

The Muslim Disparity in Education Attainment: Explanations from Indonesia

Daniel Suryadarma

Arndt-Corden Department of Economics
Crawford School of Economics and Government
Australian National University
daniel.suryadarma@anu.edu.au
www.danielsuryadarma.com

Abstract

This paper documents the gap in secondary education progression between Muslims and non-Muslims using a panel dataset from Indonesia. The finding is that Muslim males face a lower chance of enrolling in senior secondary level. For those who graduated from senior secondary, the probability of a Muslim male to enrol in college is around 53 percent lower than a non-Muslim male. It appears that equalising two sets of covariates, scholastic ability and parental education, completely removes the gap at senior secondary enrolment. However, the gap at college enrolment appears to be related to labour market returns to college education.

I. Introduction

About one-fifth of the world's population are Muslims, making Islam the second largest religion in the world (Barrett, Kurian, and Johnson, 2001). In countries where they are the minority, Muslims are less educated and poorer (e.g. Glewwe and Jacoby, 1994; Borooah and Iyer, 2005). Cross-country evidence, meanwhile, shows that the share of Muslim population is negatively correlated with democracy (Barro, 1999; Clague, Gleason, and Knack, 2001), social cohesion (Easterly, Ritzen, and Woolcock, 2006) and female-male literacy ratio (Pryor, 2007). With regards to economic prosperity, the share of Muslims in a population has a negative effect on economic growth (e.g. McCleary and Barro, 2004). Hillman (2007) finds that Muslim societies without any oil reserves have lower incomes than their comparable non-Muslim neighbours, and Kuran (2004) states that commercial practices in Middle Eastern countries have remained the same for eight centuries.¹

In a series of papers, Kuran (2003, 2004) argues that Islamic laws are the main reason for the underdevelopment of Middle Eastern countries. Hillman (2007), meanwhile, asserts that Islam's strict

adherence to the supreme value system, where the main objective of Islam is to increase its domain, allows the leaders in Muslim majority countries to relegate economic and human development behind the supreme objective to conquest more land or reconquest lost ones. Finally, Platteau (2008) states that the Islamic frame of reference provides political rulers with an option to default when they face pressure to upgrade their country's institutions and to accuse their opponents of un-Islamic behaviour. In summary, the above studies attribute the adverse relationship between Islam and indicators of progress, such as democracy, economic prosperity, and human development to be mainly the result of Islamic teaching.

Relative to the amount of research done to investigate the reasons behind economic and democratic outcomes of Muslims, there is relatively less research done on understanding the reasons why Muslims have lower educational outcomes.² Looking at cross-country data shown in Figure 1, it is indeed the case that the share of Muslims in a population is negatively correlated with education outcomes.

[FIGURE 1 HERE]

The top left panel in Figure 1 shows that a 10 per cent increase in the share of Muslim population is associated with 0.3 years of lower education attainment among adults. While the correlation becomes smaller after I control for GDP and democracy, shown in Appendix 1, it remains statistically significant. Meanwhile, the middle left panel in Figure 1 shows that a similar increase in the share of Muslim population is associated with a 2.1 per cent lower secondary enrolment rate. Finally, the bottom left panel shows that performance at PISA is also negatively associated with the share of Muslim population.

The right-hand graphs in Figure 1 examine on the correlations between the share of Muslim on gender gap, measured by male to female ratio in the three outcomes. The top graph shows that on average, adult men have one-fifth higher education attainment than adult women. At the mean of female education attainment, this is equivalent to 1.2 years. More importantly, the estimation results show that the gap is significantly wider in countries with higher share of Muslim population. Meanwhile, the middle panel shows that the pattern is similar with regards to secondary net enrolment rate. Looking at the bottom graph, however, the proportion of females scoring in PISA's highest reading proficiency bracket is higher than males and that females perform even better in countries with a higher share of Muslim population. Therefore, while in the top and middle graphs there is some indication that females have increasingly lower education

attainment as the share of Muslim population increases, the performance of females in these countries are better than in countries with lower share of Muslim population.

In summary, Figure 1 shows that the share of Muslim population in a country has a negative correlation with education outcomes. Moreover, it is also positively correlated with larger male/female ratio in two out of the three outcomes. Given the relatively important role of education on economic prosperity and democracy, it is important to unearth the reasons behind the phenomenon and examine whether there are policies that could be undertaken to address it.

In this paper, I investigate the issue of religion gap in education outcomes between Muslim and non-Muslim children using Indonesian data. Despite being a secular country, Indonesia is the largest Muslim majority country in the world, home to about 180 million Muslims. An advantage of data from Indonesia is that the religion cuts across ethnic lines. Hence, any education gap that I unearth may not be caused ethnic-specific differences. Moreover, most Indonesians do not change their religious affiliation and there is virtually no family of mixed religions. This fact ensures that religion is very likely to be exogenous in Indonesia.

The key reason for choosing Indonesia, in addition to the fact that it has a large enough Muslim respondents in any household survey, is that it has a 14-year longitudinal household survey dataset. The main barrier to the lack of comprehensive studies on this issue thus far, especially in developing countries, is the lack of a suitable dataset.³ Admittedly, it is not the norm in the literature to focus on the majority group. However, the evidence above suggests that one should focus on Muslims as opposed to non-Muslims as they are the disadvantaged group. In any case, since the next largest religious group in Indonesia is Christian, one could interpret the negative of the results as a Christian advantage.⁴

Specifically, I investigate the extent of Muslim and non-Muslim gap in education progression through secondary school in Indonesia and examine whether there are policies that could be undertaken to address it. The choice to focus on the secondary level is due to the fact that primary education attainment is practically universal in Indonesia. In contrast, the net secondary school enrolment rate has been hovering around 60 per cent at the junior secondary level and 40 per cent at the senior secondary level between 2000 and 2005 (World Bank, 2007).

Separating the analysis by sex, I find that both among male and female Muslims have lower progression rates relative to their respective non-Muslim counterparts. Among males, there is a substantial

and statistically significant gap with regards to senior secondary and post-secondary school enrolment. Among females, Muslims have a lower chance of enrolling in senior secondary school. For both genders, I find that equalising scholastic ability and parental education substantially reduces the gap at senior secondary enrolment. The Muslim gap among males at post-secondary enrolment, meanwhile, is likely to be caused by differences in the labour market returns to tertiary education between Muslims and non-Muslims.

I organise the rest of this paper as follows. The next section explores the main features of the Indonesian primary and secondary education system. Section III discusses the conceptual framework in understanding religion gap in education. Section IV describes the dataset. Section V analyses the observed gap in school progression rates. Section VI contains the main estimation results. Section VII presents robustness checks. Section VIII concludes.

II. The Indonesian Primary and Secondary School System

The primary school system in Indonesia covers the first to sixth grades, at the end of which children must pass a national examination in order to qualify to the secondary level.⁵ Primary education attainment is almost universal in Indonesia, where 99.6 per cent of primary school-age children are enrolled in or have graduated from primary school across the country by 1988 (Government of Indonesia, 1998). Meanwhile, the secondary school system is divided into two major parts. The junior secondary system covers the seventh to ninth grades, and the senior secondary system is from tenth to twelfth grades. Similar to the primary level, students must sit in a national examination at the end of the junior and senior secondary levels.

There are basically two large education systems operating in Indonesia, each having its own curriculum and administration. The first one is a secular system, while the second is an Islamic system (*madrasah*). The former is a decentralised system, where the schools are under the administration of district governments. The responsibility of the central government's Ministry of National Education is to design the core curriculum and administer the national examination at the end of each level. The latter, meanwhile, is centralised under the Ministry of Religious Affairs. The main difference between the two systems is on the curriculum. In the secular system, religion is one of among many taught subjects. In the *madrasah*, meanwhile, Islam is the foundation of the curriculum.⁶

School participation at the primary and secondary levels has been steady for the past decade. Figure 2 shows the net enrolment rates between 1970 and 2005. Compared to 1970, school participation had increased

substantially by 1995. The primary level participation increased from 72 per cent to 92 per cent, and has stayed constant since. Meanwhile, junior secondary participation tripled in 25 years, from 17 per cent in 1970 to 51 per cent in 1995. The trend then increased much more modestly in the next decade, and was at 62 per cent in 2005. Finally, the increase in senior secondary participation between 1970 and 1995 was more modest compared to the others. By 2005, the net enrolment rate at that level had only reached 42 per cent.

[FIGURE 2 HERE]

III. Conceptual Framework on Education Gaps

There are basically two competing theories with regards to the relationship between group differences in education progression. The first states that the differences are permanent because it is driven by group-specific factors. The second stream, meanwhile, states that the differences are caused by a group having less resources than the other, and that once the gap in resources are equalised, there should be no education gap between the groups. I discuss these two views in greater detail below.

Starting from the first stream, Chiswick (1988) argues that demand differences are basically caused by between-group differences in the price of quantity of children relative to the price of quality of children. The group where the quantity of children is cheaper compared the quality of children would have more children of lower quality. As a consequence, this group would have more children than the other group, but each child would have a lower education level. In their theoretical work, De Tray (1973) and Becker and Lewis (1973) state that one way to test this is through the mother's education. Other testable hypotheses discussed by Chiswick (1988) include group differences in the number of siblings and female labour supply.

The second group-specific factor is related to ethnic capital. Borjas (1992) argues that ethnicity acts as an externality in the human capital accumulation process. He finds that ethnic capital—the average education level of an ethnic group—plays a very important role in a child's education attainment; the effect is as large as the effect of the education level of the child's father. Hence, he argues that a child from an ethnic group with low ethnic capital may have a harder time progressing beyond the education level of his or her predecessors. In their study on the children of immigrants in Germany, however, Gang and Zimmermann (2000) find that the education outcome of second-generation immigrants closely mirrors that of the Germans rather than their parents.

The third factor is possibly the most important one: group-specific practice or ideology, which influences a group's optimal investment in education. Chiswick (1988) states that the Jew experience in diaspora causes them to invest more in human capital relative to physical capital because the former is more portable and transferable. In a recent paper, Becker and Woessmann (2009) attribute the Protestants' higher literacy rate relative to Catholics in Germany to Luther's exhortation to read the Bible. Therefore, especially relevant to this paper is the Islamic views on education.

Halstead (1995, 2004) states that Islam views knowledge as invaluable. However, it is important to note that Islamic teaching prioritises spiritual and moral knowledge above intellectual knowledge, and that Islam views the pursuit of knowledge to be worthwhile only if contributes to the main goal of Islam, which is to produce an individual who practices *Shariah*, the Islamic law, and works for the good of society (al-Taftazani, 1986). In addition, an aspect of the Islamic teaching on knowledge that may lead to Muslims attaining lower education attainment is its apparent dislike for Western-type materialistic view that the main goal of education is to maximise personal gains (al-Taftazani, 1986). Finally, there are several Muslim scholars that classify knowledge into Islamic knowledge and world knowledge. While it is the duty of a Muslim to pursue the former, they argue that there is no obligation to pursue the latter. And in cases where a Muslim must choose one over the other, he or she must choose the former.⁷ In conclusion, while the Islamic call to pursue knowledge is unquestionable, there is still some uncertainty to the scope and type of knowledge that the call addresses.

The second stream, meanwhile, examines factors that are closely related to wealth and parental education attainment. Given that in general higher educated parents are wealthier, they are likely to allocate more household resources to education and are able to wait longer before recouping their investment in their children. In cases where they are constrained, it is easier for them to access the credit market. Moreover, it is possible that upbringing and home environment in highly educated households are more conducive for education than the conditions experienced by a child whose parents are less educated.

In her theoretical contribution, Nordblom (2003) argues that holding everything else constant, children whose parents have a high ability will always have a higher educational attainment compared to ones whose parents have a low ability. Meanwhile, Cameron and Heckman (2001) use data from the United States and find that equalising one endowment, scholastic ability, between black, Hispanic, and white individuals overturns the lower college enrolment rate of blacks and Hispanics compared to whites. In Turkey, Kırdar

(2009) finds that equalising household characteristics completely remove the enrolment gap experienced by Kurdish and Arabic boys relative to Turkish boys. Therefore, studies finding support for this stream put forward policy recommendations that include improving the scholastic ability of the children in the group that has the lower education outcome and removing credit constraints faced by the households that the children live in.

IV. Data

In this paper, I use the Indonesian Family Life Survey (IFLS) dataset. IFLS is a longitudinal household survey that began in 1993. There are three additional waves done in 1997, 2000, and 2007. The sample represents about 83 per cent of the Indonesian population, covering 13 out of 33 provinces in Indonesia. In 1993, IFLS contains information of around 7,200 households. It has since grown to around 10,000 households in 2000 and 13,000 households in 2007 as children in the original sample marry or leave their parents' household. Attrition is quite low, around 5 per cent between waves. Overall, 87.6 per cent of households that participated in IFLS1 are interviewed in each of the subsequent three waves (Strauss et al., 2009).

In addition, I also use the Village Census (*Podes*) dataset, which contains basic information on facilities in every village in Indonesia. Podes is conducted three times every decade. I use Podes 1993, 1996, and 2000 to acquire district-level data on the number of schools, the share of private schools, and available infrastructure. Finally, I use the National Labour Force Survey (*Sakernas*) to calculate the district-level unemployment rates in 1993, 1997, and 2000. Sakernas is an annual, nationally representative, repeated cross-section, labour force survey that collects activity data of individuals in the sampled households, although the depth of its representativeness varies by year. Every year, Sakernas has an average of around 200,000 observations on individuals at or above 15 years of age, the labour force age threshold that is used in Indonesia.

The fact that Indonesia has a long-spanning longitudinal household survey is a key advantage compared to most other developing countries. It allows tracking of an individual who was still in primary school in 1993 up to 2007, when he or she is already well into adulthood. Thus, I face no difficulties with censored data and with individuals who dropped out of school and re-enrolled later. The latter point is especially important in developing countries. Pradhan (1998) investigates the determinants of enrolment and

delayed enrolment in Indonesia and finds that delayed enrolment make up between 13 per cent and 33 per cent of total enrolment at various grades in the secondary level. For this reason, it is crucial for a study that investigates school progression to have a dataset whose sample is already well beyond the official schooling ages.

Moreover, the fact that the first three rounds of IFLS were conducted within three-year intervals is coincident with the secondary education system in Indonesia, whose two levels are each three years long. Therefore, I could focus on the cohort that were in primary school in 1993, had to decide whether to continue to junior secondary school around 1997, and had to make a similar decision of whether to progress to senior secondary school around 2000. This enables me to investigate the influence of time-varying household conditions at around the time parents must make schooling decisions for their children. This is crucial as a child's background could have different effects at different education levels. As an example, family income would not play a very large role in equalising demand for education at the primary level in countries where such level is completely free, but could play a large role for higher levels where students are charged the full fee. Moreover, one must differentiate the effect of a permanent measure of household condition, such as parental education, from contemporaneous household conditions that would affect the decision to continue schooling at the time the decision must be made, such as family income. The Indonesian dataset enables me to evaluate the role of each factor at different junctures in a child's education progression and separate a household's permanent condition from its time-varying conditions. While I would not be able to very precisely measure the effects—ideally one needs an annual longitudinal survey—it is a step beyond most the studies in the literature.

The final advantage of IFLS is that it records a wealth of information on a person's experience and performance at school. It has data on the type of school the person attended, number of grade repetitions, the year he or she graduates from a particular school level, work activities during school, and the person's score in the national examinations at the end of each school level.

In this paper, I use the score in the primary level national examination as an indicator of a person's scholastic ability. The main reason for choosing this particular test is because of its comparability across regions, given that it was designed by the central government. The second reason is because the test measures an individual's proficiency in four subjects: mathematics, language, social sciences, and natural sciences.

I construct the sample the following way. I limit the sample to individuals who were between third and sixth grades in 1993 in order to circumvent cohort effects. Then I limit the sample to those who actually graduated from primary school. There are two reasons for this. Firstly, primary school graduation is nearly universal in Indonesia and the focus of this paper is on progression through secondary education. Secondly, I need the data on scholastic ability, which is only available for individuals who graduated from primary school. Removing individuals who did not graduate from primary school eliminates about 4.5 per cent of the sample. Afterwards, I match the individuals with the 2007 wave of IFLS, where the information on the individuals' final education attainment is taken from. This results in a 95 per cent match. The individuals in the sample were between 22 and 27 years old in 2007. Out of those, 96 per cent were already out of school.

V. School Progression Rates and the Religion Progression Gap

I examine an individual's school progression at five education stages: enrolment in junior secondary; graduation from junior secondary; enrolment in senior secondary; graduation from senior secondary; and enrolment in post-secondary. Following Sawada and Lokshin (2009), Figure 3 provides the progression rates and cumulative attainment rates at different education stages. The progression rates are calculated as follows. Let S_{t-1} be the set of individuals who successfully finish education stage $t-1$. A subset of these individuals, S_t , progress to the next education stage, namely t . Therefore, the progression rate at stage t is S_t/S_{t-1} . As an example, if S_1 individuals finish from primary school and S_2 individuals enrol in junior secondary school, the junior secondary school enrolment progression rate is S_2/S_1 . The cumulative attainment rates, meanwhile, is the share of individuals in the sample that attains a level of education.

Figure 3 shows that 83.8 per cent of individuals who graduate from primary school enrol in junior secondary school. Among those enrolled in junior secondary school, meanwhile, about 95.6 per cent graduate from that level. Looking across the education stages, it appears that once a person enrolls at a level, he or she is almost guaranteed to finish that level. Hence, most of the dropouts occur at the transition between education levels. At the highest stage, only one-third of senior secondary graduates enrol in post-secondary education.

[FIGURE 3 HERE]

Figure 4 shows the religion gaps in the progression rates at each education stage. It is important to note that the data do not show any religion gap with respect to graduation from primary school. Looking at males, I find that Muslim males have a significantly lower progression rate at the senior secondary enrolment stage, of around 16.2 percentage points, and a 24.2-percentage point lower chance of enrolling in post-secondary. In addition to being much larger in absolute terms at post-secondary enrolment, the relative terms are even much higher given that mean progression rates are also much lower at the post-secondary enrolment level. Finally, a Muslim male who manages to enrol in a senior secondary school has a 6.1-percentage point lower probability of graduating from it.

[FIGURE 4 HERE]

Meanwhile, Figure 4 also shows that Muslim females encounter a 15.4-percentage point lower chance of enrolling in senior secondary schools, where the gap is statistically different from zero. However, there is no statistically significant religion gap with regards to other education stages, although the gap at post-secondary enrolment is substantial relative to enrolment rate at this level. Hence, there appears to be gender-specific traits in the religion gap. Among males, the significant religion gap occurs at the last three education stages, while among females it is only statistically significant at the senior secondary enrolment.

VI. Explaining the Religion Education Progression Gap

After ascertaining in the previous section that Muslims face lower education progression rates compared to non-Muslims, in this section I investigate the factors that could explain the phenomenon. Considering the evidence thus far, one important exercise would be to separate long-term and short-term explanations. Cameron and Heckman (2001) argues that long-term family investment is more important than relieving short-term credit constraints in addressing ethnic gap. Meanwhile, the literature is scant in developing countries. In Turkey, Kırdar (2009) finds that equalising household characteristics completely remove the enrolment gap experienced by Kurdish and Arabic boys relative to Turkish boys. However, he does not distinguish between the effect of equalising long-term household conditions and the effect of equalising short-term ones. Given that the policy implications are vastly different—the former calls for long-term human capital investment and the latter calls for cash transfers or school scholarships—it is unclear

which policy to undertake in order to reduce the enrolment ethnic gap in Turkey. Looking at the evidence from India, however, it is unlikely that merely providing cash transfers would be sufficient (Borooah and Iyer, 2005).

In this paper, I separate the permanent and contemporaneous portions of household background. The former includes parental education and, following Borjas (1992), the religion capital at the parents' generation. For the latter, I use the conditions of a household at three different occasions in the first three waves of IFLS. In addition to household background variables, I include a set of covariates on access to schools in 1993. I do not include any measures of school access in 1997 and 2000 because they are highly correlated to the 1993 condition. Finally, I include a set of variables that record various infrastructure conditions in the district. Table 1 shows the means of these variables at the various education stages.

[TABLE 1 HERE]

Before providing the effect of equalising endowments on the religion gap, Table 2 shows the average differences between Muslims and non-Muslims with regards to these endowments. Among males, it appears that Muslim children on average score around 0.45 standard deviations lower than non-Muslim children. The mean ability gap between Muslim and non-Muslim females, meanwhile, is much smaller and statistically insignificant. Hence, ability may prove to be an important cause of the observed religion gap among males, but not among females.

In the United States, Hill and O'Neill (1994) find that family background plays an important influence in explaining the test score differentials between blacks, Hispanics, and whites. Looking at the difference in parental education level between Muslims and non-Muslims, it appears that there are not much gender differences. Both Muslim males and females have fathers who are much less educated than non-Muslim males and females respectively. On average, the chance of a Muslim child to have a father with at least nine years of education is between 55.0 and 61.3 percentage points lower than a non-Muslim child. There are, however, significant differences in the religion gap between males and females with regards to maternal education. The average probability that the mother of a Muslim male has at least a junior secondary credential is 63.9 percentage points lower than a non-Muslim male. Among females, meanwhile, the gap is about 27.5 percentage points.

[TABLE 2 HERE]

Comparing the wealth gap between religions in the three IFLS waves, meanwhile, it appears that Muslim and non-Muslim households have relatively equal wealth. In sum, it appears that Muslim children are born into families with lower education levels, but they are not more credit-constrained than non-Muslim children. In the rest of this section, I investigate the effects of equalising these differences on the religion gap in education progression. Merely looking at the differences in the preceding table, one could expect equalising parental education and scholastic ability to reduce the size of religion gap, while household wealth could be expected to have only a small effect.

The reduced form probit model that I estimate is in Equation 1.⁸

$$\Pr(E_{ijk,t} = 1 | F_{ijk,t-1} = 1) = \Phi(\alpha + \beta M_i + \mu A_i + \gamma X_j + \chi C_k + \varepsilon_i) \quad (1)$$

where the probability of person i living in household j in community k to achieve education stage t conditional on finishing education stage $t-1$ depends on his or her religious affiliation, where M_i is equal to one if he or she is a Muslim and zero otherwise, the individual's scholastic ability A , a vector of household characteristics X , and community characteristics C . The description and summary statistics of the covariates that are included in X and C are shown in Table 1.

The main coefficient of interest is β , the gap in education attainment of Muslims and non-Muslims, specifically how its marginal effect and statistical significance change as I equalise differences in other background characteristics. Without controlling for other covariates except age, the estimated size of β is already shown in Figure 4 in the previous section. Finally, since there is no significant religion gap in the first two education stages, I only show the estimation results for the final three education stages.

Religion Gap among Males

I begin with religion gap among males, as shown in Table 3. The raw religion gap at senior secondary enrolment is 16.2 percentage points. Equalising scholastic ability reduces the gap to 12.5 percentage points

and removes its statistical significance. Equalising parental education and religion capital basically removes any leftover religion gap. After equalising household characteristics, the gap stands at 0.1 percentage points.⁹ Finally, equalising the rest of the observables results in the gap to be positive, albeit small and statistically insignificant.

[TABLE 3 HERE]

At senior secondary graduation, meanwhile, controlling for scholastic ability does not change the gap, but controlling for parental education removes the entire gap. Moving on to the highest education stage, there is a substantial religion gap at post-secondary enrolment. While equalising scholastic ability and parental education reduces the gap from 24.2 percentage points to 13.4 percentage points, it remains substantial despite being statistically insignificant. Controlling for additional covariates does not significantly reduce the size of the gap; instead it pronounced the gap to as high as 17.7 percentage points before decreasing to 11.3 percentage points once I include all the covariates.

Given that I already control for factors that may influence demand and supply of education, a plausible explanation may lie in differences in labour market returns.¹⁰ Muslim males may choose to not enrol in tertiary education if the wage premium from such qualification is relatively low compared to the cost. However, this explanation would only be valid if it is also the case that the returns to tertiary qualification among Muslim males are lower compared to non-Muslim males. For this purpose, I use data of all adults from the IFLS and investigate the tertiary qualification premium in the labour market enjoyed by Muslim and non-Muslim males.

The estimation results are in Table 4. I examine five labour market outcomes among males with at least a senior secondary qualification: labour force participation, employment conditional on labour force participation, job type, occupation sector, and hourly wage. The coefficient in each column shows the tertiary qualification premium relative to senior secondary qualification for Muslim and non-Muslim males in each labour market outcome. The aim is to compare the premium that a Muslim male faces relative to a similarly qualified non-Muslim male.

There does not seem to be any difference in tertiary premium faced by Muslim and non-Muslim males with regards to labour force participation. Tertiary educated individuals from both groups face similarly

lower labour force participation rate compared with individuals who only have senior secondary qualification. With regards to employment, meanwhile, a tertiary educated Muslim male does not have a higher employment rate compared to a Muslim male who only has a senior secondary qualification. For non-Muslims, meanwhile, the tertiary premium is around 7.7-percentage point higher employment rate. Looking at job types, both tertiary educated Muslim and non-Muslim males do not appear to be working in different jobs than their senior secondary educated counterparts and there does not seem to be much difference between tertiary-educated Muslims and non-Muslims in this regard.

[TABLE 4 HERE]

The next labour market outcome that I examine is occupation sector. Among Muslim males, it appears that a tertiary qualification enables them to work in the services sector compared to those with only senior secondary qualification. For non-Muslim males, meanwhile, there is no statistically significant difference in the sector of occupation of tertiary educated individuals compared to those with a senior secondary qualification. The final labour market outcome is wages. Table 4 shows that the tertiary wage premium enjoyed by Muslim males is 50.2 per cent, while it is 128.5 per cent among non-Muslim males. The difference in the wage premium is statistically significant, and is possibly the strongest explanation of why more non-Muslim males continue to tertiary education compared to Muslim males. In addition, the benefit of tertiary education among non-Muslims materialises in a higher employment rate. I observe no such benefit for tertiary-educated Muslims. These two findings could explain the persistent religion gap in tertiary education enrolment among males.

Religion Gap among Females

After investigating the reasons behind the religion gap in education progression among males, I turn the investigation to females. Table 5 provides the stepwise results of the effects of controlling for each group of covariates on the observed religion gap. Starting from senior secondary enrolment, it appears that equalising scholastic ability only slightly reduces the religion gap from 15.4 to 12.5 percentage points. Controlling for parental and religion capital further decreases the gap to 6.6 percentage points, which is a small and statistically insignificant gap.

On the other hand, while there are no statistically significant religion gaps among females at the two top education stages, it is important to note that for the gap at post secondary enrolment, equalising scholastic ability and parental education reduces the magnitude of the gap from 12.4 percentage points to 1.5 percentage points.

[TABLE 5 HERE]

To conclude, the results in this section suggest that the substantial religion gap between Muslims and non-Muslims could be narrowed by equalising scholastic ability and parental education. After controlling for these two factors, household wealth and other household conditions do not seem to play any additional role in bridging the rest of the gap, which in most cases already cease to be statistically significant. The same is also true for the variables that measure access to education. In cases where the gap is persistent, it appears that it is driven by lower labour market outcomes.

The finding corroborates that of Cameron and Heckman (2001) in the United States, where the ethnic gap in education is not persistent in the majority of cases. Moreover, comparing long-term and short-term factors, it appears that the long-term influence of household characteristics, measured by parental education and scholastic ability, have the greater influence in a child's attainments than short-term household wealth. Therefore, while providing short-term relieve from budgetary constraints may be helpful in keeping children in school in extraordinary circumstances (Sparrow, 2007), such policies may not be sufficient to address religion gap in education progression in Indonesia.

VII. Robustness checks

a. Migration

It is plausible that individuals move away from their homes to attend higher education. Not controlling for this could introduce an omitted variables bias in the enrolment estimations if the decision to move is correlated with household wealth, parental education, or the individual's access to schools. One advantage of using a longitudinal dataset is that I have information on which individuals move between waves. Table 6 provides the movement pattern of the sample in 1997 and 2000. From the original sample in 1993, when the sample was between eight to 13 years old, 97.1 per cent were still living in the same subdistrict in 1997. By

2000, when the sample was between 15 and 20 years old, 84.5 per cent were still in the same subdistrict. However, about 10.2 per cent moved to other districts within the province, and 5.3 per cent moved to other province. Given that the majority of individuals still live in the same subdistrict within the seven years, this is first indication that migration may not bias the estimation results.

[TABLE 6 HERE]

In order to further see the effect of migration, I include movement status as another explanatory variable in the estimations. The results are shown in Table 7. In general, the findings in the previous section seem robust to inclusion of the movement variables.

[TABLE 7 HERE]

b. Muslims versus Christians

The second largest religion in Indonesia is Christianity. Together with Islam, the two religions make up 95 per cent of the Indonesian population.¹¹ Hence, it is interesting to see whether the religion gap that I observe in the previous section is actually a Muslim-Christian gap or whether the two groups actually have the same education progression rates but lag behind other religion.

The estimation results are in Table 8. Comparing the religion gap among females in Table 8 with Table 5, it appears that while the gap at senior secondary enrolment has a larger magnitude, equalising scholastic ability and parental education removes the Christian advantage. Moreover, the size of the gap after controlling for community condition is 4.8 percentage points. Finally, at post-secondary enrolment, there is an 18.9-percentage point Christian advantage over Muslims, which is only significant at the 10% level. While this is larger than the gap observed in Table 5, controlling for scholastic ability reduces the gap to 13.4 percentage points, and equalising differences in parental education completely eliminates the gap.

[TABLE 8 HERE]

Comparing the results for males by looking at Columns 3 and 4 of Table 8 and Table 3, it seems that the gaps in senior secondary and post secondary enrolment behave the same way. Hence, it appears that among males, the observed gap in Table 3 is mostly a Christian-Muslim gap. In summary, the results in Table 8 show that focusing the sample to Christians and Muslims does not significantly alter the results shown in the previous section.

VIII. Conclusion

This paper investigates the extent of Muslim and non-Muslim gap in education progression using a longitudinal dataset from Indonesia. Among males, a Muslim faces a significantly lower chance of enrolling at the senior secondary and tertiary levels, with the gap widest at post-secondary enrolment. Among females, a statistically significant Muslim gap is only found at senior secondary enrolment, while the gap at college enrolment is substantial but imprecisely measured.

I find that controlling for two main sets of covariates—scholastic ability and parental education—removes a large share and the statistical significance of the gap at senior secondary enrolment. After holding the above covariates constant, equalising household characteristics, including per capita expenditures, and access to schools largely has only an indirect effect on narrowing the religion gap, through their positive influence on scholastic ability.

I find similar conclusions with regards to the college enrolment gap faced by Muslim females compared to non-Muslim females. Muslim males, however, face a persistently large negative gap compared to non-Muslim males. While the gap is only imprecisely measured after I equalise every factor that could potentially cause the gap, it remains large. It appears the main cause of this gap is the lower wage returns of tertiary education faced by Muslims compared to non-Muslims.

With the findings in this paper, it appears long-term investments in human capital is more important than providing short-term relieve for credit constraints in ensuring that Muslim children progress through secondary level education. Although a significant part of an individual's scholastic ability is determined by factors within the household, there is still scope for a government intervention. As an example, by improving the quality of primary education, a child with a certain level of household investment in human capital would accrue a higher scholastic ability. Given the strong intergenerational relationship in education attainment, it

is possible that sufficient investment in improving the quality of education could close the Muslim gap in education attainment in the long-term.

Endnotes

1. In contrast, Noland (2005) and Pryor (2007) do not find any strong relationship between share of Muslim population and economic indicators. In the former study, some of the coefficients are positive although only one is statistically significant. Meanwhile, the coefficients in the latter study are negative. Young (2009) finds that the results of McCleary and Barro (2004) are not robust to different specifications and Sala-i-Martin, Doppelhofer, and Miller (2004) find a positive effect of Islam on economic growth.
2. Glewwe and Jacoby (1994) use Ghanaian data and find that Muslims continue to have a significantly lower education level even after controlling for other covariates, including inherent ability and parental education. Meanwhile, Borooah and Iyer (2005) uncover a substantial gap in school enrolment rates between Hindu and Muslim children in India. In addition, they find that the gap between Hindus and Muslims is greater than the observed differences in economic positions between the two groups. Pryor (2007), meanwhile, uses cross-country data and finds lower female-male literacy ratio in countries with higher share of Muslim population. He does not attempt to investigate the causes.
3. To the best of my knowledge, the only study in developing countries that uses long-spanning panel dataset thus far is Lillard and Willis (1994).
4. While Indonesia is home to many religions, the fact that two religions, Islam and Christianity, are followed by 95 per cent of the population prevents me from looking at how Islam compares to each religion. Hence, in the main analysis I categorise Christianity and all the other religions into “non-Muslim”, and in the robustness checks section I focus on the Muslim-Christian education gap.
5. The primary school national examination policy was removed in mid-2000. This change does not affect the cohort I am analysing.
6. In this paper, I do not make any differentiation to whether a child is enrolled in Madrasah or the secular system as Madrasah students also study the same subjects as secular school students and their diploma is accepted by the secular education system. In any case, Madrasah students only constitute a small share of total students. According to the National Socioeconomic Survey (*Susenas*), only 8.7 per cent of students were enrolled in Madrasah in 2007.

7. Abu Hamid Al-Ghazali (1058-1111) was one of the leading Islamic scholars that supported this view.
8. Another estimation strategy that could be undertaken is to estimate a sequential probit regression, assuming that the error terms in the decision to enrol in junior secondary and senior secondary schools are correlated. This is the strategy adopted by, among others, Lillard and Willis (1995) and Sawada and Lokshin (2009). The results in this paper remain qualitatively similar when estimated using this alternative strategy.
9. The results are not sensitive to changing the order of the variables. The estimates are done on a sample that has complete information on every explanatory variable.
10. Another explanation pertains to unobserved condition of the neighbourhood, which could be tied to peer effects (Haveman and Wolfe, 1995) or school quality (Hanushek, Lavy, and Hitomi, 2008). I do not have such information in the dataset. Conceptually, I could include district dummies to take these into account. Even if it works, however, I still would not be able to precisely pinpoint the cause of the gap. Hence, I decide to not pursue this avenue further.
11. In the dataset, Muslims make up 87.6 per cent of the religion, followed by Christians (7.3 per cent), Hindus (3.6 per cent), and others (1.5 per cent).

References

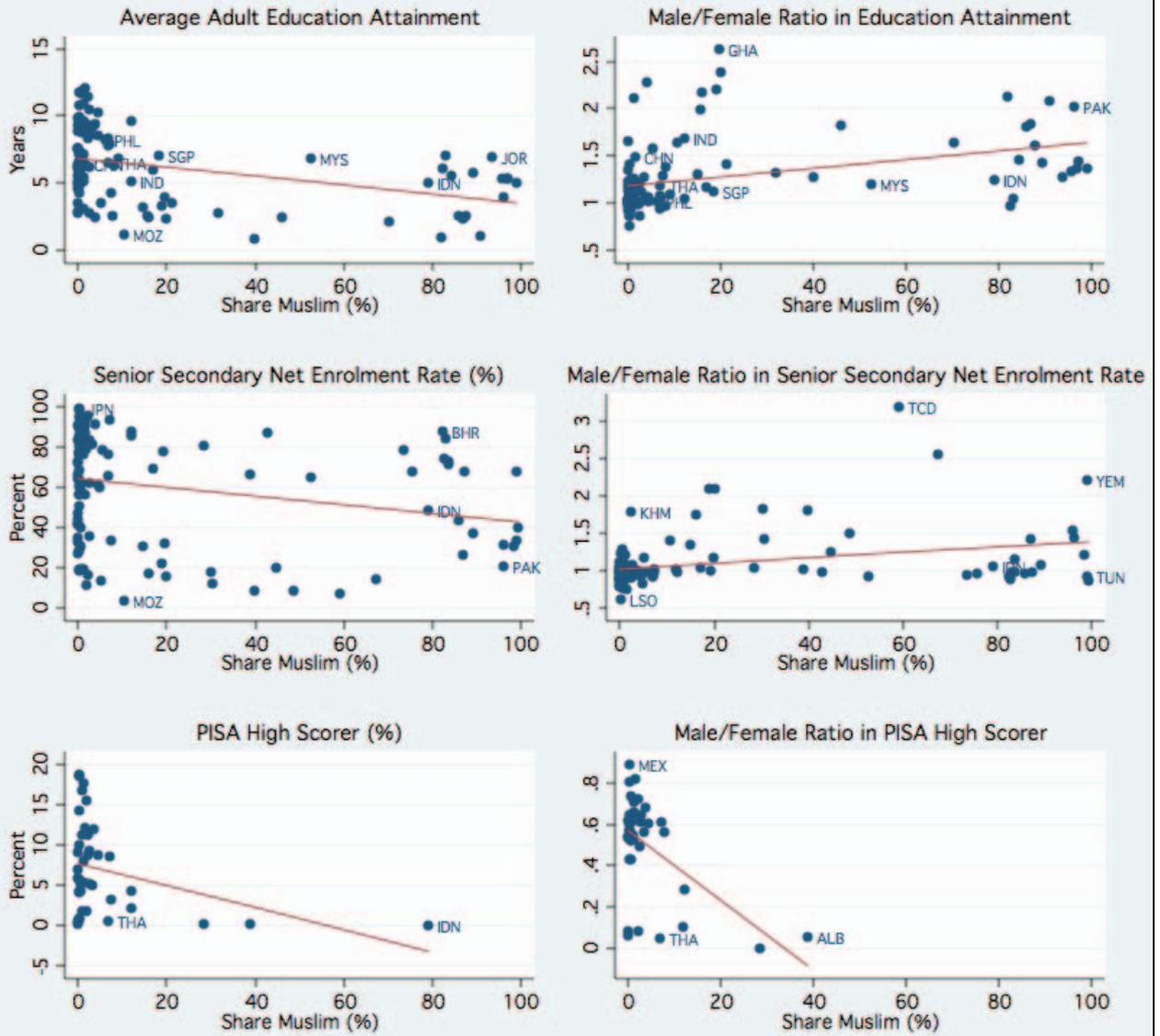
- al-Taftazani, A. (1986) Islamic Education: Its Principles and Aims. *Muslim Education Quarterly*, 4(1), pp. 66-74.
- Barrett, D.B., Kurian, G.T., and Johnson, T.M. (2001) *World Christian Encyclopaedia: A Comparative Survey of Churches and Religions in the Modern World*. 2nd edition. (New York: Oxford University Press).
- Barro, R.J. (1999) Determinants of Democracy. *Journal of Political Economy*, 107(6), pp. S158-S183.
- Becker, G.S. and Lewis, H.G. (1973) On the Interaction between the Quantity and Quality of Children. *Journal of Political Economy*, 81(2), pp. S279-S288.
- Becker, S.O. and Woessmann, L. (2009) Was Weber Wrong? A Human Capital Theory of Protestant Economic History. *Quarterly Journal of Economics*, 124(2), pp. 531-596.
- Borjas, G. (1992) Ethnic Capital and Intergenerational Mobility. *Quarterly Journal of Economics*, 107(1), pp. 123-150.

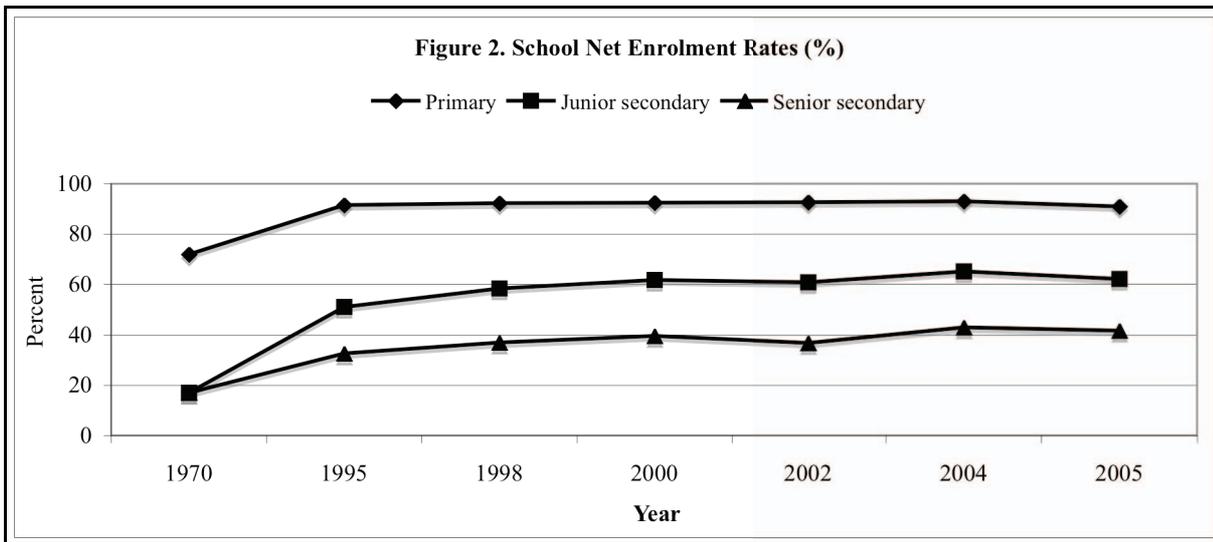
- Borooah, V.K. and Iyer, S. (2005) Vidya, Veda, and Varna: The influence of religion and caste on education in rural India. *Journal of Development Studies*, 41(8), pp. 1369-1404.
- Cameron, S.V. and Heckman, J.J. (2001) The Dynamics of Educational Attainment for Black, Hispanic, and White Males. *Journal of Political Economy*. 109(3), pp. 455-499.
- Chiswick, B.R. (1983) The Earnings and Human Capital of American Jews. *Journal of Human Resources*, 18(3), pp. 313-336.
- Chiswick, B.R. (1988) Differences in Education and Earnings across Racial and Ethnic Groups: Tastes, Discrimination, and Investments in Child Quality. *Quarterly Journal of Economics*, 103(3), pp. 571-597.
- Clague, C., Gleason, S. and Knack, S. (2001) Determinants of Lasting Democracy in Poor Countries: Culture, Development, and Institutions. *Annals of the American Academy of Political and Social Sciences*, 573(1), pp. 16-41.
- De Tray, D.N. (1973) Child Quality and the Demand for Children. *Journal of Political Economy*, 81(2), pp. S70-S95.
- Easterly, W., Ritzen, J. and Woolcock, M. (2006) Social Cohesion, Institutions, and Growth. *Economics and Politics*, 18(2), pp. 103-120.
- Gang, I.N. and Zimmermann, K.F. (2000) Is Child Like Parent? Educational Attainment and Ethnic Origin. *Journal of Human Resources*, 35(3), pp. 550-569.
- Glewwe, P. and Jacoby, H. (1994) Student Achievement and Schooling Choice in Low-Income Countries: Evidence from Ghana. *Journal of Human Resources*, 29(3), pp. 843-864.
- Government of Indonesia. (1998) *Petunjuk Pelaksanaan Wajib Belajar Pendidikan Dasar Sembilan Tahun [Implementation of Compulsory Nine-year Basic Education Guidebook]*. (Jakarta: Ministry of National Education).
- Halstead, M. (1995) Towards a Unified View of Islamic Education. *Islam and Christian-Muslim Relations*, 6(1), pp. 25-43.
- Halstead, M. (2004) An Islamic Concept of Education. *Comparative Education*, 40(4), pp. 517-529.
- Hanushek, E.A., Lavy, V. and Hitomi, K. (2008) Do Students Care about School Quality? Determinants of Dropout Behavior in Developing Countries. *Journal of Human Capital*, 2(1), pp. 69-105.

- Haveman, R. and Wolfe, B. (1995) The Determinants of Children's Attainments: A Review of Methods and Findings. *Journal of Economic Literature*, 33(4), pp. 1829-1878.
- Hill, M.A. and O'Neill, J. (1994) Family Endowments and the Achievement of Young Children with Special Reference to the Underclass. *Journal of Human Resources*, 29(4), pp. 1064-1100.
- Hillman, A. (2007) Economic and Security Consequences of Supreme Values. *Public Choice*, 131(3-4), pp. 259-280.
- Kirdar, M.G. (2009) Explaining Ethnic Disparities in School Enrollment in Turkey. *Economic Development and Cultural Change*, 57(2), pp. 297-333.
- Kuran, T. (2003) The Islamic Commercial Crisis: Institutional Roots of Economic Underdevelopment in the Middle East. *Journal of Economic History*, 63(2), pp. 414-446.
- Kuran, T. (2004) Why the Middle East is Economically Underdeveloped: Historical Mechanisms of Institutional Stagnation. *Journal of Economic Perspectives*, 18(3), pp. 71-90.
- Lillard, L.A. and Willis, R.J. (1994) Intergenerational Educational Mobility: Effects of Family and State in Malaysia. *Journal of Human Resources*, 29(4), pp. 1126-1166.
- McCleary, R.M. and Barro, R.J. (2004) Religion and Economy. *Journal of Economic Perspectives*, 20(2), pp. 49-72.
- Noland, M. (2005) Religion and Economic Performance. *World Development*, 33(8), pp. 1215-1232.
- Nordblom, K. (2003) Is increased public schooling really a policy for equality? The role of within-the-family education. *Journal of Public Economics*, 87(9-10), pp. 1943-1965.
- Platteau, J. (2008) Religion, Politics, and Development: Lessons from the Land of Islam. *Journal of Economic Behavior and Organization*, 68(2), pp. 329-351.
- Pradhan, M. (1998) Enrolment and Delayed Enrolment of Secondary School Age Children in Indonesia. *Oxford Bulletin of Economics and Statistics*, 60(4), pp. 413-430.
- Pryor, F.L. (2007) The Economic Impact of Islam on Developing Countries. *World Development*, 35(11), pp. 1815-1835.
- Sala-i-Martin, X., Doppelhofer, G. and Miller, R.I. (2004) Determinants of Long-Term Growth: A Bayesian Averaging of Classical Estimates (BACE) Approach. *American Economic Review*, 94(3), pp. 813-835.
- Sawada, Y. and Lokshin, M. (2009) Obstacles to school progression in rural Pakistan: An analysis of gender and sibling rivalry using field survey data. *Journal of Development Economics*, 88(2), pp. 335-347.

- Sparrow, R. (2007) Protecting Education for the Poor in Times of Crisis: An Evaluation of a School Programme in Indonesia. *Oxford Bulletin of Economics and Statistics*, 69(1), pp. 99-122.
- Strauss, J., Witoelar, F., Sikoki, B. and Wattie, A.M. (2009) The Fourth Wave of the Indonesia Family Life Survey: Overview and Field Report Volume 1. RAND Labor and Population Working Paper WR-675/1-NIA/NICHD. RAND Corporation.
- World Bank. (2007) *Investing in Indonesia's Education: Allocation, Equity, and Efficiency of Public Expenditures*. (Jakarta: World Bank).
- Young, C. (2009) Model Uncertainty in Sociological Research: An Application to Religion and Economic Growth. *American Sociological Review*, 74(3), pp. 380-397.

Figure 1. Education Outcomes and Muslim Intensity





Data source: World Bank (2007)

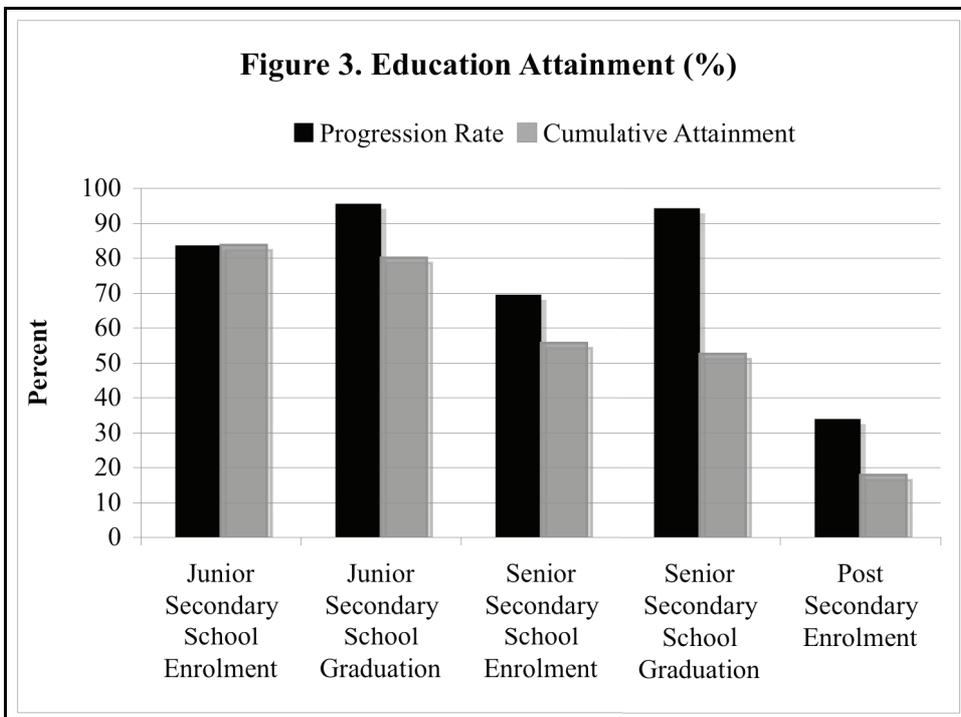


Figure 4. Muslim Gap in Education Progression

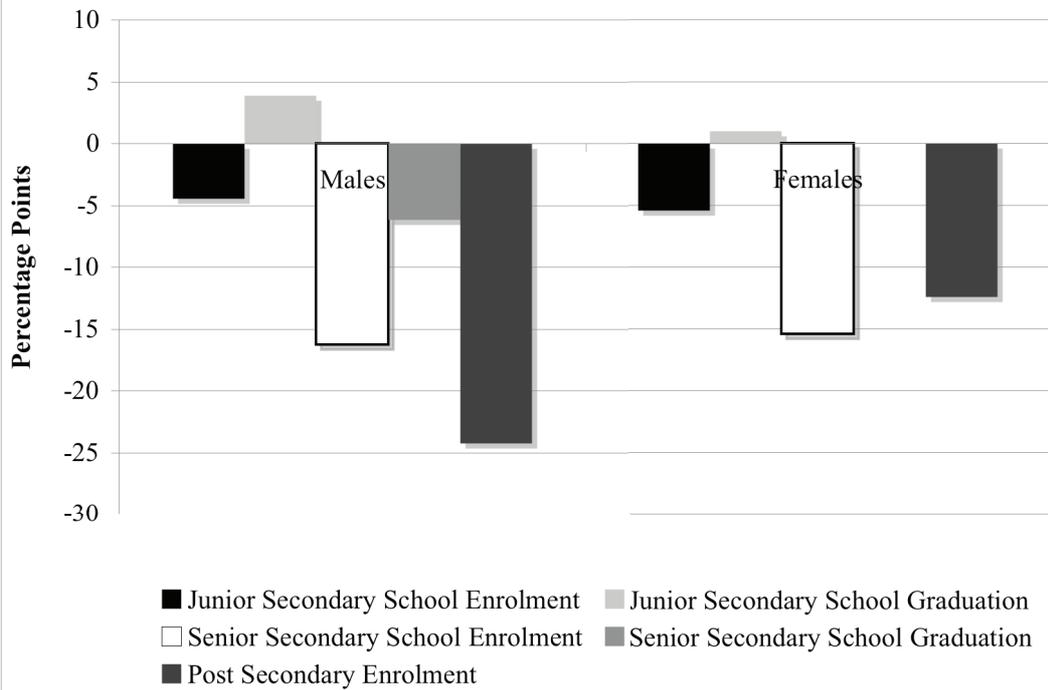


Table 1. Means of variables

		Senior Secondary School Enrolment	Post Secondary Enrolment
<i>Dependent variable</i>			
	$S_t=1 S_{t-1}=1$	0.70	0.34
<i>Individual characteristics</i>			
	Female	0.52	0.51
	Muslim	0.91	0.88
	Standardised scholastic ability	0.04	0.23
<i>Junior secondary school experience</i>			
	Working (=1)	0.07	
	Attended public school (=1)	0.66	
	Number of grade repetition	0.00	
<i>Senior secondary school experience</i>			
	Working (=1)		0.07
	Attended public school (=1)		0.38
	Number of grade repetition		0.00
<i>Parental and group education</i>			
	Father graduated from junior secondary school (=1)	0.39	0.51
	Father education missing (=1)	0.04	0.03
	Share of male Muslims graduated from JSS in parents' generation ^a	0.32	0.36
	Share of male non-Muslims graduated from JSS in parent's generation ^a	0.71	0.72
	Mother graduated from junior secondary school (=1)	0.26	0.36
	Mother education missing (=1)	0.02	0.02
	Share of female Muslims graduated from JSS in parents' generation ^a	0.22	0.25
	Share of female non-Muslims graduated from JSS in parents' generation ^a	0.62	0.62
<i>Household condition</i>			
	Household size in 1997	5.86	
	Number of female children in 1997 ^b	0.74	
	Number of male children in 1997 ^b	0.73	
	Log of per capita household expenditure in 1997	11.19	
	Own the house in 1997 (=1)	0.86	
	Household size in 2000	5.96	5.97
	Number of female children in 2000 ^b	0.54	0.50
	Number of male children in 2000 ^b	0.59	0.56
	Log of per capita household expenditure in 2000	11.84	11.94
	Own the house in 2000 (=1)	0.80	0.79
<i>Access to school in 1993</i>			
	Number JSS in district	104.15	102.10
	Share private JSS in district	0.54	0.54
	Number SSS in district	63.69	65.98
	Share private SSS in district	0.69	0.69
<i>Community Conditions</i>			
	Share of villages in district with a permanent market	0.19	0.21
	Share of villages in district with mainly asphalt road	0.40	0.45
	Share of villages in district with electricity	0.89	0.90
	District unemployment rate 1993	0.03	0.03
	District unemployment rate 1997	0.05	
	District unemployment rate 2000	0.07	0.07

Notes: ^athe share is calculated at the provincial/urban-rural level; ^bdoes not include the relevant individual; figures are weighted

Table 2. Mean Endowment Gap between Muslims and Non-Muslims in Indonesia

	Males (1)	Females (2)
Standardised scholastic ability	-0.446***	-0.253
Father graduated from junior secondary level (=1)	-0.613***	-0.550***
Mother graduated from junior secondary level (=1)	-0.639***	-0.275**
Log of per capita household expenditure in 1993	-0.080	-0.123
Log of per capita household expenditure in 1997	-0.196	-0.008
Log of per capita household expenditure in 2000	-0.073	-0.170

Notes: ** significant at 5%, *** significant at 1%; negative values indicates worse endowment for Muslims

Table 3. Religion Education Progression Gap among Males

	Senior Secondary School Enrolment Conditional on Junior Secondary Graduation (1)	Senior Secondary School Graduation Conditional on Senior Secondary Enrolment (2)	Post Secondary Enrolment Conditional on Senior Secondary Graduation (3)
Non-Muslim progression rate	0.827	0.970	0.454
Raw Muslim gap	-0.162**	-0.061**	-0.242***
Controlling scholastic ability	-0.125	-0.061**	-0.180***
+ Controlling parental and group education	-0.027	#	-0.134
+ Controlling household condition	0.001	#	-0.166**
+ Controlling school experience	0.009	#	-0.177***
+ Controlling school access	0.011	#	-0.142**
+ Controlling community condition	0.021	#	-0.113
N	439	422	342

Notes: ** significant at 5%, *** significant at 1%; figures are average marginal effects; full estimation results are available upon request. # indicates that there is no variance within the religion groups with regards to the dependent variable.

Table 4. Returns to Post-secondary Education among Muslim and Non-Muslim Males

	Labour force participation		Employment LFP				Job type			
	Muslims	Non-Muslims	Muslims	Non-Muslims	Self employed	Muslims	Casual	Self employed	Non-Muslims	Casual
Post-secondary	-0.189*** (0.018)	-0.207*** (0.043)	0.009 (0.021)	0.077** (0.031)	0.012 (0.027)	-0.003 (0.034)	-0.009 (0.029)	0.044 (0.080)	-0.021 (0.082)	-0.023 (0.069)
N	3185	500	2017	284		1765			243	
Occupation sector						Log (hourly wage)				
	Agriculture	Muslims Industry	Services	Agriculture	Non-Muslims Industry	Services	Muslims	Non-Muslims		
Post-secondary	-0.040 (0.026)	-0.080*** (0.029)	0.119*** (0.033)	-0.014 (0.069)	0.070 (0.074)	-0.056 (0.077)	0.407*** (0.069)	0.826*** (0.178)		
N		1751			236		1310	174		

Notes: ** significant at 5%, *** significant at 1%; sample limited to those with at least a senior secondary degree; all estimations use robust standard errors; results are average marginal effects; statistical significance are calculated from the estimation results, not marginal effects; all estimations include age and age squared, scholastic ability, urban dummy, and wave dummies; estimations in LFP and Employment|LFP use probit, Job type and Occupation sector use multinomial logit, and Wage uses OLS.

Table 5. Religion Education Gap among Females

	Senior Secondary School Enrolment Conditional on Junior Secondary Graduation (1)	Senior Secondary School Graduation Conditional on Senior Secondary Enrolment (2)	Post Secondary Enrolment Conditional on Senior Secondary Graduation (3)
Non-Muslim progression rate	0.835	0.991	0.461
Raw Muslim gap	-0.154**	#	-0.124
Controlling scholastic ability	-0.125	#	-0.101
+ Controlling parental and group education	-0.066	#	-0.015
+ Controlling household condition	-0.052	#	-0.005
+ Controlling school experience	-0.051	#	-0.021
+ Controlling school access	-0.056	#	-0.006
+ Controlling community condition	-0.105	#	0.012
N	505	N/A	381

Notes: ** significant at 5%, *** significant at 1%; figures are average marginal effects of the Muslim coefficient; full estimation results are available upon request. # indicates that there is no variance within the religion groups with regards to the dependent variable.

Table 6. Sample Movement in 1997 and 2000 (%)

	1997	2000
Stayed in the same subdistrict	97.1	84.5
Stayed in the same province	2.3	10.2
Moved to other province	0.6	5.3

Notes: figures are column percentages.

Table 7. Religion and Gender Gap, with movement controls

	<u>Females</u>		<u>Males</u>	
	Senior Secondary School Enrolment Conditional on Junior Secondary Graduation (1)	Post Secondary Enrolment Conditional on Senior Secondary Graduation (2)	Senior Secondary School Enrolment Conditional on Junior Secondary Graduation (3)	Post Secondary Enrolment Conditional on Senior Secondary Graduation (4)
Muslim gap with movement controls	-0.168	-0.148	-0.148	-0.265***
Controlling scholastic ability	-0.144	-0.119	-0.108	-0.198**
+ Controlling parental and group education	-0.128	-0.032	0.012	-0.159
+ Controlling household condition	-0.123	-0.013	0.037	-0.185**
+ Controlling school experience	-0.119	-0.027	0.037	-0.201**
+ Controlling school access	-0.134	-0.003	0.015	-0.163**
+ Controlling community condition	-0.186	0.020	0.017	-0.161
N	375	297	335	249

Notes: ** significant at 5%, *** significant at 1%; figures are average marginal effects; a negative coefficient means that Muslims have a lower progression rate.

Table 8. Muslim - Christian Gap in Education Progression

	<u>Females</u>		<u>Males</u>	
	Senior Secondary School Enrolment Conditional on Junior Secondary Graduation (1)	Post Secondary Enrolment Conditional on Senior Secondary Graduation (2)	Senior Secondary School Enrolment Conditional on Junior Secondary Graduation (3)	Post Secondary Enrolment Conditional on Senior Secondary Graduation (4)
Raw Muslim gap	-0.198**	-0.189	-0.183	-0.265***
Controlling scholastic ability	-0.149	-0.134	-0.130	-0.185**
+ Controlling parental and group education	-0.051	-0.033	-0.005	-0.128
+ Controlling household condition	-0.037	-0.032	0.032	-0.161**
+ Controlling school experience	-0.033	-0.048	0.040	-0.173**
+ Controlling school access	-0.030	-0.050	0.025	-0.134
+ Controlling community condition	-0.048	-0.031	0.037	-0.134
N	484	363	420	322

Notes: ** significant at 5%, *** significant at 1%; figures are average marginal effects; # indicates that there is no variance within the religion groups with regards to the dependent variable; a negative coefficient means that Muslims have a lower progression rate.

Appendix 1. Cross-Country Correlation between Share Muslim Population and Education Outcomes
(Mean Share Muslim = 22%)

Panel A	Average Years of Education among Adults		Male/Female Ratio in Average Years of Education among Adults	
Share muslim	-0.018** (0.006)	-0.013 (0.006)	0.004** (0.001)	0.003 (0.001)
GDP per capita in thousand	0.190*** (0.018)	0.184*** (0.020)	-0.012*** (0.003)	-0.010** (0.004)
Polity 2 Index		0.061 (0.038)		-0.009 (0.007)
Constant	5.151*** (0.266)	4.806*** (0.334)	1.297*** (0.051)	1.343*** (0.064)
Sample size	102	99	100	97
R-squared	0.605	0.619	0.247	0.256
Panel B	Secondary Net Enrolment Rate (%)		Male/Female Ratio in Secondary Net Enrolment Rate	
Share muslim	-0.103 (0.071)	0.107 (0.091)	0.003** (0.001)	0.003 (0.002)
GDP per capita in thousand	1.560*** (0.218)	1.496*** (0.247)	-0.006+ (0.003)	-0.006 (0.004)
Polity 2 Index		1.703*** (0.490)		-0.006 (0.009)
Constant	50.348*** (3.169)	38.862*** (4.150)	1.073*** (0.050)	1.127*** (0.074)
Sample size	108	92	106	90
R-squared	0.366	0.474	0.123	0.142
Panel C	PISA:Students at the highest level of proficiency on the reading scale (%)		Male/Female Ratio in PISA: Students at the highest level of proficiency on the reading scale	
Share muslim	-0.071 (0.056)	-0.006 (0.056)	-0.013** (0.004)	-0.010 (0.005)
GDP per capita in thousand	0.233*** (0.063)	0.240** (0.078)	0.007 (0.003)	0.006 (0.004)
Polity 2 Index		1.203 (0.696)		0.041 (0.035)
Constant	3.572 (1.397)	-7.372 (5.820)	0.441*** (0.060)	0.083 (0.299)
Sample size	39	37	38	36
R-squared	0.367	0.562	0.416	0.469

Notes: ** 5% significance, *** 1% significance; standard errors in parentheses; all estimations have homoskedastic residuals; All data is for 2000; the share of Muslim population in each country is copied from Barrett, Kurian, and Johnson (2001) in percent; GDP per capita is in 2000 US\$; Polity 2 Index range from -10 (Institutional Autocracy) to +10 (Institutional Democracy); gender gap is the ratio of male to female attainment.