Social Security Research Centre

SSRC Working Paper Series
No. 2017-3

From the Employees Provident Fund to the National Social Protection: The Case of Malaysia

Mario Arturo Ruiz Estrada
Donghyun Park
Norma Mansor

June 2017

About Social Security Research Centre

The Social Security Research Centre (SSRC) was established in March 2011 at the Faculty of Economics and Administration (FEA), University of Malaya to initiate and carry out research, teaching and dissemination of evidence-based knowledge in the area of social security, including old age financial protection in order to enhance the understanding of this critical topic to promote economic development and social cohesion in Malaysia.

To support the research in social security in general and old-age financial protection in particular the Employees Provident Fund (EPF) of Malaysia has graciously provided an endowment fund to create the nation's first endowed Chair in Old Age Financial Protection (OAFPC) at University of Malaya. OAFPC has the over-riding objectives to help formulate policies to promote better social security and improve old age financial protection, and to help formulate policies to promote economic growth in an ageing society for consideration by the Government of Malaysia.

The interest in social security and old-age financial protection is ever growing in view of an ageing population. Malaysia is also subjected to rising life expectancy and falling fertility rates, the perceived inadequacy of current social security provisions, coupled with the added fear that simply more expenditure may not be conducive to the development and growth objectives of the society. This calls for innovative policy solutions that may be inspired by international experience based on an empirical grounding in national data and analysis.

From the Employees Provident Fund to the National Social Protection Fund: The Case of Malaysia

Abstract

We introduce a new social protection fund concept, the National Social Protection Fund (NSPF). The NSPF incorporates the informal productive sector into the formal productive sector. The primary objective of NSPF is to create a robust national social protection scheme for all Malaysians by unifying the National Integral Social Security Fund (NISSF) and the National Education Fund (NEF). NISSF encompasses the actual employees' provident fund (α1), the non-employees provident fund (α2), and the unemployed insurance fund (α3). Hence, the NSPF can reduce income inequality and poverty in Malaysia in the short run. We perform simulations based on the application of the NSPF concept to Malaysia.

Keywords: Malaysia, EPF, Social Security, Social Protection, and Policy Modelling

JEL: Y20

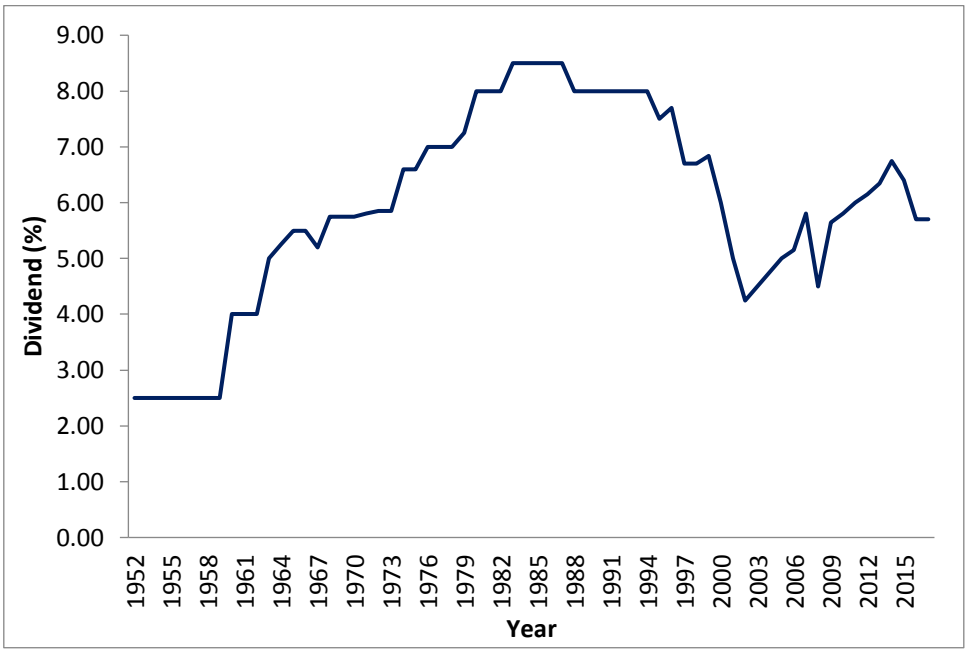
1. An Introduction to the Malaysian Employees Provident Fund (EPF)

Initially, the Malaysian Employee Provident Fund (EPF) was established in 1951 under the Ministry of Finance. The EPF is a compulsory saving account and retirement plan for all Malaysians. In the year 1991, the EPF becomes a new scheme based on the employees' contribution of 11% of wage and employers' contribution of 12%. The primary aim of the new policy is to increase EPF participation in the Malaysian economy by increasing dividends of EPF members. In short, EPF is a national compulsory retirement savings scheme.

The dividends provided by EPF show an unpredictable pattern, as seen in Figure 1. Between 1991 and 2002, EPF dividends dropped considerably from 8% to 4.25%. Between 2003 and 2007 dividends recovered moderately to 5.80%. In 2008, the dividend fell sharply to 4.50% as a result of the global financial crisis. From 2009 to 2013, the EPF dividends gradually rose to 6.35%. Finally, the dividends fell again from 6.75% in 2014 to 5.70% in 2016. The last drop is due to difficult domestic economic conditions.

The EPF has a total of 6.83 million active members, as of 2016. The Malaysian government made three significant changes in the mandatory retirement age. More specifically, the age was increased from 55 to 56 years old in 2001. In 2008, the retirement age rose from 56 to 58 years old. The most retirement age change was in 2012, when it was raised from 58 to 60 years old under the Minimum Retirement Age Act of 2012 (Social Security Administration, 2012).

Figure 1: EPF-Dividend (1952-2017)



Source: EPF (2017)

2. Difference between Social Protection and Social Security

According to Johannes Jütting (2000), there is no consensus of views among academicians and policy makers about the distinction between social protection and social security. Yet we will try to make a clear distinction between social protection and social security in our paper.

First, we define social protection as the general framework that includes the interaction between social welfare, social security, social programs, social assistance, human safety, or any social program. Social protection seeks to protect any citizen in the same country without any social, political, or economic discrimination. Also, social protection is not compulsory by law in the society.

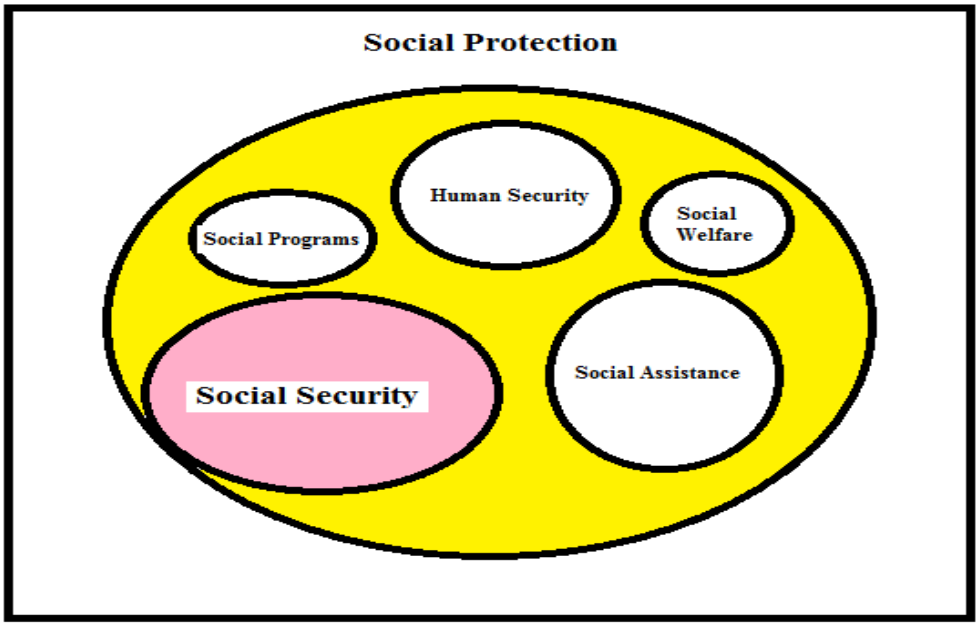
On the other hand, social security is defined as any contributory framework scheme such as employment providence funds, insurance, health programs, or any program that involve a payment. At the same time, the social security is compulsory by law for all society members."

Basically, the main difference between social protection and the social security is the cost - i.e. low or high - and benefits - i.e. individual or collectively. Conceptually, it is possible to view social security as a subset of social protection. (see Figure 2).

In this paper, we argue that the Employee Provident Fund (EPF) of Malaysia needs a broad reform. This strategic reform is to move from a primary social security fund to a more standardized social protection fund. The central objective of our paper is to find a suitable social protection fund model that will contribute to Malaysia's efforts in solving poverty, inequality, and other social and economic problems. We hope that the new social protection fund can enhance social welfare and improve the lives of all Malaysians.

Our analysis suggests that the Malaysian government and EPF would do well to consider an extensive re-engineering of the EPF. The creation of a new general social protection fund is possible only with the creation of a new institutional platform, namely the Social Security Council (SSC). The Social Security Council (SSC) is the point of departure for a robust social protection fund that will benefit all Malaysians.

Figure 2: Social Protection and Social Security



Source: Author

3. Model: The Social Protection DNA Simulator (SP-DNA-Simulator)

The social protection DNA simulator (SP-DNA-Simulator) is an alternative analytical tool to evaluate the ultimate impact of the unification of different social funds into a single common social fund. The SP-DNA-Simulator is based on the interaction and joining of two long social protection helices. These two long social protection helices are the National Integral Social Security Fund (NISSF) or (Helix-1) and the National Education Fund (Helix-2).

In the construction process of each social protection fund, Helix follows a series of steps. The first step is the calculation of the National Integral Social Security Fund (NISSF) or (Helix-1). To build the Helix-1 it is necessary to measure three social security micro-structures (MS) needed to create a single social protection sub-structure (SS). The three social security micro-structures (MS) are the actual employee's provident fund (α1), the non-employees provident fund (α2), and the unemployed insurance fund (α3).

However, the National Education Fund (Helix-2) only uses the social protection sub-structures (SS). Helix-2 doesn't have any social security micro-structures, unlike the National Integral Social Security Fund (NISSF) or Helix-1. Subsequently, the next step is to join Helix-1 and Helix-2 to build the SP-DNA structure. The objective of the SP-DNA structure is to evaluate the impact of these two different social funds (Helix-1 and Helix-2), including their interaction and final effect.

The SP-DNA-Simulator can help us to quickly assess how these two funds can contribute to Malaysia's poverty reduction in the long run. The simulator offers a new application named the real-time multidimensional graphical modeling. This alternative graphical modeling can show the permanent changes of each social security micro-structure, social protection sub-structure, social security Helix, and the SP-DNA structure simultaneously. The main reason for using the real-time multidimensional graphical modeling in the SP-DNA structure is to generate a visual effect of real time changes in each component.

Initially, we need to construct each social security micro-structure (MS) for each social protection sub-structure (SS) in the case of the Helix-1. The three

social security micro-structures (MS) depend on the construction of three small spheres. Later, these three spheres merge into a single sphere, called "social protection sub-structure (SS)." The three small spheres, or social security micro-structures, represent the actual employee's provident fund (α1), the non-employees provident fund (α2), and the unemployed insurance fund (α3).

From the beginning, we need to assume that the three social security micro-structures (MS), represented by three small spheres, for each social protection sub-structure (SS) is a result of merging the three small spheres into a single sphere for Helix-1. In the particular case of Helix-2, each social protection sub-structures (SS) is a single sphere. The calculation of any social security micro-structure (MS) and social protection sub-structure (SS) for Helix-1 or Helix-2 requires a specific formula such as the volume of a sphere (see Expression 2).

Hence the calculation of each sphere is going to represent a particular social security micro-structure (MS) or a social protection sub-structure (SS) in Helix-1. For Helix-2 we are referring to a social protection sub-structure (SS). The application of the volume of a sphere request a few steps are: First, we need to calculate the radius of the sphere (r'). The (r') is equivalent to an annual growth rate or a derivative (Expression 1).

In our case, the radius of the sphere (r') is based on the first derivative result. The first derivative represents the differentiation between two periods followed by last year's social funds collected ($\partial\Delta t\text{-}1$) and this year's social funds collected ($\partial\Delta t\text{+}1$) in Malaysian ringgit (RM) currency units.

The behavior of each social security micro-structure (MS) size and each social protection sub-structure (SS) size into Helix-1 or Helix-2 are directly connected to the radius of the sphere (r') final result.

$$r' = \partial\Delta_{t+1}/\partial\Delta_{t-1} \qquad (1)$$

$$\text{Volume of a Sphere} = 4/3\pi r^3 \qquad (2)$$

In calculating each social security micro-structure in each social protection, we need to calculate three first derivatives to find each radius (see Expression 3, 4, 5). If we find each radius, then we can calculate the volume of each

sphere to represent each social security micro-structure (MS) into its social protection sub-structure (SS).

$$r_{i(Helix\text{-}1/\alpha 1)} = \partial\alpha_{1(t+1)}/\partial\alpha_{1(t-1)} \quad (3)$$
$$r_{i(Helix\text{-}1/\alpha 2)} = \partial\alpha_{2(t+1)}/\partial\alpha_{2(t-1)} \quad (4)$$
$$r_{i(Helix\text{-}1/\alpha 3)} = \partial\alpha_{3(t+1)}/\partial\alpha_{3(t-1)} \quad (5)$$

The calculation of each social security micro-structure (MS) needs to apply Expression 6, 7, and 8 (see Figure 3).

$$MS_{i(Helix\text{-}1/\alpha 1)} = 4/3\pi r(r'_{i(Helix\text{-}1/\alpha 1)})^3 \quad (6)$$
$$MS_{i(Helix\text{-}1/\alpha 2)} = 4/3\pi r(r'_{i(Helix\text{-}1/\alpha 2)})^3 \quad (7)$$
$$MS_{i(Helix\text{-}1/\alpha 3)} = 4/3\pi r(r'_{i(Helix\text{-}1/\alpha 3)})^3 \quad (8)$$

Building a single social protection sub-structure (SS) requires us to apply the social security micro-structures interconnectivity (⫫) to merge the three social security micro-structures (MS) together into a single sphere (see Expression 9).

$$SSi_{(Helix\text{-}1)} = MS_{i(Helix\text{-}1/\alpha 1)} \fatsemi MS_{i(Helix\text{-}1/\alpha 2)} \fatsemi MS_{i(Helix\text{-}1/\alpha 3)} \quad (9)$$

The next step is to build the Helix-1 under merger the long number of social protection sub-structures (SS) according to expression 10. The initial condition to create the Helix-1 is to use the social protection sub-structures interconnectivity (⫪) to build a single Helix. (see Expression 10).

$$\begin{aligned} H_1 = [SS_1 &= [(\partial\alpha 1_{(t+1)}/\partial\alpha 1_{(to)}) \fatsemi (\partial\alpha 2_{(t+1)}/\partial\alpha 2_{(to)}) \fatsemi (\partial\alpha 3_{(t+1)}/\partial\alpha 3_{(to)})] \Vdash \dots \\ [SS_2 &= [(\partial\alpha 1_{(t+1)}/\partial\alpha 1_{(to)}) \fatsemi (\partial\alpha 2_{(t+1)}/\partial\alpha 2_{(to)}) \fatsemi (\partial\alpha 3_{(t+1)}/\partial\alpha 3_{(to)})] \Vdash \dots \\ [SS_3 &= [(\partial\alpha 1_{(t+1)}/\partial\alpha 1_{(to)}) \fatsemi (\partial\alpha 2_{(t+1)}/\partial\alpha 2_{(to)}) \fatsemi (\partial\alpha 3_{(t+1)}/\partial\alpha 3_{(to)})] \Vdash \dots \\ [SS_\infty &= [(\partial\alpha^\infty_{(t+1)}/\partial\alpha^\infty_{(to)}) \fatsemi (\partial\alpha^\infty_{(t+1)}/\partial\alpha^\infty_{(to)}) \fatsemi (\partial\alpha^\infty_{(t+1)}/\partial\alpha^\infty_{(to)})]] \end{aligned} \quad (10)$$

The construction of the Helix-2 requires only the calculation of the social protection sub-structure (SS) according to expression 11. Each social protection sub-structure (SS) requires the computation of the first derivative that represents the differentiation between two periods followed by last year's education funds collected ($\partial\theta J(t-1)$) and this year's education funds raised ($\partial\theta J(t+1)$) in Malaysian ringgit (RM) currency units (see Expression 11).

$$\Psi' = [(\partial\theta_{J(t+1)}/\ \partial\theta_{J(t-1)}) \quad (11)$$

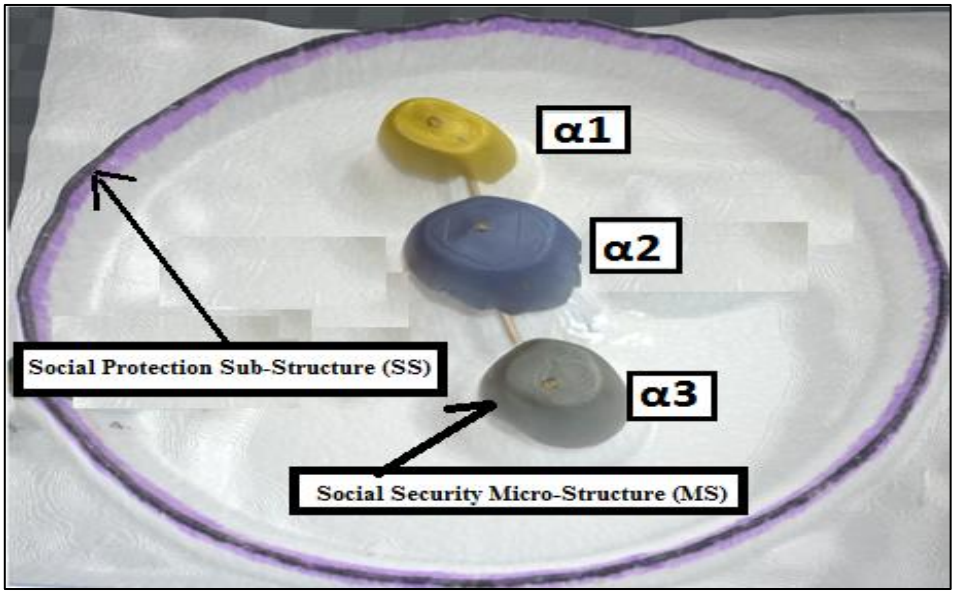
Therefore, the construction of the Helix-2 involves also the uses of the social protection sub-structures (SS) interconnectivity ($\Tilde{\Pi}$) according to Expression 12.

$$H_2 = [\Psi'_1 \Tilde{\Pi} \dots \Tilde{\Pi} \Psi'_\infty] => [(\partial\theta_{1(t+1)}/\ \partial\theta_{1(t-1)}) \Tilde{\Pi} \dots \Tilde{\Pi} (\partial\theta_{\infty(t+1)}/\ \partial\theta_{\infty(t-1)})] = [(SS_1) \Tilde{\Pi} \dots \Tilde{\Pi} (SS\infty)] \quad (12)$$

In building each Helix, it is necessary to apply the multidimensional real-time economic modeling of Ruiz Estrada, Chandran, and Tahir (2014) in the construction of the SP-DNA structure. The application of the real-time multidimensional graphical model generates a multidimensional visual effect with both helices simultaneously in full motion. The last step is to join both helices together in the assembly of a single SP-DNA structure.

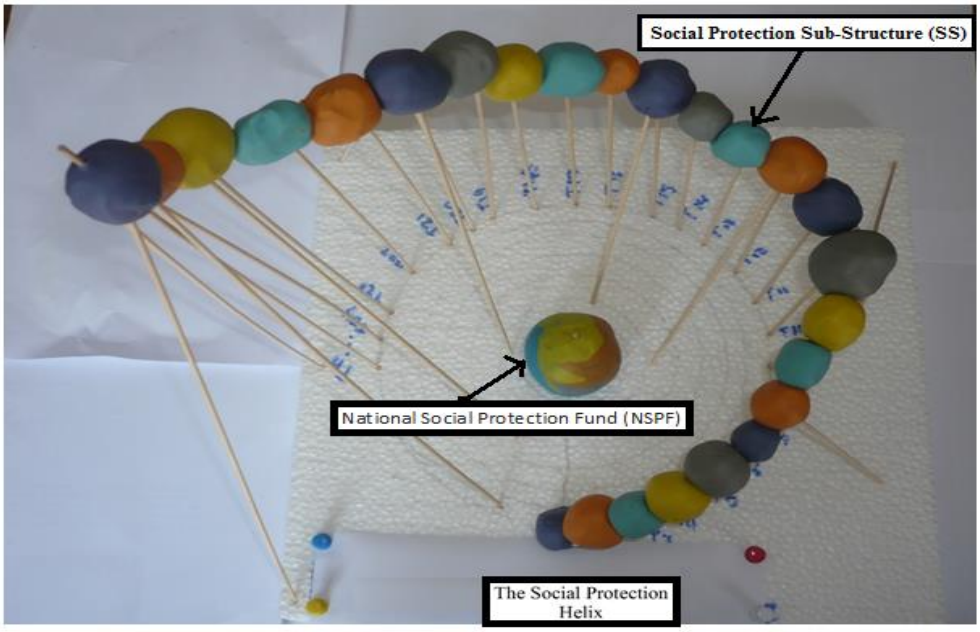
Each social security micro-structure (MS) and each social security sub-structure (SS) in Helix-1 or each social security sub-structure (SS) in Helix-2 can behave differently – e.g. expand, contract, and stagnate – in different periods of time. In addition, we make the Omnia Mobilis assumption (Ruiz Estrada, 2011) in the construction of a single SP-DNA structure. Moreover, the derivation of the National Social Protection Fund (NSPF) stems from the SP-DNA structure final results based on merging full social protection sub-structures together into a single large sphere (see Figure 4).

Figure 3: Social Security Micro-Structure (MS) and Social Protection Sub-Structure (SS)



Source: Author

Figure 4: The Social Protection Helix



Source: Author

4. Application of the Social Protection DNA Simulator: Malaysia

We perform a serial of simulations by using the Social Protection DNA Simulator in the case of Malaysia. The primary objective is to evaluate the possibility of implementing the National Social Protection Fund (NSPF) in Malaysia. Malaysia experienced rapid economic growth from the 1980s until 1997. After the Asian crisis of 1997, the Malaysian economy did not show any clear pattern until 2001. From 2001, Malaysia experienced slower GDP growth rates compared to the 1980s (World Bank, 2017). The lower and more volatile GDP growth r performance affected the production and employment of Malaysia profoundly.

In particular, the volatile behavior of output and employment has fuelled the growth of the informal sector (2014-2017). The rapid expansion of the informal sector in Malaysia is rooted in the growth slowdown. The number of Malaysians covered by the EPF consistently shrank.

There are two main factors that reduced the number of EPF members. First, the Malaysian informal economy grew rapidly in the last ten years (2006-2016). Secondly, the coverage of EPF in rural areas remains limited. The EPF scheme must be fundamentally transformed if it is to achieve higher coverage of the informal sector and the countryside. Hence, we are interested in evaluating the impact of a new social fund for Malaysia called the National Social Protection Fund (NSPF). The calculation of the National Social Protection Fund (NSPF) follows a series of steps.

1. In our calculations, we are taking into consideration (i) the Malaysian population size; (ii) the unemployment rate (U) in percentage (%); (iii) the EPF members, as a percentage (%) of the workforce; and (iv) the number of EPF non-members, as a percentage (%) of the workforce.

2. Next, we calculate basic social payment annual rates such as e_2 and e_3. These basic social payment annual rates are part of the non-employee's provident fund (α_2) and the unemployed insurance fund (α_3) from Helix-1 or the National Integral Social Security Fund –NISSF. In addition, the actual Employees Provident Fund (α_1) must also be included in the calculation of Helix-1. The basic education payment annual rate (e_4) is part of the National Education Fund (NEF), according to the SP-DNA-simulator.

3. Finally, we need to input our data to the social protection DNA simulator (SP-DNA-Simulator).

According to the social protection DNA simulator (SP-DNA-Simulator), the national social protection fund (NSPF) can help poverty in Malaysia in the short-run. The final results show that a robust national social protection fund (NSPF) can be achieved by unifying the National Integral Social Security Fund (NISSF) and the National Education Fund (NEF).

The National Integral Social Security Fund (NISSF) results show that the actual employee's provident fund (α1) needs a minimum coverage growth rate between 15% and 25% annually. The target of EPF is to get an average minimum contribution per capita of RM 600.00, 11% from the employer and 11% from the worker. The non-employees provident fund (α2) requires an (e1) equal to RM150.00 monthly.

The unemployed insurance fund (α3) requires a monthly payment of RM100.00 for any unemployed Malaysian. From now the primary target of EPF is that any Malaysian classified as in a non-employee' provident fund (α2) or in the unemployed insurance fund (α3) can move faster into the actual employees' provident fund (α1) in the short term – i.e. one year.

Hence, the Minimum Social Protection Fund (λ) shows a single equation under the uses of e1, e2, and e3 (see Expression 13).

$$\text{MSPF} = \lambda = 600X_1 + 150X_2 + 100X_3 = 0 \quad (13)$$

The Minimum Social Protection Fund (λ) requires the application of the first partial differentiation (see Expression 14, 15, and 16) to find the final value of the social security micro-structures (MS) for Malaysia.

$$\partial\lambda_t/\partial X_1 = 600 + 150X_2 + 100X_3 = 0 \quad (14)$$
$$\partial\lambda_t/\partial X_2 = 600X_1 + 150 + 100X_3 = 0 \quad (15)$$
$$\partial\lambda_t/\partial X_3 = 600X_1 + 150X_2 + 100 = 0 \quad (16)$$

Subsequently, we applied a second partial differentiation on the Minimum Social Protection Fund (λ) to build the final social protection sub-structure (SS) in Helix-1 according to Expression 17, 18, and 19.

$$MS_1 = \sum\partial^2\alpha_t/\partial^2X_1 = 0 + 150 + 100 = 0 \quad (17)$$
$$MS_2 = \sum\partial^2\alpha_t/\partial^2X_2 = 600 + 0 + 100 = 0 \quad (18)$$

$$MS_3 = \sum \partial^2 \alpha_t / \partial^2 X_3 = 600 + 150 + 0 = 0 \quad (19)$$

Now, we can proceed to find the social protection sub-structure (SS) final value by applying the Jacobian determinant to the second-order derivatives results from expression 17, 18, and 19. The application is based on a three by three matrix (see Expression 20). We obtain a social protection sub-structure (SS) final result equal to 18,000,000.

$$SS = \begin{pmatrix} 0 & 150 & 100 \\ 600 & 0 & 100 \\ 600 & 150 & 0 \end{pmatrix} \quad (20)$$

We find that the Helix-1 basic coefficient (H_1) is equal to 0.63. This result is based on expression 21, which states that the Helix-1 basic coefficient (H_1) is equal to one minus the square root of one divided by the logarithm of SS (Expression 20). The Helix-1 basic coefficient (H1 = 0.63) is used in the calculation of the national social protection fund (NSPF) of Malaysia.

$$H_1 = 1 - \sqrt{1/\log SS} = 1 - \sqrt{1/7.26} = 1 - \sqrt{0.14} = 0.63 \quad (21)$$

The Helix-1 basic coefficient (H_1) is input in each equation at expression 13, 14, 15, and 16. According to these results, Malaysia requires a minimum average social protection fund (λ) of RM535.50 monthly from 20 million members (see Expression 22).

$$MSPF = \lambda = 600(0.63) + 150(0.63) + 100(0.63) = RM535.50 \quad (22)$$

Moreover, we obtain three social security micro-structures (MS) final values of MS_1 = RM757.50 (see Expression 23), MS_2 = RM591.00 (see Expression 24), and MS_3 = RM572.50 (see Expression 25).

$$MS_1 = \partial \alpha_t / \partial X_1 = 600 + 150(0.63) + 100(0.63) = RM757.50 \quad (23)$$
$$MS_2 = \partial \alpha_t / \partial X_2 = 600(0.63) + 150 + 100(0.63) = RM591.00 \quad (24)$$
$$MS_3 = \partial \alpha_t / \partial X_3 = 600(0.63) + 150(0.63) + 100 = RM572.50 \quad (25)$$

We obtain a social protection sub-structure (SS) final value in Helix-1 of RM640.00 (see Expression 26).

$$SS_t = \sum [\partial \alpha t / \partial X_1 + \partial \alpha_t / \partial X_2 + \partial \alpha_t / \partial X_3]/3$$
$$= [RM757.50 + RM591.00 + RM572.50]/3 = RM640.00 \quad (26)$$

The inflection or critical point (σ) for Malaysia is equal to RM170.00 (see Expression 27). The inflection point or critical point gives us the minimum

contribution that needs to be paid by any Malaysian between 18 years and 60 years old. The inflection or critical point (σ) helps inform the establishment of a robust national social protection fund (NSPF) in the medium and long run.

$$\sigma = \frac{\partial \alpha_t / \partial X_1}{\partial \alpha_t / \partial X_2} \times \frac{\partial \alpha_t / \partial X_1}{\partial \alpha_t / \partial X_3} \times 100\%$$

$$= \frac{RM757.50}{RM591.00} \times \frac{RM757.50}{RM572.50} \times 100\% = RM170.00 \quad (27)$$

The Minimum Education Fund (Ð) is a single equation that evaluate how much Malaysian parents must pay each month in the future for the high school education of each child (see Expression 28). The equation depends on two variables, namely the real amount of minimum education monthly spending (a_1) and the real amount of the minimum salary monthly (a_2).

$$MEF = Ð = a_1X_1 + a_2X_2 = 0 \quad (28)$$

$$MEF = Ð = 100X_1 + 150X_2 = 0 \quad (29)$$

The Minimum Education Fund (Ð) helps us derive the social protection sub-structure (SS) final value in Helix-2. To calculate the final social protection sub-structure (SS) in Helix-2, we apply first and second derivative successively on the Minimum Education Fund (Ð), following expressions 30, 31, 32, and 33.

$$\partial Ð_t/\partial X_1 = 100 + 150X_2 = 0 \quad (30)$$

$$\partial Ð_t/\partial X_2 = 100X_1 + 150 = 0 \quad (31)$$

We obtain the final results from the second derivatives as below.

$$MS_1 = \sum \partial^2 \alpha_t / \partial^2 X_1 = 0 + RM150 = 0 \quad (32)$$

$$MS_2 = \sum \partial^2 \alpha_t / \partial^2 X_2 = RM100 + 0 = 0 \quad (33)$$

Now, we proceed to calculate the social protection sub-structure (|SS|) final result by applying the Jacobian determinant to the second-order derivatives results from expression 32 and 33. The application is based on a two by two matrix. All results from |SS| are absolute values to our final results in the simulator less volatile. Therefore, we obtain a social protection sub-structure (SS) final value of 15,000 for Helix-2.

$$|SS| = \begin{pmatrix} 0 & 150 \\ 100 & 0 \end{pmatrix} \quad (34)$$

In the next step, we compute the Helix-2 basic coefficient (H_2) value of 0.51. According expression 35, the Helix-2 basic coefficient is equal to one minus the square root of 1 divided by the logarithm of SS.

$$H_2 = 1 - \sqrt{1/\log SS} = 1 - \sqrt{1/4.18} = 1 - \sqrt{0.14} = 0.51 \quad (35)$$

We now proceed to calculate the social protection sub-structure (SS) final value of RM188.75 per child per month for Helix-2 in Malaysia.

$SS_T = ([\partial Đ_t/\partial X_1 = 100 + 150(0.51) = RM176.50] + [\partial Đ_t/\partial X_2 = 100(0.51) + 150 = RM201.00])/2 = RM188.75$ (36)

The national social protection fund (NSPF) is equal to H1 square multiplied by H2 square. The last result requires applying a square root and multiplying by 100%. The next step is to use the square root plus one and multiply by the total years for which all social funds are collected (y). At the same time, we apply the rate of risk (R), which we assume to be 20%. It means there is a probability of 20% that all Malaysians are no longer able to pay their contributions into some or all social funds covered in this paper (see Expression 37).

$$NSPF = [[1+\sqrt{(H_1)^2 \times (H_2)^2} * 100\%] \times y] - R \quad (37)$$

The final estimated value of the national social protection fund (NSPF) of Malaysia is RM 2.57 billion per year according to expression 39. Malaysia's accumulated NSPF can reach RM2.57 billion in a year and benefit 95% of Malaysians, lifting general living standards and visibly reducing poverty rates in the short run - i.e. 5 years. We are assuming a rate of risk (R) equal to 0.20 (20%), which means that 20% of Malaysians are not able to pay any social fund to propose in this simulator (see Expression 39).

$NSPF_{BY\ NO\ EVASION} = [[1 + \sqrt{(1+0.63)^2 + (1+0.51)^2}] \times 100\%] \times (1)] = RM3.22$ billion (38)

$NSPF_{EVASION\ OF\ 20\%} = [[1 + \sqrt{(1+0.63)^2 + (1+0.51)^2}] \times 100\%] \times (1)] * (0.20) =$ RM2.57 billion (39)

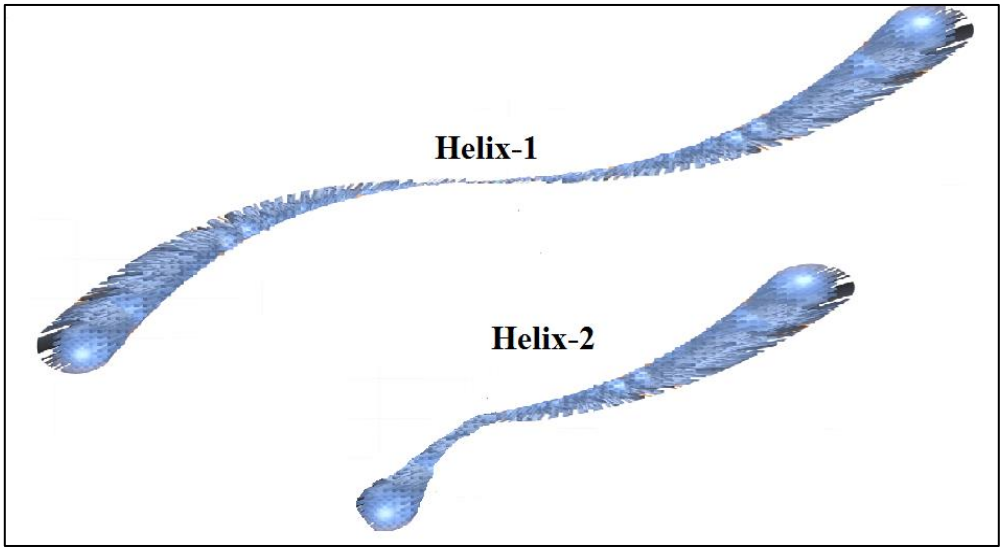
5. Conclusion

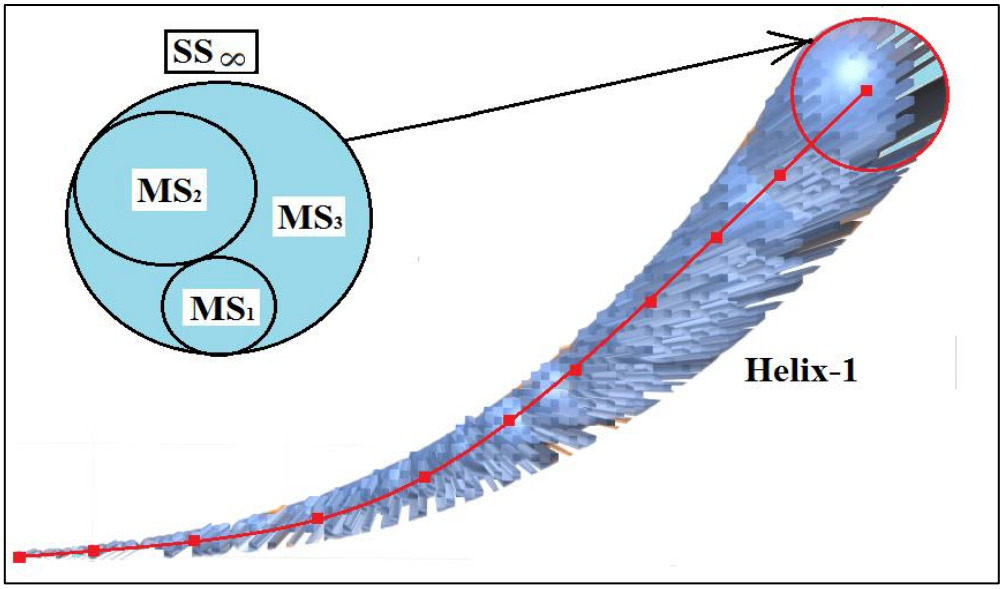
Our analysis indicates that the National Security Protection Fund (NSPF) can benefit Malaysia. At the same time, the NSPF requires the joint

implementation of the National Integral Social Security Fund (NISSF or Helix-1) and the National Education Fund (NEF or Helix-2). The NSPF can contribute significantly to poverty reduction in Malaysia. Figure 5 shows that the sizes of Helix-1 and Helix-2 are different. The size of each Helix shows the role of each Helix in the final result of Malaysia's NSPF. In this case, the Helix-1 is larger than the Helix-2. Therefore, the Helix-1 plays a larger role in the creation of a robust NSPF in Malaysia in the short run.

In addition, the different sizes of social security micro-structures (MS) and social protection sub-structures (SS) exhibit different sizes and locations in each Helix. At the same time, the Social Protection DNA (SP-DNA Structure) incorporated both helices across time and space to estimate the magnitude of returns that Malaysia can achieve in the short run. We find that all Malaysians aged between 18 and 60 years old must contribute an average monthly payment of RM640.00 to the National Integral Social Security Fund (NISSF) (or Helix-1) and RM188.75 to the National Education Fund (NEF).

Figure 5:
The Social Security Micro-Structures (MS), the Social Security Sub-Structures (SS), Social Protection Helix for Malaysia.





Finally, Malaysians need to pay an average monthly of RM415.00 to generate an active National Social Protection Fund (NSPF). In addition, implementing the NSPF requires including foreign workers. Malaysia is home to around 1.5 million legal and illegal foreign workers who work in in different sectors of the economy. The primary objective is to transform the informal sector of Malaysia into a sustainable formal sector. Achieving this objective will significantly reduce poverty. More precisely, poverty can be cut by 35% annually through a minimum per capita minimum monthly pension of RM2500.00.

References

Jütting, J. (2000). Social Security Systems in Low-Income Countries: Concepts, Constraints and the Need for Cooperation. *International Social Security Review, 53*(4): 3–24.

Ruiz Estrada, M.A. (2008). The General Economic Structures Composition Model (GESC-Model): Theoretical Framework. *FEA Working Papers No. 2008-18*. Available at SSRN: https://ssrn.com/abstract=1154858

Ruiz Estrada, M.A. (2011). Policy Modeling: Definition, Classification, and Evaluation. *Journal of Policy Modeling*, *33*(4): 523-536.

Ruiz Estrada, M.A, Chandran, V., Tahir, M. (2014). An Introduction to Multidimensional Real-Time Economic Modelling. *Journal of Contemporary Economics, 10*(1): 55-70.

World Bank. (2017). General Information and Database Statistics. Retrieved from www.worldbank.org.

About the Authors

MARIO ARTURO RUIZ ESTRADA

Dr. Mario Arturo Ruiz Estrada (Guatemalan) is currently Senior Research Fellow at SSRC and Associate Fellow in the Centre of Poverty and Development Studies (CPDS) at Faculty of Economics and Administration (FEA) in the University of Malaya (UM), since April 2001. Prior to joining University of Malaya, he was a tenured senior lecturer at Universidad de San Carlos (Guatemala). Dr. Mario Arturo Ruiz Estrada has a Ph.D. in Economics from University of Malaya, Master's degree in Economics from Otaru University (Hokkaido, Japan) and degree in Economics from Universidad de San Carlos (Guatemala). His main research fields are policy modeling, economic modelling, econographicology, natural disasters, terrorism, war and borders conflicts, economic indicators, international trade, and development of socio-economic issues.

His research, which has been published extensively in journals such as Journal of Policy Modeling, Disasters, Quality and Quantity, Singapore Economic Review, Panoeconomicus, Contemporary Economics, Defense and Peace Economics, Procedia Computer Sciences, Malaysian Journal of Economic Studies, Malaysian Journal of Science, and books, that revolves around policy-oriented topics relevant for worldwide long-term development, including policy modeling, natural disasters evaluation, war and border conflicts, social security, and food security issues.

DONGHYUN PARK

Dr. Donghyun PARK is currently Principal Economist at the Economics and Research Department (ERD) of the Asian Development Bank (ADB), which he joined in April 2007. Prior to joining ADB, he was a tenured Associate Professor of Economics at Nanyang Technological University in Singapore. Dr. Park has a Ph.D. in economics from UCLA, and his main research fields are international finance, international trade, and development economics. His research, which has been published extensively in journals and books, revolves around policy-oriented topics relevant for Asia's long-term development, including the middle-income trap, service sector development,

and financial sector development. Dr. Park plays a leading role in the production of Asian Development Outlook, ADB's flagship annual publication.

NORMA MANSOR

Norma Mansor is the Director of SSRC, a position she holds since 2013. She is a professor at the Department of Administrative Studies and Politics, Faculty of Economics and Administration, University of Malaya where she served as the Dean from April 2004 to June 2009. She was appointed as Secretary of the National Economic Advisory Council in Prime Minister's Department from July 2009 to May 2011. She was a Ragnar Nurkse Visiting Professor at Talinn University of Technology, Estonia in 2015. Prior to these appointments, she has served as advisor and consultant to various government bodies and private organizations which include The National Institute Of Public Administration (INTAN), Sarawak Economic Development Corporation (SEDC), Federal Agricultural Marketing Authority (FAMA), The United Nations Development Programme (UNDP), World Bank, International Labor Organization (ILO), Organisation for Economic Co-operation and Development (OECD) and the European Union (EU).

Her research interest includes public policy, governance and social protection. She has written extensively in books and scholarly journals. She sits as Editor in Chief of Institutions and Economies Journal, Member of Editorial Advisory Board of Public Management and Money and guest editor to several academic journals.

Recent Publications

No. 2014-1 :	Social Security: Challenges and Issues
No. 2014-2 :	Social Security in Malaysia: Stock-take on Players, Available Products and Databases
No. 2014-3 :	Old-Age Financial Protection in Malaysia: Challenges and Options
No. 2015-1 :	Framing Social Protection Analysis in Malaysia: Issues For Consideration
No. 2016-1 :	Employee's Provident Fund Data for Evidence-based Social Protection Policies in Malaysia
No. 2016-2 :	Saving Adequacy Assessment: The Case of Malaysian Employees Provident Fund Members
No. 2017-1 :	How Productivity Can Affect Pension Plan Systems: The Case of Japan and Malaysia
No. 2017-2	How Inflation and the Exchange rate Affect the Real Value of Pension Plan Systems: The Case of Malaysia

Social Security Research Centre (SSRC)
Faculty Economics and Administration
University of Malaya
50603 Kuala Lumpur, Malaysia.
Tel: 03- 7967 3774
Email: ssrc@um.edu.my
Website: http://ssrc.um.edu.my