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Mission Accomplished?

The Effects of Protestant Missionaries on Education Outcomes in Colonial Indonesia

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Research Summary

Why was the research done?

Education is a key driver of human capital development and non-governmental institutions historically played an important role in expanding access to education in underserved communities. This research examines the relationship between Protestant missionary activity and primary school enrolment during a period of colonial rule in Indonesia, exploring the role of religious institutions shaped access to educational opportunities and the factors that contribute to persistent differences in advantage.

What were the key findings?

The findings suggest that a greater concentration of Protestant missionaries was associated with higher primary school enrolment, particularly among the Indigenous Indonesian population. The results indicate that the scale of missionary activity mattered more than simply the presence of a mission. Whilst missionary activity was also positively associated with European children enrolment in some estimates, these findings were less consistent. Overall, the findings suggest that non-governmental institutions play a key role in accessibility to educational opportunities, though the research cannot establish a causal relationship.

What does this mean for policy and practice?

This research showcases the importance of understanding how institutions influence access to opportunities, particularly for populations that have historically faced barriers to education. Whilst the findings relate to the historical Indonesian context, they raise broader questions about how institutional involvement in education shapes the distribution of opportunity. These questions are also relevant in Australia, where religious missions have been involved from the early colonial period in shaping Australian society today. Understanding these processes may help inform how non-governmental institutions can contribute to address deep and persistent differences in advantage.

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We acknowledge the Traditional Custodians of the lands on which we work and live across Australia. We pay our respects to Elders past and present and recognise their continued connections to land, sea and community.

Abstract

Using a panel dataset covering 39 provinces from 1891-1895, this thesis studies the impact of Protestant missionaries on education outcomes in late-19th century colonial Indonesia. To do this, I construct a new historical dataset with information on primary school enrollment by Indigenous status, demographics, mission locations, and the Ethno-Linguistic Fractionalisation Index, as well as proximity to the closest Protestant mission from each province center.

Using a variety of methods such as the Instrumental Variables strategy and Fixed Effects, I find a statistically significant association between the scale of Protestant missions and overall primary school and Indigenous school enrollment rates. My results then suggest a positive influence of Protestant missionaries on educational outcomes, especially for the Indigenous population. With these results, this thesis contributes to the understanding of missionaries and educational outcomes by demonstrating how Protestant missionaries is associated with positive primary school enrollment, especially among Indigenous children.

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1 Introduction

Understanding the origins of universal education is crucial, and Indonesia is a particularly interesting case. Whilst the country did not gain independence until the mid 20th century, Indonesia underwent significant transformations. This era saw the colonial government establish a national education system for Europeans and Indigenous children,

where previously there were none (Aritonang, 2000). This thesis studies the religious roots of Indonesia's first push towards mass education and its immediate impact on access to schooling, focusing on how these efforts shaped educational outcomes in this period, before formal schooling laws were established post-independence.

Religious activities have historically fostered education and growth, especially those of Protestant groups (Becker & Woessmann, 2009; Becker et al., 2020). This was first posited by Max Weber (1960), who argued that specific Protestant ethics, such as hard work and frugality, contributed to growth. However, later studies have expanded on Weber's theory and posited that the core principle of *Sola Scriptura* – which encouraged increased literacy – offers an alternative explanation for the relationship between Protestantism and growth (Becker & Woessmann, 2009; Woodberry, 2012). Whilst Protestantism stemmed from Prussia, it did not only impact European development as Protestant missionaries around the globe also influenced growth in varying regions. For instance, Bai & Kung (2015) argued that an additional Protestant convert per 10,000 people in China increased the urbanisation rate by 18.8%. Further analysis reveals that 90% of this effect is derived from knowledge diffusion activities by the missionaries, such as school enrollment density. Cage & Rueda (2016) argued that the printing press in sub-Saharan Africa, introduced by Protestant missionaries, had positive long term impact on education, political engagement and development in the region. In colonial Korea, Protestant missionaries played a significant role in improving literacy rates and fostering the growth of local churches, with lasting impacts that are still evident today (Becker & Won, 2024).

Despite being colonised by the Dutch for over three centuries, including the presence of missionaries from the Dutch Reformed Church, Indonesia remained a Muslim-majority nation all throughout colonisation and continues to be so today (Fogg, 2019). Unlike Protestantism, which has been associated with the accumulation of human capital, Islam places importance on listening to scholars' interpretations and memorising holy texts (Gent & Muhammad, 2019), making it more similar to Catholicism.

Whilst Christian missionary activity has been extensively studied, there is a notable gap in research on colonial Indonesia. This coupled with the fact that Protestantism is a minority, makes it an interesting case to study. The historical roots of Indonesia's

prosperity can be traced back to its colonial period, as Dutch economic policies have been shown to contribute to increased industrialisation and education attainment (Dell & Olken, 2020). Given that Protestant missionaries and the Dutch colonial government operated concurrently (Aritonang, 2000), it is plausible that Protestantism also played a role in human capital accumulation during this era. Therefore, this thesis aims to investigate a causal relationship between Protestant missionaries and education in colonial Indonesia, specifically distinguishing the effects of colonial institutions from religious doctrine.

In an attempt to establish a causal chain from Protestant missionaries to educational outcomes, I first employ an Instrumental Variables strategy (IV) by instrumenting the scale of Protestant missionaries with the distance of the closest Protestant mission from a province urban center. This measure captures the spatial variation in missionary influence, which was shaped by the colonial administration's political goals in the initial placement of missions. The IV estimates show that the mere presence of a Protestant missionary is not sufficient to induce educational effects. Instead, the scale of Protestant missionaries is associated with a positive and significant impact on overall primary school enrollment rate, European and Indigenous enrollment rate. However, as the instrument is weak, causality cannot be inferred from these results, hence only association can be derived.

To complement the IV analysis, I also employ a Fixed Effects strategy (FE) to control for time-invariant provincial characteristics that may be correlated with primary school enrollment rates and mission presence. The FE results yield positive and insignificant estimates for overall primary school enrollment and Indigenous enrollment, and a negative and significant impact on European enrollment. This suggests that, once time-invariant provincial characteristics are controlled for, the influence of Protestant missionaries were geared towards Indigenous education, perhaps at the expense of European enrollment. Whilst this model does control for time-invariant heterogeneity, it cannot control time-variant omitted variables, such as changing government policies that may impact both Protestant missionary presence and enrollment rates. Furthermore, the limited variation in Protestant missions over time constrains the reliability of the estimates. Thus, although

an association can be observed, causality cannot be inferred from these results

Employing both FE and IV models allows me to cross-validate the findings to provide a more robust basis for interpretation as each model addresses endogeneity differently. However, the limitations of each model results in the inability to interpret the relationship between Protestant missionaries and primary school enrollments as causal. Nevertheless, employing both creates a more nuanced understanding in analysing the association between Protestant missionaries and educational outcomes.

This thesis makes several distinct contributions. First, it complements existing research on the impact of religious activities. In showing that the intensity of Protestant missions is associated with increased educational outcomes, I add to the existing literature on Protestantism and Protestant missionaries by offering a more nuanced understanding on their impact.

Secondly, my research highlights the interdependence between Protestant missions and the Dutch colonial administration, as their relationship was mutually beneficial. Missions not only facilitated Indigenous conversion and education, but also supported the colonial administration's ambitions to extend influence, particularly in the Outer Islands, where missions were often the only education providers (van Nederveen Meerkerk, 2019). The increase in Indigenous enrollment highlights this dual role. Missions acted as education agents, expanding access to education for Indigenous children, yet this increased enrollment could also serve as a proxy for expanding Dutch influence. It is uncommon for colonial administrations to work closely with missionaries. However, when their services align with colonial ambitions, missionaries may therefore play a complementary role. However, very rarely has their unique relationship been studied with literature often treating missionaries as independent institutions. An exception to this is the work by Becker & Won (2024), who exploit variation in Protestant churches and exposure to foreign missionaries in colonial Korea to distinguish human-capital accumulation between missionary and colonial educational institutions. My results confirms existing work in understanding the missionary-coloniser dynamic, showcasing how they were both educational agents and extensions of colonial authority in shaping human capital development.

My final contribution is the digitisation and creation of a provincial-level panel dataset

for colonial Indonesia from 1891-1895, which is a significant shift from cross-sectional data commonly used in studies on the short-run impact of Protestant missionaries (Becker & Won, 2024; Cage & Rueda, 2016; Bai & Kung, 2015). This panel dataset contains 195 observations across 39 provinces including information on educational outcomes, demographic data, linguistic diversity and Protestant missions for the five year period. The data is derived from archival Dutch colonial Reports (*Koloniaal Verslag*) (Departement van Kolonien, Netherlands, 1891, 1892, 1893, 1894, 1895), the Dutch Statistical Yearbook (*Jaarcijfers voor het Koninkrijk der Nederlanden – Koloniën*)(Centrale Commissie voor de Statistiek, 1893, 1894, 1895, 1896, 1897, 1898) and local Ethno-linguistic diversity from Desmet et al. (2020). Additionally, it includes details on the quantity, locations and distances pertaining to Protestant missionaries and Dutch ports, sourced from a map produced by the Dutch Topographical Bureau (1896) and Musschenbroek (1883), respectively.

This thesis is structured as follows. In Section 2, I provide a historical background on early Christianity in Indonesia, the early colonial period, the 19th century Dutch colonial government and its education policies, the role of Protestant missionaries and their interaction with the Dutch colonial government, and an explanation of why Protestantism did not expand as successfully as Islam in Indonesia. In Section 3, I describe the data, its sources and provide a brief discussion on the descriptive statistics. In Section 4, I first estimate a basic Ordinary Least Squares (OLS) result to show an association between Protestant missionary and educational outcomes, followed by an Instrumental Variable (IV) strategy to study then impact of Protestant missionaries on education, and an alternative Fixed Effects (FE) approach. Section 5 concludes.

2 Historical Context

2.1 Spread of Christianity in Indonesia and the early Dutch government

Christianity first arrived in the Indonesian archipelago with Portuguese explorers and missionaries in the early 16th century, introducing Roman Catholicism as the dominant

Christian presence in the region (Steenbrink & Aritonang, 2008). Dutch arrival in the 17th century, however, marked the end of Catholic growth, as the governor general expelled all Portuguese colonists, including the clergy (Steenbrink & Aritonang, 2008). By the 17th century, the Dutch replaced the Portuguese as the dominant colonial force and the Dutch Reformed Church became the leading Protestant denomination throughout the period of Dutch colonial rule.

The Dutch first arrived in the archipelago in 1596 when a fleet led by Cornelis de Houtman landed on the island of Java in search of valuable spices (Drakeley, 2005). In 1602, Dutch merchant-financiers agreed to maximise their resources and formed the *Vereenigde Oost-Indische Compagnie* (VOC) (Drakeley, 2005), aiming to dominate the lucrative spice trade. Although VOC was initially a private enterprise, its pursuit of resources inadvertently turned it into a colonial power (Drakeley, 2005). The company expanded its influences by ruthlessly taking territory and ports, often through violent conquests of local rulers (Drakeley, 2005). By the late 18th century, VOC controlled most strategically located ports, securing a substantial income stream. It also had established monopolies over key spices native to Indonesia – such as nutmeg, cloves, mace and cinnamon – which were highly sought after in the European market (Drakeley, 2005).

In the 17th and 18th century, VOC developed into Europe's largest commercial and colonial power in Asia (van Meersbergen, 2023). At the height of its power, VOC had successfully established an extensive network of trading posts and colonies stretching from the Cape of Good Hope to Japan (van Meersbergen, 2023). The company's approach to monopolise the spice trade varied according to local politics (van Meersbergen, 2023). Whilst they engage in military conquests in areas such as the Banda Islands, they employed diplomacy and sought trade agreements within the Mughal Empire (van Meersbergen, 2023). Hence, the VOC acted as a 'company-state', holding territorial power in some areas such as Indonesia, whilst operating as a more conventional trading company in others (van Meersbergen, 2023). This shift between engaging in diplomacy and being an aggressive colonial power, allowed VOC to amass wealth for the company itself and the Dutch Republic as well.

During VOC reign, the Dutch Reformed Church was seen as an essential component

of state structure, creating an alliance between administrators, merchants and missionaries (Watson Andaya, 2010). They realised that if locals became Christian they were more likely to cooperate with European representatives to attain economic goals (Watson Andaya, 2010). Missionaries, in turn, relied on VOC's support for access to resources and infrastructure to conduct their activities (Steenbrink & Aritonang, 2008).Whilst they had not formally accepted responsibility for overseeing mission operations, the extension of the VOC charter in 1623 included an obligation to maintain 'public belief' which signaled support for Reformed Calvinism (Watson Andaya, 2010). This strategy was aimed to consolidate VOC's political and commercial influence in the region, particularly in areas dominated by the Portuguese, and to secure the loyalty of local non-Muslim leaders could who aid in delivery of products and provide allies against Muslim attacks (Watson Andaya, 2010).

However, due to corruption, increasing costs and mounting debt, VOC went bankrupt in 1800, resulting in the Dutch government assuming control of most of its affairs and assets (Drakeley, 2005). By this time, the Dutch had established economic and political dominance over most of Java, parts of Sumatra, the eastern islands of Maluku and several strategic ports in their main areas of influence (Vickers, 2013). However, Islam was still the dominant religion (Fogg, 2019) as the colonial government employed a policy of religious tolerance, especially as they feared unrest amongst the local Muslim population (Steenbrink & Aritonang, 2008; van Nederveen Meerkerk, 2019).

2.2 The Dutch colonial government and missionaries post-VOC

When the Dutch colonial government was established, it did not consider the Church to be part of its affairs due to the emerging belief in the separation of Church and State stemming from the European Enlightenment. The Reformed Church in Indonesia functioned merely as a government agency to fulfill the religious needs of existing Protestant communities (Steenbrink & Aritonang, 2008). Missionaries from all denominations were barred from conducting missionary work, as the colonial government feared unrest among the population, and prioritised economic goals and political stability.

By the 19th century, the state gradually shifted its stance and allowed missionaries to

conduct its activities, though they remained relatively ambivalent to their presence. One key reason for this change was the Dutch expansion to the Outer Islands of Indonesia, particularly in the eastern end. Private merchants and entrepreneurs grew increasingly interested to the less densely populated and fertile regions outside of Java, which in turn spurred the colonial administration's interest in the Outer Islands (van Nederveen Meerkerk, 2019). Though they were wary of potential conflicts with the local Muslim population, the state saw missionaries as a cost-effective means to exert control and counter the growing influence of Islam in the region (van Nederveen Meerkerk, 2019).

Majority of missions operating in this era were part of the Dutch Reformed Church. The *Nederladsche Zendeling Genootschap* (NZG) was the largest and oldest (Steenbrink & Aritonang, 2008), having operated in Indonesia since the early 19th century. Still part of the Dutch Reformed Church, members who left NZG founded several new mission societies such as the *Nederladsche Zendingsvereeniging* (NZV) and *Utrechtsche Zendingsvereeniging* (UZV), whom also operated in Indonesia. By the late 19th century, however, the largest Protestant missionary in terms of size and scale was the *Rheinsche Missionsgesellsschaft* (RMG) from the German Lutheran Church (Steenbrink & Aritonang, 2008). They concentrated their activities in the province of Western Sumatra and had over 36 missionaries operating in that area by 1895 (Centrale Commissie voor de Statistiek, 1896). There were also several societies from other sects of Christianity operating in this era, such as the *Doopsgezinde Zendingvereeniging* (Menonites) and the *Kerkgenootschap gemeente der zevende-dags-baptisten* (Seventh-day adventists) (Centrale Commissie voor de Statistiek, 1896). By the late 19th century, there were over 15 mission societies operating in Indonesia. [1]

The primary goal of the Protestant missionaries was to verbally communicate the Gospel through preaching and personal dialogue, aiming to persuade individuals of the falsehood of their existing beliefs and bring them to Christ (Steenbrink & Aritonang, 2008). Two core communication strategies were emphasised ; (i) avoiding doctrinal disputes characteristic specific to individual churches to prevent division among converts, instead focusing on general Christian principles, and (ii) using local languages as much as

[1] See Figure 6 in Appendix for a detailed list of all the missionaries

possible (Steenbrink & Aritonang, 2008). This policy of embracing local languages was rooted in mission ideology, reflecting the belief that 'if the Kingdom of God is situated in the heart of the individual, the heart has to be converted, and this, according to the conviction of the time, required using the mother language' (Steenbrink & Aritonang, 2008).

2.3 Education policies

2.3.1 Dutch government

Education during the VOC was negligible as they were focused on commercial goals. When the Dutch colonial government took over, ideas regarding the implementation of a national education framework began to disseminate. Isolated far away from their homeland, they needed political stability, a skilled workforce, and loyalty necessary for their colonial ambitions (Thang et al., 2024). They viewed education as a primary tool in achieving cultural assimilation and support its ruling policies. Thus, by the early to mid 19th century, the government established two types of schools; (i) a western-style education for European children living in Indonesia (ELS) at a secondary and primary school level, and (ii) Indigenous schools only at a primary school level (Aritonang, 2000). The ELS were well-equipped and received substantial funding from the government with a comprehensive curriculum, focusing on Western languages, science and literature (Thang et al., 2024). Contrastingly, the curriculum for Indigenous schools was basic, focusing on numeracy and literacy, often taught in local languages rather than Dutch (Aritonang, 2000). However, this educational effort was minimal as raising the standards of education, especially for the Indigenous people, inspired by the Enlightenment, did not take precedence over the economic importance of the Cultivation System implemented by the Dutch to extract resources from Indigenous farmers (Aritonang, 2000). Education for the Indigenous people was aimed at creating a loyal workforce, rather than the empowerment of Indigenous students (Aritonang, 2000). Thus, in the first half of the 19th century there was not a concrete education system encompassing the whole archipelago.

New educational reforms developed in the 1870s to increase government schooling. These reforms; (i) standardized all primary schools in the East Indies, (ii) required the

utilisation of local languages or Malay as the medium of instruction, and (iii) prohibited religious instruction for Indigenous people studying in government schools and private schools subsidised by the government during curriculum hours (Aritonang, 2000). These new regulations initially saw a rapid increase in government schools, but the development of new schools started to diminish in the 1880s as these policies were deemed 'too western' as it reflected the western concern for religious neutrality (Aritonang, 2000).

The election of the Dutch Protestant political party in the 1880s resulted in a marked turn in colonial educational policy. Though the Colonial Minister still adhered to religious neutrality, he implemented a new subsidy model that allowed all forms of private education to access government funding, provided that they met certain conditions of social utility and technical standards set by the administration (Aritonang, 2000). Under these new regulations: (i) schools founded on religious principles became eligible for subsidies, (ii) two categories of primary schools for Indigenous people were established, Schools of the First Class for children of the elites and Schools of the Second Class for children of commoners, and (iii) elite Indigenous students were granted the opportunity to attend an ELS (Aritonang, 2000). These changes emphasised the increasing role of private and religious organisations in the Dutch colony.

2.3.2 Missionaries and the Dutch government

As a result of these new regulations, private education became an integral part of Indonesia's education system, leading to rapid growth, especially in missionary education. From the outset, Protestant missionaries in Indonesia viewed schools as a critical and effective tool for evangelisation, aligning with Lutheran and Reformed principles that emphasised education and instruction (Aritonang, 2000). Prior to these regulations, they were financed independently by mission boards and community support (Aritonang, 2000). Initially, Protestant mission-schools focused primarily on religious instruction, with the curriculum centered on Christian doctrine to ensure that children were able to read and write scripture (Aritonang, 2000). Whilst early mission schools emphasised religious teaching, they later broadened their objectives to include things such as community welfare and adult Christian education, adapting their curriculum to attain evolving

mission goals (Aritonang, 2000).

Since schools were the primary channel for conversion, Indigenous people, particularly those from tribal religions, were the primary target of mission education (Aritonang, 2000). Though they also aimed to reach followers of other religions, such as Islam, restrictions imposed by the colonial administration limited mission activities among communities practicing other global religions such as Islam and Hinduism. Thus, Protestant missions concentrated their efforts on groups with tribal beliefs (Aritonang, 2000). Despite the primary objective of conversion, not all students converted. However, mission societies saw this as motivation to continue their broader educational influence in Indonesia, especially in provinces outside of Java and Bali, where mission schools were often the only providers of education (Aritonang, 2000). Thus, the objective of Protestant mission education extended beyond solely evangelising Indigenous communities (Aritonang, 2000).

As mission schools were crucial for Indigenous communities outside of Java and Bali, Protestant missions, following the reforms, were tasked not only with conversion but also serving as educational agents in line with their principles and in support of the colonial government (van Nederveen Meerkerk, 2019). Whilst the subsidies aided the growth of mission schools in Indonesia, the close relationship between church and school played a more significant role (Aritonang, 2000). Local communities viewed schools as an extension of the church, hence the growth of schools was perceived as growth of the church itself, resulting in widespread community support for the development of mission schools (Aritonang, 2000).

Mission boards and the colonial administration eventually shared similar views on educational perspectives, which led to a convergence in their approaches over time. The reforms mandated mission schools to meet specific criteria, such as curriculum standards, to qualify for government subsidies Aritonang (2000). This meant that, although they were initially distinct in their education goals, mission schools were no longer able to operate outside the broader framework of the colonial education system (Aritonang, 2000). Simultaneously, the government relied on missions to provide education in certain provinces as a part of their broader implementation of a national education framework

and to also extend their influence beyond Java.

2.4 Protestantism versus Islam in Indonesia

Despite being controlled by the Dutch for over 300 years, Indonesia remained a predominantly Muslim nation, a status it retains today (Fogg, 2019). Christianity struggled to gain a prominent foothold, largely because it became closely associated with colonialism. The missions' close ties with the colonial Dutch administration resulted in the Indigenous people to perceive Christianity as a tool of foreign oppression and domination (Steenbrink & Aritonang, 2008). Whilst Christianity spread widely in other colonial contexts, this was clearly not the case in Indonesia, as the Dutch administration pursued a comparatively tolerant religious policy. Aiming to avoid conflict with the majority local Muslim population and prioritise economic gains, the Dutch refrained from enforcing religious conversion as aggressively as other colonial powers (Steenbrink & Aritonang, 2008).

On the other hand, the spread of Islam was peaceful and gradual. Islam arrived in Indonesia as early as the 9th century through Muslim traders interacting with the local population (Ricklefs, 1993). Early conversions started with the ruling elite, as they found Islam appealing due to its mystical aspects, especially within Sufism, resonating with the local Hindu-Buddhist mysticism (Ricklefs, 1993). Over time, Islam continued to spread across the archipelago primarily through international trade with Muslim merchants. Hence, it was able to integrate to local culture and tradition without brute force.

2.4.1 Protestantism versus Islam: literacy and education

Protestantism has been linked with with economic growth, first theorised by Max Weber's (1960) *Protestant Ethic*. He argued that the Calvinist belief in pre-destination instilled hard work, frugality and diligence among Protestants, leading them to view profits and material success as signs of God's favour (Weber, 1960). However, recent literature has re-examined Weber's hypothesis and proposed an alternative channel for growth. It was not primarily Protestant ethics that fostered growth; rather, the core tenet of *Sola Scriptura* – emphasis on reading the Bible – resulted in the accumulation of human capital, which in turn contributed to economic growth. This focus on literacy subsequently influenced

Protestant mission activity, as research has found that their efforts increased literacy and educational outcomes in colonial states (Becker & Won, 2024; Cage & Rueda, 2016).

Similar to Protestantism, Islam also places significance on their central religious text, the Quran. Historical evidence has shown that Islamic education systems, such as madrasas, have traditionally focused on teaching and reading Arabic, the language of the Quran (Madsah & Ariffin, 2024). However, whilst it encourages the reading of the Quran, historically, there has not been the same institutionalised push for literacy and education, often associated with Protestantism (Gent & Muhammad, 2019). Muslims are not necessarily expected to interpret the Quran independently as a large part of religious practice involves listening to scholars, such as the Ulamā (al Azami, 2023). These scholars within Islam are seen to provide guidance based on the Quran to ensure that Muslims understand their faith accurately and practice it correctly (al Azami, 2023).

In many non-Arabic-speaking Muslim communities, reciting the Quran and listening to religious scholars is a more common practice than personal interpretation (Gent & Muhammad, 2019). Furthermore, memorising the Quran in Muslim communities is also seen as a highly valued form of devotion, even if the individual does not fully understand the text (Gent & Muhammad, 2019). This practice underlines the importance of oral transmission and listening to religious authorities to understand text, akin to Catholicism. This is starkly different to Protestantism as an individual's own Biblical interpretation is central to the faith, thus accumulating literacy is key.

3 Data

I examine the impact of Protestant missionaries on education by testing whether it affected primary school enrollment rates in 19th century colonial Indonesia. The core strategy of these missionaries was the conversion of the Indigenous population through education which led to the establishment of mission schools. Indigenous children were also highly reliant on mission-provided education, especially for those residing in provinces outside the island of Java (Aritonang, 2000). Additionally, the Dutch colonial government strategically utilised these missions to consolidate power, especially in remote regions (van

Nederveen Meerkerk, 2019). Thus, school enrollment rates also reflect the effectiveness of missionaries in extending both religious and colonial influence.

Population: I collected provincial-level data on the population by Indigenous status[2] from the Dutch Statistical Yearbook on its colonies (*Centrale Commissie voor de Statistiek*) for the years 1891-1895.

Enrollment Rates: I collected data on the total number of enrolled primary school children by Indigenous status from the annual Dutch Colonial Records (*Koloniaal Verslag*) from 1891-1895 published by the Dutch Government[3]. At the provincial level, the reports detail the number of European children enrolled in public schools, non-government schools (classified as 'other'), and Indigenous children.

As the datasets report provincial population only by Indigenous status, not by age group, I measured primary school enrollment by calculating the primary school enrollment rate as the total number of enrolled primary school children by the total provincial population. Indigenous enrollment rates are calculated by dividing the number of enrolled Indigenous primary school children by total Indigenous provincial population. The same approach was applied to calculate European school enrollment rates.

Protestant missionaries: The data on Protestant missionaries was sourced from the 1894 annual Dutch Statistical Yearbook on its colonies [4]. The Yearbook reports the number of missionaries by province and mission society each year. For each province, it provides a list of mission societies operating within, along with the number of missionaries associated with each society[5].

To construct the measure of Protestant missions, I use the number of Protestant missionaries per 10,000 people in each province as a proxy for the scale of missionary activity. For each province, I divided the number of Protestant missionaries with population and multiplied it by 10,000. This approach is consistent with existing literature, such as Bai & Kung (2015) who used the number of communicants per 10,000 people as a proxy for the level of Protestantism.

[2]population was reported by Indigenous, European, Arab, Chinese and 'other orientals'

[3]which covers areas of Indonesia under Dutch rule (most of modern day Indonesia, excluding Papua, West Papua and the Moluccas)

[4]as the 1894 Yearbook also contains the number of missionaries from 1891-1895

[5]See Figure 6 in Appendix for in Appendix for a full list of mission societies

Geographical variables: I derived data on specific mission locations from a map published by the Dutch Topographical Office (Topografische dienst in Nederlandsch-Indië, 1896), whilst the location of specific ports were derived from a map produced by Musschenbroek (1883) [6].

Other controls: For provincial-level control variables, I gathered data from the Statistical Yearbook and the Colonial Records on births, and deaths of infants (age < 2) and children (ages between $2 - 10$) and calculated the mortality rates.

In their conversion efforts, Protestant missionaries were instructed to use local languages whenever (Steenbrink & Aritonang, 2008). But due to Indonesia's vast linguistic diversity, I will also utilise an Ethno-Linguistic Fractionalisation (ELF) index aggregated at a provincial level as a control. An index closer to 0 implies less linguistic diversity and an index closer to 1 indicate more linguistic diversity. This data was collected from Desmet et al. (2020) Local Linguistic diversity data [7]

The final panel data set contains 195 observations for 39 different provinces spanning a 5 year period (1891-1895).

3.1 Descriptive Statistics

Table 1 shows the key summary statistics for the 5 year period. On average, there were about 2.497 Protestant missionaries in each province. These missionaries were located in 27 out of the 39 recorded provinces, with the province of West Sumatra having 42 missionaries in 1895. In regards to the key independent variable, provinces have 0.055 Protestant missionaries per 10,000 people on average across the 5 year period. The province of Timor had the highest density with 1.196 Protestant missionaries per 10,000 people in 1891.

Additionally, Table 1 shows that, on average, the distance from each province center to the closest Protestant mission is 101.39 km with the closest mission being 0.704 km from a province center, and the furthest at 500.95 km. The distance metric measures the

[6] See Figure 7 and Figure 8 in Appendix for the original Missionaries and port maps, respectively, and Section A1 in Appendix for more detailed information in deriving the latitudes and longitudes

[7] See A2 for detailed information on how I aggregated the index and how I calculated the child mortality rate

distance from each province's urban center to the nearest Protestant mission, regardless of whether the mission is located in the same province. This captures a broader regional influence, acknowledging that missionaries were not restricted to provincial border and often extended their educational impact to neighbouring provinces, where a mission station may not exist [8]. This is evident in Figure 1 as Protestant missionaries targeted Indigenous populations across the country with a slight concentration in central and Western Indonesia. The significant heterogeneity in the geographic distance between mission stations and province centers allows for the analysis on how mission proximity affected primary school enrollment. Thus, I will utilise the distance to the closest mission from a province urban center as an instrument for Protestant missionaries per 10,000 people. Similar to previous literature, this approach allows me to study the influence of missionary proximity on educational outcomes.

Figure 2 illustrates the number of Indigenous people enrolled in primary school and the Indigenous enrollment rate. Whilst Figure 3 shows the number of Europeans enrolled in primary school and the overall European enrollment rate.

Whilst the number of both European and Indigenous children enrolled increased from 1891-1895, the Indigenous enrollment rate decreased over time and the European enrollment rate increased then decreased. A plausible explanation for this is the Dutch administration's adoption of laissez-faire trade policies where previously there were protections to ensure Dutch monopoly. Thus, the position of Dutch merchants were threatened as other non-Dutch European merchants arrived to capture the sugar, coffee and tobacco market (Wintle, 2000), resulting in their return to Europe. Concurrently, there was a war in the province of Aceh, as the colonial government sought to expand its territory and assert greater political control (Ricklefs, 1993). Thus, missionaries operating in the region had to flee and this may have resulted in the decrease of Indigenous enrollment

[8] The *Koloniaal Verslag* (1891; 1892; 1893; 1894; 1895) provides evidence supporting this approach: the number of European Protestants were reported by naming the ministers/church leaders they were under, along with the regions that these ministers cover. It was common for them to oversee multiple provinces, and sometimes the provinces under their responsibility overlaps with other ministers as well (see Figure 5 in Appendix for an example). These overlapping coverage and multi-provincial crosses supports the use of a distance-based metric that considers regional influence beyond provincial boundaries.

Table 1: Key summary statistics: 1891-1895

	Mean	**Std. Dev.**	**Min.**	**Max.**
Population	825,647	553,804	37,471	2,181,097
# Indigenous children enrolled	2,919	5,363	0	33,546
Indigenous enrollment rate	0.006	0.016	0	0.118
# European children enrolled	414	697	0	3,771
European enrollment rate	0.234	0.130	0	0.917
Total school enrollment rate	0.007	0.016	0.000	0.118
Child mortality rate per 1000 children (aged $2-10$)	45.562	47.883	0	314.286
Aggregate ELF index	0.219	0.257	0	0.720
# Protestant missionaries	2.497	6.300	0	42
Protestant missionaries per 10,000 people	0.055	0.158	0	1.196
Min. distance from mission to a province center (km)	101.39	148.980	0.704	500.951
Observations	195			

Note: ELF is the Ethno-Linguistic Fractionalisation (ELF) Index. See Table 8 in Appendix for full summary statistics of all the variables in the final panel data set

rate.

Figure 1: Protestant missionaries across Indonesia in the late 19th century

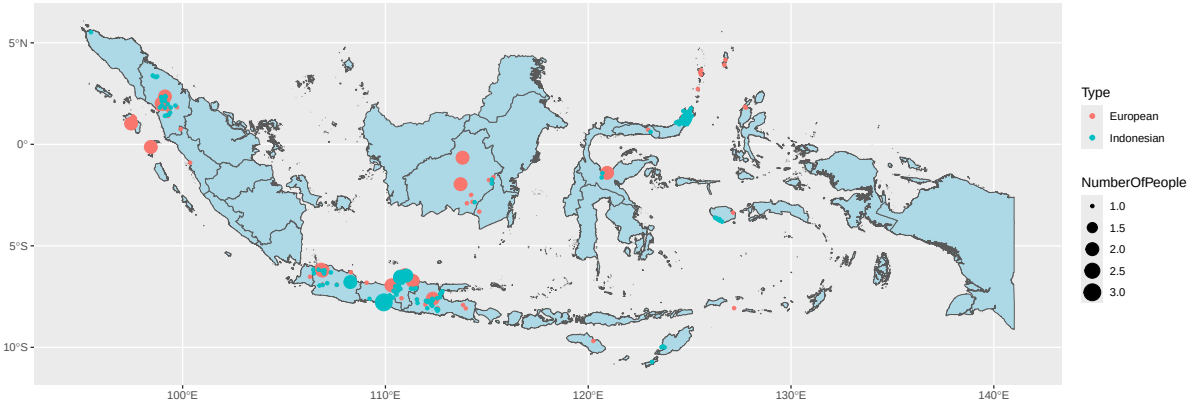


Figure 2: Number of Indigenous people enrolled and Indigenous enrollment rate

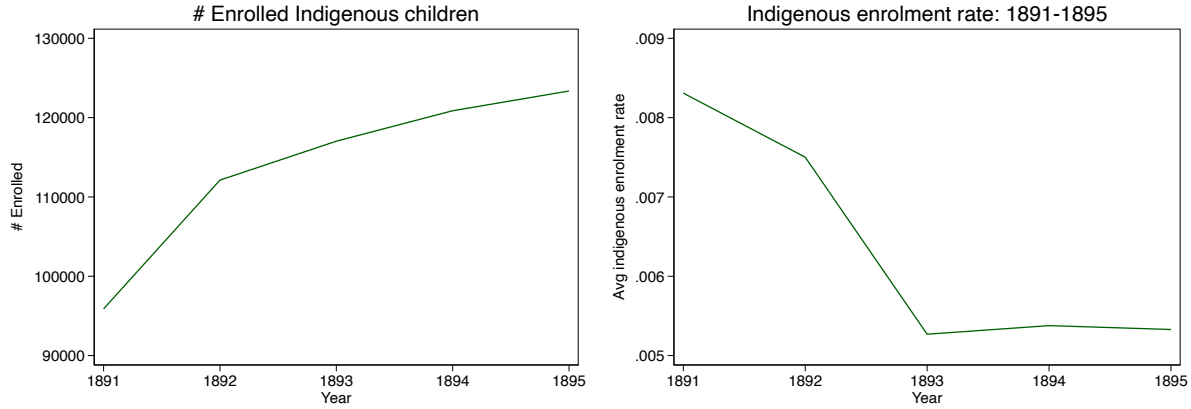
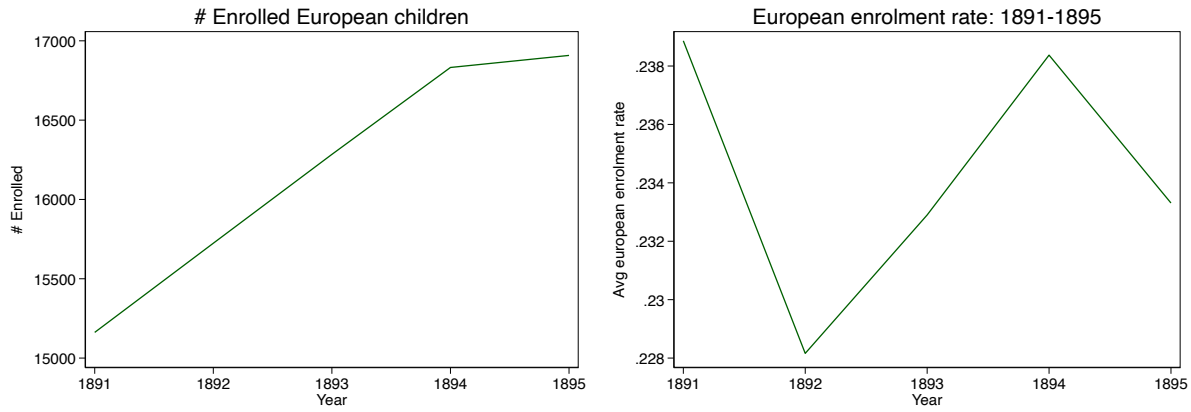


Figure 3: Number of Europeans enrolled and European enrollment rate



4 Estimation

4.1 OLS

Below is an OLS regression to explore the relationship between Protestant missionaries and primary school enrollment rate

$$EnrolmentRate_{it} = \beta_0 + \beta_1 PM_{it} + \beta_2 \mathrm{X}_{it} + \varepsilon_{it} \tag{1}$$

where i indicates 39 different provinces and $t = 1891 - 1895$. β_1 is the coefficient of interest that captures the effect of an additional Protestant missionary per 10,000 people in a province (PM_{it}) on enrollment rate. Province-level controls (X_{it}) are log of province Population, child mortality rate and the mean ELF index.

Column (1) of Table 2 shows that an additional Protestant missionary per 10,000 people is associated with an increase of primary school enrollment rate by 2.4 percentage points. Given that Protestant missionaries primarily targeted Indigenous populations, Table 2 also presents the estimates of the coefficient PM_i for primary school enrollment rates by Indigenous status with columns (2) and (3) showing the OLS estimates for Indigenous and European enrollment rates, respectively. An additional Protestant missionary per 10,000 people is associated with an increase of Indigenous enrollment rate by 3.9 percentage points in a province. Contrastingly, an additional Protestant missionary per 10,000 people is associated with an increase in European enrollment rate by 7.4 per-

centage points. It is important to note however that all of these results are statistically insignificant, indicating that based on the OLS estimation, there doesn't seem to be a meaningful association between Protestant missionaries and primary school enrollment. This is surprising, as the missionaries' primary goal was to convert the Indigenous populations through education. Indigenous communities largely lacked formal education prior to its introduction by the Dutch administration, hence theoretically Protestant missionaries should play a key role in expanding access for the Indigenous population.

Table 2: OLS Estimation

	Enrolment Rate		
	(1)	(2)	(3)
	Total	Indigenous	European
Protestant missionaries per 10,000 people	0.039	0.039	0.074
	(0.024)	(0.025)	(0.057)
Mean of dependent variable	0.007	0.006	0.234
Number of provinces	39	39	39
Observations	195	195	195
R^2	0.217	0.225	0.154
F statistic	1.38	1.61	2.73

Note: Includes log(population), child mortality and mean Ethno-linguistic Fractionalisation index as controls. Enrollment rate is total number of enrolled primary school children divided by total population, Indigenous enrollment rate is the total number of enrolled primary school Indigenous children divided by total Indigenous population and European enrollment rate is the total number of enrolled primary school European children divided by total European population. Standard errors clustered at the provincial-level in parentheses.

*$p < 0.1$, **$p < 0.05$, ***$p < 0.01$

4.2 Threats to identification

OLS estimates cannot be interpreted as causal for several reasons. First, reverse causality could arise as missionaries might settle in highly populated areas that were more developed, therefore having a high demand for education. This suggests that pre-existing enrollment rates could have influenced mission locations.

Secondly, unobserved factors could impact missionary presence and enrollment rates simultaneously. For example, provinces with a more open positive cultural attitude may not only be more receptive towards Protestant missions but also more likely to prioritise education, thus potentially increasing enrollment rates. Whilst provinces that are more isolated or have had negative experiences with the colonial government may not only be less receptive to Protestant missionaries but also more apprehensive towards formal schooling, thus lowering enrollment rates. This reluctance or openness may introduce omitted variable bias as it affects missionary activity and educational outcomes.

Furthermore, the choice of a mission's location was not entirely up to the missionaries, as the colonial government played a significant role in determining where they could operate. As the administration wanted to consolidate its influence in the Outer Islands, the state saw Christian missionary education as a cost-effective tool to counter the influence of Islamic schools (van Nederveen Meerkerk, 2019). This strategy was more about extending colonial power and control rather than a genuine focus on Indigenous educational development. If the government strategically placed missions in areas that were already more politically aligned with the state or more recepetive towards formal education, this may introduce omitted variable bias, as they may independently influence enrollment rates.

Government policies such as a 'Ban on double mission' (Steenbrink & Aritonang, 2008) also limited where European clergymen, Dutch or foreign missions could perform religious tasks. This policy required special permits, constraining missionaries to a well-circumscribed geographic area which often often aligns with a particular ethnic group, to prevent conflict and unrest (Steenbrink & Aritonang, 2008). This was especially true for Protestant missions as they generally focused on reaching distinct ethnic communities rather than populated urban centers (Steenbrink & Aritonang, 2008). However, most

missions in the late 19th century were Protestants who belonged to Reformed or mixed Lutheran-Reformed churches, hence there was no was no incentive to reach out to people outside their allocated territory (Steenbrink & Aritonang, 2008).

Third, estimates may suffer from selection bias due to the endogeneity of mission locations. Although the Indigenous people were the mission's prime target for evangelisation, thus education, the initial placement of their location is not exogenous. The Dutch colonial state and missionary activities were closely intertwined, hence resulting in missionaries potentially going to regions with existing colonial settlements which most likely had better infrastructure and higher enrollment rates.

To address these threats to identification, I employ an Instrumental Variable (IV) model by instrumenting missionary presence with proximity to the closest Protestant missionary from province center. This model isolates the exogenous variation in missionary presence that is driven by proximity, and not directly influenced by pre-existing educational demand or unobserved provincial characteristics that may impact both missionary presence and enrollment rates.

4.3 Instrumental Variable

The colonial government and mission societies strategically located mission stations, focusing on political influence and aligning with economic interests, such as proximity to trade routes and administrative centers (van Nederveen Meerkerk, 2019). Though educating the Indigenous population was a key objective of the Protestant missionaries, their initial placements were therefore driven by political strategies, exogenous to educational attainment. As such, theoretically the proximity of the closest Protestant mission from a province urban center provides a source of exogenous spatial variation of missionary influence. Thus, the exclusion restriction assumes that proximity to mission only affects enrollment rates through the presence of Protestant missionaries.

Geographical instruments are widely used in literature. For instance, Nunn (2008) instrumented the number of slaves with the distance between the country of origin and their destination port to investigate the relationship between slave exports and economic development in Africa. Thus, his exclusion restriction relies on the idea that geographic

distances from slave markets only influences modern economic outcomes through its impact on slave exports. In testing Weber's hypothesis in 19th century Prussia, Becker & Woessmann (2009) posited that the concentric diffusion of Protestantism from the city of Wittenberg makes distance to Wittenberg a valid instrument for Protestantism.

Since the data is structured as a panel, I averaged each province across the 5 years to obtain a cross-sectional dataset for this analysis. Equation 2 represents the first stage of the IV and Equation 3 the second stage, respectively.

$$\bar{PM}_i = \alpha_0 + \eta_1 \text{closest } \bar{\text{Protestant}} \text{ mission}_i + \alpha_1 \bar{X}_i + e_i \tag{2}$$

$$\bar{EnrolmentRate}_i = \beta_0 + \beta_1 \hat{\bar{PM}}_i + \beta_2 \bar{X}_i + \epsilon_i \tag{3}$$

where i indicates the 39 different provinces, closest $\bar{\text{Protestant}}$ mission_i is the average proximity of the closest Protestant mission from each provincial center, which also serves as the instrument. $\hat{\bar{PM}}_i$ is the average predicted Protestant missionaries per 10,000 in each province from the first stage and $\bar{X}_i$ represents the average control variables at a provincial level including natural log of a population, child mortality rate and mean ELF, averaged across the 5 year period.

Table 3 presents the second-stage IV results [9] Panel A uses protestant missionary per 10,000 people as the key variable whilst Panel B represents the presence of a Protestant mission with a dummy variable. The inclusion of a missionary presence dummy allows for comparison with existing research that uses binary measures to indicate the impact of Protestantism in an IV and to analyse whether the mere presence of missionaries was sufficient to induce educational effects.

In the first column of Panel A, an additional Protestant missionary is associated with an increase in primary school enrollment rates by 10.9 percentage points. Similar to OLS results, the coefficient of Protestant missionaries per 10,000 people are also reported by Indigenous status in columns (2) and (3). An additional Protestant missionary per 10,000 people is associated with an increase in the Indigenous enrollment rate by 10.5 percentage points. Whilst an additional Protestant missionary per 10,000 is associated

[9] See Table 9 and Table 10 in Appendix for First stage and Reduced-form estimates, respectively

with an increase in European enrollment rate by 54.3 percentage points. The coefficients across all groups are statistically significant.

A plausible explanation for the difference between IV and OLS estimates is that the IV captures the local average treatment effect (LATE) with varied local contexts. Enrollment rates driven by proximity to a mission tend to be higher in areas closer to missions, where stronger missionary influence is expected. Contrastingly, more isolated regions or areas with less mission activity show smaller educational impacts. Since the instrument captures variations in Protestant missionary presence driven by proximity, it reflects the larger enrollment rates near missions, which the OLS may underestimate.

The downward bias in the OLS is likely due to unobserved provincial characteristics that impact both missionary presence and school enrollment rates. For instance, more remote regions may have limited infrastructure and investment, implying lower enrollment rates. It also may attract fewer missionaries due to logistical and accessibility challenges. If these disadvantages are correlated with both missionary presence and enrollment rates, the OLS would likely underestimate the true impact of Protestant missionaries on school enrollment rates. This is because they may attribute part of the difference in enrollment rates between IV and OLS to these provincial characteristics rather than Protestant missions. Thus, the IV estimator isolates variations in mission presence that is driven by proximity from province center yielding larger estimates.

Unsurprisingly, The IV model yields statistically significant estimates across all groups. Firstly, the statistically significant Indigenous enrollment rate and total school enrollment rate suggest that Indigenous educational attainment is highly impacted by proximity to Protestant missions. This indicates that Protestant missionaries likely had a substantial impact on the Indigenous population in regions closer to missions, where access to other educational opportunities and resources may have been limited. These findings aligns with the conversion strategies of these Protestant missionaries, who aimed to convert the Indigenous population through education. Hence, it is unsurprising that an additional missionary is associated with an increase in Indigenous enrollment.

Secondly, the significance of IV estimates for European enrollment suggests that European children also benefited from proximity to a Protestant mission. This finding may

initially seem surprising, as European children had alternative access to education, including high-quality government-funded secular ELS. However, for Europeans residing outside the island of Java, government-funded schools were likely fewer, hence increasing their reliance on mission schools. Furthermore, as Europeans outside this region were more isolated and dispersed, proximity to a Protestant mission would have had a greater impact on their educational access.

These findings are consistent with existing research in finding a positive association between Protestant missionaries and educational attainment. For instance, in instrumenting the share of Protestants with Distance to the city of Wittenberg, the birthplace of the Reformation, Becker & Woessmann (2009) found that there is a 18.9 percentage points difference in literacy between Protestant and Catholic counties in 19th century Prussia, with Protestants yielding higher literacy rates. In African provinces, Gallego & Woodberry (2010) found that regions with Protestant missionaries have a literacy rate that is 10 percentage points higher and 1.31 more years of schooling, comparatively to regions with Catholic missions.

However, it is important to note that the Kleibergen-Paap rk Wald F statistic of 3.903 indicates that the instrument is weak, raising concerns regarding the reliability of the IV estimation in this analysis. With a statistic of 3.903 , the instrument does not meet any of the Stock & Yogo (2005) critical value thresholds, even for the most lenient 25% maximal IV size, which requires a value of at least 5.53. Although the first stage, presented in Table 9 in Appendix, yields statistically significant estimates for the endogenous variable, the instrument does not meet the Stock & Yogo (2005) critical values. Hence, whilst it does have some predictive power for PM_i, it lacks sufficient explanatory power to strongly predict the endogenous variable. Consequently, the estimates produced may be biased or inconsistent. Given these limitations, these results should be interpreted with caution and causality cannot be inferred[10].

To compare with existing research that uses a binary measure for Protestantism and test for the robustness of the IV results, I changed the key explanatory variable to a

[10]Other instruments have been tested including aggregate distance from mission to port, distance from port to province center and port dummy. However, these instruments were weaker.

mission dummy equal to one if a Protestant mission was present in the province within the 5 year period. This captures the broad impact of having a Protestant mission in a province to see if its mere presence will yield similar estimates. The results are presented in Panel B of Table 3.

In the first column, the presence of Protestant mission in a province is associated with an increase in school enrollment rates by 6.9 percentage points. Whilst the mere presence of a Protestant mission is associated with an increase in Indigenous enrollment rates by 6.7 percentage points and European enrollment rates by 34.7 percentage points. However, none of the estimates are statistically significant, implying that the mere presence of a Protestant mission is not sufficient to induce educational effects as it does not impact primary school enrollment rates across all groups.

The results for Panel B are inconsistent with existing research that uses a binary measure of Protestantism. As discussed above, Becker & Woessmann (2009) utilises a binary measure for Protestantism and find a positive and significant impact on literacy. Similarly, Bai & Kung (2015) found that an additional Protestant convert per 10,000 people in China increases the urbanisation rate by 18.8% when evaluated at the mean.

This insignificance may be due to the reduction in variation of the explanatory variable. In Panel A, the instrument captures the variation in mission intensity. This continuous measure allows the instrument to reflect the difference in mission intensity across provinces. Whilst in Panel B, the key variable only distinguishes whether a mission is present or absent. This binary measure reduces the variation the instrument can capture. This is reflected in the Kleibergen-Paap rk Wald F statistic of 0.869, much lower than the statistic for Panel A, and does not meet the Stock & Yogo (2005) threshold for a strong instrument.

The difference in insignificance underscores the importance of capturing mission intensity, as done in Panel A. Whilst the instrument in Panel A is still weak, it is relatively stronger than when it is utilised in binary setting as done in Panel B. This suggests that the continuous measure of the scale of Protestant missions capture more meaningful variation than a binary indicator as used in Panel B. This difference emphasise the critical role of mission intensity in capturing the impact on primary school enrollment, as areas

with a higher density of Protestant missions is associated with higher primary school enrollment.

However, due to the weak instruments in both panels, the results for both panels should be interpreted with caution. Although Panel A provides a more nuanced view on the effect of Protestant missionaries, the weak instrument suggests that these findings may lack reliability and consistency. Additionally, with only 39 observations, as the archival material reports data only at the provincial level, the limited sample size restricts the reliability and robustness of these findings. Thus causality cannt be confidently inferred from these results. Nonetheless, the comparison supports the idea that capturing the intensity, rather than its mere presence, is essential for understanding the effect of Protestant missionaries on education.

Table 3: IV estimation

	Enrolment Rate		
	(1)	(2)	(3)
	Total	Indigenous	European
Panel A			
Protestant missionaries per 10,000 people	0.109**	0.105**	0.543*
	(0.051)	(0.051)	(0.320)
R^2	-0.200	-0.163	0.072
Kleibergen-Paap rk Wald F statistic	3.903	3.903	3.903
Panel B			
Missionary presence dummy	0.069	0.067	0.347
	(0.058)	(0.057)	(0.384)
R^2	-2.599	-2.407	-0.638
Kleibergen-Paap rk Wald F statistic	0.869	0.869	0.869
Mean of the dependent variable	0.007	0.006	0.234
Number of observations	39	39	39
Instrument: closest mission from province center			

Notes: IV analysis was conducted at the provincial-level using averages of each variable over the period 1891-1895. Total enrollment rate is the number of children enrolled in primary school divided by total population, Indigenous enrollment rate is the number of Indigenous children enrolled in primary school divided by Indigenous population and European enrollment rate is the number of European children enrolled in primary school divided by European population. All regressions includes log(population), child mortality and mean Ethno-Linguistic Fractionalisation index as controls. See Table 9 and Table 10 in Appendix for First stage and Reduced-form estimates, respectively. Robust standard errors clustered at a provincial level in parentheses.

*$p < 0.1$, **$p < 0.05$, ***$p < 0.01$

4.4 Fixed Effects Estimates

To complement the IV analysis, I also use Fixed Effects (FE) to control for unobserved heterogeneity across provinces that may impact both Protestant mission presence and school enrollment rates. Whilst FE addresses time-invariant variables specific to each province, such as terrain, it does not solve for omitted variables that change over time. Since enrollment rates themselves are time-variant, FE cannot address biases arising from fluctuations in factors such as the colonial government's policy on where missions could conduct their activities, which may impact mission presence and enrollment rates. Hence, the FE model focuses on isolating within-province variation due to unobserved time-variant provincial characteristics. However, it is not a perfect solution for biases that may arise due to time-variant omitted factors. In combination with the IV, however, this approach aims to strengthens the relationship between Protestant missionaries and education outcomes by mitigating endogeneity and controlling for unobserved, time-invariant factors that may confound the relationship.

$$EnrolmentRate_{it} = \beta_1 PM_{it} + \beta_2 X_{it} + \mu_i + \lambda_t + \epsilon_{it} \tag{4}$$

Equation 4 illustrates the FE estimation where i indicates the 39 provinces and $t = 1891 - 1895$. $EnrolmentRate_{it}$ is the total number of enrolled primary school children on population, PM_{it} is Protestant missionaries per 10,000 people, X_{it} is a vector of province-level controls including; log of population and child mortality rate, μ_i are the province fixed-effects, and λ_t are the year fixed effects.

Results of this equation are presented in Table 4. In the first column, an additional Protestant missionary per 10,000 people is associated with an increase primary enrollment rate by 2.3 percentage points. Whilst Indigenous enrollment rate is associated with an increase of 2.4 percentage points and European enrollment rate is associated with a decrease of 3.4 percentage points. Total enrollment and Indigenous enrollment are statistically insignificant whilst European enrollment is significant at the 1%. These coefficient are inconsistent with existing literature as Protestant missionaries generally tend to have a positive and significant impact across all groups. For instance, Becker & Won (2024) found that an additional Korean Protestant church leads to an increase in

total literacy rate by approximately 2.2%, with the effect larger for females than males, albeit still positive and statistically significant for male literacy. Whilst Calvi et al. (2022) found the probability of women attending school in Protestant mission-settled districts is higher at 10.7% compared to their male counterparts within the same district at 5.5% in India.

The FE estimates for total school and Indigenous school enrollment seem to no longer be significant in comparison to IV. This may be due to the limited within-province variation for PM_{it} as the number of missionaries within provinces did not change substantially over the five year period [11] Thus, the FE model may struggle to identify a clear effect, decreasing precision.

Surprisingly, there is also a change in magnitude as the effect of Protestant missionaries on European enrollment is now negative. This may be because the FE model controls for time-invariant province-specific characteristics that are not captured in OLS or IV. For instance, some provinces may have had established colonial infrastructure that supported the education of European children. This created favourable conditions for European primary school enrollment. When Protestant missionaries arrived, they would focus on educating Indigenous children as they were their main target of conversion and European education was already established. In OLS and IV, these initial provincial investments into European education may inflate the positive association between Protestant missionaries and overall European school enrollment. However, FE controls for these provincial characteristics, revealing a negative relationship, due to missionary presence being focused on influencing Indigenous education rather than additional support for overall European education.

[11] Only 19 provinces have the number of Protestant missionaries changed throughout the 5 year period out of the 27 total provinces that was visited by these missionaries.

Table 4: Fixed Effects

	Enrolment Rate		
	(1)	(2)	(3)
	Total	Indigenous	European
Protestant missionaries per 10,000 people	0.023	0.024	-0.034***
	(0.016)	(0.016)	(0.008)
Mean of dependent variable	0.007	0.006	0.234
Observations	195	195	195
Number of provinces	39	39	39
R^2	0.109	0.121	0.0323
F statistic	317.42	349.40	39.38

Notes: Total enrollment rate is the number of children enrolled in primary school divided by total population, Indigenous enrollment rate is the number of Indigenous children enrolled in primary school divided by Indigenous population and European enrollment rate is the number of European children enrolled in primary school divided by European population. All regression includes log(population) and child mortality controls, year fixed effects and province fixed effects. Robust clustered standard errors at the provincial level in parentheses.

*$p < 0.1$, **$p < 0.05$, ***$p < 0.01$

Whilst the FE model controls for province-specific, time-invariant factors, its reliance on within-province variation presents a limitation. This is particularly an issue within the context of colonial Indonesia, where the number of Protestant missionaries (PM) changed little over time and was shown through the drastic decrease in precision and magnitude for total enrollment rate and Indigenous enrollment rate in the FE estimates.

Additionally, the FE estimates may not fully account for the endogeneity of missionary placement as they were often strategically located in certain areas based on unobserved factors such as ease of access or demand for education. This spatial endogeneity may bias the FE estimates if these location-specific characteristics also influence primary school enrollment rates. For instance, if these missionaries chose a location that is accessible this

may imply existing Dutch infrastructure, where there may already be higher enrollment rates due to this investment. Thus, the model may overestimate the impact of missionary presence on enrollment as it attributes the increase on Protestant missionaries rather than pre-existing government investment. Because the FE model relies on variation within provinces over time, it may not adequately capture spatial variation when missionary presence is stable over time. This stability implies that once Protestant missionaries were established in a region, they tend to remain, thus limiting temporal variation and making it difficult to disentangle the impact of their presence from the characteristics of the area itself.

When comparing the FE and IV results, we gain complementary insights into the relationship between Protestant missionaries and primary school enrollment. The IV model exploits the exogenous variation in mission intensity through mission proximity as an instrument to address endogeneity. This approach may mitigate bias that may arise from unobserved factors that is correlated with mission presence and school enrollment rates, such as unobservable provincial characteristics. However, the low Kleibergern-Paap statistic implies that the instrument is weak, affecting the precision of estimates as well as the ability to interpret the relationship as causal. Furthermore, the limited number of observations restricts the the reliability and robustness of the results. Despite this, IV estimates reflect a local average treatment effect, capturing the impact in areas where the instrument itself induced variation in mission intensity. This makes the IV strategy useful for identifying a relationship in especially regions where the presence of Protestant missions is driven by proximity. However, causality cannot be inferred due to the limitation of the instrument and the limited number of observations.

Contrastingly, the FE model addresses unobserved heterogeneity across provinces by controlling for time-invariant, province-specific characteristics that may be correlated with both Protestant mission presence and enrollment rates, such as pre-existing infrastructure. Whilst the FE model does account for these fixed characteristics, it cannot capture time-variant omitted variables, such as changing government policies, or how these time-variant factors interact with time-invariant spatial traits. For instance, although the initial placement of Protestant missions in accessible areas doesn't change

over time, its impact may persist, as these provinces may continue to benefit from early education investments. FE controls for the time-invariant placement of these missionaries, however, it doesn't capture how its long term impact evolves with time-variant factors, such as local economic development, which may impact enrollment rates. Thus, the FE model is best suited in capturing within-province changes over time to offer insights into how school enrollment rate changes relative to Protestant mission presence once time-invariant provincial characteristics are controlled for.

Using both FE and IV models allows me to cross-validate the findings to provide a more robust basis to interpret the relationship as each model addresses bias differently. The IV addresses endogeneity by exploiting exogenous spatial variation, albeit with a weak instrument and limited sample size, associating Protestant missionary presence with a positive and statistically significant impact on school enrollment rates across all groups. Contrastingly, the FE model controls for time-invariant provincial characteristics to observe within-province effects over time. The model yields a consistent effect for total school enrollment and Indigenous enrollment, albeit statistically insignificant, whilst the impact on European enrollment is negative. This difference implies that the impact of Protestant missionaries on European enrollment appears more ambiguous.Whilst the positive association in the IV estimates suggests that Europeans may have benefited from mission-provided education, particularly outside Java where secular ELS schools were sparse, Protestant missions likely directed their resources towards Indigenous children as it aligned with their objectives. These multiple roles of targeting Indigenous communities whilst also offering educational access to Europeans in more isolated regions suggests that the scale of Protestant missionaries may have provided educational support to Europeans, though not as a primary focus. Thus, the impact on European education is somewhat ambiguous, as it likely depended on local needs and distribution of educational missionary resources. Hence, whilst both models have its own assumptions and limitations, employing both creates a more nuanced understanding between Protestant missionaries and primary school enrollment rates across different groups

5 Conclusion

This thesis explores the relationship between Protestant missionaries and enrollment rates in colonial Indonesia. Existing literature have highlight the core tenet of *Sola Scriptura* in driving increased education and literacy among Protestants (Becker & Woessmann, 2009; Cage & Rueda, 2016). This in turn significantly influenced the strategy of Protestant missionaries, especially in Lutheran and Reformed principles, the two main sects of the Protestant missionaries operating in colonial Indonesia (Aritonang, 2000).

By employing an Instrumental Variable and Fixed Effects model, I show that an additional Protestant missionary per 10,000 people is associated with an increase in overall primary school enrollment rates and Indigenous enrollment rates. However, the mere presence of a Protestant mission alone is not sufficient to induce educational effects as the intensity of the mission is critical. Whilst European enrollment rates in the IV was positive, their impact seems to be negative in the FE model, suggesting that Protestant missions may have directed more resources toward Indigenous children. This showcases the nuanced effect of missionary activity, where its scale influenced groups differently, reinforcing the importance of examining both its intensity and target population of the Protestant missions to understand their educational impact.

However, due to the weak instrument, limited sample size as well as the lack of variation in the presence of mission over time, causality cannot be inferred from these results. Although I have found an association between Protestant missions and education outcomes in colonial Indonesia, this relationship cannot be inferred as causal.

Appendix

A Data

Variable	Description and Source
Population	Population of each province. Source: Centrale Commissie voor de Statistiek (1893; 1894; 1895; 1896; 1897; 1898)
European	Number of Europeans in each province. Source: Centrale Commissie voor de Statistiek (1893; 1894; 1895; 1896; 1897; 1898)
Indonesian	Number of Indonesians in each province. Source: Centrale Commissie voor de Statistiek (1893; 1894; 1895; 1896; 1897; 1898)
Protestants	Number of Protestants in each province. Source: Departement van Kolonien, Netherlands (1891; 1892; 1893; 1894; 1895) and own calculation
Protestant and all missionaries	Number of Protestant and other missionaries per province. Source: Centrale Commissie voor de Statistiek (1893; 1894; 1895; 1896; 1897; 1898)
Years since the arrival of Protestant missionaries	Number of years since the first Protestant missionary arrived in each Province. Source: Centrale Commissie voor de Statistiek (1893; 1894; 1895; 1896; 1897; 1898), Aritonang and Steenbrink (**?**), and own calculations
Protestant missionary per 10,000 people	Number of protestant missionaries per 10 000 people in each province. Source: own calculations
Enrolled European children	Number of European children enrolled in primary school in each province. Source: Departement van Kolonien, Netherlands (1891; 1892; 1893; 1894; 1895)

Table 5: Summary of Variables and Data Sources

Variable	Description and Source
Enrolled Indigenous children	Number of Indigenous children enrolled in primary school in each province. Source: Departement van Kolonien, Netherlands (1891; 1892; 1893; 1894; 1895)
% European enrolment	Percentage of European children enrolled in schools out of European population in each province. Source: own calculations
% Indigenous enrolment	Percentage of Indigenous children enrolled in schools out of Indigenous population in each province. Source: own calculations
Female and male children death	Number of female and male children who died between the ages of 2-10 per province. Source: Departement van Kolonien, Netherlands (1891; 1892; 1893; 1894; 1895)
Female and male infant death	Number of female and male infants who died under the age of 2 per province. Source: Departement van Kolonien, Netherlands (1891; 1892; 1893; 1894; 1895)
Female and male baby born	Number of female and male babies born per province. Source: Departement van Kolonien, Netherlands (1891; 1892; 1893; 1894; 1895)
Mortality rate of male and female children per 1000 children	Number of male or female children between the ages of 2-10 who died divided by the total number of babies born in each year per province multiplied by 1000. Source: own calculations
Mortality rate of male and female children per 1000 infants	Number of male or female children between the ages of 2-10 who died divided by the total number of babies born in each year per province multiplied by 1000. Source: own calculations

Table 6: Summary of Variables and Data Sources cont.

Variable	Description and Source
Aggregate distance from mission to port	Aggregate distance from mission to port in each province. Source: Topografische dienst in Nederlandsch-Indië (1896), Musschenbroek (1883) and own calculation
Min. distance from mission to province center	Closest mission from each province center. Source: Topografische dienst in Nederlandsch-Indië (1896) and own calculations
Min. distance from port to province center	Closest port from each province center. Source: Musschenbroek (1883) and own calculations
# Missions within a 5km, 20km and 50km radius from province center	Number of missions within a 5km, 20km or 50km radius from the center of each province. Source: Topografische dienst in Nederlandsch-Indië (1896) and own calculations
# Ports within a 5km, 20km and 50km radius from province center	Number of Ports within a 5km, 20km or 50km radius from the center of each province. Source: Musschenbroek (1883) and own calculations

See A1 for more information.

Table 7: Summary of Variables and Data Sources cont.

A.1 Data on Ports and Missions Coordinates

Mission coordinates – To find the coordinates of missions, I utilised a historical map, *Kaart van den Nederlandsche Oost Indischen archipel aantoonende de door de Indlandsche bevolking beleden godsdiensten*, published by the Dutch Topographical Office (1896) which showcased the religions and locations of the Protestant missions [12].

Ports coordinatees – I utilised the historical map; *Handelskaartje van den Nederlandsch Indischen archipel* (Musschenbroek, 1883) which showcases the trade routes in the

[12]See Figure 7 in Appendix for an excerpt of the map

Dutch East Indies in the late 19th century including where the ports are located [13]

After obtaining the map, I overlay each map to a current map on Indonesia on Google Earth. Then I added a placemark on each location indicated by the map as a port or protestant missionary to find the latitude and longitude. See Figure 4 for an example.

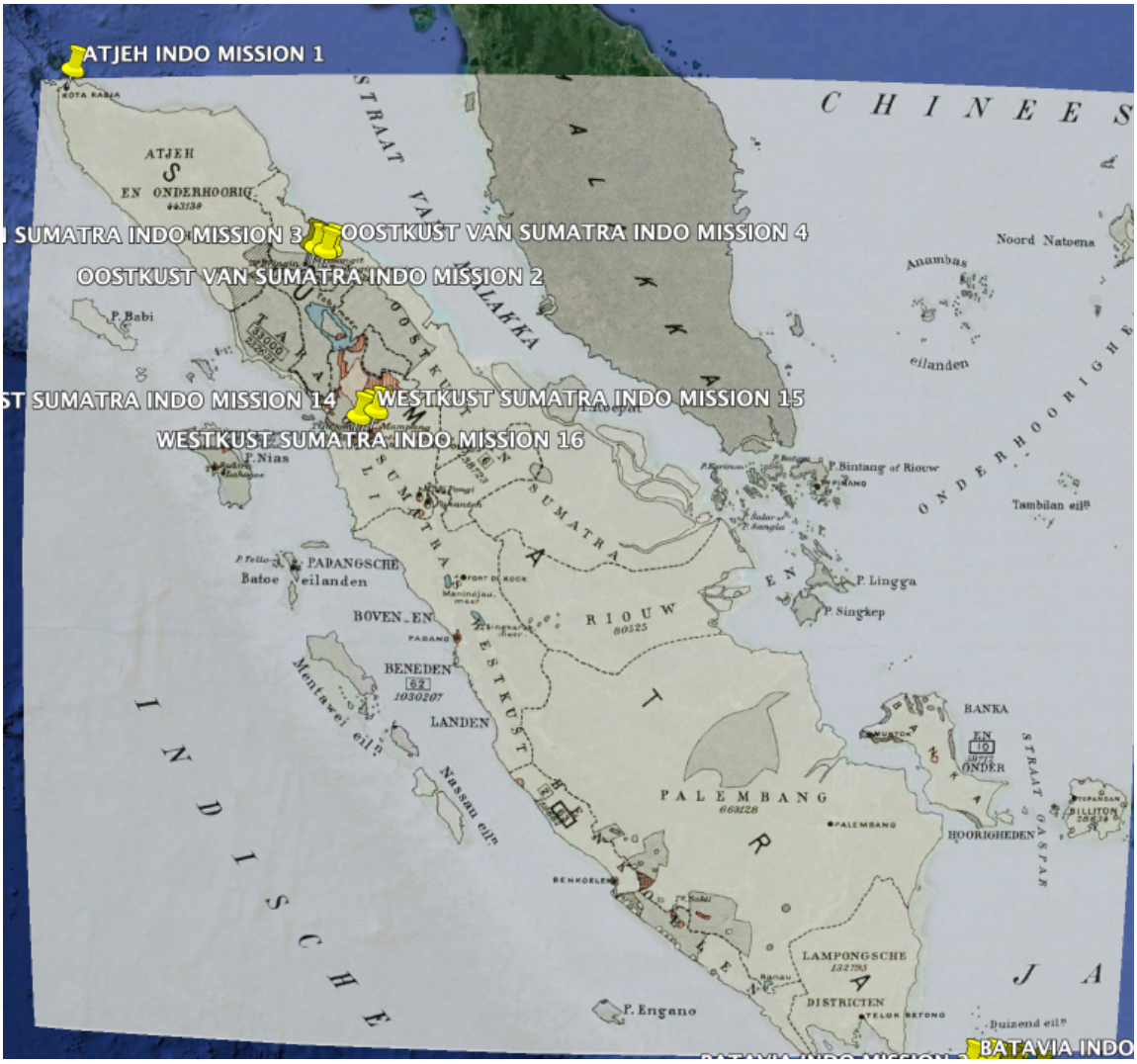


Figure 4: Mission map overlay on Google Earth

A.2 1891-1895 data

Mean ethno-linguistic fractionalisation (ELF) - To obtain the Ethnolinguistic Fractionalisation (ELF) statistic at the provincial level, I utilised data provided by Desmet et al. (2020) in their Local Linguistic Diversity data set which I then aggregated at a provincial level using R (see Linguistic Diversity FINAL.R for the codes). However, to ensure com-

[13] See Figure 8 in Appendix for the full map

patibility with the historical adminstrative divisions relevant to analysis, I used Robert Cribb's (2010) historical atlas to accurately match contemporary provinces to their historical counterparts. The matching process required several strategies depending on the relationship between the old and contemporary provinces:

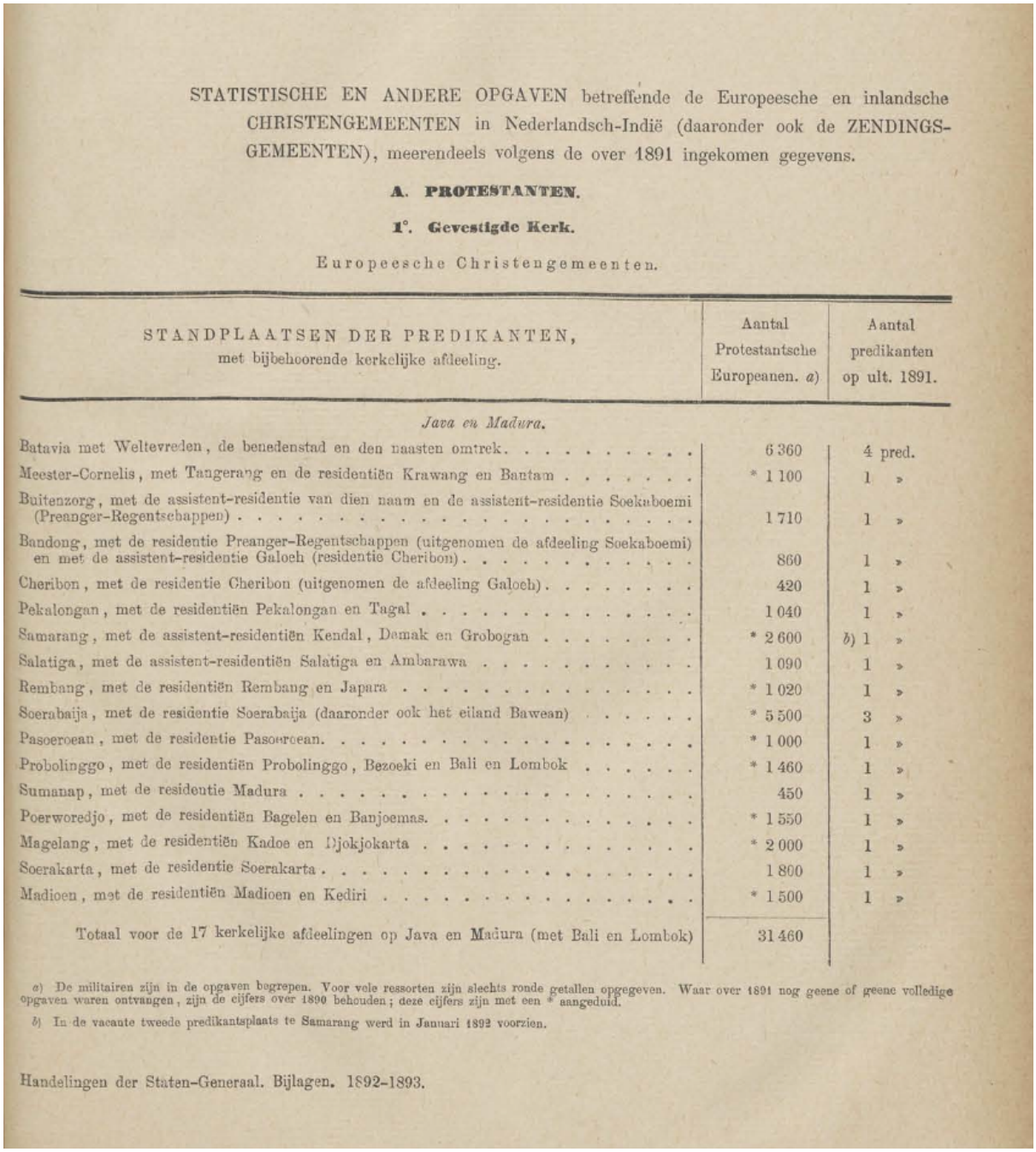
1. **Contemporary provinces containing multiple old provinces**: if contemporary provinces encompassed several historical provinces, such as the contemporary province of *Jakarta Raya*, which includes the old provinces of *Batavia* and *Krawang*, the same ELF value was assigned to all historical provinces within the contemporary boundary

2. **Direct match**: if contemporary provinces corresponds precisely to a single historical province, such as the contemporary province of *Yogyakarta* which aligns exactly with the old province of *Djokjakarta*, the same ELF value was assigned to all historical provinces within that contemporary boundary

3. **Old province encompassing multiple contemporary provinces**: if an old province covered multiple contemporary provinces, such as the old province of *Menado* which includes the contemporary provinces of *Gorontalo, Sulawesi Tengah* and *Sulawesi Utara*, I then calculated the ELF for the historical province as a mean of the ELF values from the contemporary provinces it encompasses.

Child mortality statistic - To find the child mortality statistic for each province, I first added the number of children between the ages of 2 and 10 who died for a specific year and province from the Koloniaal Verslag (1891; 1892; 1893; 1894; 1895). Then I added the number of births for a specific year and province from the same report. Finally, I utilised the following formula to calculate the child mortality rate per 1000 children

$$\left(\frac{\text{Number of deaths of children between 2-10 for province } i}{\text{Total number of births for province } i}\right) \times 1000$$



STATISTISCHE EN ANDERE OPGAVEN betreffende de Europeesche en inlandsche CHRISTENGEMEENTEN in Nederlandsch-Indië (daaronder ook de ZENDINGS-GEMEENTEN), meerendeels volgens de over 1891 ingekomen gegevens.

A. PROTESTANTEN.

1°. Gevestigde Kerk.

Europeesche Christengemeenten.

STANDPLAATSEN DER PREDIKANTEN, met bijbehoorende kerkelijke afdeeling.	Aantal Protestantsche Europeanen. *a)*	Aantal predikanten op ult. 1891.
Java en Madura.		
Batavia met Weltevreden, de benedenstad en den naasten omtrek	6 360	4 pred.
Meester-Cornelis, met Tangerang en de residentiën Krawang en Bantam	* 1 100	1 »
Buitenzorg, met de assistent-residentie van dien naam en de assistent-residentie Soekaboemi (Preanger-Regentschappen)	1 710	1 »
Bandong, met de residentie Preanger-Regentschappen (uitgenomen de afdeeling Soekaboemi) en met de assistent-residentie Galoch (residentie Cheribon)	860	1 »
Cheribon, met de residentie Cheribon (uitgenomen de afdeeling Galoch)	420	1 »
Pekalongan, met de residentiën Pekalongan en Tagal	1 040	1 »
Samarang, met de assistent-residentiën Kendal, Demak en Grobogan	* 2 600	*b)* 1 »
Salatiga, met de assistent-residentiën Salatiga en Ambarawa	1 090	1 »
Rembang, met de residentiën Rembang en Japara	* 1 020	1 »
Soerabaija, met de residentie Soerabaija (daaronder ook het eiland Bawean)	* 5 500	3 »
Pasoeroean, met de residentie Pasoeroean	* 1 000	1 »
Probolinggo, met de residentiën Probolinggo, Bezoeki en Bali en Lombok	* 1 460	1 »
Sumanap, met de residentie Madura	450	1 »
Poerworedjo, met de residentiën Bagelen en Banjoemas	* 1 550	1 »
Magelang, met de residentiën Kadoe en Djokjokarta	* 2 000	1 »
Soerakarta, met de residentie Soerakarta	1 800	1 »
Madioen, met de residentiën Madioen en Kediri	* 1 500	1 »
Totaal voor de 17 kerkelijke afdeelingen op Java en Madura (met Bali en Lombok)	31 460	

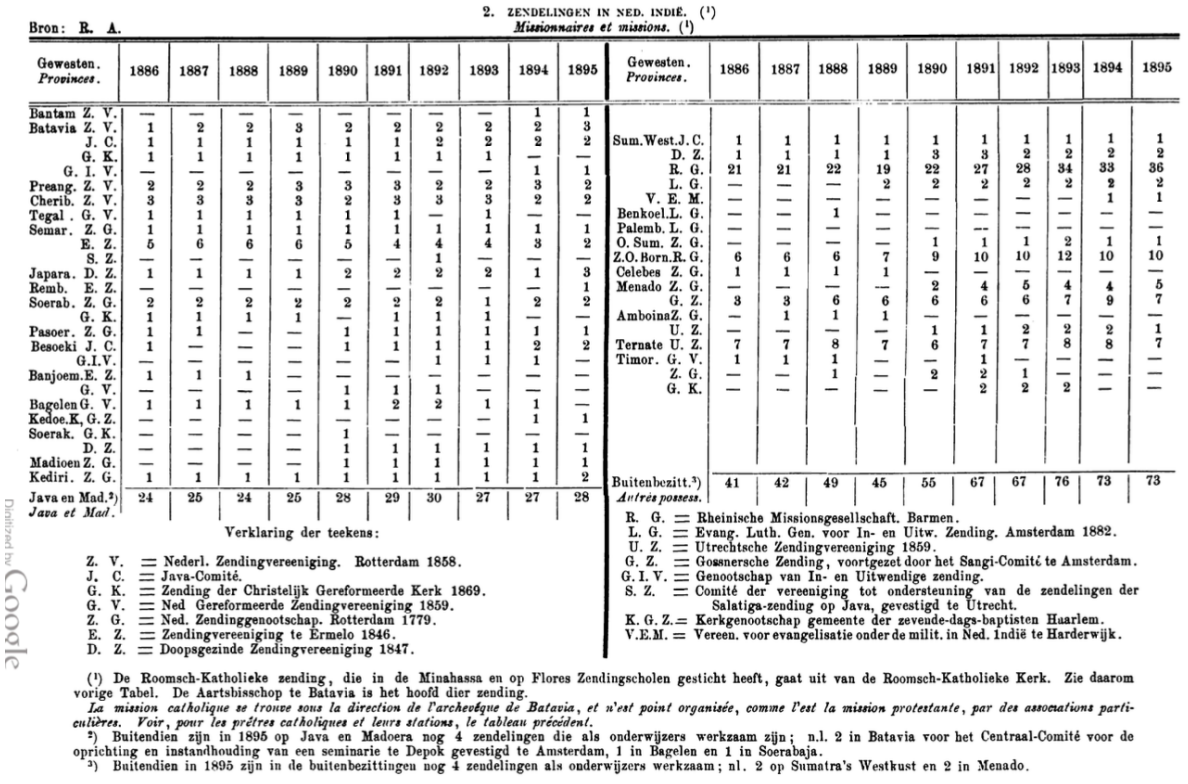
a) De militairen zijn in de opgaven begrepen. Voor vele ressorten zijn slechts ronde getallen opgegeven. Waar over 1891 nog geene of geene volledige opgaven waren ontvangen, zijn de cijfers over 1890 behouden; deze cijfers zijn met een * aangeduid.

b) In de vacante tweede predikantsplaats te Samarang werd in Januari 1892 voorzien.

Handelingen der Staten-Generaal. Bijlagen. 1892–1893.

Figure 5: Number of European Protestants in 1991 (Departement van Kolonien, Netherlands, 1892)

B Excerpts from Historical data



2. ZENDELINGEN IN NED. INDIË. (1)

Bron: R. A. *Missionnaires et missions.* (1)

Gewesten. *Provinces.*	1886	1887	1888	1889	1890	1891	1892	1893	1894	1895
Bantam Z. V.	—	—	—	—	—	—	—	—	1	1
Batavia Z. V.	1	2	2	3	2	2	2	2	2	3
J. C.	1	1	1	1	1	1	2	2	2	2
G. K.	1	1	1	1	1	1	1	1	—	—
G. I. V.	—	—	—	—	—	—	—	—	1	1
Preang. Z. V.	2	2	2	3	3	3	2	2	3	2
Cherib. Z. V.	3	3	3	3	2	3	3	3	2	2
Tegal . G. V.	1	1	1	1	1	1	—	1	—	—
Semar. Z. G.	1	1	1	1	1	1	1	1	1	1
E. Z.	5	6	6	6	5	4	4	4	3	2
S. Z.	—	—	—	—	—	—	1	—	—	—
Japara. D. Z.	1	1	1	1	2	2	2	2	1	3
Remb. E. Z.	—	—	—	—	—	—	—	—	—	1
Soerab. Z. G.	2	2	2	2	2	2	2	1	2	2
G. K.	1	1	1	1	—	1	1	1	—	—
Pasoer. Z. G.	1	1	—	—	1	1	1	1	1	1
Besoeki J. C.	1	—	—	—	1	1	1	1	2	2
G.I.V.	—	—	—	—	—	—	1	1	1	—
Banjoem.E. Z.	1	1	1	—	—	—	—	—	—	—
G. V.	—	—	—	—	1	1	1	—	—	—
Bagelen G. V.	1	1	1	1	1	2	2	1	1	—
Kedoe.K, G. Z.	—	—	—	—	—	—	—	—	1	1
Soerak. G. K.	—	—	—	—	1	—	—	—	—	—
D. Z.	—	—	—	—	1	1	1	1	1	1
Madioen Z. G.	—	—	—	—	1	1	1	1	1	1
Kediri. Z. G.	1	1	1	1	1	1	1	1	1	2
Java en Mad.[2]) *Java et Mad.*	24	25	24	25	28	29	30	27	27	28

Gewesten. *Provinces.*	1886	1887	1888	1889	1890	1891	1892	1893	1894	1895
Sum.West.J. C.	1	1	1	1	1	1	1	1	1	1
D. Z.	1	1	1	1	3	3	2	2	2	2
R. G.	21	21	22	19	22	27	28	34	33	36
L. G.	—	—	—	2	2	2	2	2	2	2
V. E. M.	—	—	—	—	—	—	—	—	1	1
Benkoel.L. G.	—	—	1	—	—	—	—	—	—	—
Palemb. L. G.	—	—	—	—	—	—	—	—	—	—
O. Sum. Z. G.	—	—	—	—	1	1	1	2	1	1
Z.O. Born.R. G.	6	6	6	7	9	10	10	12	10	10
Celebes Z. G.	1	1	1	1	—	—	—	—	—	—
Menado Z. G.	—	—	—	—	2	4	5	4	4	5
G. Z.	3	3	6	6	6	6	6	7	9	7
AmboinaZ. G.	—	1	1	1	—	—	—	—	—	—
U. Z.	—	—	—	—	1	1	2	2	2	1
Ternate U. Z.	7	7	8	7	6	7	7	8	8	7
Timor. G. V.	1	1	1	—	—	1	—	—	—	—
Z. G.	—	—	1	—	2	2	1	—	—	—
G. K.	—	—	—	—	—	2	2	2	—	—
Buitenbezitt.[3]) *Autres possess.*	41	42	49	45	55	67	67	76	73	73

Verklaring der teekens:

Z. V. = Nederl. Zendingvereeniging. Rotterdam 1858.
J. C. = Java-Comité.
G. K. = Zending der Christelijk Gereformeerde Kerk 1869.
G. V. = Ned Gereformeerde Zendingvereeniging 1859.
Z. G. = Ned. Zendinggenootschap. Rotterdam 1779.
E. Z. = Zendingvereeniging te Ermelo 1846.
D. Z. = Doopsgezinde Zendingvereeniging 1847.

R. G. = Rheinische Missionsgesellschaft. Barmen.
L. G. = Evang. Luth. Gen. voor In- en Uitw. Zending. Amsterdam 1882.
U. Z. = Utrechtsche Zendingvereeniging 1859.
G. Z. = Gossnersche Zending, voortgezet door het Sangi-Comité te Amsterdam.
G. I. V. = Genootschap van In- en Uitwendige zending.
S. Z. = Comité der vereeniging tot ondersteuning van de zendelingen der Salatiga-zending op Java, gevestigd te Utrecht.
K. G. Z. = Kerkgenootschap gemeente der zevende-dags-baptisten Haarlem.
V.E.M. = Vereen. voor evangelisatie onder de milit. in Ned. Indië te Harderwijk.

(1) De Roomsch-Katholieke zending, die in de Minahassa en op Flores Zendingscholen gesticht heeft, gaat uit van de Roomsch-Katholieke Kerk. Zie daarom vorige Tabel. De Aartsbisschop te Batavia is het hoofd dier zending.
La mission catholique se trouve sous la direction de l'archevêque de Batavia, et n'est point organisée, comme l'est la mission protestante, par des associations particulières. Voir, pour les prêtres catholiques et leurs stations, le tableau précédent.
2) Buitendien zijn in 1895 op Java en Madoera nog 4 zendelingen die als onderwijzers werkzaam zijn; n.l. 2 in Batavia voor het Centraal-Comité voor de oprichting en instandhouding van een seminarie te Depok gevestigd te Amsterdam, 1 in Bagelen en 1 in Soerabaja.
3) Buitendien in 1895 zijn in de buitenbezittingen nog 4 zendelingen als onderwijzers werkzaam; nl. 2 op Sumatra's Westkust en 2 in Menado.

EEREDIENST. *Cultes.* 27

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Figure 6: Number of missionaries from 1891-1895



Figure 7: Map of mission stations in the East of Indonesia

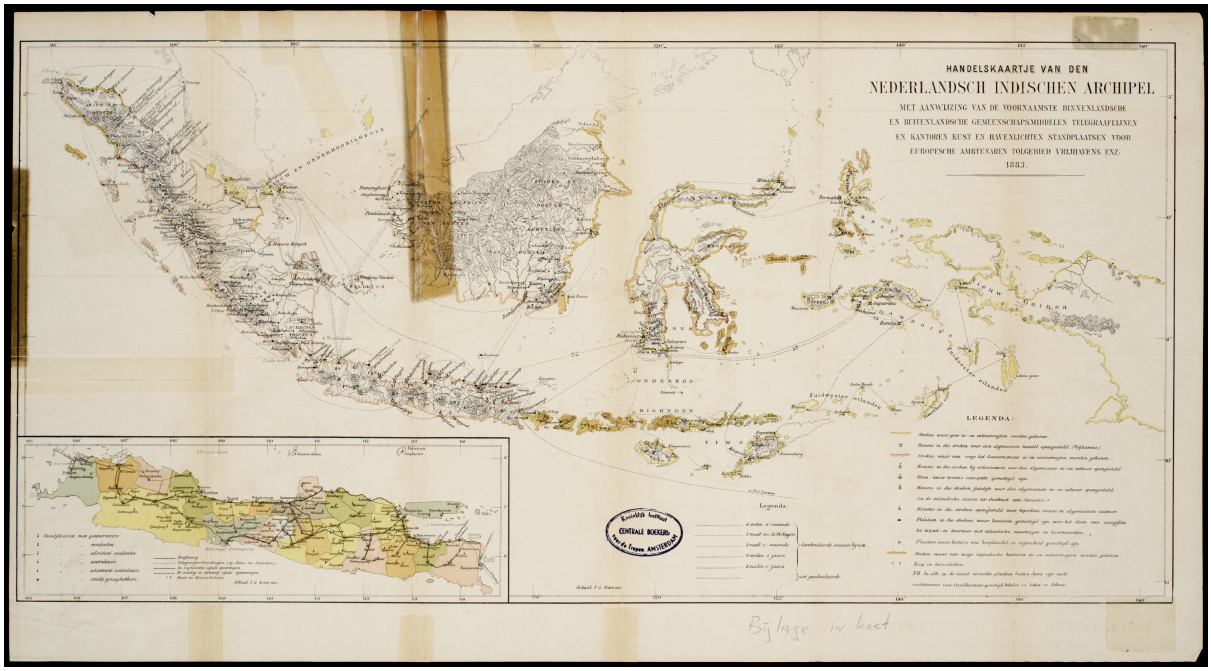

Figure 8: Map with location of Ports

C Tables

Table 8: Summary Statistics

Variable	**Mean**	**Std. Dev.**	**Min.**	**Max.**
Population	825647.641	553804.629	37471.000	2181097.000
# Europeans	1530.631	2293.835	46.000	12793.000
# Indigenous	810960.205	552060.716	27500.000	2166271.000
Share of Europeans	0.002	0.003	0.000	0.028
Share of Indigenous	0.957	0.084	0.651	0.999
Protestants	8859.856	30192.989	10.000	245842.000
Protestant missionaries from 1891-1895	2.497	6.300	0.000	42.000
Missionaries from 1891-1895	2.549	6.288	0.000	42.000
Years since the arrival of Protestant missionaries	32.985	34.132	0.000	81.000
Protestant missionaries per 10,000 people	0.055	0.158	0.000	1.196
Share of Protestants	0.027	0.095	0.000	0.729
# Enrolled female children	1422.913	2147.106	29.000	12148.000
# Enrolled male children	1915.103	3425.315	28.000	22112.000
# Total enrolled children	3338.015	5492.175	57.000	33911.000
Share of female enrollment	0.435	0.079	0.179	0.606

Continued on next page

Variable	Mean	Std. Dev.	Min.	Max.
Share of male enrollment	0.565	0.079	0.394	0.821
Rate of total enrollment out of population	0.007	0.016	0.000	0.118
# Enrolled Indigenous children	2919.287	5363.309	0.000	33546.000
Indigenous enrollment/Indigenous Population	0.006	0.016	0.000	0.118
# Enrolled European children	414.923	697.483	0.000	3771.000
European enrollment/European Population	0.234	0.130	0.000	0.917
Mean ELF	0.219	0.257	0	0.720
# Female child deaths (2-10)	1.703	3.213	0.000	24.000
# Male child deaths (2-10)	1.933	3.584	0.000	25.000
# Total child deaths (2-10)	3.636	6.542	0	43
# Female infant deaths (< 2)	5.831	9.843	0.000	53.000
# Male infant deaths (< 2)	7.067	11.250	0.000	60.000
# Female babies born	35.200	49.401	1.000	277.000
# Male babies born	37.477	52.239	0.000	290.000
# Total babies born	72.677	101.237	2	534
Mortality rate of female children per 1000 children	47.424	64.850	0.000	333.333
Mortality rate of male children per 1000 children	44.402	59.580	0.000	450.000

Continued on next page

Variable	**Mean**	**Std. Dev.**	**Min.**	**Max.**
Total child mortality rate per 1000 children	45.562	47.883	0	314.286
Mortality rate of female infants per 1000 infants	137.075	127.009	0.000	800.000
Mortality rate of male infants per 1000 infants	183.631	180.665	0.000	1500.000
Aggregate distance from mission to port	72.430	63.437	7.821	338.572
Min. distance from mission to province center	101.392	148.871	0.704	500.951
Min. distance from port to province center	41.693	71.754	0.308	422.411
# Missions within a 5km radius from province center	0.487	0.875	0.000	4.000
# Missions within a 20km radius from province center	1.590	3.556	0.000	21.000
# Missions within a 50km radius from province center	4.872	9.407	0.000	56.000
# Ports within a 5km radius from province center	0.359	0.481	0.000	1.000
# Ports within a 20km radius from province center	0.641	0.531	0.000	2.000
# Ports within a 50km radius from province center	0.974	0.975	0.000	5.000
Observations	195			

Table 9: IV first stage estimation

	(1) Total	(2) Indigenous	(3) European
Panel A: Protestant missionaries per 10,000 people			
Closest Protestant mission from province center	-0.0004*	-0.0004*	-0.0004*
	(0.0002)	(0.0002)	(0.0002)
Kleibergen-Paap rk Wald F statistic	3.90	3.90	3.90
Panel B: Protestant mission dummy			
Closest Protestant mission from province center	-0.0006	-0.0006	-0.0006
	(0.0007)	(0.0007)	(0.0007)
Kleibergen-Paap rk Wald F statistic	0.87	0.87	0.87
Number of observations	39	39	39

Notes: All regressions includes log(population), child mortality, mean Ethno-Linguistic Fractionalisation index and year fixed effects as controls. Robust standard errors clustered at a provincial level in parentheses.
*$p < 0.1$, **$p < 0.05$, ***$p < 0.01$

Table 10: IV Reduced-form estimation

	Enrolment Rate		
	(1)	(2)	(3)
	Total	Indigenous	European
Closest Protestant mission from province center	-0.00004*	-0.00004*	-0.00020***
	(0.00002)	(0.00002)	(0.00007)
R^2	0.183	0.185	0.306
F statistic	1.22	1.26	7.36
Number of observations	39	39	39

Notes: All regressions includes log(population), child mortality and mean Ethno-Linguistic Fractionalisation index as controls. Robust standard errors clustered at a provincial level in parentheses. $^*p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$

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