khoisan, o=Others, m=Cape Malays, a= Asiatics (different name for Cape Malays)

The earliest source we use is a list of British immigrants – mostly families – that arrived in Cape Town in 1820. All of them are white and 91% were probably able to state their age correctly, which is in line with the numeracy levels that Britain displayed at the time (Crayen, Baten and Voth 2013).

Second, we use the mission census of 1849 that was carried out in the Cape Colony[3]. Individuals included in this census are not categorized into ethnic groups, but they are all Natives. Figure 1 shows a map with the location of the mission stations.

The background of this census is well described by Ross and Viljoen (2009). The driver behind the inquiry that was carried out by the colonial authorities was probably a group of farmers who suffered from labour shortages in the Western Cape eleven years after the abolition of slavery (in 1838). They blamed the mission stations for hosting Natives who could work on their estates and did not. In fact, many women and children did not engage in wage labour outside of the mission stations. Ex-slave owners saw mission stations as "a pool of untapped workers" (Ross and Viljoen 2009). And thus, the authorities carried out an extensive inquiry about 12,977 converts from 34 mission stations throughout the Cape Colony in order to record the number of "potential labourers" and their situation in the labour market. The information recorded includes name, age, literacy, occupation, trade, marital status, employability as well as other personal information (such as e.g. the number of children, the crops they planted and whether they owned cattle or other animals). The ability to read was evaluated by the census takers by letting the residents read a passage of the Bible. The literacy rate among the (23 to 72 year old) population in the mission is very high (24%), taking into account that all converts included are Natives.

Because the age heaping technique makes use of age statements, we are especially interested in how the ages were recorded and for this particular census we can derive useful information from a quote. A missionary reported how the commission proceeded "[...] in order to state the age of the children, as also of the older inhabitants of the place, who are but rarely able to indicate the day, or even the year, of their birth. Our documents not reaching back to the time when many of our older members were born, we were frequently compelled, in the absence of accurate statements, to content ourselves with *probable conjectures*. We obtained in general, much information respecting their age, by inquiring whether they had been alive at the time

[3] This census was used for a human capital analysis before in Fourie, Ross and Viljoen (2014).

when the English took possession of the colony on which they indicated with their hands how tall they had been then, or stated how long they had at that time tended the cattle" (Ross and Viljoen 2009, p. 398). We can therefore not completely discard that in some cases the ages were counter-checked when possible with the help of birth registers, and should bear in mind that the heaping in this census might be slightly underestimated.

Figure 1: Location of Mission Stations. Source: Fourie and Viljoen (2014)

Third, a number of official censuses carried out between 1865 and 1951 are used. The census data of 1865 are a sample of the first proper census of the Cape Colony. It does not include Natal, or the two independent Boer republics, Transvaal and the Orange Free State. This census includes the *Wittebergen Native Reserve* (located in the district of Almae North). Appendix Figure 1 shows the location of the districts included in this census sample.

We also use a much smaller sample of the 1875 census that captures the population of the "Paarl" district. These two censuses include extensive information on the population, including ethnicity, literacy, occupation (agriculture, manufacture or commerce) of the individuals as well as the amount of cattle owned per household. In 1865 and 1875, the population was classified into White, "Kaffir" (=Xhosa), "Hottentot" (=Khoisan), Mfengu and Other. "Other" included people of mixed blood as well as the Cape Malays, descendants of slaves imported from Asia. However, the latter are still very few.

The complete censuses of 1904 and 1951 are included in the analysis as well. 1904 is the first time that the whole territory of contemporary South Africa is censed, since the independent republics of Natal, Transvaal and the Orange Free State conducted the census as well as the Cape Colony. The census of 1951 is the first one carried out during the apartheid regime. The Khoisan and Mfengu are not anymore stated separately in 1951, but are included together with the Xhosa and others into the category of "Natives". Regarding how the ages were

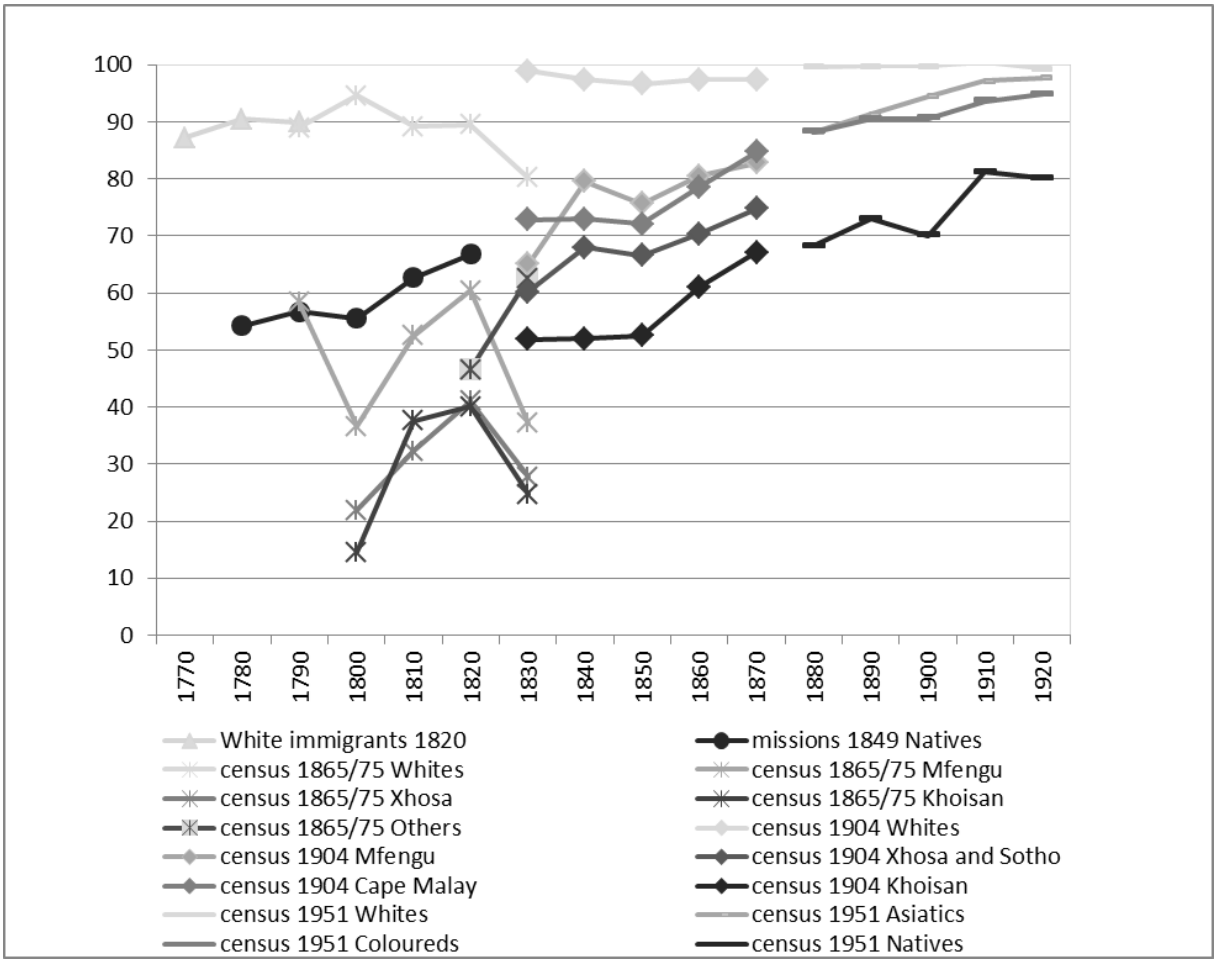
recorded, it seems that the authorities did not counter-check them with other official documents that could have stated the birth date. Instead, individuals were asked their year of birth to verify the stated age, in order to have more accurate results. The introduction to the census report of 1951 states: “As practically all white persons in the Union know their date of birth, the ages shown for whites may be accepted as accurate. There is no apparent concentration on any particular age”. “For Coloureds and Asiatics, however, abnormal concentrations on ages ending in 0 and 5, particularly among adults, and accordingly the ages for Coloureds and Asiatics are not as accurate as those for whites. Relatively few Natives know their exact date of birth, or even the year in which they were born. The figures show extreme concentrations on ages ending in 0 and 5, and to a lesser extent on those ending in 2 and 8. Consequently the single year figures for Natives are unreliable, and must be used with caution.” Enumerators were acquainted to estimate the approximate age as accurately as possible when a person did not know her exact age. To assist enumerators in estimating the ages of Natives, they were supplied with a historical calendar entitled “List of Important Historical Events”. And thus, the amount of age heaping here might be even slightly underestimated due to this (not very effective) method of counter-checking.

3. Results

With the help of the age heaping technique, we calculated the ABCC Index of the different ethnic groups by decades of birth. The results are portrayed in Figure2.

The white population consistently displays the highest levels of numeracy. From 1840, it had reached nearly complete numeracy. We hypothesised that Natives living in missions probably displayed higher cognitive skills than others, since children in mission stations could visit schools that would provide them at least basic knowledge of numbers. And in fact, Natives who could visit missions had a large advantage with respect to Natives who resided outside of missions.

Figure 2: ABCC levels in South Africa. Sources: See table 1.



The Khoisan are the group that displays the lowest numeracy levels. From those born in the 1800s to 1830s, only between 12 and 40 per cent of the population was able to state their age correctly. In the census of 1904 the share increases to between 51(age group 63 to 72) and 67 (age group 23 to 32).

The Xhosa display similar numeracy levels as the Khoisan until 1830. However, in the census of 1904, where Xhosa and Sotho are included in a sole category, their advantage over the Khoisan appears to be substantial. Their joint ABCC levels reach between 60 in 1830 and 74 in 1870. The Mfengu are consistently the native group that displays the highest ABCC levels between 1800 and 1870 (apart from those Natives who could visit missions). *Asiatics*, or Cape Malays, who were immigrant indentured labourers (or their descendants), had around the same numeracy levels as the Mfengu.

In the census of 1951 we cannot distinguish between different native groups. However, the difference in numeracy levels between the Natives (which includes Mfengu, Khoisan as well as Xhosa and Sotho) and the next group, the Coloureds, is relatively large, around 20 ABCC points. The Coloured population did not reach complete numeracy for the time under

measurement. Instead their levels of around 90 were already achieved by the white population more than one hundred years earlier.

The basic numeracy of the different ethnic groups was also assessed in a regression portrayed in Table 2. The regression analysis allows to control for several variables that may influence numeracy besides ethnicity. The dependent dummy variable (numeracy) is coded as 0 when the age stated was a multiple of five and as 1 if it was not. A logistic regression model was used because it fits best for a dichotomous dependent variable. Each ethnic group is assigned a separate Dummy independent variable. Control variables for the decades of birth are included, in order to control for time (birth cohort) effects. Moreover, we control for the younger age cohort, since they are generally more likely to state a correct age, either because they can better guess it or because life events in which they have to state their age (marriage, military service) are more proximate.

The ethnic reference category is “Xhosa and Sotho”. The coefficients of the ethnicity variables “Mfengu”, “Malay” and “White” are negative and highly significant, whereas the sign for “Khoisan” and “other” is positive. Table 2 portrays the marginal effects at a representative value of the independent variables, because they are more informative than the actual coefficients (Cameron and Trivedi 2005). Of course, one has to keep in mind that a multiple of 5 is not always a rounded age, because 20% of all individuals were really 25, 30, 35...70 if we assume a uniform distribution of ages. When multiplying the coefficients by 125, we can say that, on average (for individuals born between 1790 and 1870), Xhosa are 10% more numerate than Khoisan, Mfengu are 7.5% more numerate than Xhosa, and Whites are 17.5 % more numerate than Mfengu.

Table 2: Determinants of numeracy in logistic regression

Dep. Var.	numeracy
Xhosa and Sotho	ref. Cat.
Mfengu	0.06***
	(0.000)
Khoisan	-0.08***
	(0.000)
Malay	0.06***
	(0.000)
Others	-0.07**
	(0.023)
White	0.20***
	(0.000)
Age group 23 to 32	0.11***
	(0.000)
Birth dec. incl.	yes
Observations	871,468
Pseudo R2	0.0348

Notes: P-values are included in parenthesis. The Table reports marginal effects of the Logit regression. Included are individuals born between 1750 and 1870.

4. Historical overview

4.1. European relationships with Khoisan, Xhosa and Mfengu

The first tribe the Europeans encountered in South Africa, when a refreshment station for ships travelling to Asia was founded by the Dutch East India Company (VOC) in 1652, were the Khoisan.[4] They resided parallel to the coast from Swakop river in the Atlantic Ocean to Buffalo on the Indian ocean shore (Thompson and Wilson 1969). The VOC traded livestock with the pastoralist Khoikhoi before it decided to establish a permanent settlement of white peasants who were to produce crops to supply the passing ships. The possibilities of these white farmers to expand their production and their land acquisitions were relatively limited at the beginning There was no room for surplus production and growth, since the population of the Cape was still small and the amount of passing ships was limited. The most important limitation for the colonists was that they were obliged to sell their products to the VOC at low fixed prices, and could not trade with foreign ships or with Natives. The Company actively discouraged the expansion of the settlement due to conflicts with the native population and the high costs of defending it (Feinstein 2005).

The discontent of the white peasants with the policies of the VOC probably led them to seek land outside the early boundaries of the colony and the Company was not able to avoid it in the early 18th century. The expansion of the small colony inevitably led to conflict with the Khoisan. However, the white farmers gradually acquired the land of the Khoisan to the north and east of the base at Cape Town with relatively low effort, since quarrels over land as well as smallpox epidemics had already severely decimated the Khoisan population. Only a few remaining tribes moved away from the land frontier and maintained their independence, but the majority was left with no other option than to engage as herdsmen or farmhands for the colonists. Only very few Khoisan of the 18th and 19th centuries possessed land, and mission stations had space for only a small proportion of them. Moreover, a number of proclamations of the colonial government since the 1810s bound most of them to compulsory servitude to their white employers (Thompson 1990, p. 58). For instance, Khoisan children of farm labourers were to be apprentices until the age of eighteen, binding also their parents to the white landowners. Khoisan mostly worked as servant herders and agricultural labourers, but also as cooks and interpreters, and were sent to wars against other indigenous tribes, such as the Xhosa (Thompson and Wilson 1969).

While in the censuses until 1904 the Khoisan were listed as a separate racial group, after this date they were included in the category of “Natives”(in 1951) or “Coloured”, although not all had been assimilated into other ethnic groups but still had their own identity (Le Fleur and

[4] Actually, the term Khoisan merges two original subgroups: the Khoikoi nomadic pastoralists, and the San hunter-gatherers. However, there where close relationships between the two, which is most vividly revealed by the click sounds that were characteristic of all Khoisan tribes.

Jansen 2013). Therefore, they cannot be identified in the later censuses[5]. The Khoisan display consistently the lowest ABCC levels of all natives for as long as we can identify them. We derive from it that the intensive contact with the colonizers in the form of farmhands or herders in their estates did not have a substantial positive effect on their numerical skills. Given the rule of apprenticeships that forced Khoisan children to work for the white employer of their parents, most of them were probably not able to either visit mission schools or be taught basic numeracy at home.

The Bantu speaking tribes, including the Xhosa and the Sotho, resided North-East and East of the early Cape Colony. The colonial expansion led to the collision with the Xhosa people and to nine Frontier Wars (from 1779 to 1879). Xhosa first came into conflict with the white settlers in the late 18th century. Following the British take-over of the colony in 1806, a group of discontent residents of the Cape, mostly of Dutch descent, decided to migrate north-east seeking independence from the new central administration, and embarked on the famous "Great Trek". Thereby the "Trek Boers" used their superior force to subdue or displace the Bantu speakers they encountered. The British colonial administration joined the Boers in the East (North of Bushmans river) from 1811 on and actively pursued a policy of conquest (Feinstein 2005). The Xhosa were pushed beyond Fish River and further East after subsequent wars. Those Xhosa included in our censuses of 1865/1875 reside in different places of the Cape Colony, but in their large majority were born in "Kafferland"[6], that is, the land of the Xhosa in the Eastern Cape. We therefore assume that most of them were raised (and developed most of their numerical skills) having relatively low contact with the white population, and only later worked as farmhands in the Cape Colony, often on a seasonal basis. They display higher numeracy levels than Khoisan, which, on the one hand, may seem counter-intuitive, because contact to Europeans could allow to acquire numerical skills. However, the fact that Xhosa enjoyed some more autonomy and engaged in mixed farming could have had positive effects on their basic education.

The Mfengu were refugees from the Zulu expansion (known as the *mfecane*) and arrived in Xhosa territory from around 1820. They occupied subordinated positions within Xhosa society, since they arrived there without property. Therefore, they were probably more susceptible to the ideas of the Europeans (Thompson 1990). During the Frontier War of 1835/6, 17,000 of them were invited by the colonial governor to settle in formerly Xhosa territory at the frontier. They became allies of the whites in the wars against Xhosa in 1846 and 1850 and were rewarded by the British government with protection against prosecution and with land tracts near Queensland, in the later Ciskei "homeland" (Thompson and Wilson 1969). Many of them also settled in the Wittebergen native district in the second half of the 19th century. The Mfengu are stated separately in the census of 1865, 1875 as well as 1904.

[5] Identifying them by their spoken language (recorded in some 20th century censuses) is not possible, because Khoi and San languages had disappeared by the 20th century.
[6] Kaffer was the original name given to Xhosa. It means "infidel" in Arab language.

The special treatment this group received in the Colony can be derived from the descriptive part of the 1904 census: "Their peculiar relation with the colony as involuntary immigrants within its boundaries and their intelligence and progress in civilization lead to their being considered separately" (Christopher 2002). This ethnic group displays the highest ABCC levels of all three native groups. Their privileged socio-economic situation may have allowed them to invest slightly more in education. Moreover, the possibility to engage in subsistence farming and possibly trade some agricultural surplus may have been an incentive to acquire basic numerical skills.

4.2. The Native Reserve of Wittebergen

The amount of land that was owned by native tribes was severely limited following the expansion of the areas ruled by the colonizers since the 18th century (first the Dutch East India Company and the "Boers", later the British Colonial government as well as the independent republics).[7] However, the land grabbing exacerbated in the late 1800s, culminating in the land act of 1913(slightly revised in 1936) that prohibited Natives (who accounted for two thirds of the population) to buy or hire land in 93% of South Africa (Bundy 1979). The main motive for those land acts seems to have been to ensure *cheap labour for the mines* and for commercial agriculture. With the expansion of economic activity, especially mining after the discoveries of diamonds and gold (in 1867 and1886 respectively), in an alliance of government and mining companies, several laws and practices that aimed at pushing Natives into wage labour and pressing low-skilled wages were set in place. They included the imposition of native direct taxes and the reservation of land for European use only (Feinstein 2005, Austin, Frankema and Jerven 2014).

A period of successful "modern" African farming in the 19th century in some areas, further stimulated by the increased demand derived from the mining sector, was replaced by the definitive "proletarianisation" of the native population. The limited land reserves in which Natives could farm independently soon suffered from overcrowding and erosion of the land. Subsistence became unsustainable and left them no possibility but engage in wage labour for the whites.

The Wittebergen Native Reserve, later called Herschel district (1870), was one of those land tracts reserved for the African population. It became a settlement of different tribes that were displaced by the Zulu military kingdom[8] in the early 19th century.[9] In 1850, the territory was proclaimed a reserve for inhabitation by Natives only and further land was included later in the 1850s. In its beginnings the living conditions were probably relatively favourable; the population was able to engage in subsistence farming and even produce agricultural surplus that was traded with white settlers. Wittebergen also supplied the growing demand for food of the surrounding mines. The absence of traditional chiefdom allowed the accumulation of capital and ambitious peasants adopted modern agricultural techniques, such as ploughs. In

[7] For its location, see the map in Appendix Figure A.
[8]The conflicts are called Mfecane, which refers to a series of Zulu and other Nguni wars and forced migrations of the second and third decades of the 19th century that were set in motion by the Zulu military kingdom.
[9] The first European settlers were missionaries of the Methodist Missionary Society.

the mid-19th century, the native reserve attracted numerous immigrants, especially Mfengu people, and the population grew rapidly (Bundy 1979, p. 149). In our census sample, almost all inhabitants of Wittebergen that are older than 22 were born elsewhere.

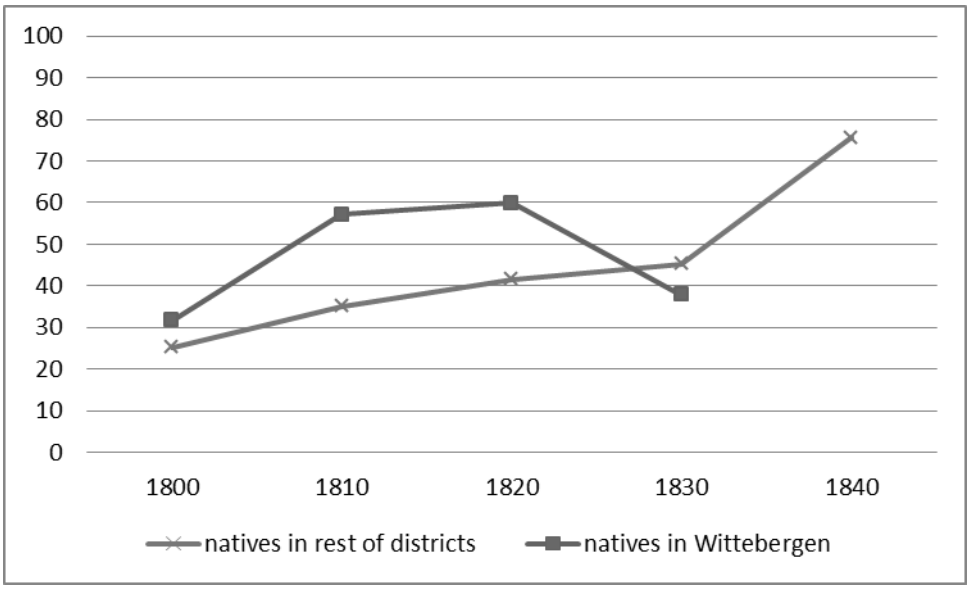
However, overcrowding, the unfavourable climate and soil coupled with unsustainable farming practices and overgrazing soon took its toll. Conflicts arose between those groups (1) practicing intensive agriculture and seeking the expansion of commercial activity, (2) those wanting to practice subsistence farming, and (3) pastoralists who needed land for their herds. According to Bundy (1979), already in the 1870s peasants were leaving the reserve in search of better opportunities and land elsewhere. Others searched employment outside the district, since they could not rely (entirely) on subsistence farming anymore. Later, between 1895 and 1899 farm production was seriously harmed by droughts, *rinderpest* and locusts. Although the agricultural capacity was exhausted and the farmers remained were very poor, the district continued to be isolated (the government did not provide infrastructure for the area) and more so by the Native Land Act of 1913, by which Herschel was proclaimed a "scheduled area", as land reserves were then named. The district remained a "pool of migrant labour" that was engaged by white settlers in agriculture and in the diamond mines (Bundy 1979). During the apartheid regime, Herschel became part of the Transkei homeland.

Figure 3 displays ABCC levels of natives residing in Wittebergen and outside the reserve. Wittebergen natives have higher numeracy levels, except for the latest birth decade. One possible explanation could be the decline in living standards that the native reserve suffered in the late 19th century.

While individuals of the age group 23 to 32 residing in Wittebergen according to the census of 1865/75 account for only 35% of the observed population (aged 23 to 72), in the rest of the Colony they account for on average 50%. This could be the result of an exodus of mainly the younger residents from Wittebergen, who were probably more prone to seek better opportunities outside of the reserve.[10] In that case, our ABCC trends for natives residing in Wittebergen and natives in the rest of the colony would point to above- average numeracy for those living in Wittebergen, except for those left in the age group of 23 to 32 after outmigration took place. This suggests that an exodus of mainly numerate peasants took place.

[10] We then have to assume that outmigration already took place in 1865, when our census was taken.

Figure 3: ABCC of natives in Wittebergen and rest of districts



4.3 Mission stations

The colonizers were of the opinion that the native population should not receive education. And thus, the missionaries were the only providers of schooling for the native population in the Cape Colony. The burghers believed that the education missionaries gave them would discourage the Natives to render service to the whites or to demand higher wages. Later, white people feared that their better paid jobs in the mining industry could be threatened by the competition of a skilled native labour force. In fact, when a public school system emerged in the 1880s, Africans were banned from enrolling in government schools (Inwood and Masakure 2013).

Missions had a strong incentive to provide education. Mostly, because they wanted to attract Natives for conversion to Christianity, and being able to visit a school or send their children to one was an important factor of attraction. In this vein, the competition between Missionary Societies possibly even improved the quality of education that they offered (Gallego and Woodberry 2010). Moreover, most of the missions in the Cape Colony were Protestant, and Protestants usually tended to emphasise on education, especially literacy, because being able to read the Bible was considered very important (Becker and Woessmann 2009).

After the abolition of slavery in 1834, a consequence of British occupation, the missions offered an alternative for former slaves to remaining bound to the white masters as labour tenants. Those Natives who could find refuge in mission stations were able to use a small plot of land and engage in seasonal work outside the missions. Another advantage was that wives and children were not bound to work for the same landlord, as was usual for wage labourers who lived on colonists' farms with their family. Moreover, children could visit schools in most of the stations. Former slave owners thus blamed missions for the crisis of labour they were going through, since they provided alternative options for freed slaves to remaining bound to their former owners (Ross and Viljoen 2009).

Those natives included in the Mission Station censuses display the highest levels of numeracy, which is consistent with their history of providing school instruction. However, we need to take into account that enquirers may possibly have been slightly more accurate with the recording of ages for this census than for other censuses.

5. Conclusion

20th century policies of black segregation caused huge deprivation among natives. In terms of real wages, the gap between blacks and whites was huge and increasing (De Zwart 2011). Racial policies set in place in the late 19th century prevented Natives from engaging in skilled work and unskilled wages were kept artificially low for the sake of productivity of the mining sector (Feinstein 2005). However, for the 19th century, we observe an important catch up process of the native population with regard to the whites in terms of numeracy (though we have to keep in mind that the numeracy is topped at 100 ABCC points, a level that whites reached quite early in the 19th century). [11]

Moreover, this study sheds new light on the debate of racial inequality in South Africa by disclosing the differences in numeracy of different native ethnic groups and relating them to their historical relationship with the colonizers. We find that the Mfengu native group that received preferred treatment in the colony due to their alliance with Europeans in wars against other native groups, displayed higher levels of numeracy than the other native groups. The Khoisan, who had been withdrawn from their land and forced to work as farmhands and herders in estates of Europeans, display the lowest numeracy levels together with the Xhosa and Soto until 1830. This result is relatively surprising, since we had expected that the close contact to the white population could have allowed them to acquire numerical skills. We suppose the reason to be that children of farmhands or herders who lived in white farms were mostly not able to visit schools or receive any informal instruction, since they were usually bound to work for their parents' employer. The Xhosa and Sotho had been defeated in most of the several Frontier Wars against the colonizers that took place in the 19th century and were therefore especially marginalised. However, they catch up and overtake Khoisan in the mid-19th century.

We also find empirical evidence –unsurprisingly– that residing in a mission station, where children could often visit schools, substantially increased natives' numerical skills. For inhabitants of native reserves, other than we had expected, we found a relatively good performance during four decades in the early 19th century and a subsequent fall in numeracy levels. Our results suggest that the native reserve of Wittebergen probably attracted relatively skilled peasants, who enjoyed a period of successful independent farming, but in the 1860s, overgrazing and overcrowding in the limited land tract took its toll, leading to an exodus of the better skilled younger generation.

[11] ABCC levels of Natives in the Cape Colony compare with those of other non-settler sub-Saharan colonies, like Ghana and Togo (Prayon and Baten 2013).

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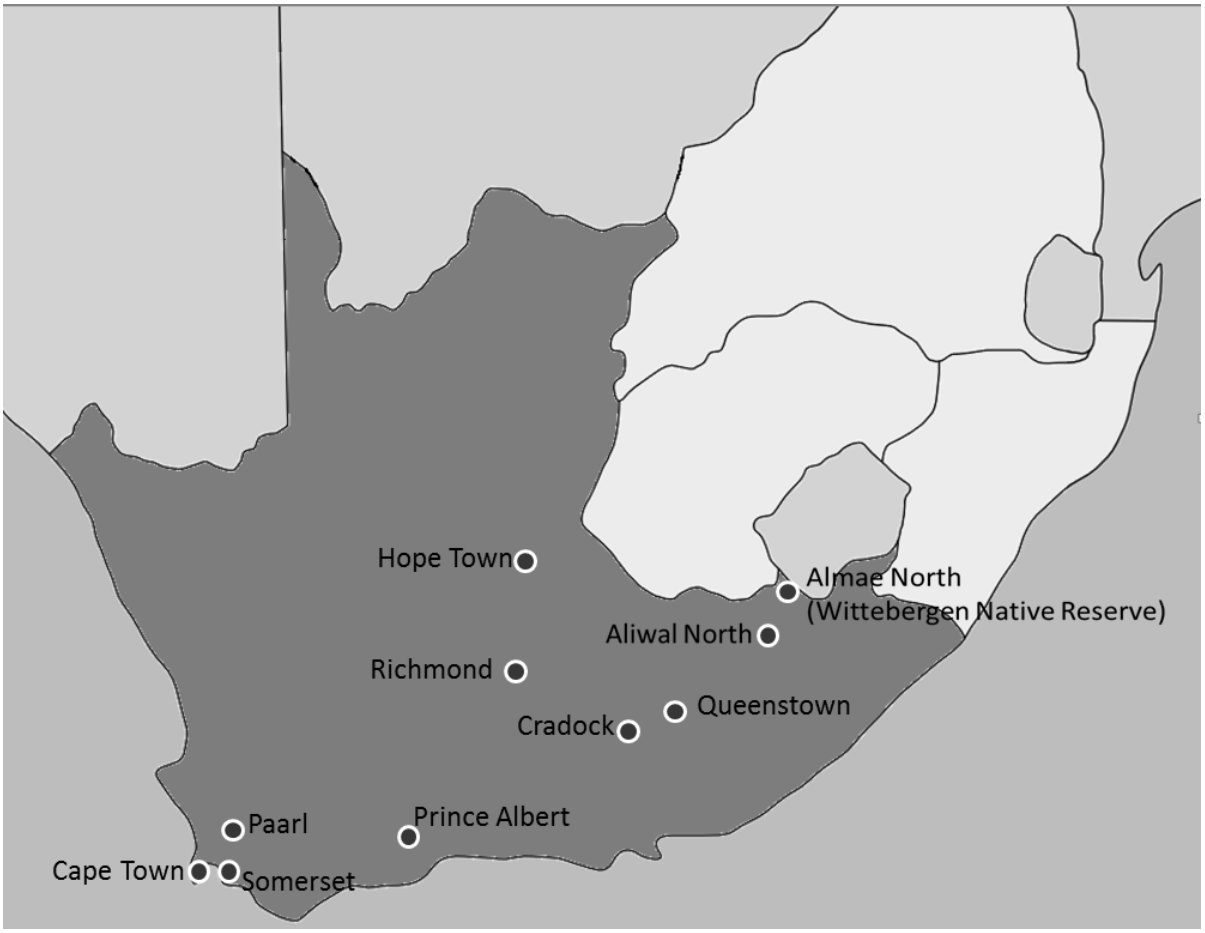
Appendix Figure A: The location of districts included in 1865/1875 census



Appendix Table A: ABCC levels

Source and ethnicity	1770	1780	1790	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920
White immigrants 1820	87.2	90.5	89.9													
missions 1849 Natives		54.2	56.7	55.6	62.7	66.8										
census 1865/75 Mfengu			58.3	36.6	52.5	60.5	37.2									
census 1865/75 Khoisan				14.5	37.6	40.1	24.7									
census 1865/75 Others						46.5	62.6									
census 1865/75 Whites			88.9	94.6	89.1	89.4	80.2									
census 1865/75 Xhosa				21.9	32.3	41.0	27.7									
census 1904 Mfengu							65.0	79.5	75.6	80.5	82.8					
census 1904 Khoisan							51.9	52.0	52.5	61.1	67.1					
census 1904 Cape Malay							72.9	73.0	72.1	78.5	84.8					
census 1904 White							98.9	97.3	96.6	97.4	97.3					
census 1904 Xhosa and Sotho							60.2	68.0	66.6	70.3	74.8					
census 1951 Natives												68.2	73.0	70.1	81.1	80.1
census 1951 Coloureds												88.2	90.5	90.6	93.6	94.8
census 1951 Whites												99.6	99.7	99.8	100.4	99.3
census 1951 Asiatics												88.2	91.4	94.5	97.1	97.7