



# Risk Profiling In Student Tuition Fees' Repayment: A Case Study

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**Abstract.** Private higher learning institution is vulnerable towards heavy dependence in students' tuition fees to sustain operation, thus the default in tuition payments is among its most critical risk. In this work, the statistics-based scoring method is adopted to provide risk assessment that offers risk profiling for every students, specifically on their ability to pay tuition fees. Risk mitigation and preventive measure are also proposed in this work.

**Keywords:** Risk assessment, risk mitigation, credit scoring, and cash at risk.

**2010 MSC:** 91G40 Credit Risk, 91B30 Mathematical Finance

## 1. Introduction

Higher education institution has always been criticized as unsustainable from financial austerity perspective; with some study include investigation by Browne [3] in England, and Tham [11] in Malaysia. Whereas Altback [1] and Becker [2] focus their investigation on the loss making of international branch campuses of UK universities, to name a few. Tham [11] argued that this unsustainable model may be due to poor repayment records of student loans, and economic need to reduce government's fiscal deficit, among others, though the demand for higher education is increasing every year. Most universities and other higher learning institutions are dependent on government, or tax-generated revenue, with most of its expenditures are recurrent and dynamic (Johnstone, [6]).

In Malaysia, private higher learning institutions (PHLI) have growth steadily over the years, as they provide alternatives to students to pursue higher education, as most public universities are overcrowded and more competitive in nature. However, financial risk is a factor that directly affects PHLI as they are vulnerable towards heavy dependencies in students' enrollment and the collection of tuition fees to sustain their operation. There are growing concerns about the incurred debt on tuition fees in PHLI.

This study will focus on one of PHLI in northern Malaysia; will be referred to as PHLI ZZ in later text. Readers should note that PHLI ZZ offers programs in the field of Information Technology, Computer Science, Health Science, Social Science, Accounting, Business Management, Engineering, Humanities and Bio-Industry. PHLI ZZ also vulnerable to financial risk as its return on investment (ROI) needs to be generated to sustain operation.

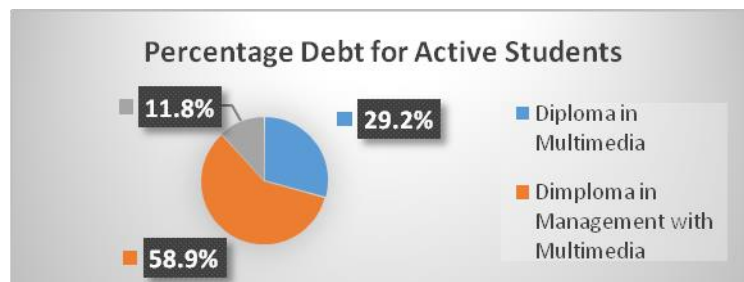
In PHLI ZZ, tuition fees are also the major contribution in its revenue making, thus making it the main risk factor. Its major decision-making involved in identifying the good, and the bad student account based on their capability to pay the tuition fees. How to assess such concern can be answered by adopting debt collection strategy, in which from this perspective, the good account are more likely to meet payments arrangements, while the bad accounts are more likely to fail (Experian, [5]). In debt collection, non-payment in payment (or default) is the major risk faced in this industry (Obeng & Krah [7]). Butaru et al. [4] emphasized the dire need to identify accounts with high risk of default at the earliest, and try to prevent it from happening.

In a nutshell, risk analysis in debt collection can be divided into risk assessment and risk management. Risk assessment consists of identification and estimation of risk, in which scoring model is among its tool. While risk management includes both the assessment and its mitigation activities (Ohlsson [8]; Salim, *et al.* [9]). Thus, the purpose of this study is to identify the risk and determine if the events can be avoided, reduced, spread, transferred or prevented from occurring. A high quality risk management process is necessary for successful project or business. Motivated by similarity of this platform, in this research work, we will propose risk assessment and mitigation for students' fees collection by using statistics-based scoring method adopted from SunGard [10].

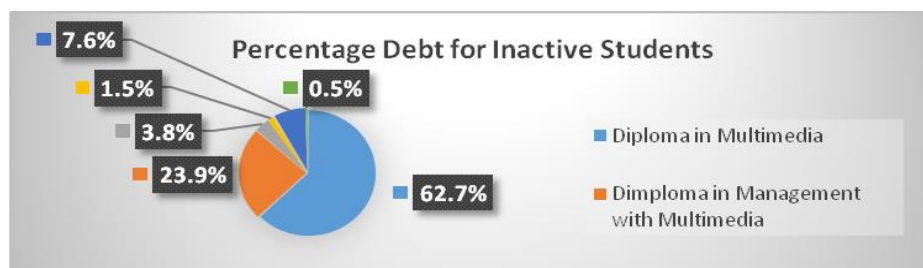
In PHLI ZZ, fees collection can be divided into two categories – the active debtors and inactive debtors.

**Table(1):Category of Debtors in PHLI ZZ**

Category		Description
Active	Self-sponsored	Pay the fees by themselves without taking any sponsorship.
	Half-sponsored	Students get only 70% or 50% from full sponsorship from MARA or PTPTN to pay the fees.
	Suspended sponsorship	Students with CGPA below 2.
Inactive	Missing-in-action	Students that attend to class for five weeks only from the registration date then leave PHLI ZZ without settle full tuition fees.



**Chart(1): Percentage of Debt for Active Student by Course**



**Chart(2): Percentage of Debt for Inactive Students by Course**

## 2. Risks Categorization

We categorize risks in PHLI ZZ into two main streams– the external risk and internal risk. These risks are focusing on the fees collection problem.

### 2.1 External Risks

### a) Economic Risk

Malaysia showed slow growth in economy in the recent years, resulting to students' main sponsors such as Majlis Amanah Rakyat (MARA) and National Higher Education Fund Corporation (PTPTN) stricter their current policies and requirement in sponsoring students to study in PHLI. In Table 3, we illustrate sponsorship of MARA and PTPTN. Prior to September 2015, PTPTN sponsored RM 4,000 per semester for tuition fees without any requirement for household income. As PHLI ZZ's tuition fee is RM 3,400, there were excess in fund for student's daily allowance. As Malaysia economy is in decline, post September 2015 showed the difference scenario in sponsoring students. PTPTN now only sponsor students based on household income less than RM 4,000, with additional requirement that their parents are BRIM holder with tuition fees of RM3,400 per semester. Whereas, for household income between RM 4,000 and RM 8,000, students will be sponsored with 70% tuition fees. Meanwhile, for household income more than RM 8,000, students will get 50% sponsorship. Other than that, students are not qualifying for PTPTN sponsorship. These new arrangements impacted students in PHLI ZZ in order to pay tuition fees since the fees in PHLI ZZ is generally higher compare to others public institutions.

**Table(2): The Differences in Terms of Sponsorship between MARA & PTPTN**

Sponsorship	Before September 2015	After September 2015	Description
PTPTN	RM 4,000 (full)	RM 3,400 (full)	Household income below RM 4,000 (BRIM) / month
		RM 2,550 (75%)	Household income RM 4,001 – RM 8,000 / month
		RM 1,700 (50%)	Household income more than RM 8,001 / month
MARA	Full tuition fees Self-allowance (RM535/month) Stationary allowance Computer allowance	Tuition fee and living allowance	Household income less or equal to RM8,000.00
		Tuition fee only	Household income RM 8,001- RM 15,000 / month
		MARA-Bank Scheme	Household income more that RM15,000.01

For MARA sponsorship, prior to September 2015, students were given full tuition fees, on top of monthly self-allowance at RM535, stationary and computer allowance. After September 2015, MARA only sponsored students based on the household income, as presented in Table 2

### b) Competition Risk

PHLI ZZ is also prone to pressure by competition among other private and public higher learning institutions. Some other PHLI may offer variety of competitive courses that will attract the students to go to that institution, comprehensive online learning facilities, resulting to students do not have to attend physical classes anymore. This may attract student to go to other PHLI. Though, the main competition is from public higher learning institution (PuHLI). PuHLI not only offer students with better qualification, but they also cater for students with lower entry qualifications such as in Polytechnics, Community College and Giat MARA. The tuition fees are lower, accompanied by good facilities in campus. Community College and Giat MARA, for example not only able to offer free tuition fees, with monthly allowance to student, but they are also able to provided free accommodation. These institutions offering technical course in various fields, in 3 to 24 months duration of study.

**Table(3): Number of Inactive Student's Debt in year 2016**

No	Course Name	Inactive (RM)		
		MARA	PTPTN	Self
1	Dip in Management with Multimedia	-	-	333,588.27
2	Diploma in Multimedia	8,355.00	5,570.00	860,470.36
3	B.Sc. (HONS) in Multimedia computing	-	-	52,460.00
4	B.Sc. (Hons) In Multimedia Computing	-	-	204,70.00
5	Diploma in Multimedia PHLI- PHLI Caw. ZZ- Trimester	-	-	105,836.00
6	PIP Information Technology	-	-	6,945.00
<b>TOTAL</b>		8,355.00	5,570.00	1,379,770.16
		RM 1,393,695.16		

Meanwhile, Polytechnics' student intake is later than of PHLI ZZ. Some students who already accepted placement and enroll in PHLI ZZ will leave their study once being offered placement in Polytechnic. Such scenario resulting leavers with debts in tuition fees. Table 3 shows number of inactive student with outstanding fees in 2016.

## 2.2 Internal Factor

In PHLI ZZ, the number of staff in finance department is small. Currently, there are four staff and one accountant that are responsible to handle more than one thousand students. The current staff cannot oversee most bad accounts given the current scenario of manual laboring.

These risks show the needs to utilize available resources in PHLI ZZ and finding better alternative to improve fees collection. Among which, is the scoring system, specifically adopted to cater such problem is proposed in the next section.

## 3. Scoring System For Risk Mitigation Initiative

### 3.1 Cash at Risk (CAR)

We make use of the statistic-based scoring method in SunGard (2011) to quantify specific risk probabilities. This model originally develops for debts collection, which collect debts data over a period of time. In PHLI ZZ case, we can use this model to identify the level of risk among students in their ability to pay tuition fees. Do note that this scoring system is suitable to be adopted for the profiling initiative to new registered students. First, this scoring model will determine the probability of bad (PBAD), which is the probability that a student will go for BAD in paying their fees. PBAD is the weights from the number of debts regarding every category of students divided with total all debts in PHLI ZZ. There are six PBAD weights identified for PHLI ZZ, i.e. PTPTN, half PTPTN, dismissed, MARA, half MARA, and self-funded students. Table 4 shows PBAD and its respective classification.

<b>Table(4): Probability of BAD</b>	
<b>PBAD</b>	<b>STATUS</b>
0.0511	PTPTN
0.0648	Half PTPTN
0.1717	Dismissed
0.1864	Self- Funded
0.2091	MARA
0.3133	Half MARA

Note that the example of PBAD calculation as follows:

$$\begin{aligned}
 \text{PBAD (Dismissed)} &= \text{Number of debts category dismissed} / \text{Total all debts} \\
 &= 1,393,695.16 / 8,117,036.46 \\
 &= 0.1717
 \end{aligned}$$

Further, the risk is identified by multiplying PBAD with outstanding account at risk (AR) balance. AR balance in this case is referring to parents' salary. Then, cash at risk (CAR) can determine the level of risk, as in the model that follows

$$\text{CAR} = \text{AR} \times \text{PBAD}.$$

The general criteria for all type level of risk as mention in Table 5 are as follow:

#### a. Ptptn And Half Of Ptptn Loan.

- Fulfill the requirements for apply the loan are the same as the program entry requirements offered.
- Following family monthly income status.

#### b. Dismissed

- The tuition fee is to be full paid if the students quitted after 5 weeks of study from the date of registration.

**c. Self-funded**

- The students who responsible for tuition fee payment by own self.
- Getting financial support from a relative or friends.
- Receiving financial assistance direct from an external funder.
- The students who not qualified with any requirements PTPTN and MARA loans.

**d. MARA and Half of MARA Loan.**

- Fulfill the requirements for apply the scheme. The students must at least get credits for Mathematics subject and another three subjects excluding Malay Language, English and History must passed in these subjects.

**Table(5): Cash at Risk**

<b>RISK CLASS</b>	<b>SCORE RANGE</b>
Very low	100-199
Low	200-299
Moderate	300-399
High	400-499
Very high	500-599
Extreme	>600

Table 5 shows CAR with the risk class and its score range. Six risks class are identified from very low to the extreme. For new registered students, their risk level will be calculated based on this CAR model. When this model is properly applied, it will assist PHLI ZZ in allocating resources to the specific accounts with high score in the CAR's scoring system that will maximize the return on investment of PHLI ZZ moving forward.

This model is specifically proposed to the new registered students. Such scoring validation allows PHLI ZZ to know just how well these new students able to pay their tuition fees and early counter measure can be taken for those with high risk in default. This early prevention mechanism may reduce future debt. This model can be developed through software such as Visual Basic and Java to be incorporated in current PHLI ZZ system. Every student that register at PHLI ZZ can also immediately know their risk level in paying tuition fees, and able to take necessary actions.

**3.2 Numerical Illustration**

We illustrate the calculation of such scoring model for the case of a new student's registration process in PHLI ZZ. We consider Student A with parent's salary RM 3,500 under sponsorship from PTPTN. CAR for Student A is as follows,

$$\text{CAR} = 3500 \times 0.0511 = 178.85$$

Based from Table 6, the scoring for Student A falls under very low risk class. Now, we consider the case for Student B, with parent's salary RM 5,000, under MARA sponsorship. CAR for Student B follows,

$$\text{CAR} = 5000 \times 0.2091 = 1045.5$$

Now, the score exceed 600, under extreme risk class. Such warning mechanism allows earlier intervention by PHLI ZZ to come up with preventive measure to address this issue. Possible initiatives include the arrangement for monthly or quarterly payments of tuition fees.

**3.3 Preventive Measures**

Once this system is in place, some activities are proposed to ensure the successful implementation of this process, both for active and inactive students.

**a. Active students**

- Utilizing academics mentoring to improve student's academic performances. In current regulation, students with CGPA below 2.00 will be suspended from receiving sponsorship. Such

early mentoring helps students to continuously focus on their current study and reduce possibility to fall under 2.0 in CGPA.

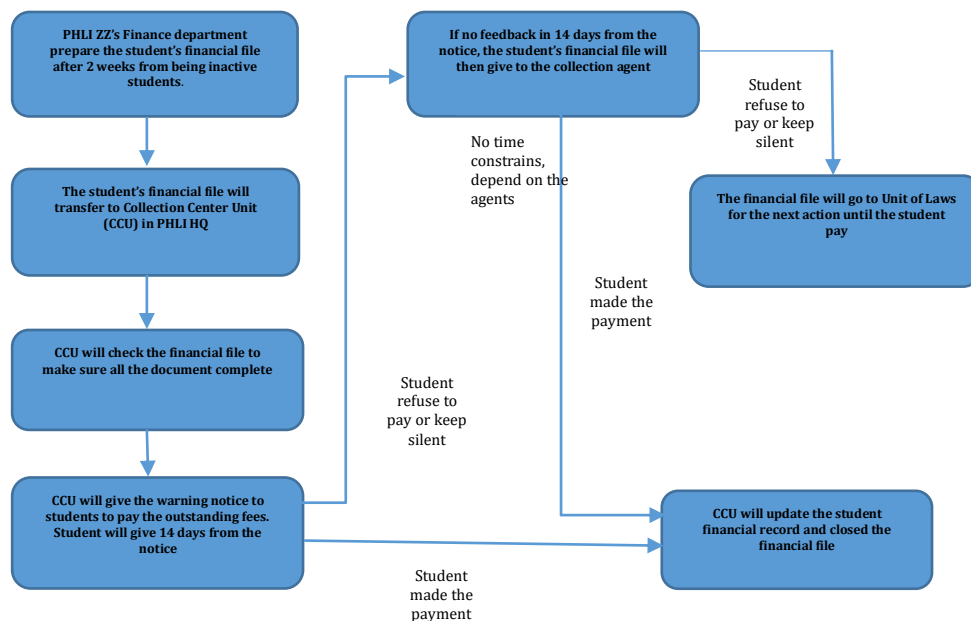
- Providing monthly installment alternative for students fall under high level of risk to encourage them consistently pay tuition fees.
- Creating job opportunity and entrepreneurial facilities inside campus for poor students.

## b. Inactive students

Currently, PHLI adopted two methods to collect outstanding tuition fees from inactive students.

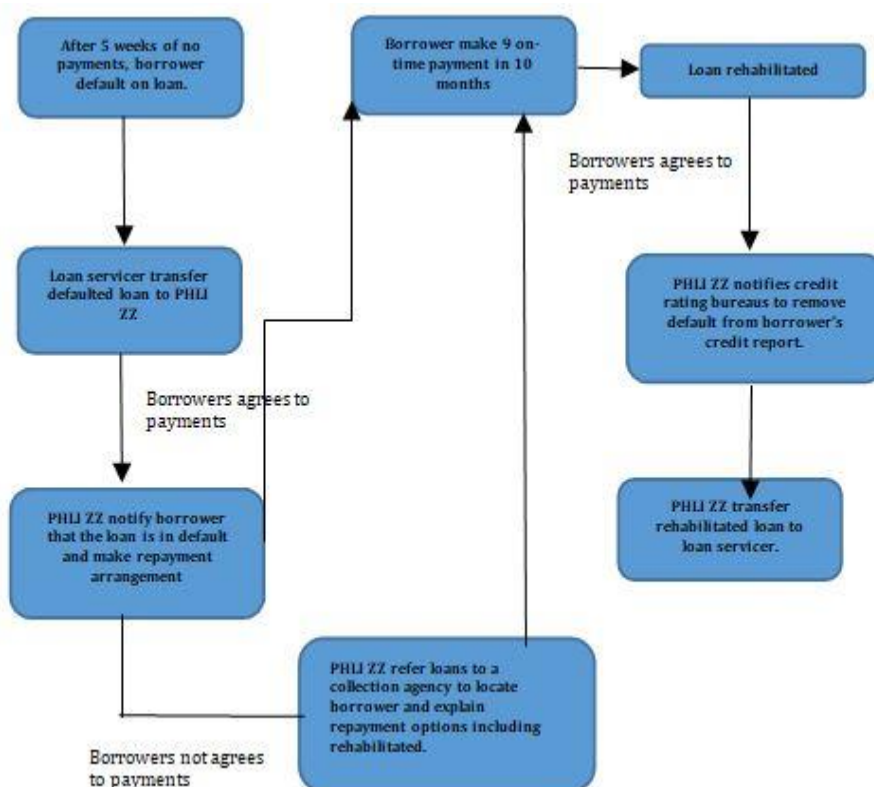
### i) Loan collection

Currently, PHLI adopting this method to collect outstanding tuition fees from inactive students.



**Flowchart(1): Loan collecting Process in PHLI ZZ**

### ii) Loan rehabilitation



Loan rehabilitation in Flowchart 2 is proposed to PHLI ZZ for more effective way to collect outstanding debt from inactive students. This approach has been utilized in other countries (SunGard, 2011). The process will start after five weeks (or 35 days) when inactive student default in their payment. PHLI ZZ is advised to arrange with loan servicer on these bad accounts. Loan servicer will transfer the defaulted loan amount to PHLI ZZ based on outstanding amount of student's debt. Then, PHLI ZZ will notify the students that their current loan is in default and advice for repayment arrangements with loan servicer. If students agree to make payment, then they will need to make as much as nine on time payments in 10 months. After the completion of the 10 months payments, PHLI ZZ can now notifies credit rating bureaus to remove students from borrower's credit report (such as the AKPK). Then, PHLI ZZ will transfer the rehabilitated loan-to-loan servicer back. For cases where students refuses to accept the defaulted loans, PHLI ZZ will refer this bad loans to a collection agency to locate borrower and explain repayment options including the loan rehabilitated process. Then the process will continue for 9 on time payments.

## **Conclusion**

Financial austerity is crucial especially in private higher learning institution (PHLI) in Malaysia, where risk in particular finance risk is very much influences the sustainability of PHLI's daily operation (Browne, 2010). As these institutions are not under the public sector, their source of incomes are independent from the government's budget allocation. Thus, the main revenue should come from tuition fees charged to students undergoing studies in these institutions. Heavy dependence in tuition fees as the main source of revenue showed vulnerability in most PHLI, in which the failure to received full amount of tuition fees will hinder other segments of their development and growth, consistent with Obeng & Krah (2016) that emphasize the major risk in industry is in the default payment. Their sustainability can be easily jeopardized, and in consequence may effects the education ecosystem in a whole.

This article contributed in using qualitative judgment and quantitative assessment for such issue. The qualitative judgment is used when assessing risk while dealing with outstanding debts from incurred tuition fees among students. The risks are categorized into external, i.e. the economic and competition risk, and internal risks, i.e. small number of staff in finance department. The quantitative assessment proposed in this work is in the form of scoring system which can provide measurement to identify students with good and bad level of risk in paying their tuition fees. This system can be applied to new students before they enroll to the education system. Such scoring system is easy to be implemented, objectively gauged, and provided proactive counter measure to combat this issue. The potential risks well be better managed, and the plan for counter measures can be done.

## **References**

- [1] P. Altbach, Why branch campuses may be unsustainable, *International Higher Education*, 58(2015), <https://doi.org/10.6017/ihe.2010.58.8467>
- [2] R. F. J. Becker, *International branch campuses*, London: The Observatory on Borderless Higher Education, 2009.
- [3] J. Browne, *Securing a sustainable future for higher education: an independent review of higher education funding and student finance*, (2010).
- [4] F. Butaru, Q. Chen, B. Clark, S. Das, A. Lo & A. Siddique, Risk and risk management in the credit card industry, *Journal of Banking and Finance*, 72(2016), 218-239, <https://doi.org/10.1016/j.jbankfin.2016.07.015>
- [5] Experian, *The value of implementing scoring in the collections process*. Bristol: Experian, 2006.

- [6] B. Johnstone, Challenges of financial austerity: Imperatives and limitations of revenue diversification in higher education, *The Welsh Journal of Education*, 11(1)(2002), 18-36, <https://doi.org/10.16922/wje.11.1.3>
- [7] K. Obeng & R. Y. Krah, Default Risk and Debt Recovery Strategies of Microfinance institutions, *European Journal of Business and Management*, 140-148, 2016.
- [8] C. Ohlsson C, Exploring the potential of machine learning: How machine learning can support financial risk management. Unpublished Thesis, (2017).
- [9] Y. Salim, C. Tzu Enn, S. Hamzah, M. Misiran & H. Sapiri, RROI analysis in assessing risk of open source software in organization: A case study in Malaysia. *Journal of Advanced Research in Business and Management Studies*, 8(1)(2017), 66 -75.
- [10] SunGard, Business Credit and collection risk analysis. SunGard. Retrieved 18 August, 2018, from [www.sungard.com](http://www.sungard.com),(2011).
- [11] S. Tham, Exploring access and equity in Malaysia's private higher education, ADBI working paper 280. Tokyo: Asian Development Bank Institute,(2011).