

FINANCIAL PLANNING DETERMINATION OF RETIREMENT FUND FOR INDONESIAN PEOPLE: The Significant of Expenses Ratio

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ABSTRACT

Many Indonesian people do not have individual retirement fund. They think that their expenses in retirement years can be paid by their children. Although it is a good opportunity for younger people to look after their parents, it can be a burdensome to some of the people who do not have stable income for themselves. It is unfortunate that not all Indonesian people are aware of the individual retirement fund. Furthermore, even if they knew about individual retirement fund, they would not give the contribution to make individual retirement fund. Moreover, there is limitation on information on the website and local book to guide Indonesian people to have and calculate his/her individual retirement fund.

The purpose of this research is to help Indonesian people to aware about total individual retirement fund by calculating their individual retirement fund. In order to calculate individual retirement fund, they must know the expenses ratio, inflation rate, net interest rate, productive years, and retirement years. These five variables will help them to give the formula to calculate the individual retirement fund. Due to limitation of time and data, this thesis will only give more emphasis in expenses ratio, because it has significant level of determining total individual retirement fund that will differ from one to another person.

The result of this thesis explains the relationship between each variable toward the individual retirement fund by doing sensitivity analysis. Furthermore, this thesis guides Indonesian people step-by-step to calculate individual retirement fund by using spreadsheet, such as Microsoft Excel.

Keywords: *Indonesian people, total individual retirement fund, sensitivity analysis, expenses ratio, inflation rate, net interest rate, productive years, retirement years, spreadsheet*

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INTRODUCTION

Majority of Indonesian do not think about individual retirement fund. They think that their retirement income and expenses are covered by their children or company. Therefore, when they retire from their job, they will realize that their retirement money is not enough to support their retirement life. Based on this reason, there is a need to plan ahead of retirement fund, so that the fund supports the investors' retirement life.

Actually, Indonesian Government requires companies to have and manage pension fund for their employees, either the companies manage it by themselves or delegate other companies to manage the fund. Indonesian Government has two social security organizations that are related to retirement fund for civil people, which are PT. Jamsostek (Jaminan Sosial Tenaga Kerja) and PT. Taspen (Tabungan dan Asuransi Pegawai Negri Sipil). These two organizations must manage the pension and retirement fund of their members. Research found that these two organizations did not give good performance to manage the pension fund, due to poor investment regulations, lack of Government coordination, and corporate governance (Wiener M., Alijoyo A., and Van der Auwera M., 2007). Based on this poor performance, the investment result will disappoint the investors.

Furthermore, PT. Jamsostek manages Rp. 53.7 trillion for Pension Fund (Kompas Newspaper, 26 November 2008, Bisnis & Keuangan Column, pg. 19). The official members that are listed in the PT. Jamsostek, are 25 million people (Kompas Newspaper, 26 November 2008, Bisnis & Keuangan Column, pg. 19). The total amount pension fund for each people is Rp. 2,148,000 (total amount of pension fund is divided by total official member). Moreover, Kompas Newspaper states that only 7.9 million people who are still paying the premium for Pension Fund. If it is calculated based on each person who pays the premium, each person only gets Rp. 6,797,468.354. Therefore, it is a fact that the retirement fund may not support the investors' retirement life. They will ask their children to cover all the expenses for their entire retirement life.

Although it is common for Indonesian children to take care of their parents when they are in retirement life, not many children are willing to support their parents' retirement life for many reasons. Many people know that if their children must cover all the expenses that are arose from their parents, the children will have big burden and may have difficulties on providing the balance life both for their parents and their families. If the children do not want to cover all their parents expenses, their parents will be forced to ask for help from other people. It will have destructive impact both on the retiree and other people, due to unprepared retirement fund. Therefore, the retiree must think and plan the retirement fund to prevent this from happening into reality. These reasons explain why Indonesian people, need to have retirement fund for their retirement life.

PROBLEM IDENTIFICATION

Many Indonesian people do not know about retirement fund. Moreover, many Indonesians are not aware the importance of retirement fund. If some people are aware of it, they will think that the retirement fund is a burden for them, which means that they do not know clearly the basic purpose of retirement fund. Also, they do not know whether their companies provide and manage the pension fund for them. From this perspective, they even do not consider their retirement life as one of the important aspect in life. Even if they know

the retirement fund and they know that their retirement fund is managed by social security organization, they may know or not know how to attain or claim the retirement fund from the organization. Therefore, when they are in retirement life, they will ask their children to cover the income and expenses.

They are not well informed about the importance of retirement fund, because there is little explanation about retirement fund in many financial books and other media, such as newspaper, tabloid, and etc. Furthermore, the financial books only cover theory without the calculation on “total retirement fund” that is needed. Also Indonesian people do not have a basic idea on what the criteria that must be included in the calculation. If they know the criteria, they fail to link and understand the relationship between the criteria (that have impact on total retirement fund) and the total retirement fund. Therefore, Indonesian people still think vague idea about retirement fund. Also, calculation on total retirement fund is needed to open Indonesian people. If they are taught to calculate “total retirement fund”, they will realize that they really need it and they want to participate in investing for getting total retirement fund.

Lack of knowledge and practice on determine criteria and calculate total retirement fund are the main issues of the problems. Therefore, if Indonesian people can determine criteria and know how to calculate the total retirement fund, they will understand and have a need in investing for their retirement fund.

LITERATURE REVIEW

Individual retirement fund means that the person saves his/her own money to plan his/her retirement life. He/she can do by him/her self or financial planner. If the company pays for its employees, it means that it is pension plan. Therefore, there is little difference between individual retirement fund and pension fund. For this purposes, I would like to use “retirement fund” as refer to individual retirement fund. Furthermore, individual retirement fund is not necessarily the predetermined retirement fund, such as DPLK, Jamsostek, or Taspen.

Retirement fund is the amount of money that is needed to support the investor’s retirement life. Based on Dictionary.com, the retirement fund is explained as “a monthly payment made to someone who is retired from work.” In order to have adequate retirement fund, the investor must calculate total retirement fund.

Total retirement fund consists of Future Value of Expenses and Present Value of Annuity. The investor must calculate future value of expenses in order to make reasonable assumption of future expenses that will be arisen in the future date. Furthermore, the investor must calculate the present value of annuity, because the investor will take amount of money periodically from total retirement fund to support his/her retirement life. Here is the picture:

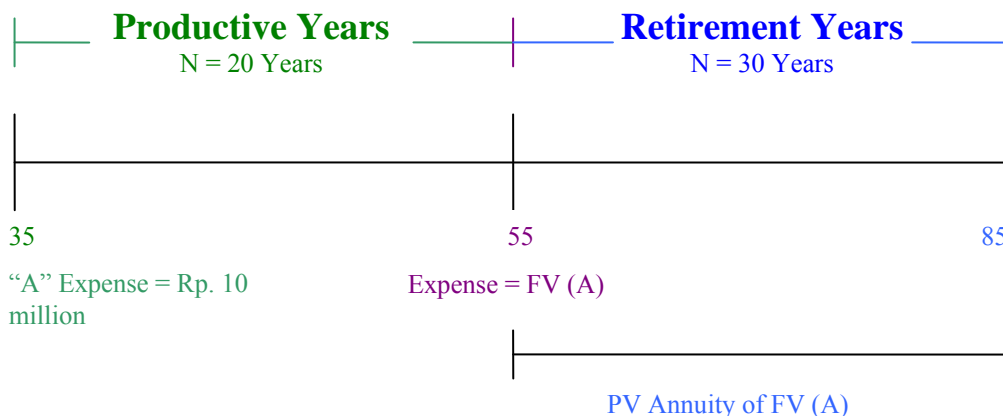


Figure 1. Definition of Total Individual Retirement Fund.

There are five steps to calculate total retirement funds based on Keown (2004, pg. 519). The first step is to set the goals for their retirement life. Each investor has different goals. The basic questions are: “How costly a lifestyle do you want to lead? Do you want to live like a king or more economically, perhaps like a minor duke or nobleman? Do you currently have any medical conditions that you know are going to be costly later in life?”. According to Keown, these basic questions can explain about each investor’s goals. In this step, the investor is asked to think about lifestyle that he/she wants without putting the number on it. Once this step is clear, the investor must move on to the second step.

The second step is to estimate how much money that will be needed in his/her retirement life. This step is very important because the investor must put his/her goals into numbers. The investor finds difficulties on making assumptions on future retirement life expenses. Therefore, the best way to calculate the future expenses is to calculate his/her current living expenses. The expenses consist of work expenses and other expenses. Work expenses would be “clothing expenses, housing expenses, and government income taxes.” Other expenses would be “insurance, medical expenses, expenses for leisure activities, and gifts and contributions.” (Kapoor, Dlabay, and Hughes, 2003, pg. 588-599). Here is the table of listing the expenses between current expenses and retirement expenses, based on Kapoor, Dlabay, and Hughes:

Table 1. Monthly Present and Retirement Expenses

Monthly Expenses		
Item	Present	Retirement
Fixed Expenses:		
Rent or mortgage payment		
Taxes		
Insurance		
Savings		
Debt payment		
Other		
Total Fixed Expenses:		
Variable Expenses:		
Food and beverages		
Household operation and maintenance		
Furnishings and equipment		
Clothing		
Personal		
Transportation		
Medical Care		
Recreation and education		
Gifts and contributions		
Other		
Total Variable Expenses:		
Total Expenses:		

In this table, there are time differences, which are present and retirement (future time). First, the investor must fill the present expenses. After that, the investor must adjust his/her expenses with the inflation. The result will be put in the retirement section. In this step, we can use expenses ratio also to make comparison between current expenses and assumption on future expenses. If the expenses ratio is 100%, it means that the assumption of future expenses will be the same as current expenses.

The third step is to estimate investor income available at retirement. The investor must calculate how much money that he/she will get when he/she is in the retirement life. In USA, the investor would have Social Security benefits, where the investor can get detail information about annual earnings and benefits statements. Furthermore, if the investor wants to know how much the pension fund, he/she must ask it into his/her company. It is common action in the USA.

Calculate the inflation as the fourth step that must be considered. Everything will get an impact from the inflation, which lead higher price in future date. Therefore, the expenses must be adjusted with the inflation in the future date. The investor must think about Future Value of expenses. The formula is:

$$FV = PV(FVIF_{i\%, n\ yr})$$

Equation 1. Future Value Formula.

PV is the current expenses and FVIF is the assumption of future expenses that are needed. $i\%$ is the inflation rate, and $n\ yr$ is the number of years. This formula is to make us know how much money that we need in the future date. The investor must make sure that if he/she counts the expenses monthly, the formula must be adjusted, so that it will give result in monthly also.

The last step is to calculate the funds needed to cover this shortfall. This step is to count total retirement fund. In this step, the investor must adjust net interest rate, which means Nominal Interest Rate – Inflation Rate. If the inflation rate is bigger than nominal interest rate, it means that the investor money would be eroded by inflation and vice versa. The investor must think about the Present Value of Annuity, because the investor's total retirement fund is taken periodically in annuity to support his/her retirement life. The formula is:

$$PV = PMT(PFIFA_{i\%, n\ yr})$$

Equation 2. Present Value of Annuity Formula.

PMT is payment periodically. PFIFA is Present Value of Annuity. $i\%$ is net interest rate and $n\ yr$ is number of years. The investor will get an amount of number that reflects the total retirement fund that is needed. Furthermore, the investor must think about his/her life expectancy. It is because the longer the life expectancy, the bigger the total retirement fund.

METHODOLOGY

Majority of Indonesian people do not think about retirement fund. Furthermore, they may not have retirement fund. Even if they have retirement fund, they do not know whether their retirement fund can cover their retirement life or not. Moreover, there is no clear explanation in retirement fund in any financial planner books. Therefore, they do not have necessary knowledge and understanding about the retirement fund.

In order to make them understand about retirement fund, the people must know how to calculate retirement fund by themselves. They must know each variable that must be used in order to calculate the retirement fund. Therefore, it is important to elaborate each variable to calculate retirement fund. There are three ways to calculate retirement fund. First, they must know how to get the reliable data for each variable, so that they may input the right thing to get right output. Second, they must think about Future Value of Expenses. The formula is:

$$FV = PV(FVIF_{i\%, n\ yr})$$

The investors must think about their expenses that will be occurred in the future year. The investors can make necessary adjustment to give the expected expenses. For example: if the investors think that the future expenses amount is greater than today expenses, the investors may add the expenses. In order to get better understanding, the expenses would be in

ratio as expenses ratio. For example: today expenses are Rp. 10,000,000/month. If the investors think the future expenses would be the same as today expenses, the expense ratio would be 100%. If the investors think the future expenses would be Rp. 15,000,000/month, the expense ratio would be 150%. If the investors think the future expenses would be Rp. 5,000,000/month, the expense ratio would be 50%. For example:

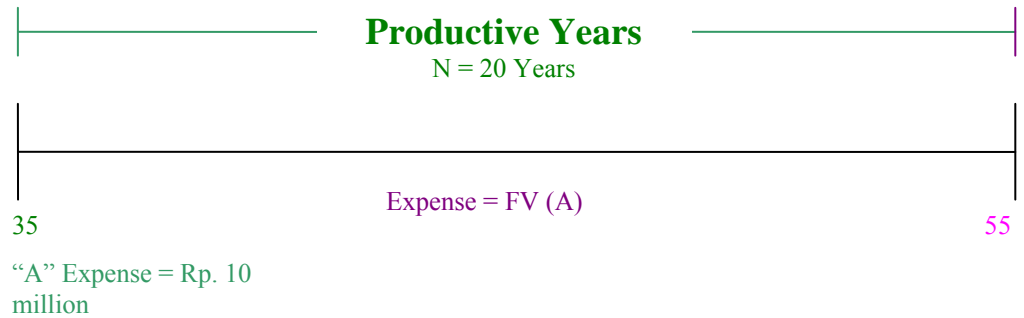


Figure 2. Future Value of Expenses.

From this picture, the expenses are Rp. 10 million/month. The assumption for expenses ratio is 100%, so that the estimated future expenses are Rp. 10 million/month. Therefore, the investors can use this estimated future expenses to calculate Future Value of Expenses, which is adjusted with inflation rate. Third, they must think about Present Value of Annuity. The formula is:

$$PV = PMT(PFIFA_{i\%, n\ yr})$$

The Present Value of Annuity is to calculate total cash for the investors that will provide cash inflow periodically for their retirement life. For example:

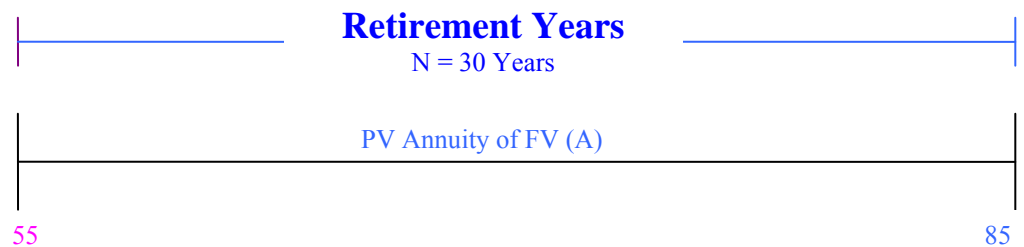


Figure 3. Present Value of Annuity of Expenses.

From the picture, Present Value of Annuity must be calculated in order to get total amount of cash that is in age 55 years old. That total amount will be used as cash inflow for the investors’ retirement life.

For reasonable hypothesis, the formula will be tested with the *Sensitivity Analysis* (tested in multiple scenarios) in every variable to get better understanding each variable impact to the total retirement fund. The result will be used as total retirement fund in a specific time and place. Therefore, the investors can use the formula to calculate total retirement fund

by themselves. It is expected that the investors will understand the importance of total retirement fund and they will provide their total retirement fund without burdening their children to cover their retirement life.

Due to limitation data and time, the expenses ratio will be used in normal probability distribution, so that it can affect the majority of all Indonesian people. According to Wikipedia.org, normal probability distribution is a continuous probability distribution that describes data that clusters around a mean or average. This method is used, so that the expense ratio can be computed as a mean to get the average of normal people expenses ratio. The result of normal probability distribution on expenses ratio can be used as a mean, although it can change overtime in line with people awareness of their future.

Due to limitation time and data, it only uses 35 correspondents as a sample of large population. From the calculation, the mean (average) expenses ratio is 105%. The symbol of the mean is “ μ ”. Furthermore, from the calculation, the standard deviation is 31.13%. The symbol of the standard deviation is “ σ ”. This is the example of how calculate mean and standard deviation.

There are 8 values, which are 2, 4, 4, 4, 5, 5, 7, 9. The mean is $(2 + 4 + 4 + 4 + 5 + 5 + 7 + 9) / 8 = 5$. There are 2 steps to calculate standard deviation. The first step is: $(2 - 5)^2 + (4 - 5)^2 + (4 - 5)^2 + (4 - 5)^2 + (5 - 5)^2 + (5 - 5)^2 + (7 - 5)^2 + (9 - 5)^2 = 32$. The second step is: $\sqrt{(32) / 8} = \sqrt{4} = 2$. Therefore, from the calculation, the mean (μ) is 5 and standard deviation (σ) is 2.

After that, Z value must be calculated by $Z = (X - \mu) / \sigma$. X means the number that wants to be inputted. From the expenses ratio cases, it can have many probabilities that can be made. Due to limitation of time and data, it will only give 6 possibilities.

The first possibility is how many persons (in percentage) have expenses ratios $\leq 100\%$. The Z value would be -0.16. This Z value must be converted into probability by converting it with Z table. The probability is 44.04%. It means that when one uses 100% on expenses ratio, it would only cover 44.04% majority from all the people. Furthermore, it means that the accuracy result on calculation would be 44.04%.

The second possibility is how many persons (in percentage) have expenses ratio $\leq 130\%$. The Z value would be 0.81. When the number is converted, the probability is 79.10%. It means that the accuracy of calculation on total individual retirement fund is 79.10%. It is because the result can affect 79.10% majority of all people.

The third possibility is how many persons (in percentage) have expenses ratio $\leq 150\%$. The Z value would be 1.45. When the number is converted into possibility, it gets 85.20%. Therefore, when one uses this number (150%) in expenses ratio, the accuracy of calculation would be 85.20% majority of all people.

The fourth possibility is how many person (in percentage) has expenses ratio $\leq 170\%$. The Z value is 2.09 and probability is 98.21%. It means when one uses (170%) on expenses ratio, the accuracy of the calculation would be 98.21%. It is because it can affect 98.21% majority of all people.

The fifth possibility is how many persons (in percentage) have expenses ratio $\leq 190\%$. The Z value is 2.73 and probability is 99.69%. And the last possibility is how many person (in percentage) is that has expenses ratio $\leq 200\%$. The Z value is 3.06 and probability is 99.88%. It means that the accuracy of calculation would be 99.88% that can affect 99.88% majority of all people.

But it must be reminded that this method is done, so that the expenses ratio can be put in the same way for everyone without concern of anything. But if one wants to have different

expenses ratio than this one, it would be a pleasure to use the one that wants, so that the number on expenses ratio can truly reflect one goal on his or her retirement life.

RESEARCH RESULT

Sensitivity Analysis

From the sensitivity analysis, it shows that each variable determines the total individual retirement fund. The result will be explained in detail in the each section.

Sensitivity Analysis Expenses Ratio

First variable is Expense Ratio. Expense Ratio is the percentage between current expenses and expected future expenses that will incurred in the retirement period. For example, if the current expenses are Rp. 20,000,000, and the future expenses, that will be incurred, will be Rp. 40,000,000, the expenses ratio will be Expected Future Expenses is divided by Current Expenses (Expected Future Expenses / Current Expenses). Therefore, Rp. 40,000,000 / Rp. 20,000,000 = 200%. This ratio means that one can have bigger expected future expenses in the retirement period. If the ratio is 100%, it means that one may have the same expenses between current expenses and expected future expenses. Based on the average of 10 Indonesian people, the expenses ratio would be 93%. Most of them think that the future expenses are same with the current expenses. In the example, the expenses/month is Rp. 20,000,000. Here is the example:

Table 2. Expenses Ratio 100%.

PV of Pension Expense	20,000,000	FV	Rp. 348,988,045.38
Expenses Ratio	100%	Total IRF	Rp. 9,096,647,464.30
Inflation Rate	10.0%		
Net Interest Rate	1.0%		
Productive Years	30		
Retirement Years	30		

From the table, it shows that when Expenses Ratio is 100%, the total IRF (Individual Retirement Fund) will be Rp. 9,096,647,464.30. It means that one must provide Rp. 9,096,647,464.30 to support his/her life in retirement period, if the current expenses/month is Rp. 20,000,000. The bigger the current expenses/month, the bigger the IRF and it is vice versa also.

If the expenses ratio is changed into 150% with all variables stay the same, the Total IRF (Individual Retirement Fund) will be:

Table 3. Expenses Ratio 150%.

PV of Pension Expense	30,000,000	FV	Rp. 523,482,068.07
Expenses Ratio	150%	Total IRF	Rp. 13,644,971,196.46
Inflation Rate	10.0%		
Net Interest Rate	1.0%		
Productive Years	30		
Retirement Years	30		

From the above table, it shows that PV of Pension Expense is Rp. 30,000,000. To get PV of Pension Expense number, the expenses/month must times with the expenses ratio. Therefore, when the expenses ratio is 150%, the PV of Pension Expense is Rp. 20,000,000 X 150% = Rp. 30,000,000. Furthermore, it shows that when the Expenses Ratio is 150%, the total IRF will be Rp. 13,644,971,196.46. It means that one must provide Rp. 13,644,971,196.46 to support his/her life in the retirement period. If the two tables are compared, it shows that there is significant change in the total individual retirement fund when the expenses ratio is changed with all variables stay the same.

From the sensitivity analysis, it can be assumed that the expenses ratio determines the total individual retirement fund that is needed for his/her life during retirement period.

Sensitivity Analysis Inflation Rate

Second variable is inflation rate. Inflation rate is used to calculate the Future Value of Expenses/Month that will determine the total individual retirement fund also. Here is the example:

Table 4. Inflation Rate 9.5%.

PV of Pension Expense	20,000,000	FV	Rp. 304,406,254.15
Expenses Ratio	100%	Total IRF	Rp. 7,934,588,065.75
Inflation Rate	9.5%		
Net Interest Rate	1.0%		
Productive Years	30		
Retirement Years	30		

From the table, it shows that when the inflation rate is 9.5% with all variables stay the same, the total IRF will be Rp. 7,934,588,065.75. If it is compared to the second table, which has 12% as inflation rate with all variables stay the same:

Table 5. Inflation Rate 12%.

PV of Pension Expense	20,000,000	FV	Rp. 599,198,442.42
Expenses Ratio	100%	Total IRF	Rp. 15,618,577,954.27
Inflation Rate	12.0%		
Net Interest Rate	1.0%		
Productive Years	30		
Retirement Years	30		

From the above table, it shows that the total individual retirement fund will be Rp. 15,618,577,954.27. If it is examined in detail, the inflation rate changes the Future Value of the Expenses/Month that determines the total individual retirement fund. When the inflation rate is 9.5%, it shows FV: Rp. 304,406,254.15. When the inflation rate is 12%, it shows FV: Rp. 599,198,442.42.

From this point, it is clear that inflation rate has important role in order to determine both the future value of expenses/month and total individual retirement fund. The reason is because the total individual retirement fund is determined by future value of expenses/month. The bigger the inflation rate, the bigger the future value of expenses/month is. The bigger the future value of expenses/month, the bigger the total individual retirement fund is. It is vice versa also.

Sensitivity Analysis Net Interest Rate

The third variable is net interest rate. Net interest rate is used to determine the rate that will be used in total individual retirement fund calculation. Net interest rate is nominal interest rate minus inflation rate. For example: when the bank says that the interest rate is 9%, it means that the nominal interest rate is 9%. If the inflation rate is 7%, the net interest rate will be $9\% - 7\% = 2\%$. Therefore, we use 2% as the net interest rate that will be used in the total individual retirement fund calculation. Here is the example of sensitivity analysis net interest rate:

Table 6. Net Interest Rate 2%.

PV of Pension Expense	20,000,000	FV	Rp. 152,245,100.85
Expenses Ratio	100%	Total IRF	Rp. 3,477,945,646.80
Inflation Rate	7.0%		
Net Interest Rate	2.0%		
Productive Years	30		
Retirement Years	30		

From the table, it shows that when net interest rate is 2%, the total IRF will be Rp. 3,477,945,646.80. If it is compare to net interest rate is 1% with all variables stay the same, the total IRF will be changed also. Here is the table:

Table 7. Net Interest Rate 1%.

PV of Pension Expense	20,000,000	FV	Rp. 152,245,100.85
Expenses Ratio	100%	Total IRF	Rp. 3,968,388,112.35
Inflation Rate	7.0%		
Net Interest Rate	1.0%		
Productive Years	30		
Retirement Years	30		

From the second table, it shows that when net interest rate is 1%, the total individual retirement fund will be Rp. 3,968,388,112.35. It means that the net interest rate also determines the total individual retirement fund. The smaller the net interest rate, the bigger the total individual retirement fund is. It is also vice versa.

Sensitivity Analysis Productive Years

The fourth variable is productive years. Productive years mean that how long the person works until he/she retires from his/her job. It means that the person who has the ability to gain income from working. These productive years are determined by the age when the person starts the job and when the person retires. In order to find the productive years, one must do calculation, which is age in retire minus age start job. Here is the table for the example:

Table 8. Comparison Age Start Job (25) and Age Retire (55).

PV of Pension Expense	20,000,000	FV	Rp. 348,988,045.38
Expenses Ratio	100%	Total IRF	Rp. 9,096,647,464.30
Inflation Rate	10.0%		
Net Interest Rate	1.0%		
Age Start Job	25		
Age Retire	55		
Productive Years	30		
Retirement Years	30		

Table 9. Comparison Age Start Job (30) and Age Retire (60).

PV of Pension Expense	20,000,000	FV	Rp. 348,988,045.38
Expenses Ratio	100%	Total IRF	Rp. 9,096,647,464.30
Inflation Rate	10.0%		
Net Interest Rate	1.0%		
Age Start Job	30		
Age Retire	60		
Productive Years	30		
Retirement Years	30		

Table 10. Comparison Age Start Job (20) and Age Retire (50).

PV of Pension Expense	20,000,000	FV	Rp. 348,988,045.38
Expenses Ratio	100%	Total IRF	Rp. 9,096,647,464.30
Inflation Rate	10.0%		
Net Interest Rate	1.0%		
Age Start Job	20		
Age Retire	50		
Productive Years	30		
Retirement Years	30		

From three tables above, they show that no changes in productive years and the individual retirement fund. The reason is because the total individual retirement fund is determined by the productive years, which is 30 years. Therefore, as long the productive years is 30 years, it does not matter whether the age of start job and age retire that are explained in the tables.

But, if the productive years are changed, the total individual retirement fund is changed also. Here is the example:

Table 11. Productive Years (20).

PV of Pension Expense	20,000,000	FV	Rp. 134,549,998.99
Expenses Ratio	100%	Total IRF	Rp. 3,507,151,386.17
Inflation Rate	10.0%		
Net Interest Rate	1.0%		
Productive Years	20		
Retirement Years	30		

Table 12. Productive Years (25).

PV of Pension Expense	20,000,000	FV	Rp. 216,694,118.87
Expenses Ratio	100%	Total IRF	Rp. 5,648,302,378.94
Inflation Rate	10.0%		
Net Interest Rate	1.0%		
Productive Years	25		
Retirement Years	30		

From the above two tables, they show the differences in future value of expenses/month and total IRF. The reason is productive years determines the expenses/month that will determine the total IRF. Therefore, when the productive years is 20, the Future Value of Expenses/Month is Rp. 134,549,998.99 and the total IRF is Rp. 3,507,151,386.17. And when the productive years is 25, the Future Value of Expenses/Month is Rp. 216,694,118.87

and the total IRF is Rp. 5,468,302,378.94). Therefore, the bigger the productive years, the bigger the future value of expenses/month is that will lead bigger individual retirement years.

Sensitivity Analysis Retirement Years

The last variable is retirement years. Retirement years is gotten from life expectancy minus the age retire. It means that how long one wants to enjoy the retirement. The main principal is same with the productive years. Although, the retirement years are determined by age retire and life expectancy, the individual retirement fund will be the same if the result of retirement years calculation is same. Here is the example:

Table 13. Comparison Age Retire (45) and Life Expectancy (75).

PV of Pension Expense	20,000,000	FV	Rp. 216,694,118.87
Expenses Ratio	100%	Total IRF	Rp. 5,648,302,378.94
Inflation Rate	10.0%		
Net Interest Rate	1.0%		
Productive Years	25		
Age Retire	45		
Life Expectancy	75		
Retirement Years	30		

Table 14. Comparison Age Retire (50) and Life Expectancy (80).

PV of Pension Expense	20,000,000	FV	Rp. 216,694,118.87
Expenses Ratio	100%	Total IRF	Rp. 5,648,302,378.94
Inflation Rate	10.0%		
Net Interest Rate	1.0%		
Productive Years	25		
Age Retire	50		
Life Expectancy	80		
Retirement Years	30		

Table 15. Comparison Age Retire (60) and Life Expectancy (90).

PV of Pension Expense	20,000,000	FV	Rp. 216,694,118.87
Expenses Ratio	100%	Total IRF	Rp. 5,648,302,378.94
Inflation Rate	10.0%		
Net Interest Rate	1.0%		
Productive Years	25		
Age Retire	60		
Life Expectancy	90		
Retirement Years	30		

From the above three tables, they show that although the age retire and life expectancy are different from one to another, the retirement years result is still the same. The reason is because retirement fund focus on how long one wants to enjoy his/her retirement.

For the sake of sensitivity analysis, it is better to use different retirement years, so that the changes can be shown. Here is the example:

Table 16. Retirement Years (20).

PV of Pension Expense	20,000,000	FV	Rp. 348,988,045.38
Expenses Ratio	100%	Total IRF	Rp. 6,360,659,080.03
Inflation Rate	10.0%		
Net Interest Rate	1.0%		
Productive Years	30		
Retirement Years	20		

Table 17. Retirement Years (40).

PV of Pension Expense	20,000,000	FV	Rp. 348,988,045.38
Expenses Ratio	100%	Total IRF	Rp. 11,573,502,056.78
Inflation Rate	10.0%		
Net Interest Rate	1.0%		
Productive Years	30		
Retirement Years	40		

From the tables, they show the differences in the total individual retirement fund, although the future value of expenses/month is still the same. The reason is because the longer the retirement years, the bigger the total individual retirement fund is. Another reason is because one must support his/her life longer than expected.

Calculation of Individual Retirement Fund

Calculation of individual retirement fund is important to be known, so that every person can calculate his/her individual retirement fund. In order to make the calculation easier, it may use the spreadsheet, such as Microsoft Excel and etc. For the purpose of calculation, Microsoft Excel is used. The reason is because Microsoft Excel has the Present Value and Future Value formula, which give easiness to the operator. The version, that is going to be used, is Microsoft Excel 2003.

Before calculation, one must question him/herself to ask many questions. The first question is to ask oneself to know the current age. The second question is to ask oneself to know when one wants to retire from the jobs. The third question is to ask oneself to know how long one wants to enjoy or spend his/her retirement life. The fourth question is how much the current expenses/month is for oneself not including spouse or children, because this is individual retirement fund. It is best to separate the individual retirement fund for spouse or children. The last question is to know how much the future expenses/month is for oneself in retirement period. In order to give a clear understanding about these questions, there is

questionnaire in the Appendix A or B to be followed, so that the calculation about oneself may not be wrong.

The next step is to find the inflation rate. Fortunately, one can find reliable data from either Government Statistic Company or reliable Bank source. This thesis uses both of them, since the inflation rate is same between Government Statistic Company (BPS)³ and Bank of Indonesia⁴. The data may be ranged into many different years, it is best to use average of inflation rate between each year, or each month. It is better to use 5 years to use average calculation. But due to unavailable data for 5 years, it is good to average the available data, which is 4 years that can be taken from BPS (Badan Pusat Statistik).

The third step is to find the net interest rate. The net interest rate will use either Mutual Fund in Bond or Government Bond. The reason is because net interest rate will be used in retirement period, so that one can have stable income per period to support his/her life. Furthermore, Government Bond may be considered as risk-free rate that is suitable for the person who lives in the retirement period. In this thesis, Government Bond is used to give the clear picture of calculation net interest rate. In this thesis, mutual fund in bond may not be used, because it takes a lot of time to consider which mutual fund does not consist of corporate bond, which is riskier bond than Government Bond. One can find the data from Indonesia Stock Exchange Website (IDX)⁵. From the website, one must click one-by-one to know the YIELD of Government Bond with Specific Time Range. The data must be averaged to get reliable data. One can see in the Appendix A or B also to get the clear picture of calculating the average Government Bond. After that, one can extract the average Government Bond with the inflation rate to get net interest rate.

To summarize the above paragraphs, it is better to put calculation table. Here is the table:

Table 18. Summarize Table Calculation.

Current Expenses/Month	20,000,000
PV of Pension Expense	20,000,000
Expenses Ratio	100.00%
Inflation Rate	10.46%
Government Bond Yield	11.83%
Net Interest Rate	1.37%
Age Start Job	25
Age Retire	55
Productive Years	30
Retirement Years	30

From the above table, it shows many data. First is the current expenses/month. Second is PV Exp Ratio, which means that how much the future expected expenses/month would be in the retirement period with current nominal value. The third one is expenses ratio, which is

³ <http://www.bps.go.id/sector/cpi/table3.shtml>

⁴ <http://www.bi.go.id/web/id/Moneter/Inflasi/>

⁵ <http://www.idx.co.id/Bonds/Government/HistoricalIGSYC/tabid/302/lang/id-ID/language/id-ID/Default.aspx>

gotten by dividing the current expenses/month with PV Exp Ratio, which is 100%⁶. The fourth is inflation rate data that is taken from average data. The fifth data is Government Bond Yield. The data is taken from average data. The next data is net interest rate, which is gotten from extracting Government Bond Yield with Inflation Rate, which is 1.37%⁷. The seventh data is current age or age start job. The eighth data is age when one wants to retire from his/her jobs. According to Peraturan Menteri No. 02 TH 1993, the normal of age pension is 55 years and the maximum is 60 years⁸. Therefore, we can find the next data, which is productive years, which means how long one works before retires. The last data is retirement years, which is how long one wants to enjoy or spend his/her retirement life. One can adjust for him/herself for this data. According to Data Statistik Indonesia⁹, which is another Government Statistic Company, the life expectancy for Male is 69 years and Female is 73 years that are resident in Jakarta.

After all data are inputted in the Microsoft Excel 2003, the future value of expenses will be known. This future value of expenses is different from PV Expenses Ratio. The reason is because future value of expenses is counted from PV Exp Ratio with inflation rate adjusted. It means that how much money one will put as expenses in the first year of retirement period. Fortunately, Microsoft Excel provides Future Value formula that can be used quickly. The formula is:

$$=FV(\text{rate},\text{nper},\text{pmt},[\text{pv}],[\text{type}])$$

Equation 3. Future Value Formula in Microsoft Excel 2003.

FV means future value. The inflation rate is used in the Rate, so that the expenses/month can be adjusted in the retirement period. The productive years is used in the Nper, because the result will explain about the first year of future expenses in retirement period. Pmt is payment for each period. Leave it blanks. The PV is Present Value. The data that must be used is PV Exp Ratio with “-“ sign. The last one is type. Leave it blank. The result is Rp. 395,531,578.33. Here is the example:

$$=FV(10.46\%,30,-20000000)$$

Next step is to calculate total individual retirement fund. In order to calculate total IRF (Individual Retirement Fund), the present value annuity is needed. The reason is because the total individual retirement fund must be extracted by some amount of money (Rp. 395,531,578.33) to support his/her life during retirement period. Here is the present value annuity formula:

$$=PV(\text{rate},\text{nper},\text{pmt},[\text{fv}],[\text{type}])$$

Equation 4. Present Value Formula in Microsoft Excel 2003.

⁶ Expenses Ratio = Current Expenses/Month / PV Exp Ratio = Rp. 20,000,000 / Rp. 20,000,000 = 100%.

⁷ Net Interest Rate = Government Bond Yield - Inflation Rate = 11.83% - 10.46% = 1.37%.

⁸

<http://www.banten.go.id/dokumen/USIA%20PENSIUN%20NORMAL%20DAN%20BATAS%20USIA%20PENSIUN%20MAKSIMUM.pdf>

⁹ http://www.datastatistik-indonesia.com/component/option,com_tabel/kat,5/idtabel,132/Itemid,167/

PV stands for present value. The data that is used is net interest rate. The reason is because the interest must be bigger than inflation rate, so that the money can growth bigger and bigger. Furthermore, it uses net interest rate, so that one can enjoy his/her retirement years without having problem in paying one expenses/month in the retirement years. Pmt is payment and is inputted as Rp. 395,531,578.33. The reason is because that amount of money that will be used each period to support one life in retirement period. FV is left blank. The type must be inputted as 1. Here is the example:

$$=PV(1.37\%,30,395531578.33,,1)$$

The result of total individual retirement fund would be Rp. 9,810,520,691.71., which mean that one must provide that number in year 55, so that one can have stable income in each period from year 56 until 86 (retirement period). In order to give clear picture for the whole calculation, the table must be provided as an example. Here is the example:

Table 19. Calculation Total IRF Table in Microsoft Excel 2003.

Current Expenses/Month	20,000,000	FV	395,531,578.33
PV of Pension Expense	20,000,000	Total IRF	9,810,520,691.71
Expenses Ratio	100.00%		
Inflation Rate	10.46%		
Government Bond Yield	11.83%		
Net Interest Rate	1.37%		
Age Start Job	25		
Age Retire	55		
Productive Years	30		
Retirement Years	30		

CONCLUSION & RECOMENDATION

Conclusion

Individual retirement fund is amount of money that is prepared by oneself to support his/her retirement life. It is necessary for every one to have individual retirement fund, so that his/her retirement life can be enjoyed without burdening his/her children or other member families. Unfortunately, many Indonesian people do not think or consider this fund as an important matter that must be done right away. They do not know that they will burden themselves in later years.

Based from the calculation and research result about sensitivity analysis, the individual retirement fund can be calculated by every one. Furthermore, the result of individual retirement fund would be different from one person to another person. The reason is because each person has different variables that will affect the individual retirement fund.

It is already explained and proofed that when one of the variables changes, such as expenses ratio, inflation rate, net inflation rate, productive years and retirement years, with all

variables constant, the individual retirement fund result will differ also. Therefore, it is best for one to carefully choose the data to be inputted to each variable.

Expenses ratio is the first variable that must be inputted. Each person may have same or different expenses ratio. The reason is because every one may have same or different perception on his/her life in the future years or in the retirement years. Expenses ratio can be calculated by dividing Expected Future Expenses/Month by Current Expenses/Month.

Inflation rate is the second variable that must be inputted correctly. It may have slightly different number from one person to other persons. The inflation rate must be taken from Government Authority, because it has validated data that reflects the Indonesian economy.

Net interest rate is the third variable that must be considered. Every one may have same or slightly different number, but it must reflect the Indonesian economy also. Net interest rate can be calculated by extracting the Nominal Interest Rate with Inflation Rate. Net interest rate can be called Real Interest Rate. Nominal Interest Rate can be taken from SBI (Surat Berharga Indonesia) or Bond (Government Bond), or Mutual Fund that is managed in Government Bond. It is used to minimize the risk of not getting paid or money to support one retirement life.

Next variable is productive years. Productive years can be calculated by extracting the Pension Age with Current Age. It means that how long one can be a productive person to earn money. Each person may have the same or different number.

Next variable is retirement years. Retirement years means how long one can spend or enjoy his/her retirement life. Each person may have the same or different number.

After all variables are inputted correctly, one can use them to calculate one individual retirement fund. It must be done in two steps. First, one must find the Future Value of Expenses/Month that is adjusted with Inflation Rate. The next step is to find the total individual retirement fund by using Present Value of Annuity. The result will be the total individual retirement fund.

From the calculation, one can know that one needs a lot of money to be saved in order to achieve the total individual retirement fund. Therefore, it is better for person to understand how to calculate his/her total individual retirement fund and after that one can know how much money he/she must save to achieve that total individual retirement fund.

Based on the normal probability distribution, it is better to put either 150% or 170% in Expenses Ratio in order to affect the majority of all Indonesian people. But if one wants to have different Expenses Ratio, one may use it as only for personal reference.

Recommendation

The recommendation would be that the sooner the person knows about the importance of individual retirement fund, the better it will be. The person must use his/her personal judgment in determining his/her expenses ratio. But the person must use available data from Government Authority or Statistic Company to use data for other four variables. The person may calculate his/her individual retirement fund to know the importance of that fund.

If the person is still in vague in calculating the total individual retirement fund or determining the data that should be inputted in each variable, the person can go to his/her personal financial planner to help making the total individual retirement fund.

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