When selection trumps persistence
The lasting effect of missionary education in South Africa[1]

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Abstract

To estimate the long-term, persistent effects of missionary education requires two strong assumptions: that mission station settlement is uncorrelated with other economic variables, such as soil quality and access to markets, and 2) that selection into (and out of) mission stations is unimportant. Both these assumptions are usually not sufficiently addressed, which renders the interpretation of the persistent effects of mission stations suspect. We use an 1849 mission census of the Cape Colony in South Africa to test whether, controlling for location and selection, mission station education can explain education outcomes 147 years later. Our first set of results show that Black and Coloured residents of districts with a mission station are today likely to attain more years of schooling than those in districts with no stations. In addition, when only modern-day controls are included, education seems to be the mechanism that explains this persistence. However, when we control for selection in 1849, literacy loses its explanatory power. Education outcomes may be highly persistent – even in the face of active repression by apartheid authorities – but the key factor is early selection and not education persistence.

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1   Introduction

Measuring the persistent impact of historical events is a fashionable topic in development economics. Past shocks, like the slave trade or artificially-imposed borders, can have a lasting impact on development outcomes in the present, notably in Africa.[2] Researchers now aim to identify the mechanisms by which these early shocks continue to affect outcomes. While geography[3], infrastructure[4] and formal and informal institutions[5] have been posited, the enduring impact of education on development outcomes has arguably received the most attention.

Education is one of the essential building blocks of economic prosperity. Yet, like most institutions, formal education is slow to evolve and largely path dependent. Early improvements can have large and persistent effects that can span centuries.[6] This is nowhere more visible than in sub-Saharan Africa, where missionary activity at the start of the twentieth century created what economists now call a 'natural experiment': the mostly random settlement of missionary stations, and schools, that allow scholars to test the persistent effects of education vis-à-vis a 'control group', i.e. a region where no missionaries settled. Two general conclusions from the literature are that Protestant missionaries significantly improved the levels of education in their surrounding community, mostly by encouraging female education, and that British colonisers created more supportive policies for

2   S. Michalopoulos and E. Papaioannou, 'Pre-Colonial Ethnic Institutions and Contemporary African Development,' *Econometrica*, 81 1 (2013), 113-152; N. Nunn 'The long-term effects of Africa's slave trades', *Quarterly Journal of Economics*, 123 1 (2008) 139–176; J. Fenske and N. Kala, 'Climate and the slave trade', *Journal of Development Economics*, in press.

3   N. Nunn and D. Puga, 'Ruggedness: The blessing of bad geography in Africa', *Review of Economics and Statistics* 94 1 (2012) 20-36.

4   R. Jedwab, E. Kerby and A. Moradi, History, Path Dependence and Development: Evidence from Colonial Railroads, Settlers and Cities in Kenya, Unpublished working paper no 2014-02 (George Washington University, 2014).

5   D. Acemoglu, S. Johnson and J.A. Robinson, 'The colonial origins of comparative development: an empirical investigation' *American Economic Review* 91 5 (2001) 1369–1401; N. Nunn & L. Wantchekon, 'The Slave Trade and the Origins of Mistrust in Africa', *American Economic Review*, 101 7 (2011), 3221-52

6   J. Mokyr and H.-J. Voth, 'Understanding growth in Europe, 1700-1870: theory and evidence', in S. Broadberry and K. O'Rourke (eds), *The Cambridge Economic History of Modern Europe* 1 (2010): 8-42; J. Baten and J.-L. Van Zanden, 'Book production and the onset of modern economic growth', *Journal of Economic Growth* 13 3 (2008) 217-235.

missionary activity in the colonies.[7] The result is that those countries colonised by Britain and injected with Protestant missionaries not only have better education outcomes today, but higher levels of income and improved living standards.[8]

These results are not devoid of criticism. Missionary settlement was not always non-random; the missionaries' goal was to convert as many souls as possible and they therefore would have settled in the most densely populated regions. But these high levels of population density may have resulted from other geographic and economic features: proximity to water, for example, access to fertile fields, or political concentration. It is likely that other factors therefore confound results of a causal relationship between missionary activity and education outcomes; higher education may, therefore, be a result of not only missionary activity but some other, unobserved variable that explain both missionary settlement and education outcomes.[9] More importantly, once settled, a missionary station may draw residents non-randomly from the population. It may be that the more educated, are the more affluent, or the more able migrate to these mission stations, inflating their impact. As far as we are aware, no study has yet been able to control for such selection.

In addition, studies of the effects of missionary stations often rely on limited contemporaneous survey-data to establish the size of the educational persistence. Often these modern-day surveys lack adequate data on incomes or controls that would allow a more accurate reflection of the size of historical education coefficient. Moreover, these studies often cover several countries and territories and therefore ignore the implicit heterogeneity of cultures and languages that may affect the results. And because one would expect migrants to move from poorer performing to better performing regions, the coefficient that captures the effect of historical education may misreport the true impact.

7   F.A. Gallego and R. Woodberry, 'Christian Missionaries and Education in Former African Colonies: How Competition Mattered', *Journal of African Economies* 19 3 (2010) 294-329; E. Frankema, 'The Origins of Formal Education in sub-Saharan Africa: Was British Rule More Benign?' *European Review of Economic History* 16 4 (2012) 335-355.

8   N. Nunn, 'Gender and Missionary Influence in Colonial Africa' (Boston, Department of Economics, Harvard University, 2011) 1-24.

9   L. Wantchekon, M. Klašnja and N. Novta, 'Education and Human Capital Externalities: Evidence from Colonial Benin', (Princeton, Department of Economics, Princeton University, 2014) 1-70.

Illustration 1. Lovedale school

Source: J. Wells, 1909, Chapter 11: The Stewart of Lovedale. In: The Life of James Stewart. London: Hodder and Stroughton

What is necessary, therefore, is to consider a region where missionary settlement was indeed random or, because complete randomness is highly unlikely, where missionaries settled regions with low population density and few economic benefits. Such a region should also have early missionary activity, a relatively homogenous population (or, at least, allow one to control for different population groups) and a society where migration was limited. Moreover, an ideal test of education persistence would allow for the control of early residents' observable characteristics.

We believe South Africa's Cape Colony is an excellent example of such a society. The missionary experience in South Africa is different to that of other colonies; colonisation occurred earlier than elsewhere in Africa and was combined with significant European settlement.[10] That meant that missionary societies were active in the Colony from as early as the beginning of the eighteenth century. Because these societies were keen to convert the native population groups, they established mission stations in areas outside European settlement, in other words, in areas with limited economic potential.[11] Here they could provide a livelihood for emancipated slaves and disgruntled farm labourers from the neighbouring regions, and

10   J. Comaroff and J. Comaroff, 'Christianity and colonialism in South Africa, *American Ethnologist* 13 1 (1986) 1-22; H.C. Bredekamp and R. Ross (eds) *Missions and Christianity in South African History* (Johannesburg, Witwatersrand University Press, 1995).

11   R. Ross and R. Viljoen, 'The 1849 census of Cape missions' *South African Historical Journal* 61 2 (2009) 389-406.

instil the principles of Christianity which included the ability to read and write.

On these mission stations they and their descendants remained. South Africa's racially oppressive segregation and apartheid policies meant that opportunities for what would become known as the Coloured and black population groups were limited. Not only that, but the Bantu Education Act of 1953 abolished missionary education too, replacing it with a sub-standard curriculum.[12] That is, the South African government not only discouraged missionary education but introduced policies to actively pre-vent its positive effects. This restraint on migration and suppression of education lasted until the abolishment of pass laws and other apartheid policies by the end of the 1980s, and the equalisation of school funding between white and black schools in the 1990s.[13]

This study, using an 1849 census of Cape mission stations and the 1996 population census of South Africa, tests whether the presence of Cape mission stations improved education outcomes of school children nearly 150 years later. Even against the backdrop of South Africa's political history and controlling for a multitude of other factors, we find that it did. Living in the same district as a historical mission station increases the numbers of years at school by 0.4 years. Because we have microlevel information on the residents in 1849, we can control for selection effects that may inflate our measures of historical persistence. And, we find, that selection does make a difference. We show that, when controlling for the composition of the population in 1849, the size of the literacy rate coefficient falls in size and becomes insignificant in explaining the historical persistence of educa-tion. While historical education may still be important, sample selection may drive much of the impact of past education.

2   Missionaries, education and development

The spread of education in a country depends on both education facilities and the incentives for mastering specific skills needed for indigenous or imported technology. Both factors are influenced by what economists have labelled 'institutions'. Several factors explain the emergence of said coloni-

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12   H. Giliomee, 'A note on Bantu Education, 1953 to 1970' *South African Journal of Economics* 77 1 (2009) 190-198.

13   S. van der Berg, 'Redistribution through the budget: public expenditure incidence in South Africa, 1993–1997' *Social Dynamics* 27 1 (2001) 140-164.

al institutions, and the persistence of these institutions over time: the climate, factor endowments and disease environment have famously been suggested as possible explanations for the persistence of 'good' or 'bad' institutions.[14]

Engerman and Sokoloff argue that much of the Americas saw large increases in the use of slave labour in labour-intensive industries like coffee and sugar, causing large disparities in wealth and human capital between European settlers and slaves in the colonial period.[15] The unequal allocation of property rights contributed to inequality, but so too did access to schooling; the rich were able to build their human capital, reserve voting rights and exclude a large proportion of the population from the gains of economic progress. The result was severe and persistent wealth and human capital inequality in these regions, and lower levels of development.[16]

In Africa, the presence of malaria and other tropical diseases resulted in high mortality rates for European settlers. In these regions, Europeans chose to rather build 'extractive' institutions which resulted in weak enforcement of property rights, and lower levels of investment.[17] Differences in living standards today are, at least in part, a result of these weak institutions. Not everyone attributes Africa's poor performance to institutions *in toto*; Bolt and Bezemer argue instead that one institution in particular – colonial education – is a better predictor of Africa's development differences, although their work suffers from weak instrument and measurement error problems.[18]

Regardless of the underlying reasons for the inequalities between and within countries, there is little disagreement about how to reduce it: more and better education. Engerman and Sokoloff show that societies that achieved higher literacy rates earlier than others were also the economies to achieve higher economic growth rates over longer periods.[19] Easterly and Levine similarly find a strong correlation between earlier European

14 Acemoglu, Johnson and Robinson, 'The colonial origins'; S.L. Engerman and K.L. Sokoloff, *Economic development in the Americas since 1500: endowments and institutions* (Cambridge, Cambridge University Press, 2012).

15 K.L. Sokoloff and S.T. Engerman, 'History Lessons: Institutions, Factor Endowments and Paths to Development in the New World' *Journal of Economic Perspectives* 14 3 (2000) 221.

16 A. Castelló and R. Doménech, 'Human Capital Inequality and Economic Growth: Some Evidence' *The Economic Journal* 112 (2002) C187-C200.

17 Acemoglu, Johnson and Robinson, 1373.

18 J. Bolt and D. Bezemer, 'Understanding Long-Run African Growth: Colonial Institutions vs Colonial Education?' *Journal of Development Studies* 45 1 (2009) 24-54.

19 Sokoloff and Engerman, 'History Lessons', 227.

settlement and better development outcomes today, attributing most of this to the higher levels of human capital that the settlers brought to these regions.[20] And with the settlers, sometimes even earlier, came missionaries: Roman Catholic mission stations in the Spanish and French colonies, while the British and Dutch colonies promoted Protestant missionary activity.[21]

Since Max Weber emphasised the Protestant ethics of hard work, frugality and diligence, economic historians have attempted to isolate the ethics from the education promulgated by the Protestants.[22] While scholars have traditionally tested the effect of religion in Europe[23] and, more recently, China[24], it is in Africa where the differences between Catholic and Protestant mission stations are much more evident, where missionaries arrived more recently and the persistence of their actions can be more easily quantified. Gallego and Woodberry use the historical literacy rates of 17 former African colonies to estimate its impact on current education outcomes.[25] They find that Protestant missionaries were more efficient in converting the native population and more successful in improving literacy. They are also the stations that have a persistent effect on current levels of development. Catholic missions, in contrast, had lower levels of conversion and educational attainment, and no discernable effect today.

Nunn builds on their work by using the 2005 Afrobarometer survey to identify more spatially disaggregated correlations between missionary activity and development outcomes.[26] The Afrobarometer survey contains information at the individual level on education, age, gender and opinions about female equity and through GIS mapping of the original mission stations; Nunn is able to identify those individuals today that still live within a 10 km radius of a mission station. He finds significant effects of missionary

20 W. Easterly and R. Levine, *The European origins of economic development* (No. w18162, National Bureau of Economic Research, 2012).

21 Frankema, 'The Origins of Formal Education', 336.

22 S.O. Becker and L. Woessmann 'Was Weber wrong? A human capital theory of Protestant economic history', *Quarterly Journal of Economics* 124 2 (2009) 531-596.

23 S.O. Becker and L. Woessmann, 'Luther and the Girls: Religious Denomination and the Female Education Gap in Nineteenth-century Prussia' *Scandinavian Journal of Economics* 110 4 (2008) 777-805; S.O. Becker and L. Woessmann, 'The effect of Protestantism on education before the industrialization: Evidence from 1816 Prussia' *Economics Letters* 107 2 (2010) 224-228.

24 Y. Bai and J. Kai-sing Kung, 'Diffusing knowledge while spreading God's message: Protestantism and economic prosperity in China, 1840–1920' *Journal of the European Economic Association* doi: 10.1111/jeea.12113.

25 Gallego and Woodberry, 'Christian Missionaries and Education', p. 318.

26 Nunn, 'Gender and Missionary Influence'.

activity on long-term education levels, most notably for Protestant mission stations. He argues that this is because Protestant stations, in contrast to the Catholic stations, emphasised female education.[27] Nunn's coefficients are smaller than those of Gallego and Woodberry which is explained by the additional control variables Nunn uses.

In a recent working paper, Wantchekon, Klašnja and Novta investigate the impact on education of missionary stations in Benin.[28] Here, they argue, the settlement of missionaries was near-random, providing the possibility of a 'natural experiment' to test the lasting effect of education. They find 'a significant positive treatment effect of education for the first generation of students, as well as their descendants – they have higher living standards, are less likely to be farmers, and are more likely to be politically active'.[29] What is clear is that missionary settlement at the start of the twentieth century has a persistent impact on education levels in much of Africa.

Not all missionaries were privately financed. Benavot and Riddle investigate the spread of primary education from 1870-1940 and the extent to which such education was supported by the colonial ruler.[30] They found higher enrolment rates in British, Dutch, Portuguese and Belgian colonies than in the colonies ruled by France, and attribute this to the British emphasis on the training of Africans for lower-skilled occupations such as clerks and craftsmen. Frankema builds on their analysis by comparing enrolment rates with public investments in education.[31] He returns the focus to missionary activity instead of the nationality of the colonial ruler; the British impact should not be overstated, he argues, because they invested relatively little in public education. In British colonies, Frankema argues, Africans were more amiable to missionary activity which allowed colonial authorities to rely on missionary schools to foot most of the education bill.[32] Here causality becomes an issue: did the British colonise areas where missionaries were already active, or did missionaries follow British rule? If the former is true, missionary zeal must explain most of the benefits of education. If the latter is true, then British rule does have some role to play.

Both explanations complicate the story, though, because missionary settlement and colonisation are not orthogonal to economic considerati-

27 Nunn, 'Gender and Missionary Influence', 15.
28 Wantchekon, Klašnja and Novta, 'Education and Human Capital Externalities'.
29 Ibid, 2.
30 A. Benavot and P. Riddle, 'The Expansion of Primary Education, 1870-1940: Trends and Issues' Sociology of Education. 61 3 (1988) 191-210.
31 Frankema, 'The Origins of Formal Education'.
32 Frankema, 'The Origins of Formal Education'.

ons. Frankema explains how pressure from Scottish missionaries forced the British government to annex the Shire highlands of modern-day Malawi[33], a region that had (and still has) a fertile soil and high population density.[34] Are these early advantages not confounding factors when considering the impact of historical education on development outcomes today? In the absence of accurate historical data, can we control for location advantages and population density during this early period? In the absence of accurate information on historical settlement patterns and the size of the population, such controls are unlikely to be available.

Another possibility is that, after missionary settlement, the region draws a non-random sample from the general population. Perhaps those inclined to education, for ability or preference, are more likely to migrate to the mission stations. If this happens, the impact of mission stations on current outcomes will be inflated.

For these reasons, it is important to consider a region where the choice of missionary settlement was made for political and not economic reasons and where migration was recorded or restricted. We argue that in a colony where Europeans settled in large numbers, mission stations were located as far away as possible from European society, in essence, to keep the natives away from land attractive for European settlement. In addition, the demand for labour on farms necessitated detailed record-keeping of mission societies. This is the South African situation we discuss in the next section.

3   The missions in South Africa

The Cape region was inhabited by nomadic, pastoral Khoe and hunter-gatherer San when the first Europeans settled in Table Bay to found a refreshment station for passing ships. The Dutch East India Company had thought the construction of a fort and vegetable garden below Table Mountain a good idea to ensure a steady supply of fresh produce, water and fuel for their ships' journey to the East, and on their return to Hol-

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33 Frankema, 'The Origins of Formal Education'.

34 M. Vaughan, 'Food production and family labour in southern Malawi: The Shire highlands and upper Shire valley in the early colonial period', *The Journal of African History* 23 3 (1982) 351-364.

land.[35] To supply the ships with meat, the plan was to trade cattle and sheep with the Khoesan who lived in the vicinity of the fort. A small crew of Company officials, under command of Jan van Riebeeck, arrived in 1652 to implement the plan.[36] Soon, however, it became obvious that trade would not be that easy, and settlement of Europeans as farmers was arranged on lands next to the Liesbeeck River. The process of colonisation, and the disintegration of Khoesan society, had begun.

While stock farming was initially popular, further expansion of the territory into the fertile region west of the first mountain ranges allowed farmers to move into wheat cultivation and viticulture. This necessitated a larger labour force and to ensure the low prices of produce, the Company decided to import Asian and African slaves instead of encouraging European immigration.[37] But even before colonial expansion, slaves had become a familiar sight at the fort, after the Amersfoort, a Dutch ship that had captured 170 slaves from a Portuguese slave trader, had arrived in Cape Town in 1658.[38] A slave lodge was added to the fort to house these Company slaves, and it was for this group that the first formal school was created. The teaching methods used were, like other treatment of slaves, harsh; alcohol was used to foist students' obedience and desertion into the mountainous surroundings was not uncommon.[39] But the slave lodge would continue to educate generations of slave children, and there is at least some evidence to show that basic skills such as literacy and numeracy were taught.[40]

This is often more than what European children could expect. Little more than an ability to read the Bible was required of the descendants of Calvinist Dutch and German immigrants, and French Huguenots.[41] Wealthier farmers could afford to appoint teachers to school their young and

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35 W.H. Boshoff and J. Fourie, 'The significance of the Cape trade route to economic activity in the Cape Colony: a medium-term business cycle analysis', *European Review of Economic History*, 14 (2010) 469–503.

36 G. Schutte, 'Company and colonists at the Cape', in R. Elphick and H. Giliomee (eds), *The Shaping of South African Society,1652–1820* (Cape Town: Longman Penguin Southern Africa, 1980).

37 N. Worden, *Slavery in Dutch South Africa* (Cambridge University Press, Cambridge, England, 1985); R.C-H. Shell, *Children of bondage: a social history of the slave society at the Cape of Good Hope, 1652–1838* (Wesleyan University Press, Hanover, 1994).

38 A.L. Müller, 'The Economics of Slave Labour at the Cape of Good Hope' *South African Journal of Economics* 49 1 (1981) 28-36.

39 Shell, Children of bondage,

40 Shell, Children of bondage,

41 J. Fourie and D. von Fintel, 'Settler skills and colonial development: the Huguenot winemakers in eighteenth-century Dutch South Africa' *Economic History Review*, In press.

books were widely available[42], but formal education beyond literacy was the exception. In any case, children were from a young age expected to help on the farm, leaving little time and incentive for further education.

This was true at least until the mid-nineteenth century. As the colonial frontier expanded and the economy had reached what Fourie calls an affluent plateau[43], there was little need for formal education. Yet even without formal education, European descendants did acquire basic levels of literacy and numeracy skills, as Baten and Fourie have shown.[44] Using court records that report the age of individuals and calculating a Whipple Index, they show that European descendants at the Cape attained high numeracy levels, even in comparison to their compatriots in Europe.[45] Slave children born at the Cape perform worse than Europeans, but significantly better than slaves born outside the region. They argue that this is because of better nutrition at the Cape, and better education in the slave lodge.

The higher numeracy levels of the locally-born slaves were also a consequence of the Cape's early missionary stations. These stations were mostly ad hoc attempts by missionaries to convert the increasingly marginalised Khoesan; George Schmidt, a German missionary of the Moravian Church, founded Genadendal in 1738, for example, the first mission station in southern Africa.[46] Early stations like Genadendal were small and subject to the whims of the VOC governors and the Dutch Reformed Church, the official religious authority in the Colony. These mission stations would also cause discontent amongst farmers, especially when baptising converts (baptised slaves, and their descendants, were legally free). But they provided a haven for emancipated slaves and others who wanted to escape from the strains of the colonial economy. And that is the important point here: all these mission stations were rural in nature, located far from towns and often in rugged terrain that had poor accessibility. The only real require-

42 J. Fourie and J. Uys, 'Luxury product consumption in eighteenth-century Cape Colony households' *Tijdschrift voor Sociale en Economische Geschiedenis* 9 2 (2012) 29-60.

43 J. Fourie, 'The remarkable wealth of the Dutch Cape Colony: measurements from eighteenth-century probate inventories' *Economic History Review* 66 2 (2013) 419-448.

44 J. Baten and J. Fourie, 'Numeracy of Africans, Asians, and Europeans during the Early Modern Period: New Evidence from Cape Colony Court Registers', *Economic History Review*, In press.

45 For a description of age heaping, see B. A'Hearn, J. Baten and D. Crayen. 'Quantifying Quantitative Literacy: Age Heaping And the History of Age Heaping', *Journal of Economic History* 69 3 (2007) 783-808.

46 R. Viljoen, '"Sketching the Khoikhoi": George French Angas and his depiction of the Genadendal Khoikhoi characters at the Cape of Good Hope, c. 1847', *South African Journal of Art History* 22 2 (2007) 277-290.

ment for settlement was a steady supply of water for drinking and to sustain the small plots of land most converts used for farming. Resident men would often supplement their income by working on settler farms during harvest season.

The missionaries did not only bring with them the zeal to convert souls, but also ideas of the Protestant Reformation, which taught that education should be available to all people.[47] Literacy was essential; the ability to read the Bible was believed to be crucial to salvation. Time and, importantly, resources from abroad were thus devoted to expand missionary education in South Africa. As the colonial borders expanded, so did the reach of the missionaries, bringing them into contact, by the end of the eighteenth century, with the Xhosa, the westernmost Bantu tribe. This opened a considerable new arena for recruiting, attracting several more missionary societies into South Africa, so that by 1834 missionary activity was spread over the entire colony.[48]

The arrival of the British in 1806 also affected state education institutions. The Cape government established a Department of Education in 1839 under James Rose Innes, which later enacted the Education Act of 1865.[49] The Act changed the funding model of schools from a grant-in-aid system to a pound-for-pound principle, where the amount received from government was determined by the amount schools were able to raise themselves.[50] This system divided schools into A, B, C and D categories. Missionary schools fell into the B category, which comprised schools that were generally considered unable to sustain themselves, making the schools eligible for government aid of between £15 and £75 which usually only covered teacher salaries.[51] Their unsustainability was due to the fact that the children were almost entirely from the Coloured (descendants of

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47 Even if allocation of stations were random, it is possible that some missionaries, those with a greater ability to convert and educate, chose the more favourable locations and it was the residents at these stations that benefited most. This hypothesis can easily be rejected, as missionaries (at least those of the Moravian and the London Missionary Society) drew lots to determine their placement on arrival in South Africa. See E. Elbourne, Blood Ground: Colonialism, Missions, and the Contest for Christianity in the Cape Colony and Britain, 1799-1853 (McGill-Queen's University Press, 2008), 117.

48 M.E. McKerron, A History of Education in South Africa (Pretoria, J.L. van Schaik Ltd. Publishers, 1934), 158.

49 E.G. Malherbe, Education in South Africa (1652 – 1922) (Cape Town, Juta and Co. Ltd., 1925).

50 Ibid.

51 Ibid, 96.

slave, Khoesan and European liaisons), black and poor white communities.[52]

Most mission schools only covered a primary school curriculum.[53] Even so, mission schools often provided a better quality education than what most whites had access to.[54] The mission schools also did more than simply teach residents to read and write: they introduced European ideas and beliefs about family life into Coloured and black society. This included wearing European style clothes, building houses similar to those of the settlers, and public sobriety.[55] Missionaries spread the English language, and were responsible for some of the first written records of indigenous African languages.[56] While teaching was initially mostly religious, the curriculum gradually evolved to become more secular. After the unification of the two colonies (Cape Colony and Natal) and the two former Boer republics (Transvaal and the Orange River Colony) in 1910, the curricula became identical to that of state schools.[57]

Unification saw little changes in the internal structure of the four education systems, although control of institutions was moved from provincial to Union government.[58] The majority of the Coloured and black population did not wish for unification and the many protests, often organised by mission-educated leaders, failed in halting the political change. Inevitably, unification brought with it policies aimed at segregation based on race, and the first of these were the Natives Land Act of 1913. The Act appropriated land to whites who were financially supported by the state to acquire modern technology. The same financial support was not extended to black farmers, hastening the creation of what Ross calls a black 'propertyless agricultural proletariat'.[59]

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52 McKerron, *A History of Education*, 26.

53 Lovedale in the Eastern Cape was the exception. Here, secondary education was offered and sometimes even tertiary education.

54 S.E. Duff, 'What will this child be? Children, Childhood, and the Dutch Reformed Church in the Cape Colony, 1860-1894' Unpublished PhD dissertation (Birkbeck, University of London, 2010) 201-202.

55 R. Ross, *Status and Respectability in the Cape Colony, 1750-1870* (Cambridge, Cambridge University Press, 1999) 78–88. This is not true of all mission stations. Those in the frontier regions focused on translating the Bible into the indigenous languages, often with little success. See S. Volz, 'The Rise and Fall of The Moffat Institution: Mission Education in a Colonial Borderland', *South African Historical Journal* (2014) 1-16.

56 V. Bickford-Smith, 'Revisiting anglicisation in the nineteenth-century Cape Colony', *Journal of Imperial and Commonwealth History* 31 2 (2003) 82-95.

57 McKerron, *A History of Education*, 172-173.

58 Malherbe, *Education in South Africa*, 436.

59 R. Ross. *A concise history of South Africa* (Cambridge, Cambridge University Press, 2008), 90.

The following decades would see an increase in discriminatory and repressive labour policies against blacks. The most important policy for the purposes of this discussion followed the election win of DF Malan's National Party in 1948 and the beginning of apartheid. The 1953 Bantu Education Act established different educational standards for whites and blacks (including Coloureds and Indians), as well as different curricula to be taught in racially-separated schools. More importantly, because of their 'liberal' curriculum, the Act removed state support for missionary schools, forcing most to close down or severely limit operations. While the Act did expand schooling for many blacks, the poor quality of the new system was soon apparent, as Ross has shown with reference to the decline of literacy rates in the Eastern Cape.[60]

Redress of the education system already began during the last decade of the apartheid regime. The proportion of black children in school increased from 50% in 1976 to 85% by the early 1990s.[61] The new democratically elected government continued the trend. Education spending on blacks increased from 58.1% of total education spending in 1993 to 79.2% in 1997.[62] Social spending in South Africa today is extensive; almost all children of school-going age are in the classroom. Yet quality remains the issue: key despite the massive fiscal redistribution that has occurred, pre-1994 inequalities in education outcomes remain.[63]

The former mission station schools are now all state schools, following the same national curriculum. There has been significant out- and in-migration since the pass laws were revoked in 1986.[64] Even so, the mission stations themselves remain mostly isolated, far away from job opportunities and populated mostly by the descendants of earlier residents. Young people tend to move to larger towns or cities in search of employment.[65] There is little that differentiates these mission stations from surrounding towns today.

60 Ross, *A concise history*, 122.
61 Ross, *A concise history*, 122.
62 S. van der Berg, 'Public Spending and the Poor since the Transition to democracy' in H. Bhorat and R. Kanbur (eds) *Poverty and Policy in South Africa* (Pretoria: HSRC Press, 2006) 210.
63 N. Spaull, 'Poverty and privilege: primary school inequality in South Africa', *International Journal of Educational Development*, 33 (2013) 436–447
64 For an overview of migration in South Africa, see H.E. Reed, 'Moving across boundaries: migration in South Africa, 1950–2000' Demography 50 1 (2013) 71-95.
65 L. Grieger, A. Williamson, M. Leibbrandt, and J. Levinsohn, 'Evidence of short-term household change in South Africa from the National Income Dynamics Study', *Development Southern Africa* 31 1 (2014): 146-167.

4   Data and methodology

It is in this setting that we hope to analyse the persistent effects of mission school education. We use the results from an 1849 mission station census and compare that to the 1996 South African census, the first population census after the 1994 democratic elections.

The 1849 mission station census was ordered by the Cape government after the emancipation of slaves in the colony in 1838 had caused a severe shortage of labour on settler farms.[66] Many emancipated slaves had moved to the mission stations after 1838, and to address the labour shortages, the government hoped to better understand the material living conditions of these former slaves. Government officials thus travelled to each of the stations, recording the names of the 4768 mission station residents, as well as their age, gender, marital status, the length of time they have resided at the station, their literacy ability and, in some cases, even crop and stock production figures.[67] Fourie, Ross and Viljoen use these figures to measure literacy and numeracy rates, and show that large and significant differences in literacy rates arose between the different mission societies; the London Missionary Society, for example, were more successful at delivering literacy to their subjects than the Moravian Society.[68]

Aside from the 1849 census, we have little information about the residents of these stations. Ross and Viljoen, the two authors who transcribed the 1849 census, noted that the "significance and value of the document and project at this early stage of the project is not to be underestimated. It provides researchers with a different view of the inhabitants of the mission stations by the mid-nineteenth century".[69] Indeed. Except what could be gleaned from the letters and diaries of missionaries[70], little is known about the personal characteristics of mission station residents and, specifically, their lives before arriving at the mission stations. All we know is that the stations offered ex-slaves, the Khoe and the Xhosa a way to 'escape the discriminatory labour practices on farms' by providing them with 'skills with which to consolidate their position within Cape society'.[71] The 1849

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66 Slaves were formally emancipated in 1834, but had to remain on farms for another four years.

67 Ross and Viljoen, 'The 1849 census of Cape missions'.

68 J. Fourie, R. Ross and R. Viljoen, 'Literacy at South African mission stations', *Journal of Southern African Studies*, 40 4 (2014) 781-800.

69 Ross and Viljoen, 'The 1849 census of Cape missions', 404.

70 E. Elbourne, 'Concerning Missionaries: The Case of Van der Kemp', Journal of Southern African Studies, 17 1 (1991) 153-164.

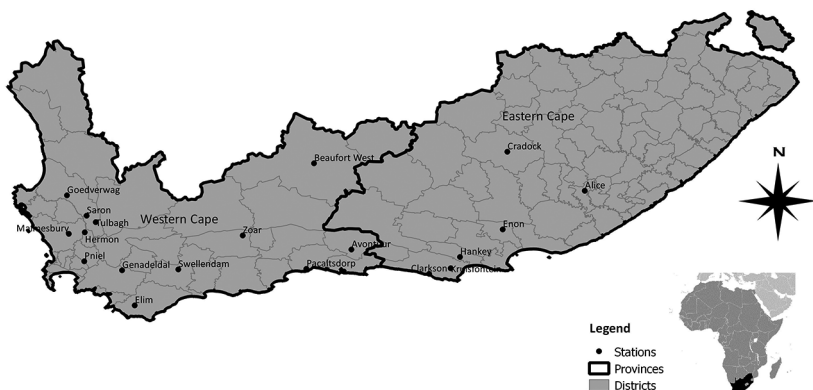71 Fourie, Ross and Viljoen, 'Literacy at South African mission station',

Figure 1. Location of mission stations with modern-day municipal district and provincial borders

Source: 1996 Population Census, own calculations

census, which includes a question about the length of time each resident lived at the station, allows us to begin filling in the blanks.

Figure 1 shows the location of each of these mission stations. Fourteen of them are in the Western Cape, while twelve are in the Eastern Cape. What is immediately clear from the map is the dispersion of stations across the territory; few are located close to the coast or to major economic hubs. We compare the presence of these mission stations on education outcomes in the 1996 South African Population Census. We use a 10% weighted sample of the full census disaggregated by province, municipal district, transitional local and rural councils (TLCs and TRCs), and enumerator areas. To keep individuals anonymous, Statistics South Africa decided that a local authority in a geographical region had to consist of at least 2000 households. If it did not, it was pooled with the nearest district authority, a situation that creates measurement issues for us at the smallest geographical region. For this reason we have opted for the larger municipal district classification.

The 1996 census provides additional information which allows us to control for several observable characteristics in the regression analysis, including age, gender, religion and race. Table 1 provides the descriptive results for each of the 26 stations.[72]

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72 Fourie, Ross and Viljoen, 'Literacy at South African mission station',

Table 1: Descriptive statistics of selected variables, 1996 Population Census

Missionary Station	Municipality	Prov	Highest school level	Age (years)	Gender (% male)	Race (% Coloured)	Income (average)	Migration after 1984	Religion (% Christian)
Avontuur	Uniondale	WC	7.58	26.05	49.05	96.48	2.29	32.89	93.55
Bethelsdorp	Port Elizabeth	EC	6.41	26.17	47.81	0.10	1.74	39.24	45.61
Clarkson	Humansdorp	EC	8.09	28.17	49.56	66.33	2.58	57.43	84.30
Dyzelskraal	Oudtshoorn	WC	7.06	24.75	48.07	99.18	1.99	33.39	80.46
Ebenezer	Clanwilliam	WC	7.72	28.25	52.38	98.10	2.65	58.62	96.40
Elim	Bredasdorp	WC	8.40	29.18	51.22	93.96	2.50	54.90	92.61
Enon	Kirkwood	EC	7.19	27.56	48.20	23.94	2.13	36.50	78.00
Genadendal	Caledon	WC	9.07	30.22	55.13	87.18	2.91	54.13	90.83
Goedverwacht	Piketberg	WC	8.68	28.73	51.62	97.13	2.85	45.00	95.98
Groenekloof	Malmesbury	WC	8.14	28.35	51.04	93.18	2.80	49.35	93.87
Gwali/Tyumie	Victoria East	EC	8.69	27.39	47.05	1.48	1.76	21.64	83.88
Hankey	Hankey	EC	7.26	26.97	50.00	54.17	2.13	30.38	80.73
Haslope Hills	Craock	EC	6.49	26.30	53.38	42.88	2.44	61.27	90.16
Lovedale	Victoria East	EC	8.69	27.39	47.05	1.48	1.76	21.64	83.88
Pacaltsdorp	George	WC	9.65	28.49	49.38	69.18	3.14	58.57	85.86
Pniel	Paarl	WC	8.30	27.01	50.23	90.81	3.00	52.79	88.03
RietVley	Somerset East	EC	6.80	27.20	51.62	28.32	2.10	42.74	78.94
Saron	Tulbagh	WC	7.66	26.75	51.73	88.61	2.53	49.10	92.66
Schietfontein	Beaufort West	WC	8.46	27.05	46.67	78.80	2.37	45.40	90.80
Shiloh	Hewu	EC	6.98	27.18	46.00	0.44	1.60	16.21	74.15
Stynthal	Tulbagh	WC	7.66	26.75	51.73	88.61	2.53	49.10	92.66
Theopolis	Peddie	EC	6.83	30.00	47.08	0.53	2.16	42.18	61.78
Trappe's Valley	Peddie	EC	6.83	30.00	47.08	0.53	2.16	42.18	61.78
Zoar	Ladismith	WC	7.79	29.35	48.44	98.86	2.42	30.67	94.73
Zuurbraak	Swellendam	WC	7.45	28.07	51.99	91.25	2.48	54.75	91.42

Notes: TLC is a unique identifier for the transitional local council. Income is measured on a logarithmic scale.

Our variable of interest, education, is the average of the highest school level completed, where all tertiary education and further training is counted as 13 years. The highest average years of schooling completed was achieved by Pacaltsdorp, a village close to George, with 8.1 years. The poorest education performance was by residents of Haslope Hills close to Cradock, achieving an average of only 5.6 years. When tertiary education is included, the rankings stay roughly the same; Pacaltsdorp, for example, remains the best-performing former mission station, with an average of 9.65 years.

To test whether living on a past mission station matters for education performance today, we run a standard Ordinary Least Squares regression

with education output (E, the highest school level completed by an individual in the 1996 census) as dependent variable and a dummy for mission station (Station) as our variable of interest:

$$E = \beta_0 + \beta_1 Station + \beta_2 Rug + \beta_3 Pop1911 + \beta_4 Age + \beta_5 Male + \beta_6 Coloured + \beta_7 Urban + \beta_8 Income + \beta_9 Migration + \beta_{10} Religion + \varepsilon$$

We include several control variables. Rug is a measure of ruggedness by district. Pop1911 is the population density in 1911. Age is the age of the individual and gender is a dummy which equals 1 if the individual is male. Because mission station education mostly benefited Coloured and black residents, we restrict the sample to only include individuals from those race groups. The race variable is therefore a dummy which equals 1 if the individual is Coloured (and zero if the individual is black). Urban is a dummy variable if the former mission station is now located in an urban area (as classified by the census). Income ranges between 1 and 14 and represents the self-reported income bracket of the individual, 1 meaning no income and 2 meaning an income between R1 and R200 monthly. This is unfortunately the only information available from the census. Migration is a dummy which is 1 if the individual migrated into the region after 1984. Because pass laws were repealed in 1986, this serves as a useful cut-off date for measuring in-migration. Religion is a dummy which is 1 if the individual self-identifies with the Christian belief.

OLS requires two strong assumptions to have consistent and unbiased results: linearity and exogeneity. Because we have no prior about the dimensionality of the effect of residing on a former mission station, we assume that it effects education in a linear fashion. Alternative specifications do not seem to suggest any non-linearity. The assumption of exogeneity is usually the most stringent to pass: in our case, exogeneity implies that the presence of a former mission station only affects the current education of individuals in those regions through education. We have argued above that mission station were located, for political reasons, in undesirable and rural regions not particularly appealing to settler farmers. If anything, this should bias the coefficient of interest – the presence of a mission station on current education levels – negatively. Table 2 provides the first set of results.

Table 2: OLS regression results for the effect of historical missionary stations on current education using magisterial districts with 1996 controls

	Schooling Level			Education Level		
	(1)	(2)	(3)	(4)	(5)	(6)
Station	0.629***	1.446***	0.735***	0.784***	1.688***	0.865***
	(113.601)	(4.338)	(4.409)	(125.859)	(4.363)	(3.843)
Ruggedness		-0.000	-0.000		-0.000	-0.000
		(-0.742)	(-0.633)		(-0.591)	(-0.409)
Population 1911		0.021***	0.009**		0.024***	0.009*
		(3.623)	(2.302)		(3.188)	(1.854)
Age			-0.000			-0.000
			(-0.232)			(-0.210)
Male			0.026***			0.026***
			(3.562)			(3.161)
Urban			1.683***			1.848***
			(6.005)			(6.040)
Coloured			0.812***			0.988***
			(4.663)			(4.699)
Income 2			0.029			0.034
			(0.585)			(0.632)
Income 3			0.179***			0.198***
			(4.146)			(4.161)
Income 4			0.206***			0.236***
			(4.388)			(4.390)
Income 5			0.146***			0.169***
			(3.527)			(3.575)
Income 6			0.123***			0.151***
			(3.152)			(3.258)
Income 7			0.104**			0.139**
			(2.078)			(2.255)
Income 8			0.101*			0.142**
			(1.715)			(1.985)
Income 9			0.105			0.152*
			(1.568)			(1.865)
Income 10			0.169*			0.234**
			(1.952)			(2.259)
Income 11			0.202*			0.287**
			(1.753)			(2.058)
Income 12			0.247**			0.343**
			(2.160)			(2.463)
Income 13			0.328***			0.437***
			(3.371)			(3.577)

	Schooling Level			Education Level		
	(1)	(2)	(3)	(4)	(5)	(6)
Income 14			0.315**			0.412**
			(2.046)			(2.175)
Migration from 1980			0.333***			0.371***
			(5.179)			(5.235)
Proportion Christian			0.016			-0.002
			(0.264)			(-0.035)
Constant	6.812***	6.311***	5.127***	8.139***	7.548***	6.243***
	(3689.384)	(13.042)	(16.746)	(3916.331)	(14.161)	(18.785)
R-squared	0.014	0.302	0.660	0.017	0.289	0.652
N	925551	819053	553878	925551	819053	553878

Notes: * p<0.05, ** p<0.01, *** p<0.001. t-stats reported in brackets. The dependent variable in column 1 is the highest school level obtained (excluding tertiary education). The second column includes tertiary education. Standard errors are clustered at the district level. The first income category is the control group.

The census 10% sample includes information on more than 550 000 individuals living in the Western and Eastern Cape of South Africa, the two current provinces in which our historical mission stations are found. The results at the magisterial district level suggests that mission stations do indeed matter for current-day education levels: the presence of a historical mission station increases the years of education attained for a current resident by 0.74 years. The size of the coefficient increases slightly in specification 2 which also includes tertiary education. All the control variables have the predicted signs: age has a small, insignificant effect on education, males perform better than females, urban areas have higher education outcomes, and the positive coefficient on migration suggests that migration flows into areas with better education. Religion controls for the possible Protestant Ethic mechanism of historical missionary stations; its small, insignificant coefficient suggests that there is little evidence of such persistent Weberian effects.

Yet the availability of station-level microdata in 1849 allows us to control not only for present day selection effects, but also for past selection. Mission stations, we argue, would have attracted individuals with greater cognitive ability or individuals with a greater preference for education. We found some anecdotal evidence that support our selection hypothesis. The Khoe who lived in the vicinity of Genadendal, the first mission station at the Cape, were affluent, some owning up to 500 cattle.[73] One affluent Khoe

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73 Balie, Isaac Henry Theodore, 1986. Die 2½ eeu van Genadendal – 'n Kultuurhistoriese Onder-soek. Masters dissertation, Stellenbosch University.

farmer, Africo, spoke Dutch fluently and acted as a translator between the missionaries and the inhabitants. He was also the first learner at the school. Another case was that of August Klein, a well-off individual who decided to settle at the Elim missionary station soon after it was established.[74] Such scattered evidence suggest that more affluent and more educated Khoe farmers, for a variety of reasons, moved to the newly-established mission stations. If such selection is large, the coefficient that measures the long-term persistence of education would typically be overestimated.

We find more evidence that these early mission stations were already quite prosperous from the accounts of European travellers.[75] James Backhouse toured the colony in 1838 and 1839 and reported on the physical state of several missions.[76] Genadendal was the most prosperous with 'neatly thatched cottages… which stand well in this climate'.[77] Further east, in the Kat river valley, Backhouse noted that 'the neat cottages of those who have become more prosperous… would not discredit the more respectable of the labouring class in England'.[78]

Here we include several variables that control for past selection and early living standards. As far as we are aware, this is the first study that is able to do so. This allows for a better understanding of the mechanism through which the past presence of a mission station may affect present outcomes. Our additional controls include the age of the mission station, the size of the mission station in the 1849 census, the average age of residents at the station, the average length of time residents lived on the station, the proportion of residents that were ex-slaves (i.e. that arrived after 1838) and the proportion or residents born on the station. All these variables are from Fourie, Ross and Viljoen and are shown in Table 3.[79]

74 Van der Hoven, Liane, 2001. Elim: A Cultural Historic Study of a Moravian Mission Station at the Southern Extreme of Africa. Masters dissertation, Stellenbosch University.

75 R. Ross, Missions, 'Respectability and Civil Rights: The Cape Colony, 1828-1854', *Journal of Southern African Studies*, 25 3 (1999) 333-345.

76 J. Backhouse, *Narrative of a Visit to the Mauritius and South Africa* (London, 1844).

77 Backhouse, p. 97.

78 Backhouse, p. 189.

79 Fourie, Ross and Viljoen, 'Literacy at South African mission station'.

Table 3: Descriptive statistics of selected variables, 1849 Mission Station Census

Station	Soc	Town	Prov	Num	Age	Res	Eman	Born	Lit
Avontuur	LMS	George	WC	52	42.6	4.7	1.00	0.00	0.25
Bethelsdorp	LMS	Port Elizabeth	EC	166	44.0	25.6	0.06	0.07	0.44
Clarkson	Mo	Uitenhage	EC	80	39.2	8.8	0.94	0.00	0.16
Dyzelskraal	LMS	George	WC	43	44.1	8.1	0.79	0.00	0.45
Ebenezer	Rh	Clanwilliam	WC	52	44.5	17.9	0.44	0.23	0.57
Elim	Mo	Caledon	WC	373	40.8	10.3	0.66	0.01	0.16
Enon	Mo	Uitenhage	EC	191	35.1	18.5	0.21	0.30	0.50
Farmersfield	We	Albany	EC	104	38.2	7.9	1.00	0.00	0.36
Genadendal	Mo	Caledon	WC	1099	42.9	21.1	0.46	0.20	0.24
Goedverwacht	Mo	Piketberg	WC	26	37.7	5.9	0.96	0.00	0.08
Groenekloof	Mo	Malmesbury	WC	238	43.4	18.3	0.44	0.10	0.14
Gwali	FC	Alice	EC	131	40.8	19.2	0.21	0.14	0.37
Hankey	LMS	Uitenhage	EC	278	39.0	10.9	0.41	0.01	0.42
Haslopehills	We	Cradock	EC	115	41.3	5.3	0.50	0.40	0.29
Hermon	Rh	Paarl	WC	11	37.5	1.0	1.00	0.00	0.27
Kruisfonteyn	LMS	Uitenhage	EC	87	35.1	6.5	0.94	0.02	0.35
Lovedale	FC	Alice	EC	48	32.9	5.1	1.00	0.00	0.48
Pacaltsdorp	LMS	George	WC	213	40.8	19.0	0.28	0.12	0.42
Pniel	SA	Paarl	WC	110	37.6	2.8	1.00	0.00	0.09
Raithby	We	Stellenbosch	WC	12	39.4	2.1	1.00	0.00	0.00
Rietvley	FC	Somerset East	EC	52		8.4	0.58	0.02	0.35
Saron	Rh	Tulbagh	WC	122	41.4	1.1	1.00	0.00	0.07
Schietfontein	Rh	Beaufortwest	WC	21	39.0	14.2	0.14	0.00	0.05
Scottsbottom		Bathurst	EC	14	32.5	5.8	0.79	0.00	0.21
Shilo	Mo	Alice	EC	263	40.9	9.7	0.64	0.00	0.12
Somerset West	We	Somerset West	WC	62	39.2	6.7	0.77	0.11	0.34
Stynthal	Rh	Tulbagh	WC	62	42.5	3.0	1.00	0.00	0.15
Theopolis	LMS	Bathurst	EC	71	43.8	20.7	0.27	0.20	0.32
Trappesvalley	We	Bathurst	EC	26	36.7	7.9	0.92	0.00	0.54
Zoar	SA	Riversdale	WC	390	38.3	9.6	0.35	0.02	0.10
Zuurbraak	LMS	Swellendam	WC	166	42.1	14.1	0.58	0.05	0.20

Notes: Calculations from Fourie, Ross and Viljoen (2014)

Why would we expect these variables to matter? If it is indeed the case that some mission stations attracted more affluent individuals, or perhaps those with a greater propensity to be educated, then including observable characteristics like age and residency in a standard regression framework would allow us to control for the effects of this early selection. Missionaries may have attracted, for example, younger individuals keen to learn the Dutch or English language. Stations may therefore have had an *advantage*

in the quality of residents that, if we do not control for this advantage, might overestimate the impact of their education activities on the descendants of these residents. We therefore include several variables from the 1849 census. If we find that literacy still matters while also controlling for other observable characteristics, then the persistent effect of education is evident. If we, however, find that literacy is less important once we control for other observables, then selection might be a more important factor in explaining education persistence.

Our variable of interest is therefore the proportion of individuals that were literate in 1849. A significant, positive coefficient would suggest that those stations that had the highest literacy in 1849 continued to have an advantage vis-à-vis the other stations. Specification (7) includes no controls, while specification (8) and (9) include controls for the 1996 census and both the 1996 and 1849 census, respectively. The sample is now limited to only those districts that included a mission station. Table 4 provides the results of a standard OLS regression shown in equation (2).

$$E = \beta_0 + \beta_1 Lit49 + \beta_2 Rug + \beta_3 Pop1911 + \beta_4 Age49 + \beta_5 Size + \beta_6 Res + \beta_7 Eman + \beta_8 Born + \beta_9 Age96 + \beta_{10} Gender + \beta_{11} Race + \beta_{12} Urban + \beta_{13} Income + \beta_{14} Migration + \beta_{15} Religion + \varepsilon$$

Equation (2) is similar to equation (1) except that our station dummy has been replaced by several control variables based on the 1849 census. These include the age of the station (Age49), the size of the station (Size), the average number of years residents have lived at the station (Res), the proportion of emancipated slaves living at the station (Eman), the proportion of residents born at the station (Born) and our variable of interest, the literacy (Lit49) rate.

Table 4: OLS regression results for the effect of historical missionary stations on current education using magisterial districts with 1849 and 1996 controls

	Schooling Level			Education Level		
	(7)	(8)	(9)	(10)	(11)	(12)
Literacy at Station	0.496***	1.016**	0.653	0.791***	0.978*	0.660
	(4.557)	(2.265)	(1.364)	(5.001)	(1.998)	(1.258)
Ruggedness		0.000***	0.000*		0.000**	0.000
		(2.969)	(1.725)		(2.719)	(1.496)
Population 1911		0.019*	0.015**		0.020	0.015**
		(1.701)	(2.402)		(1.636)	(2.320)
Age		-0.013*	-0.014*		-0.013*	-0.015*
		(-1.747)	(-1.918)		(-1.823)	(-2.010)
Male		-0.650***	-0.645***		-0.699***	-0.692***
		(-11.300)	(-10.974)		(-11.688)	(-11.405)
Urban		1.223***	1.261***		1.272***	1.328***
		(7.003)	(9.169)		(7.021)	(9.331)
Coloured		-0.051	0.217*		-0.083	0.208
		(-0.261)	(1.775)		(-0.386)	(1.554)
Income 2		0.451**	0.499**		0.463**	0.517**
		(2.099)	(2.497)		(2.153)	(2.606)
Income 3		0.174	0.263		0.179	0.276
		(0.533)	(0.839)		(0.545)	(0.875)
Income 4		1.615***	1.682***		1.676***	1.750***
		(6.999)	(7.824)		(7.091)	(7.965)
Income 5		2.858***	2.908***		3.047***	3.104***
		(13.575)	(14.222)		(14.500)	(15.151)
Income 6		3.478***	3.507***		3.949***	3.983***
		(13.886)	(14.136)		(15.162)	(15.415)
Income 7		5.218***	5.217***		6.375***	6.380***
		(15.839)	(15.486)		(14.147)	(13.863)
Income 8		5.849***	5.817***		7.660***	7.625***
		(17.699)	(17.012)		(21.036)	(20.461)
Income 9		5.567***	5.560***		7.742***	7.732***
		(13.522)	(13.634)		(13.999)	(14.082)
Income 10		5.679***	5.665***		8.072***	8.062***
		(14.625)	(13.930)		(13.513)	(13.268)
Income 11		5.066***	5.132***		6.975***	7.043***
		(9.349)	(9.033)		(10.223)	(10.086)
Income 12		5.342***	5.307***		8.105***	8.069***
		(5.639)	(5.485)		(4.825)	(4.738)
Income 13		5.275***	5.438***		7.479***	7.654***
		(4.711)	(4.956)		(4.552)	(4.733)

		Schooling Level			Education Level	
	(7)	(8)	(9)	(10)	(11)	(12)
Income 14		3.946***	4.061***		6.066**	6.191**
		(3.431)	(3.436)		(2.509)	(2.542)
Migration from 1980		0.080	0.136**		0.075	0.140*
		(0.889)	(2.086)		(0.747)	(1.944)
Proportion Christian		0.265**	0.231**		0.299***	0.262***
		(2.706)	(2.578)		(2.857)	(2.760)
Age of residents			-0.108***			-0.117***
			(-4.622)			(-4.681)
Size of station			0.001*			0.001*
			(1.744)			(1.823)
Residency			0.017			0.018
			(0.665)			(0.683)
Emancipated			0.533			0.589
			(1.038)			(1.059)
Born at station			-0.409			-0.601
			(-0.422)			(-0.592)
Constant		4.716***	8.445***	7.175***	5.789***	9.815***
		(16.002)	(8.383)	(146.045)	(18.308)	(9.078)
R-squared	0.000	0.134	0.138	0.001	0.158	0.163
N	51881	51881	51881	51750	51750	51750

Notes: * p<0.05, ** p<0.01, *** p<0.001. t-stats reported in brackets. The dependent variable in column 1 is the highest school level obtained (excluding tertiary education). The second column includes tertiary education. Standard errors are clustered at the district level. The first income category is the control group.

Specifications (7) and (8) (as well as (10) and (11)) reveal a large and statistically significant impact of past literacy rates on 1996 education outcomes. The size of the coefficient in these specifications are also economically significant; moving from a station in 1849 with no literacy to one that is fully literate increases the number of years of schooling obtained by individuals in these districts by more than a year.

Yet the results reported in specifications (9) and (12) show why controlling for selection effects early in a mission station's existence is so important: once controls are added for the observable characteristics of individuals during the colonial period, the impact of early literacy on 1996 education outcomes diminishes significantly. Moreover, the significance of the coefficient disappears. Instead, the effect seems to work through demographic composition of the station during its early development; the age of the residents, for example, seems to matter more than the literacy. The size of the station, the period of residency and the proportion of people that were emancipated all seem to matter, although their effects

are not always statistically significant. These effects remain across many different specifications not shown here. Excluding some of the 1849 control variables increases the size of the literacy coefficient, but the coefficient remained insignificant in all the specifications we attempted. Instead, some of the 1849 variables become significant when other controls are removed.

What type of selection do our results imply? Younger residents in 1849 seem to be more important in explaining later education outcomes than the literacy rates of those early residents. Mission stations that attracted younger individuals, for whatever reasons, would have been more likely to have an effect on their educational attainment and thus the persistence of education outcomes. So, too, did the size of mission stations. Larger stations offered more opportunities for economic specialisation and the development of tertiary industries, including education. Genadendal, the largest station in the 1849 and at one stage the largest town after Cape Town in the entire colony, was the first to open a Teacher's Training College in 1838. The College was closed down in 1926 as discriminatory government policies intensified. Yet despite attempts by the segregationist and apartheid governments to suppress education, Genadendal continued to produce above-average education outputs. A third selection effect that seems to matter, although not statistically significant in all specifications, is the proportion of residents that arrived after the slave emancipation in 1838. The more residents who arrived after emancipation, the better education outputs more than a century later seem to be. Stations that attracted a lot of individuals that self-selected into mission stations after receiving their freedom, in contrast to having lived in an area that happened to be in the vicinity of an arriving missionary, seem to have a stronger education persistence. This is the clearest evidence we have that selection effects seem to explain part of the story.

This is not to say that there is no persistence in historical literacy. The coefficient, although insignificant, does have a positive coefficient. Yet the purpose here is to warn against overenthusiastic claims about the persistence of education without considering the selection effects that may be equally important in explaining the positive impact of mission stations on current development outcomes. While earlier studies suggests strong persistence in education outcomes, our results here suggest that, once variables are included that can control for the early selection effects at mission stations, the persistence of education is less obvious.
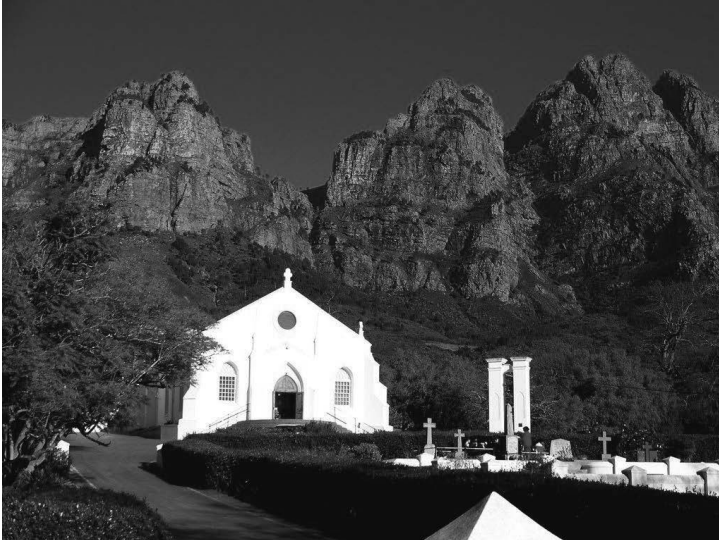
Illustration 2. Present-day Pniel church, with the slave bell and graveyard

Photo: Colleen Williams

5   Implications and conclusions

Over the last decade, economists have shown, by using novel datasets and innovative techniques, how the effects of past events persist into the present. These studies have been criticised for 'compressing history'; Austin, for example, argues that such studies over-simplifies the causal mechanism and the complexity of history.[80] Despite this criticism, though, the persistence of past exogenous shocks on development outcomes today remains a fashionable topic in the economics literature.[81]

The establishment of mission stations, in particular, are useful historical events to test the persistence of one kind of development outcome: education. Several recent papers document their persistent effects. We, too, find that the presence of a mission station in South Africa's 1849 Cape Colony explains better education outcomes for the 1996 residents in the districts of these former mission stations. However, this result becomes smaller and insignificant once we control for early selection. The observables we find to

80   G. Austin, 'The "Reversal of Fortune" thesis and the compression of history: Perspectives from African and comparative economic history, *Journal of International Development* 20 (2008) 996-1027.

81   See, for example, J. Fenske and N. Kala, 'Climate and the slave trade'.

be important include the age of residents, the size of the mission station and the proportion of residents that consisted of former slaves. We can find plausible reasons why all three are important in boosting the long-run impact of education: younger residents tend to be more educated, larger stations allow for specialisation into tertiary activities, like teacher training centres, and a greater proportion of the population that migrates after 1838 means that more residents self-selected into mission stations. All three can, and do, explain why selection may be important. Earlier studies that fail to control for such early selection may, we argue, overestimate the impact of mission stations on modern-day development outcomes. Mission stations have better education outcomes today not only because they were better in educating their residents, but also because they attracted the most talented learners.

Our results have important implications for the development literature in general, and the economic history profession specifically. Selection biases necessitate cogent identification strategies; the rise of randomised control trials[82] (RCT) is perhaps the best indication of economists' attempts to circumvent selection biases.[83] Yet RCTs are not possible in history, which has sent economic historians in search of the elusive 'natural experiment'. But most historical events, or at least those worth investigating, do not adhere to the conditions of an experiment. These events, like the arrival of missionaries in Africa or the reasons people migrate to these mission stations, are influenced by many observable and unobservable factors, which may inflate any estimates of their long-run impact on development outcomes. As Collins and Wanamaker show in a recent study of African American migration, positive selection matters.[84] Our results confirm that selection is important, and that we should attach less weight to studies that do not control for early period migration into mission stations.

Our results thus provide empirical support for the critiques against the compression of history.[85] Historical events are complex and multifaceted. A long-run persistent effect may be statistically significant, but the strength

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82 Randomized control trials involve the random assignment of treatments to a population of individuals.

83 See J. Fenske, 'The causal history of Africa: A response to Hopkins', *Economic History of Developing Regions* 25 2 (2010) 177-212; J. Fenske, 'The causal history of Africa: replies to Jerven and Hopkins', *Economic History of Developing Regions* 26 2 (2011) 125-131.

84 W. Collins and M. Wanamaker, 'Selection and Economic Gains in the Great Migration of African Americans: New Evidence from Linked Census Data', NBER Working Paper 19124 (2013) 1-43.

85 Austin, 'The "Reversal of Fortune" hypothesis.

of this persistence may depend entirely on the choice of control variables used. This choice is often determined solely by data availability. In this respect, an articulate critique has emerged recently against the use of 'convenience samples' in history. Bodenhorn, Guinnane and Mroz argue that selection may be responsible for one of the great paradoxes of economic history – the decline in heights during the industrial revolution.[86] As they note, 'what the cliometrician observes may not reflect what is actually happening in the economy'.[87] The lack of adequate micro-level data during mission stations early years, we argue, biases estimates of the impact of education on modern-day education outcomes, and overstates the role of persistence in development.

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86 H. Bodenhorn, T. Guinnane and T. Mroz, 'Caveat Lector: Sample Selection in Historical Heights and the Interpretation of Early Industrializing Economies', NBER Working Paper 19955 (2014) 1-42.
87 Ibid., p. 32.