

Financing Higher Education in Indonesia: Assessing the Feasibility of an Income-Contingent Loan System



Elza Elmira

Daniel Suryadarma

SMERU WORKING PAPER

**Financing Higher Education in Indonesia:
Assessing the Feasibility of an Income-Contingent
Loan System**

Elza Elmira

Daniel Suryadarma

Editor:

Budhi Adrianto

The SMERU Research Institute

December 2018

The SMERU Research Institute Cataloging-in-Publication Data

Elmira, Elza and Daniel Suryadarma

SMERU Working Paper: Financing Higher Education in Indonesia: Assessing the Feasibility of an Income-Contingent Loan System.
/ Written by Elmira, Elza and Daniel Suryadarma

v, 15 p ; 29 cm.

ISBN 978-602-7901-48-3 (print)

ISBN 978-602-7901-49-0 (web)

1. Financing higher. 2. Loan system. I. Title

370.7 –ddc23



This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

SMERU's content may be copied or distributed for noncommercial use provided that it is appropriately attributed to The SMERU Research Institute. In the absence of institutional arrangements, PDF formats of SMERU's publications may not be uploaded online and online content may only be published via a link to SMERU's website.

The findings, views, and interpretations published in this report are those of the authors and should not be attributed to any of the agencies providing financial support to The SMERU Research Institute.

For further information on SMERU's publications, please contact us on 62-21-31936336 (phone), 62-21-31930850 (fax), or smeru@smeru.or.id (e-mail); or visit www.smeru.or.id.

Cover photo: Tony Liong

ACKNOWLEDGEMENTS

We are grateful to Asep Suryahadi as the director of The SMERU Research Institute for providing comments in the revision of the paper. We thank the participants of seminars at the Indonesian Regional Science Association 2017 for their comments on earlier versions of this paper. The authors are grateful to Bruce Chapman for his helpful comments in developing the paper. They are also grateful to The SMERU Research Institute for providing the data used in this paper and especially the editorial team for providing helpful support during the writing process of the paper. The authors alone are responsible for errors and omissions.

ABSTRACT

Financing Higher Education in Indonesia: Assessing the Feasibility of an Income-Contingent Loan System

Elza Elmira and Daniel Suryadarma

This paper examines the feasibility of an income-contingent loan (ICL) system to finance higher education in Indonesia. Using graduates' income data from the 2015 National Labor Force Survey (Sakernas), we model the life-cycle income distribution of university graduates using unconditional quantile regression. We use these estimates to simulate different income-contingent loan schemes to observe the effect on the amount of repayment, length of repayment, government subsidy, and repayment burden of males and females in different quintiles of income. We utilize three loan schemes: without real interest, with 25% surcharge of the total loan, and with 2% real interest. Implicit government subsidy is lowest with the 25% surcharge scheme. Therefore, increasing the repayment burden by 2 percentage points to 10%, still within the range of acceptable burden, could reduce repayment duration by 3–4 years and reduce government's implicit subsidy. Result shows that ICL with lower repayment burden is feasible in Indonesia and can increase access to higher education. However, the scheme requires a certain level of capacity among tax authorities, as the repayment needs to be administered through the tax system. The government also needs to develop strategies to reach graduates who choose to work in the informal sector.

Keywords: income-contingent loan, ICL, student loan, repayment burden, higher education financing, Indonesia

TABLE OF CONTENTS

ACKNOWLEDGEMENTS	i
ABSTRACT	ii
TABLE OF CONTENTS	iii
LIST OF FIGURES	iv
LIST OF ABBREVIATIONS	v
I. INTRODUCTION	1
II. HIGHER EDUCATION FUNDING AND POLICY IN INDONESIA	2
III. THE CONCEPT OF REPAYMENT BURDEN	3
IV. A HYPOTHETICAL STUDENT LOAN SCHEME: MORTGAGE-TYPE LOAN	3
V. THE CONCEPT OF INCOME-CONTINGENT LOAN	5
VI. A HYPOTHETICAL STUDENT LOAN SCHEME: INCOME-CONTINGENT LOAN	6
VII. MODELING THE AGE-EARNINGS PROFILES OF UNIVERSITY GRADUATES IN INDONESIA	7
7.1 Data	7
7.2 Methodology	7
VIII. RESULTS	8
IX. DISCUSSION AND CONCLUSION	12
LIST OF REFERENCES	14

LIST OF FIGURES

Figure 1. Loan repayment burdens of mortgage-type loans	4
Figure 2. Life-cycle predicted annual income distribution for males and females in the 25 th , 50 th , and 75 th quintiles of income	8
Figure 3. Income-contingent loan repayment patterns for male employees among three quintiles of income distribution (Q25, Q50, and Q75) for different repayment schemes (using 8% and 10% repayment burdens)	9
Figure 4. Income-contingent loan repayment patterns for female employees among three quintiles of income distribution (Q25, Q50, and Q75) for different repayment schemes (using 8% and 10% repayment burdens)	11

LIST OF ABBREVIATIONS

GDP	gross domestic product
ICL	income-contingent loan
Kemenristekdikti	Ministry of Research, Technology, and Higher Education of the Republic of Indonesia
RB	repayment burden
Sakernas	National Labor Force Survey
Susenas	National Socioeconomic Survey

I. INTRODUCTION

Higher education in Indonesia is mostly funded by private fees (e.g., tuition and other fees and levies). The contribution of private fees constitute three-quarters of the total spending of tertiary education (World Bank, 2010). Public expenditure for tertiary education in Indonesia—at 0.3% of its gross domestic product (GDP)—is the third lowest in East Asia, only higher than those of Laos and Cambodia (Hill and Thee, 2013). Meanwhile, financial aid provided by universities only cover 3% of the total cost, while coverage from government scholarships is limited (World Bank, 2010). This has resulted in low tertiary education enrollment. The gross enrollment rate at tertiary level was only 26.3% in 2010 (Hill and Thee, 2013).

To increase access to higher education, students need support from a better government financing policy. An alternative is to create a student loan system. Generally, there are two types of student loan systems. The first type is a mortgage-type loan for which the repayment period is already set. This type of loan usually entails a high repayment burden, especially among those with lower incomes; therefore, it increases the risk of default. The second type is an income-contingent loan (ICL) system, for which debtors start repaying after their income reaches a certain threshold. Therefore, the length of repayment is not fixed upfront. This is a scheme practiced in many countries, such as Australia, Sweden, England, and Germany.

In this paper, we simulate the pattern and implementation of income-contingent loan schemes in terms of affordability, feasibility, duration, and necessary policies. We also compare the performance of ICL with a mortgage-type loan simulation conducted by Chapman and Suryadarma (2013).

We find the following. First, ICL with a lower repayment burden can reduce or even eliminate default associated with mortgage-type loans. Second, the government should expect to provide subsidies for student loans, with the amount dependent on the type of ICL scheme implemented. In this study, implementing a 25% surcharge results in a smaller implicit subsidy, although the repayment period is longer than in schemes using a zero real interest rate or a 2% interest rate and no surcharge. Third, females, especially those in the 25th quintile (Q25) of income, start paying off their debt later than males and have a higher implicit subsidy than males. This result shows that females experience slower income increases than males and need higher subsidies from the government to be able to repay their loans.

We organize the rest of the paper as follows. The next section discusses several issues of the higher education financing system and policy context. In the subsequent three sections, we discuss the conceptual and empirical issues associated with repayment burden before elaborating further on the concept of two different hypothetical student loan schemes: one using a mortgage-type loan and the other ICL. Afterwards, we explain the econometric approach taken to model income distribution of fresh graduates in Indonesia. These estimates are then used to examine the effects of a simulated ICL in terms of the time spent to repay loans and the implicit burden on the government, using different models of ICL. Finally, we discuss the results and conclude.

II. HIGHER EDUCATION FUNDING AND POLICY IN INDONESIA

Currently, around 10 million people in the Indonesian labor force have a university degree. In comparison, 32 million have primary-level (six years) education, 22 million have nine years of education, and 34 million are senior secondary level graduates (Kemenristekdikti¹, 2016). According to Hill and Thee (2013), the gross tertiary education enrollment rate was 26% in 2010, implying that an increase in the proportion of tertiary-educated individuals in the Indonesian labor force will not happen in the short term.

The current higher education funding scheme, which is dependent on students paying the full costs, significantly limits the chances for those coming from lower-income families. Based on the welfare levels, 55% of tertiary-educated students come from the top income quintile (the richest 20%), 24% from the fourth quintile, and only 2.6% from the bottom (Hill and Thee, 2013). People from poor families are extremely underrepresented in universities. Even with the government and universities providing financial aid for lower-income students, only a small portion of these students (less than 20%) fulfill the merit-based selection criteria to access scholarships (Hill and Thee, 2013). Furthermore, such financial aid falls short of the initial target of covering 33% of the total cost of education, to only covering one-eleventh of it (Wicaksono and Friawan, 2006).

The government, financial institutions, and philanthropic institutions have previously attempted to implement a student loan system for higher education. None of the programs developed under this system have been successful. Wicaksono and Friawan (2006) state that the default rate was reported to reach 95%, and programs suffered from poor administration and failure in monitoring and tracing graduates. Most banks consider student loans a high-risk business and are reluctant to be involved. The Sampoerna Foundation redesigned student loans with the involvement of the International Finance Corporation and Bank Internasional Indonesia; however, only 15 students have received the loan since the scheme was established (Wicaksono and Friawan, 2006). Therefore, at the moment, there is no student loan scheme that is widely accessible to all those wishing to pursue higher education in Indonesia.

The tertiary education system has several characteristics that must be considered in a student loan design (Doris and Chapman, 2016). They also apply to the Indonesian context. First, the quality of tertiary education in Indonesia, with only 55% of higher education institutions receiving government accreditation, is still relatively low (Kemenristekdikti, 2016). This implies that the returns of tertiary education may not be high enough to enable the graduates to pay back their loans. Second, students who drop out may not be able to repay any of their outstanding loans. Third, the value of degree investment changes, making the calculation of potential returns to a particular degree very difficult. These characteristics pose risks that may deter prospective students. This is why in most countries, the government covers these risks.

In the next section, we provide a discussion of repayment burden, a central concept in a student loan system. Then, we continue with discussing two types of student loan design.

¹Ministry of Research, Technology, and Higher Education of the Republic of Indonesia.

III. THE CONCEPT OF REPAYMENT BURDEN

Loan repayment burden (RB) is defined as the proportion of income required to service a loan. Therefore, the RB in period t is:

$$\text{Repayment burden}_t = \frac{\text{Loan repayment}_t}{\text{Earnings}_t} \quad (1)^2$$

The equation shows that repayment burden increases with higher loan amount or lower earnings. As the RB increases, the probability of default also increases. Shen and Ziderman (2009) show that RB of around 8% is still feasible. A study examining factors leading to student loan default indicates that debtors report hardship when RB exceeds 8%, inability to manage the debt when RB reaches 11%, and default on the loan when RB is at 20% (Gross et al., 2009).

IV. A HYPOTHETICAL STUDENT LOAN SCHEME: MORTGAGE-TYPE LOAN

In this section, we provide a summary of a study by Chapman and Suryadarma (2013), who conducted a simulation of RBs for a mortgage-type loan. This is the type of student loan system that is most often used, including in the United States, Canada, the Philippines, and Thailand. Basically, loan repayments are made in pre-determined amounts over a given time period.

Cross-country comparison of RBs shows that mortgage-type loans usually have RBs that exceed the ideal rate of 8%. As an example, low-earner graduates in Vietnam face an RB of up to 85% of their annual income (Chapman and Liu, 2013), while in Thailand, it reaches 30% (Chapman et al., 2010). The experience in developed countries is not much different. In the United States, the RB goes as high as 60% of income and in Germany, female borrowers in the lowest quintile are prone to living under poverty due to loan repayment (Chapman and Sinning, 2014). With such a high RB, it is highly likely that many of the borrowers will end up defaulting.

To simulate the RB of a mortgage-type loan in Indonesia, Chapman and Suryadarma's (2013) hypothetical loan scheme has the following features:

First, the loan covers both education costs (tuition and other associated costs) and living expenses (assumed to be of the same amount as the education costs) for four years. Second, the loan repayment starts after the student graduates from university, with a one-year grace period. In this paper, we assume that individuals enroll in universities at age 18 and graduate at age 21. Therefore, the repayment starts when the individual is 23. Third, the loan must be fully repaid within 10 years.

In addition, we assume that the loan carries a nominal interest rate of 8% and an annual inflation rate of 5% in the economy. The real interest rate of 3% and the ten-year repayment period are similar to those used in the US and Canada.

²This theory is explained in detail by Doris and Chapman (2016).

Using data from the 2006 National Socioeconomic Survey (Susenas), Chapman and Suryadarma (2013) discover that the RB for graduates working in Java ranges from 20% for those earning in the 75th percentile to 50% for those earning in the 25th percentile. Using the 8% threshold discussed in the previous section, loans would have a very high default risk for graduates in the 25th and 50th percentiles of earnings, as well as those earning in the 75th percentile, except for the last few years of the repayment schedule.

The authors also simulate the RBs for graduates in Sumatra as well as for male and female workers separately. Figure 1, reproduced from Chapman and Suryadarma's (2013) paper, shows the results.

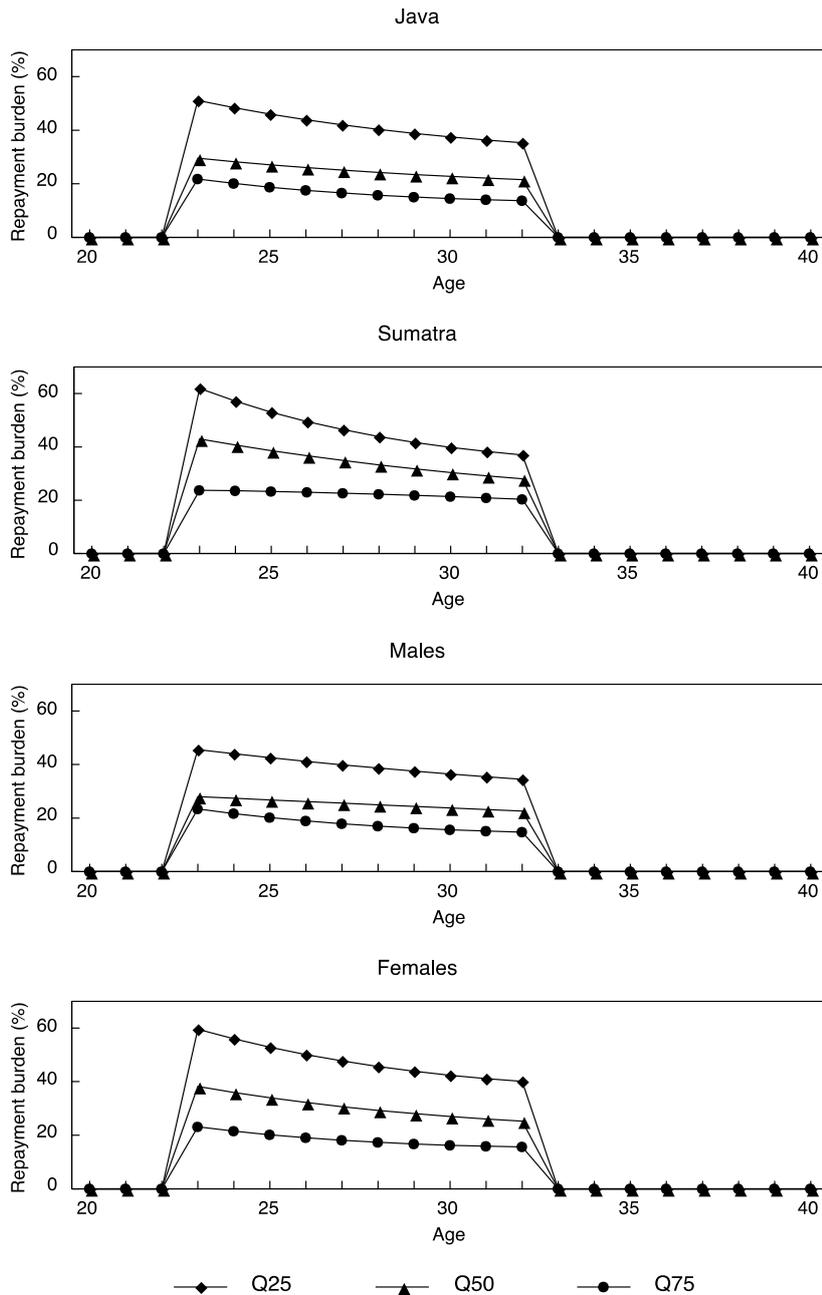


Figure 1. Loan repayment burdens of mortgage-type loans

Source: Chapman and Suryadarma, 2013.

To conclude, the authors found that the RBs for a mortgage-type loan system would be extremely high for the majority of Indonesian graduates and would also pose financial difficulties for the majority of borrowers. The prospects for default—and the adverse consequences for both students and the government—are clear. These conclusions indicate that a different loan type to finance higher education is needed. In the next section, we describe the ICL scheme.

V. THE CONCEPT OF INCOME-CONTINGENT LOAN

The significant feature that differentiates an ICL from a mortgage-type loan is that a predetermined income signals the start of paying off the debt. Debtors are expected to start paying off their loan once their income reaches a certain threshold, with the RB set at a relatively low proportion of the income. When income is low, the absolute amount of repayment is low and the repayment amount increases as income increases. This feature, which follows the age-earnings profile, will inevitably smooth the repayment process, enabling more people, including those coming from disadvantaged families, to participate in higher education (Migali, 2012).

Two major advantages of implementing ICL are default protection through government subsidies and guarantees, and consumption smoothing due to lower RB. Several developed countries applied a 25–30 year time limit on the life cycle of the loan repayment, meaning that when the time limit is exceeded, the loan will be written off. Australia is an exception, where there is no time limit for repayment. In Australia, the level of unpaid debt of those whose income is insufficient over the life cycle is around 15%–18% of the total debt. Doris and Chapman (2016), however, argue that this should not be considered as default but rather the cost and insurance of implementing ICL.

There are several important discussions on implementing ICL—the variance of scheme with respect to loan calculation, collection, and policy issues in the country. Among different countries, the major differences in the implementation of ICL lie in the interest rate and the amount of subsidy that the government is willing to provide. When governments do not charge the full cost of government borrowing (e.g., the interest rate that the government pays on government-issued bonds), essentially, it is subsidizing the loan. In addition, the cost of administering the loan, which could reach up to 3%–5% of the total loan, is often covered by the government. These types of subsidies are usually called implicit subsidies because even if the graduates repay the debt in full in real terms, the government is still subsidizing the loan to a certain extent. As a rule of thumb, the subsidy is smaller when the debt is fully repaid more quickly.

There are different subsidy schemes across the world. Australia sets a zero real interest rate. In contrast, Canada, the Czech Republic, Namibia, and the Netherlands provide almost no subsidy for the loan (Shen and Ziderman, 2009), that is, they charge the full cost of government borrowing, usually by setting a real interest rate that is equal to the cost of government borrowing.

Another way of addressing the interest rate issue is through setting a surcharge on the loan as soon as the student graduates. In addition, hybrid arrangements where surcharges are combined with a particular rate of interest are considered less regressive than most interest rate options (Chapman and Higgins, 2014).

Another important discussion is that ICL implementation highly depends on a country's policy scheme, especially a good taxation program that enables the government to access personal income data. Despite the weaknesses in Indonesia's current tax system (Arnold, 2012), the increased participation rate after tax amnesty (Hamilton-Hart and Schulze, 2016) indicates an improving taxation administrative system. The current improvement in tax administration is a cause for optimism for implementing ICLs.

VI. A HYPOTHETICAL STUDENT LOAN SCHEME: INCOME-CONTINGENT LOAN

The following are the characteristics of the ICL in this simulation:

- a) A total debt of Rp48,800,000 (US\$3,754), calculated from the average education expenditure of families in Java and Sumatra with children in university undertaking a four-year degree in Susenas 2015. The loan consists of a total tuition fee of Rp24,400,000 (US\$1,877) for a four-year degree and a living cost allowance that is assumed to be of the same amount.
- b) Repayment begins after the graduates reach a certain threshold of earnings. In our case, we used the median income of fresh graduates (22–24 years old) from Sakernas³ 2015, which is Rp16,800,000 (US\$1,292) per annum for male graduates and Rp12,000,000 (US\$923) per annum for female graduates. This ensures that half of the male and female graduates start repaying immediately.
- c) The repayment period is set at 25 years starting from the first year of repayment. After the 25-year period, any outstanding debt is written off.

We simulated three different schemes of ICL:

- a) A loan with a zero real interest rate;
- b) A loan with a 25% surcharge of the total loan, charged as soon as the graduate earns the degree, and a zero real interest rate; and
- c) A 2% real interest rate on the outstanding principal, starting immediately after graduation with a four-year degree. From an administrative point of view, this scheme is the most difficult to implement, as it requires calculating real interest rates.

In each scheme, we set RBs at three different levels: 5%, 8%, and 10%. We utilized these schemes to calculate repayment period and government subsidies for graduates in the 25th, 50th, and 75th percentiles of income.

³National Labor Force Survey.

VII. MODELING THE AGE-EARNINGS PROFILES OF UNIVERSITY GRADUATES IN INDONESIA

7.1 Data

Before calculating the repayment period and government subsidies, we modeled graduate age-earnings profile. Given our interest in various points of the earnings distribution, we used an unconditional quantile regression. The data was obtained from Sakernas 2015, which is a nationally representative labor force survey, implemented annually by Statistics Indonesia. It collects data on individual characteristics of adults and their activities, as well as—if they are working—information on their incomes and hours of work. We focused our analysis on the sample of 13,208 tertiary education graduates aged 22–60 years old and living on the Sumatra and Java islands—Indonesia’s two main islands.

7.2 Methodology

Equation (2) shows the model to predict life-cycle income:

$$\ln Y_i = \alpha + \beta PE_i + \gamma PE_i^2 + \varepsilon_i \quad (2)$$

where $\ln Y_i$ is the monthly earnings of worker i and PE_i is the potential experience of the individual, calculated as current age minus 22.⁴ The result of this calculation is the prediction of life-cycle earnings for incomes in different quintiles. This is particularly important to assess the effect of loan repayment among the lowest income distribution.

Based on the data, we can see that the income distribution starts to decrease among males and females in the early fifties for those in Q25. However, for males and females whose income is in Q50 and Q75, their income continues to increase even after the age of 50. Male income prediction, especially in Q75, is lower than that of females in the same income distribution, although this could be driven by outliers among female workers after the age of 50.

⁴The use of age 22 comes from the 16 years required to graduate with a four-year university education, including 12 years of primary and secondary education, assuming a student first enrolls in school at the age of 6 (i.e., $22 = 16 + 6$).

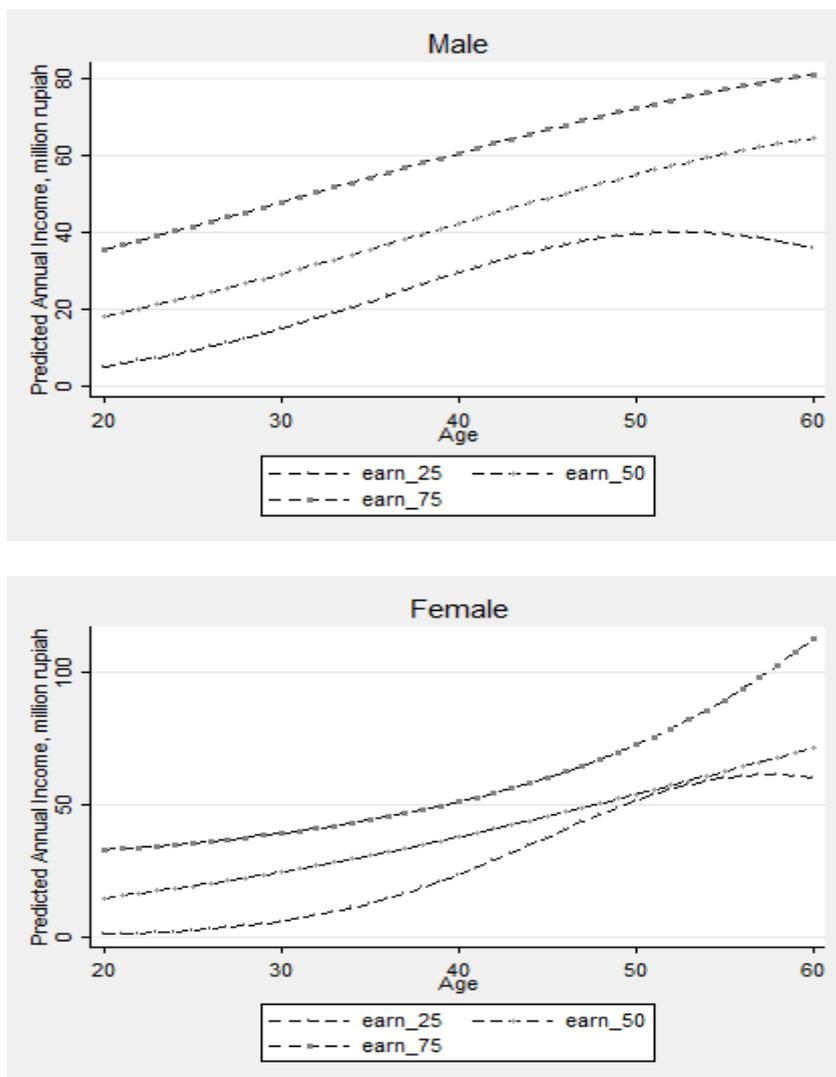


Figure 2. Life-cycle predicted annual income distribution for males and females in the 25th, 50th, and 75th quintiles of income

Source: Sakernas 2015.

Using this estimation, we calculated the period of repayment, monthly RB, and the subsidy that the government needs to provide in an ICL system. As previously mentioned, in each scheme, we set RBs at three different levels: 5%, 8%, and 10%. We utilized these schemes to calculate the repayment period and government subsidies for graduates in the 25th, 50th, and 75th percentiles of income.

VIII. RESULTS

In the ICL simulation, we calculated the period of repayment using three different scenarios of RB— 5%, 8%, and 10% of predicted life-cycle income. The results section only display the 8% and 10% RB scenarios since the 5% RB scenario generates less feasible model due to the long period of repayment. The results for males are shown in Figure 3, while Figure 4 shows the results for females.

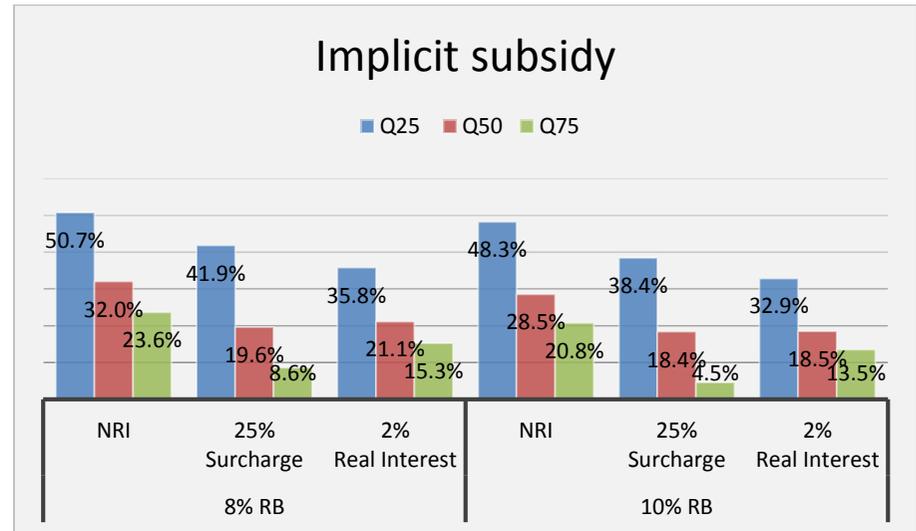
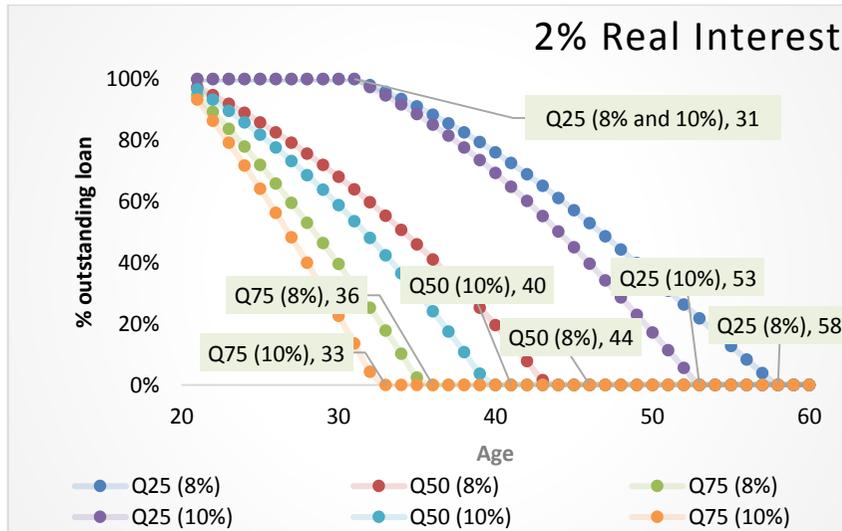
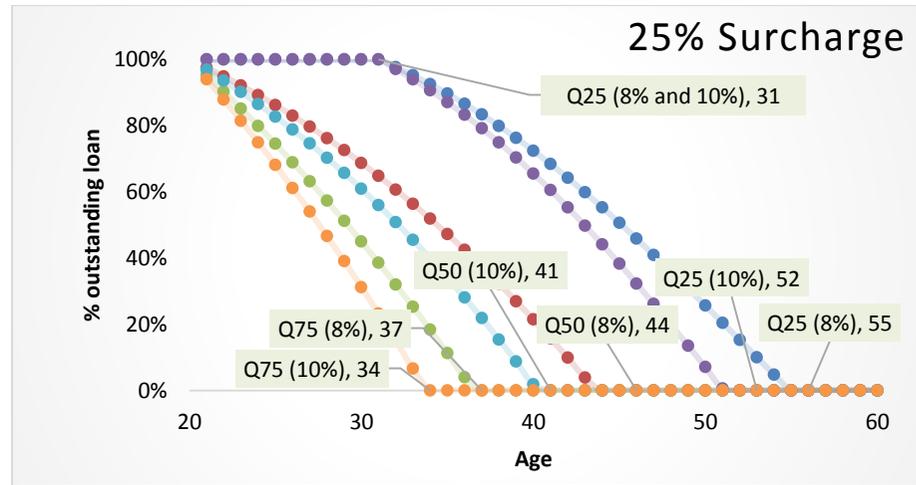
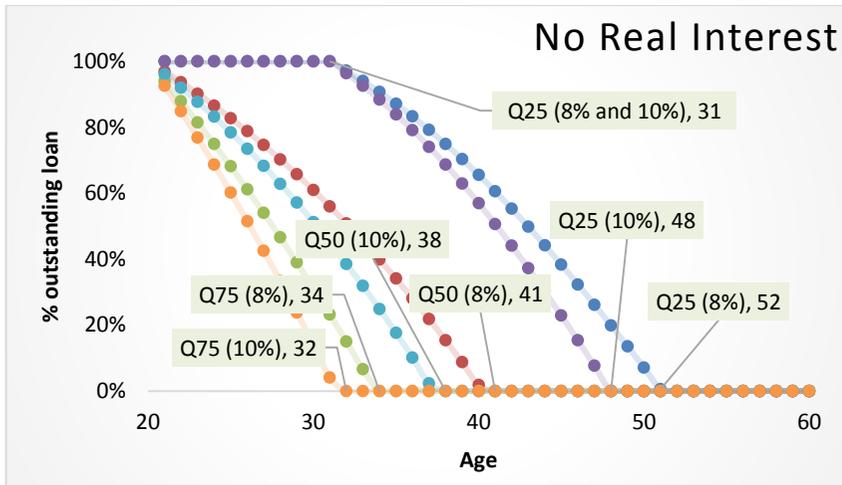


Figure 3. Income-contingent loan repayment patterns for male employees among three quantiles of income distribution (Q25, Q50, and Q75) for different repayment schemes (using 8% and 10% repayment burdens)

Among the male employees, those in the 25th percentile would start repaying their loan at a later age (i.e., 31 years old). When we used the 8% RB, the result was that most of the graduates across different income quintiles and schemes would be able to finish repaying their debt within 25 years. This was not the case for male employees in Q25 who would finish repaying in 27 years at age 58 if we used a 2% real interest rate scheme. For these individuals, the outstanding loan would be written off when they reach 56 years old. A significant reduction of government support was apparent when an additional surcharge or becomes a 2% real interest, is applied to the loan, compared to when the zero real interest scheme is used (see Figure 3). This is especially the case for those whose income is in Q50 or Q75.

For male employees, when the repayment burden was increased to 10%, it became apparent that using higher RBs would mean significantly lower government subsidy, regardless of the schemes. Other than that, we also expect that the duration of repayment would be shorter by two to five years, with a 2% real interest rate scheme cutting the years of repayment the most. Despite this, the reduction in government subsidy was not higher than when using the 25% surcharge scheme due to the accumulation of interest. When we compared across repayment schemes, the use of the 25% surcharge and 10% RB was the most effective one, where the government's subsidy to Q75 would only amount to 4.5% for male graduates and debts would be fully repaid at age 34.

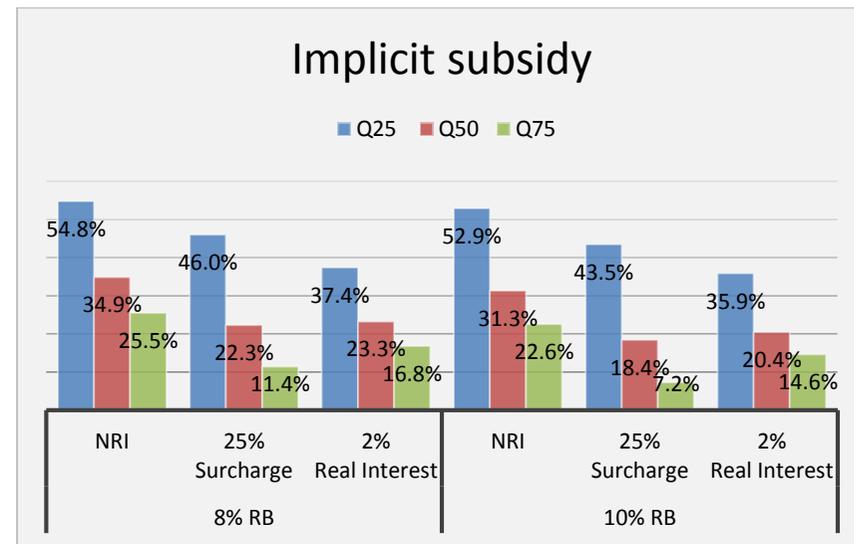
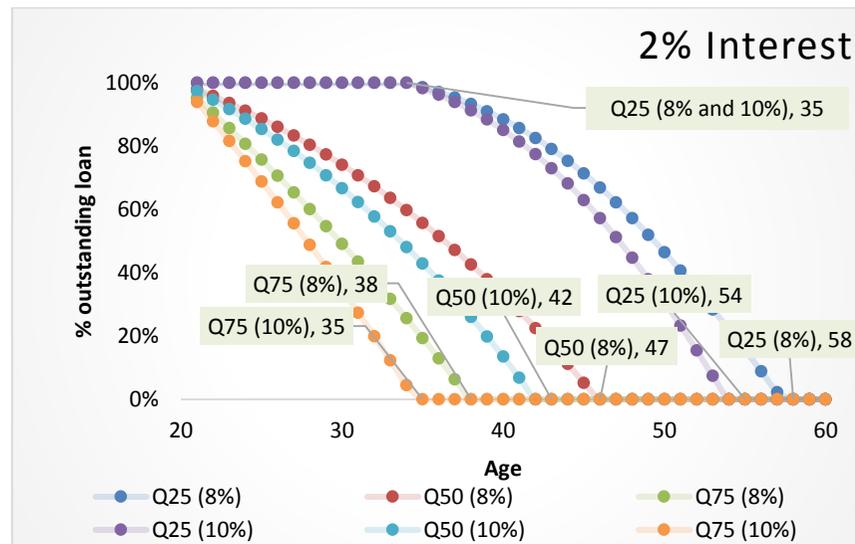
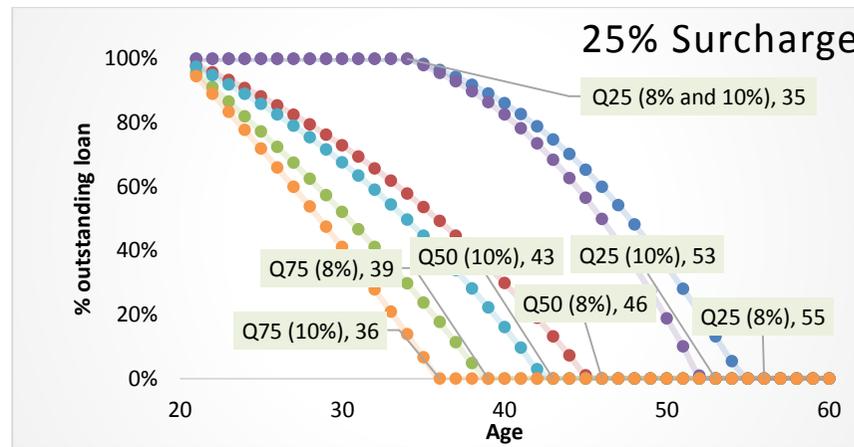
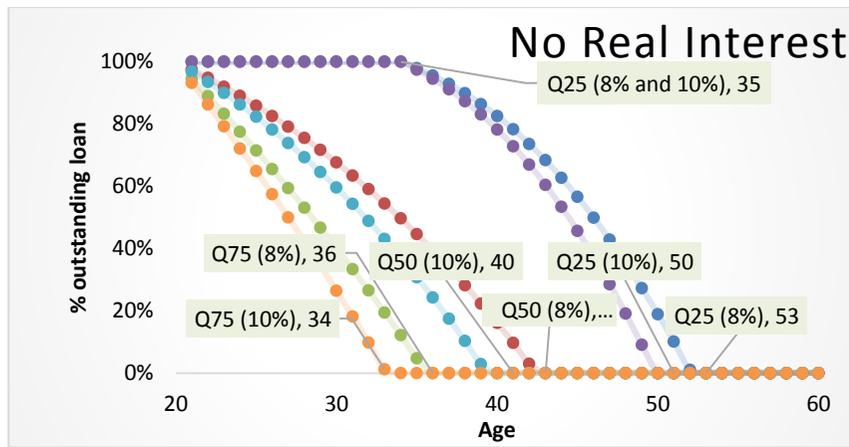


Figure 4. Income-contingent loan repayment patterns for female employees among three quantiles of income distribution (Q25, Q50, and Q75) for different repayment schemes (using 8% and 10% repayment burdens)

Meanwhile, for female employees in Q25, loan repayment would start later than male employees' (i.e., 35 years old). Most female borrowers are predicted to finish repaying in 25 years, except for those in Q50 if we implement a 2% real interest rate scheme. When we used other schemes, those in Q25 would be able to finish repaying the debt within 25 years, despite starting later than the rest of the income groups. This is due to the small increase in income in Q50 in the first decades of life. In fact, the predicted income of female employees above age 50 in Q25 and Q50 converges, indicating more equal welfare among working women the longer they stay in the workforce. With the 25% surcharge scheme using 10% RBs, government subsidy for female graduates amounts to only 7.2% in Q75 with the debt fully repaid at age 36 (see Figure 4).

Overall, male and female graduates in all three earning quantiles would have paid off the debt before they turn 60. Together with starting later in repayment, female graduates have a longer duration of loan repayment than male graduates by around two to three years, with most of the loan schemes. Male and female graduates whose income belongs to the lowest quantile are predicted to start paying off at a later date due to the longer period taken to reach the median income. Meanwhile, for graduates with income in Q50 and Q75, loan repayment would start immediately after graduation, per the loan scheme design.

When comparing the results for male and female graduates, a distinct feature is that government subsidy is consistently higher among females. The higher government subsidy is indicative of the gender earnings gap.

We find that applying a real interest rate results in graduates in Q25 having to pay the highest total loan repayment, compared to the others. Although this results in a lower government subsidy, policymakers need to consider the equity aspect of a policy that results in lower-income earners paying more than higher-income earners.

A more feasible scheme for male and female graduates to reduce the government's subsidy is adding a 25% surcharge toward the total loan. Despite the relatively longer period of repayment, the government can expect to provide smaller implicit subsidies. Among males and females, a 10% RB with a 25% loan surcharge results in the lowest implicit subsidy.

IX. DISCUSSION AND CONCLUSION

This study has several main findings regarding modeling student loans using ICL schemes. First, ICL with a lower RB can reduce or even eliminate default. Second, the government should expect to provide subsidies for student loans, with the amount dependent on the type of ICL scheme implemented. In this study, implementing a 25% surcharge results in a smaller implicit subsidy, although the repayment period is longer than in schemes using a zero real interest rate, or a 2% interest rate and no surcharge. Third, females, especially those in income Q25, start paying off debt later than males and have a higher implicit subsidy than males. This result shows that females experience slower income increases than males and need higher subsidies from the government to be able to repay their loans.

Based on the analysis, the scheme that implements a 25% surcharge would be beneficial to both the government and students. First, compared to the other schemes, adding a 25% surcharge would lower the implicit subsidy, which would benefit the government. Among males, this scheme requires the least amount of subsidy. Second, it is not regressive; those in the lower-income

distribution do not have to pay more in real terms than those earning a higher income. Finally, the surcharge scheme is easier to administer than the 2% real interest scheme, benefiting the evolving capacity of the Indonesian tax office. These are characteristics of a well-targeted program (Chapman, Higgins, and Stiglitz, 2014).

Considering the level of repayment burdens, we discovered that a 10% RB is a good compromise. The government does not have to provide as high subsidies as those in an 8% RB scheme. The level of subsidy of 18% (males and females in Q50) is still reasonable, given the social returns of tertiary education. In addition, graduates are less burdened by the debt repayment and can still take out other types of loans, such as home or vehicle loans.

Another important discussion that we have yet to touch upon in this paper is that an ICL system requires reliable lifetime income documentation, usually provided by the tax office, and participation by the tax office in debt collection—as repayment is usually automatically deducted from income taxes. The capacity of the Indonesian Tax Office to administer an ICL system still needs to be examined.

Being the first simulation of an ICL system in Indonesia, this study has a number of limitations that must be addressed in future, more detailed studies. First, we have not controlled for university major choice, which significantly affects the amount of education expenditure. Health and science degrees have significantly higher costs due to the reliance on laboratory and practical activities; however, they also have higher potential returns. Second, we have not incorporated the employment rate of males and females in modeling the age-earnings profiles of university graduates. The employment rates of males and females after graduating from school differ, not to mention the probability that women are more likely to leave work earlier than men due to caretaking duties. Lastly, we have not discussed those working in the informal sector. This is important because many university graduates are self-employed and it is difficult to obtain data on actual earnings of this type of workers compared to workers in the formal sector.

In conclusion, an ICL is more feasible than a mortgage-type loan. There are many ways in which ICL can be implemented, but all of them would guarantee smaller RBs and protection against periods of hardships for graduates. However, there must be a discussion in the government to establish good policy support to implement a successful ICL program. This is where the discussion should proceed next.

LIST OF REFERENCES

- Arnold, Jens (2012) 'Improving the Tax System in Indonesia.' OECD Economic Department Working Papers No. 998. Paris: OECD Publishing.
- Chapman, Bruce and Amy Y. C. Liu (2013) 'Repayment Burdens of Student Loans for Vietnamese Higher Education.' *Economics of Education Review* 37 (78): 298–308.
- Chapman, Bruce and Daniel Suryadarma (2013) 'Financing Higher Education: The Viability of a Commercial Student Loan in Indonesia.' In *Education in Indonesia*. Daniel Suryadarma and Gavin W. Jones (eds.) Singapore: ISEAS.
- Chapman, Bruce and Mathias Sinning (2014) 'Student Loan Reforms for German Higher Education: Financing Tuition Fees.' *Education Economics* 22 (6): 569–588.
- Chapman, Bruce and Timothy Higgins (2014) *HELP Interest Rate Options: Equity and Costs* [online] <http://images.theage.com.au/file/2014/07/31/5639573/Help_interest_rate_options_report.pdf> [29 August 2018].
- Chapman, Bruce, Kiatanantha Lounkaew, Piruna Polsiri, Rangsit Sarachitti, and Thitima Sitthipongpanich (2010) 'Thailand's Student Loans Fund: Interest Rate Subsidies and Repayment Burdens.' *Economics of Education Review* 29 (5): 685–694.
- Chapman, Bruce, Timothy Higgins, and Joseph E. Stiglitz (2014) 'Introduction and Summary.' In *Income Contingent Loans: Theory, Practice, and Prospects*. Bruce Chapman and Joseph E. Stiglitz (eds.) New York: Palgrave Macmillan: 1–11.
- Doris, Aedin and Bruce Chapman (2016) 'Modelling Higher Education Financing Reform for Ireland.' Unpublished manuscript, Department of Economics, Finance and Accounting, Maynooth University, County Kildare, Ireland.
- Migali, Giuseppe (2012) 'Funding Higher Education and Wage Uncertainty: Income Contingent Loan versus Mortgage Loan.' *Economics of Education Review* 31 (6): 871–889.
- Gross, Jacob P. K., Osman Cekic, Don Hossler, and Nick Hillman (2009) 'What Matters in Student Loan Default: A Review of the Research Literature.' *Journal of Student Financial Aid* 39 (1): 19–29.
- Hamilton-Hart, Natasha and Günther G. Schulze (2016) 'Taxing Times in Indonesia: The Challenge of Restoring Competitiveness and the Search for Fiscal Space.' *Bulletin of Indonesian Economic Studies* 52 (3): 265–295.
- Hill, Hal and Thee Kian Wie (2013) 'Indonesian Universities: Rapid Growth, Major Challenges.' In *Education in Indonesia*. Daniel Suryadarma and Gavin W. Jones (eds.) Singapore: ISEAS: 160–179.
- Kemenristekdikti (2016) *Puspawarna Pendidikan Tinggi Indonesia* [Many Colors of Higher Education in Indonesia] [online] <<http://www.dikti.go.id/epustaka/puspawarna-pendidikan-tinggi-indonesia-2011-2015/#book/>> [29 August 2018].

Shen, Hua and Adrian Ziderman (2009) 'Student Loans Repayment and Recovery: International Comparisons.' *Higher Education* 57 (3): 315–333.

Wicaksono, Teguh Yudo and Deni Friawan (2006) 'Recent Developments in Higher Education in Indonesia: Issues and Challenges.' In *Financing Higher Education and Economic Development in East Asia*. Shiro Armstrong and Bruce Chapman (eds.) Canberra: ANU Press: 159–187.

World Bank (2010) *Putting Higher Education to Work: Skills and Research for Growth in East Asia*. Washington, D. C.: World Bank.

The SMERU Research Institute

Telephone : +62 21 3193 6336
Fax : +62 21 3193 0850
E-mail : smeru@smeru.or.id
Website : www.smeru.or.id
Facebook : [@SMERUInstitute](https://www.facebook.com/SMERUInstitute)
Twitter : [@SMERUInstitute](https://twitter.com/SMERUInstitute)
YouTube : [The SMERU Research Institute](https://www.youtube.com/TheSMERUResearchInstitute)