

What is Personal Financial Engineering?

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Personal Financial Engineering (PFE) refers to the use of mathematical and statistical techniques to solve financial problems systematically, as defined by Investopedia. This article explains the concept of PFE using 2 case studies for easy understanding.

The article also discusses the advantages and benefits gained in the medium to long terms if we have applied the knowledge correctly. In short, PFE should be financially easy to use, technically adaptable and commercially adjustable.

Due to the Covid-19 pandemic, the Malaysian government has taken various measures to ensure the financial and economic outlook for the months ahead remains steady. A moratorium on loan payments has been implemented, something that has not happened in the Malaysian financial market since the 1997 and 2008 financial crises. As such, many uncertainties have arisen and this article will also discuss the financial impacts carefully, using the examples quoted by Bank Negara Malaysia (BNM).

We are now in the period of a moratorium on loan payments. Other than a lowering of the OPR as happened recently, both deferment and a lower ELR (Effective Lending Rate) will definitely create more liquidity for both consumers and bankers. Let's look at this independently. Do consult your financial planner if you need more information and guidance. We will be sharing 2 additional scenarios based on Housing Loan Deferment and Hire Purchase Loan Deferment respectively.

Key Features of Personal Financial Engineering

Easy to Use: Users like you and I can use the system (financial calculator) easily and it shall be capable of interacting with and advising you if you have some financial concerns to be addressed carefully.

Technically Adaptable: Users like you and I can "Act and React" to the market dynamics to address the WHAT IF analysis in a real time manner. For example, if today, BNM reduces the ELR or Effective Lending Rate, What if:

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1. I choose to keep my instalments the same as before the reduction;
2. I choose to reduce my instalment as advised;
3. I choose to pay more now, not taking options 1 and 2?

Commercially Adjustable: Users like and I can “Engineer and Re-engineer” our financial plan when one or more of our life’s priorities change due to any reason. For example, we recently experienced a sudden market crash due to the Covid-19 pandemic. How can you capitalize on this window?

Can We Engineer Our Future Financially?

Yes, definitely. We are now dealing with the principle of TVM (Time Value of Money). This explains how TVM relates to 3 basic economic parameters, i.e. Growth, Inflation and Risk.

To put things into perspective, if you are 25 years old now and you think ahead to your being 35 years of age, you could probably engineer more financial results than one who is now 45 years old and only has 15 years ahead to plan his finances.

In financial engineering, the first 10-15 years are categorised as the accumulating phase, and the next 10-15 years are categorised as the accelerating and exponential phase. If we don’t take care during the first 15 years, we will have technically lost the financial advantages in a big way.

Figure 1

- Assuming:
 - we invest RM24,000 into a trust fund
 - we invest for only 10 years
 - we let the portfolio continue to grow and compound.

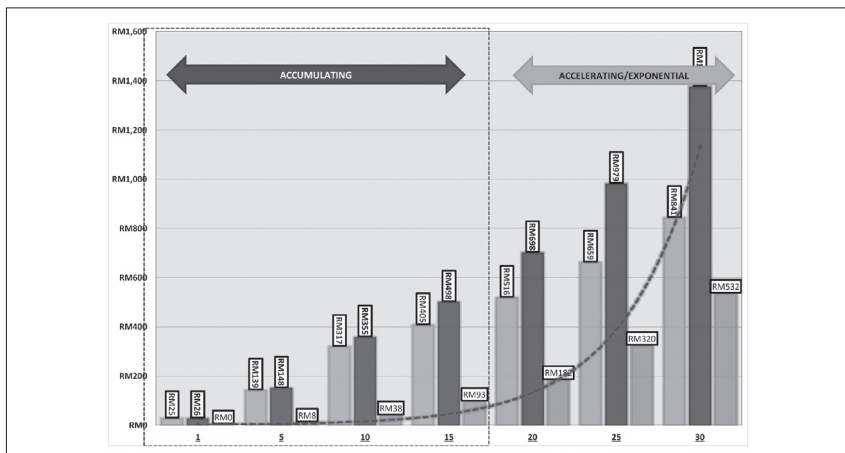


Figure 1

- Based on 5% as average return and 7% as average return:
 - Green: 5%
 - Red: 7%
 - Orange: Additional Capital Growth and Gain.

Figure 1 explains the accumulating phase and the accelerating/exponential phase. Time plays a critical role here; we need both phases to work together.

Factors and Controls

TVM is a very powerful financial planning concept and it works around key economic parameters, i.e. Growth (G), Inflation (I) and Risk (R).

Growth: Refers to the annual return of an investment vehicle such as FD (Fixed Deposit) and EPF (Employees Provident Fund). Using EPF as an example, if the average return is 5.5% p.a and for FD it is 3.0% p.a., both vehicles will deliver more or less the same results at 10 years, but will be significantly different at 20 years and exponentially huge at 30 years. This is the power of compounding.

Inflation: Refers to the rise in the general level of prices where a unit of currency effectively buys less in the future. In simple terms, RM1 tomorrow will be worth less than RM1 today. By using the rule of 72, if inflation is 4% p.a, it takes exactly 18 years to half its economic value.

Risk: Refers to the associated factors such as financial and non-financial

risks but both are financially correlated. For example, if your investment vehicle delivers a bad return over the years, you will accumulate significantly lower returns. Another example is non-financial risks as related to a health crisis. If the bread winner suffers a health crisis such as being diagnosed with a major critical condition or suffers total permanent disability or passes away, we can imagine the potential disaster.

Hence, if we apply the know-how to manage the G, I and R very wisely, we will not only structure and engineer a sustainable financial result but at the same time mitigate the associated/unforeseen risks, as much as possible. No matter what, we aim to reach our target objectively due to proper financial planning and management.

Figure 2:

- Managing the vehicle, time and money is vital because we can achieve favourable financial results (See Figure 1) more confidently.
- Our example above was prepared based on 10 years. Imagine today this is a 20/30 years scenario. The final harvest will be huge during investment maturity.
- Vehicle: FD, Bond Fund, Equity Fund, Dividends-Based Fund, etc.
- Time: Commitment to Time to Accumulate and Compound.
- Money: Level/Incremental investment, discipline and consistency.

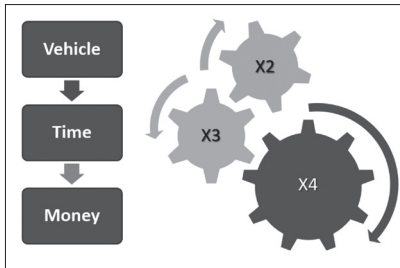


Figure 2

We can achieve different financial results by 2X, 3X or 4X, using similar resources but a different investment vehicle

Case Study A

In case study A, we use a real scenario to study the cause and effect using the housing loans category. If your loan has an Initial Borrowing at RM600K,

- (1) Initial Borrowing:
- (2) ELR, Effective Lending Rate:
- (3) Tenure: 30 Years/360 Months:
- (4) ELR Reduced:
- (5) Effective From:
- (6) Total O/S After 60 Months:
- (7) Strategy of Repayment:
- (8) Strategy of Repayment:
- (9) Final Payments End at:
- (10) Savings in Months:

assuming an Effective Lending Rate of 4.3% p.a unchanged for simplicity, Tenure is 360 Months. We have a situation here, assuming OPR is reduced by 0.25% at 60 months, let's assess the financial implications carefully. We can use FE to "engineer" the results (before and after) immediately for consideration. (Please note: this is just for explanation purpose; it does not reflect any banks in Malaysia).

Figure 3

- A) What if I choose to let my instalment remain as it is?
- B) What if I choose to reduce my instalment as advised?

	RM600,000	
	4.30%	
	360	
	4.05%	
	61 Months	
(6) Total O/S After 60 Months:	545,271.22	545,271.22
(7) Strategy of Repayment:	Remained	Reduced
(8) Strategy of Repayment:	<u>RM2,969</u>	<u>RM2,893</u>
(9) Final Payments End at:	<u>347 / 360</u>	<u>360 / 360</u>
(10) Savings in Months:	<u>-13</u>	<u>0</u>

Figure 3

Repayment strategy when ELR is reduced by 0.25%; repayment remains as before reduction or is reduced.

YOU DECIDE: We could save up to 13 months of additional instalments!

Case Study B

Using the window resulting from the Covid-19 pandemic, many of the good fund houses have suffered losses due to the recent market crash, mostly due

to oversold stocks in a very sensitive window. If you have RM50K now which is maturing soon, which vehicle would you choose if you have FD, Bond, and Equity-Based Unit Trust?

Figure 4

- This is for those with a higher risk appetite. Many funds have now dropped by more than 30% from their NAV before the market crash.
- For simplicity, if your fund has dropped by 30%, it actually offers capital gains of up to 42.86% to be on par before the crash.
- Tapping and capitalizing is very important as this golden window may not last long once the pandemic ends.
- Consult with your RFP/CFP today for advice.

Capital	Gain/ Lose	Quantum
100	80	-20.00%
100	70	-30.00%
100	60	-40.00%
80	100	25.00%
70	100	42.86%
60	100	66.67%

Figure 4

UT (Unit Trusts) seem to be more attractive at this time, compared to the typical FD offering of between 2.0% - 2.5% p.a in Malaysia now

Case Study C

Example Quoted using BNM, Revision 27 March 2020. Housing Loan During Moratorium.

During this moratorium period, many financial institutions including banks and insurance companies have reacted proactively. During this

period, borrowers/customers with loan/financing that meet the conditions do not need to make any payments, and no late payment charges or penalties will be imposed to provide some financial reliefs to individuals and businesses who face temporary financial constraints arising from the COVID-19 pandemic. (Ref: FAQ_BNM, Revision 27 March 2020.)

With reference BNM FAQ_24, what would my housing loan/financing monthly payment be after the 6 months' moratorium period? Referring to the case study given, let's understand this better from the PFE perspective.

From FAQ 24

Monthly instalment before deferment	Monthly instalment after deferment
RM1,438	RM1,483 (RM45 increase)

The above illustration of a conventional housing loan is based on these assumptions:

- No extension of tenure after deferment period.
- Loan amount - RM300,000.
- Interest rate - 4.6% p.a (interest not compounded during deferment period).
- Original tenure - 35 years, and borrower has repaid for 5 years.
- Principal and interest payments suspended during deferment period.
- Outstanding principal before deferment period - RM280,585.
- Outstanding amount post-deferment to be repaid within 29.5 years = RM287,038.

Source: BNM, Moratium,
Revision 27 March 2020

Table 1

(1) Initial Borrowing	RM300,00	
(2) ELR, Effective Lending Rate:	4.60%	
(3) Tenure: 35 Years/420 Months	420	
(4) Effective From:	61 Months	
(5) Total O/S After 60 Months:	280,585.00	
(6) Due to Moratorium	Before Moratorium	After Moratorium
(7) Total O/S After 6 Months:	<u>RM278,387</u>	<u>RM287,038</u>
(8) <u>Interests</u> Paid in 6 Months: (Rounded)	<u>RM6,432</u>	<u>RM0</u>
(9) <u>Principal</u> Paid in 6 Months: (Rounded)	<u>RM2,198</u>	<u>RM0</u>
(10) Instalment Per Month:	<u>RM1,438</u>	<u>RM1,438 + RM45</u> ↑
(11) Final Payments End at:	420/420	420/420

NOTE 1: Additional RM45 has been Amortized to make The Tenure On-Track!

NOTE 2: To be Exact, You need to pay "MORE", ~ RM15,930 in total!

NOTE 3: Consult Your RFP/CFP, There are other Better Ways to Engineer This!

NOTE 4: This Analysis has been Performed Using in-House Financial Technology, **The, PHASE**.

Note: This is for case study purpose only.

We have other better ways to "engineer" this situation wisely.

We shall go through this very carefully for the benefit of our readers who may comprise members of the general public. We now have Table E as below:

Case Study D:

Hire Purchase Loan During Moratorium.

- This is for Hire Purchase Loan, based on the latest FAQs released on 1 May 2020 by BNM regarding Hire-Purchase Product. This amendment

will result in 3 different scenarios accordingly. Borrowers can decide on their option from the 3 financial arrangements as below:

- Option A:**
 - To opt out of the moratorium; repayment tenure remains.
- Option B:**
 - To opt for the moratorium but to CLEAR all outstanding (April - Sept + Oct) at one go; repayment tenure remains.

- **Option C:**
 - To opt for the moratorium, agreeing to pay extra interests and late payments incurred and repayments extended for another 6 months.

Please consider the pros and cons carefully as each option shall result in a different financial impact. If you need cash in hand now and can compromise on the additional 3% of extra monthly instalments, Option C should be the popular option.

Table 2

Hire Purchase Moratorium	
Hire Purchase Amount, P:	RM60,000
Flat Interest Rate Charged, i p.a:	2.71%
Initial Loan Tenure, N:	5
Total Interests Charged Over 5 Years, I:	RM8,130.00
Total "P & I" Payable in 5 Years:	RM68,130.00
Monthly Instalment Per Month:	RM1,135.50
Moratorium Commenced at:	25 Months

Note: The delayed or deferred instalments shall be extended for 6 months from initial contract

Benefits and Key Takeaways:

The average Malaysian does not need to become a financial professional to deal with PFE but needs a qualified financial consultant who can provide relevant, accurate and reliable advisory.

Understanding financial engineering may not be easy, but this is so practical and critical in managing effective personal financial planning. This takes many years of practical experience, trial and error.

We have 3 immediate key takeaways:

- To keep your plan, both planned and actual, on track is important. This is very true when your life priorities change along the way. These are the fundamentals to achieve the "must have" without compromising the "nice to have". Every resource is important.
- Ensure your plan works based on pattern, trend and data without relying too much on previous information. This financial world is ever-changing and ever-challenging; it is beneficial to monitor the performance of the plan every year as a milestone.
- Plan for recovery if case plan A fails or becomes non-performing and replace this with plan B. When we adopt some forms of flexibility and risks tolerance, we are able to improve and manoeuvre the strategy effectively. When this is achieved, we can achieve FE more meaningfully.



Conclusion

Financial engineering is the way forward. We can benefit from it, avoiding unnecessary mistakes, errors and wastages. In Malaysia, there are many avenues to learn and practise financial engineering successfully. We can start by becoming an RFP, Registered Financial Planner/CFP, Certified Financial Planner. However, just the qualifications are not enough as ultimately, we still require real practical experience. If we can combine both theory and practical knowledge, we will be able to make an effective plan each time we use TVM to engineer it. ■