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# Mitigating market risks in the ASEAN ecosystem to foster inclusive growth

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**Abstract.** Inclusive rather than exclusive growth is the consideration of most development strategies in charting the economic growth of their country. The ASEAN as a single market and collective body should consider this as its paramount concern. Now part of inclusive growth strategies is to identify the risks and impediments to its realization. Now generally there are two types of financial risks namely: market systemic risks and the unsystemic risk. The unsystemic risk is mitigated by the Markowitz portfolio theory that was subsequently improved by Sharpe with the Capital Asset Pricing Model (CAPM). Portfolio theory relies on the comfort of large numbers. If you have only one investment avenue and it fails then you lose all your investment but if you spread it over 40 investment destinations then you are virtually insulated provided the investments are inversely correlated. If these are positively correlated then it follows only one direction and will simulate market systemic risk. Market risk is unexplored territory. The Mexican hat wavelet theory was used to plug the unequal equation. The U.S. government used a combination of bailout plan and stimulus package that Krugman criticized since the size of the package is a hit or miss game. If it is too much then fiscal imbalance might happen that will trigger budget deficits. If too little then no stimulus will happen. Krugman proposed exchange rate modification to make your currency cheaper for exports as an improvement of the Mundell Fleming model. Economics is interrelated and interconnected and this is very evident in financial economics. Mitigating market systemic risks relies on the interdependence on interest rates, stimulus package, and foreign exchange into an algorithm that involves the Mexican hat wavelet equation.
**Keywords.** Mitigating market risks, Mexican hat wavelet, Systemic risk, Portfolio theory, Mundell-Fleming model.
**JEL.** C40, C50, C57.

## 1. Introduction

The Association of East Asian Nations (ASEAN) is celebrating tis golden year in 2017and this milestone 50 years reflects the changes in the world and in particular in this part of the region since the Philippines is an original member. The four other original members are Thailand, Indonesia, Malaysia, and Singapore. The different Foreign affairs Ministers of these five countries met in Thailand in 1967 at the behest of the Thai foreign ministers to forge the ASEAN, mainly as a political group to counteract the pervasive political theory at that time of the domino theory with the communist threat in the region. The mental image here is that of the domino blocks arranged closely together such that if one block falls, it will induce a fall in the block beside it until the whole set of domino cards fall. But this is easier said than done since Malaysia and Singapore are at loggerheads every since Malaysia expelled Singapore from the federation in 1965. On the other hand, Philippines, Indonesia and Malaysia were all contesting the Borneo with Sabah and Sarawak as the focus.

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Now that the cold war is over since the 1990s, there is no more communist threat and it erased the need to have a political group to counteract communism so ASEAN became an economic block similar and akin to the inspiration provided by the European Common Union and the North American Trade Agreement comprised by United States of America, Canada, and Mexico. ASEAN became integrated in January 2015. Now the block naturally expanded to plus three nations of China, Korea and Japan to recognize the impact and importance of these three ASEAN neighbors.

The ASEAN has since embraced these communist countries of Vietnam, Laos, Cambodia, Myanmar, plus Brunei Darussalam to form a block of ten countries. Initially the characteristics of these countries were compare to animal types such that Singapore and Brunei were seen as elephants because of their big economic size in spite of their relatively smaller population, the Philippines then as turtle because of its promising economy but relatively small phase of growth while the rest were seen as horses. The Philippines has since recovered from its perception of being the sick man of Asia and that of a turtle economy to become one of the best performing in the recent past few years.

The Philippines poverty level has gone down to below the 50 % mark in the recent past and this level characterizes the ASEAN countries except for Singapore and Brunei so it has become an imperative to push for inclusive growth. Inclusive growth tries to include as many of the population as possible although ideally it should include all sectors of society especially the poor and marginalized.

In contrast, exclusive growth is concentrated and focused to the middle class and the upper class who comprised a smaller percentage of the population and with the idea of trickle down effect, the affluence cascades to the poor and marginalized. The cascades are not the wild river effect as idealized but more of the brook since capital flight and conspicuous consumption have invaded the mindsets of the ASEAN rich and famous. The invisible hand of Adam Smith is not happening but rather the trickle down effect is largely invisible and ineffective. Now comes the predisposition for inclusive growth that is actually a need to diffuse the rising tide of indifference and relativism.

The capital market is one of the avenues of opportunities to foster inclusive growth. A vibrant and active capital market is an indication of a strong economy. It could also be a venue for the poor and the marginalized to feel the effects of inclusive growth. If you have a chance to visit Singapore and strike a conversation with their taxicab drivers, most of them are conversant in stock trade and that only means they participate in the stock market by buying and selling shares. This is unthinkable in the Philippines.

## 2. Methodology and Framework

Diversification is an act of investing in a variety of different assets into a portfolio rather than just one or two similar assets that explains why a portfolio usually has a lower standard deviation than the individual securities that make up that portfolio (Graham, *et al.,* 2014).

Some securities in a portfolio will have high returns in any given year while some will earn lower returns. But if they are in a basket of portfolio assets, the collective ups and downs of individual securities can at least partially cancel each other out so that the standard deviation of the individual securities cancel each other out, resulting in a lower standard of deviations. The key concept here is that the returns expressed in the Beta β and the standard deviation σ are covariant and do not move in the same direction.

Now there are two types of risks and these are market risks and unsystematic risks and while the unsystematic risk refer to individual risks and these risks in the form of standard deviation can be lower as more securities are added, assuming that they are not positively correlated, meaning they move in different directions as the economy moves. Market risks remain.

But should they?

Several phenomena such as earthquakes and other physics related endeavors use this Mexican hat formula from a Gaussian function as possible predictors of physical phenomena. The wavelet had been used to explain several phenomena in very diverse fields such as music, atmospheric analysis, physics, medicine, earthquake detection, and even the analysis of emerging markets.

The idea is to migrate the principles and use it to mitigate market risks. Rua & Nunes (2012) used it to predict market risks in emerging countries. This should mean that it could also be sued to mitigate market risks.

Fan & Lu (2008) described the wavelet as small wave localized in both time and frequency space and are useful for processing data with sharp discontinuities or compressing image data. There are two main uses as an integration nucleus of the analysis to get information about the processes and as a characterization basis of the processes.

Chun-Lin (2010) cited Morlet in 1981 as well as Morlet & Grossman in 1984 then improved on the concept from its beginnings with Alfrd Haar in 1909. Goupellaud, Grossman, & Morlet (1984) proposed an improvement from the mathematician Alfrd Haar as early as 1909. Eadie, *et al,* (1971) mentioned the Mexican wavelet as part of the statistical methods in experimental physics.

Then Meyer further improved on the wavelet concept in 1985 as well as Mallat in 1988 and separately with Daubeechies in 1988. Daubeechies (1992) published his ten lectures on wavelets that he conducted at the University of Lowell in Massachusetts. Alexey Vikhlinin together with Forman and Jones (1998) cited applications in astrophysics, cosmology, and X ray astronomy and further expounded on this in 2001. Holschneider (1995) published his work on wavelets as tools for analysis.

Fischer, *et al.,* (1996) cited spatial filters to discuss the role of wavelets in pixels. Recent works include those of Brinks (2008) and Lindeberg (2015) on imaging and the Gaussian wavelet function. Rua & Nunes (2012) used the concept to evaluate emerging markets like Portugal.

The Mexican Wavelet Mathematical Formula in mathematics and numerical analysis is the Ricker wavelet (1)

$$\psi(t) = 1/\sqrt{2\pi\sigma^3}(1-t^2/\sigma^{2)}\ \varepsilon^{-t/2\sigma 2} \quad (1)$$

and is the negative normalized second derivative of a Gaussian function. It is a special case of the family of continuous wavelets that are used in a continuous wavelet transform, known as Hermitian wavelets.

## 3. Discussion and Analysis

The Ricker wavelet is frequently employed to model seismic data, and as a broad-spectrum source term in computational electrodynamics. It is usually only referred to as the Mexican hat wavelet in the Americas, due to taking the shape of a sombrero when used as a 2D image-processing kernel. It is also known as the Marr wavelet for David Marr (2).

$$\psi(x, y) = -1/\pi\sigma^4(1- x^2+y^2/2\sigma^2)\ \varepsilon^{-(x2+y2)/2\sigma 2} \quad (2)$$

Shown as Figure 1 is the 2D Mexican hat wavelet

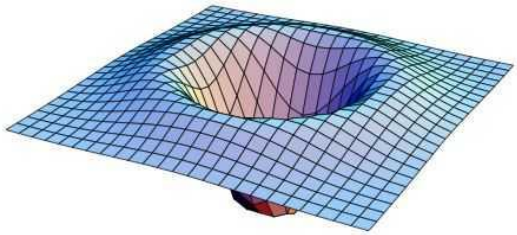

**Figure 1.** *2D Mexican wavelet*

The multidimensional generalization of this wavelet is called the *Laplacian of Gaussian* function. In practice, this wavelet is sometimes approximated by the *difference of Gaussians* function, because it is separable and can therefore save considerable computation time in two or more dimensions.

The scale normalized Laplacian (in $L_1$-norm) is frequently used as a blob detector and for automatic scale selection in computer vision applications; see Laplacian of Gaussian and scale space. The Mexican hat wavelet can also be approximated by derivatives of Cardinal B-Splines.

Precisely because of its symmetric qualities that enable the Mexican hat wavelet mathematical formula to be applied in various disciplines that seem unrelated such as commerce and business. Rua & Nunes (2012) used the Mexican wavelet to explain risk in emerging markets like the Philippines.

Dr. Harry Markowitz introduced the concept of portfolio theory to mitigate the business risk but this meant dichotomizing risk into diversifiable and market risks. Diversifiable risks are unsystematic risks that are intrinsic and inherent in the companies that comprise the portfolio while market risks are systemic risks that involve the general conditions of business wrestling with the notion of inflation, unemployment, and business cycles. The idea is to treat investments in companies' stocks as a basket of goods with wide disparity in beta variances.

An investor and the investment manager does not really chose companies with all low betas as the investment might be better managed as investing in low risk government bond or commercial paper instead of a portfolio. The systemic and market risk will go against the investment bundle. The idea is to comingle varied betas such that risk is spread and even mitigated.

The notion is to fire proof investments to increase capital and wealth resources. This action is purely private sector and does not involve the government except in the usual regulatory role. There are several economists who perceived this as important. Thomas Piketty sees this as one that can reduce inequality and improve the distribution of wealth while Krugman criticized the bail out and recovery of banks as one of the need to address capital inadequacy of banks instead of bailing them out.

Paul Krugman (2009) assailed the bail out plan of both the Bush and the Obama Presidency as skewed in its incentive prerogative that penalized the taxpayers and kept the banks and financial institutions whole, thereby creating a moral hazard that too big to fail institutions should be bailed out with taxpayers money (Krugman, 2009).

Dr. William F. Sharpe introduced the Capital Asset Pricing Model (CAPM) to improve on the idea of the Portfolio Theory. The CAPM mathematical formula (3) is shown below:

$$E(R_i - R_f/\beta_i = E(R_m) - R_f \quad (3)$$

The market reward mechanism is effectively the market risk premium and by rearranging the equation 3 and solving for $E(R_i)$ the CAPM is the outcome as shown in equation 4.

$$E(R_i) = R_f + \beta_i (E(R_m) - R_f \quad (4)$$

This means that $E(R_i)$ is the expected rate of return, $R_f$ is the risk free rate of interest such as interestarising from government securities, Beta β is the sensitivity of the E(R) that is seen as Covariant, $E R_m$ is the expected return of the market, and $E(R_m) - R_f$ is the market premium. Of course, this equation 4 can be restated in terms where individual risk premiums equal the market premium multiplied to β as equation (5)

$$E(R_i) - R_f = \beta_i (E(R_m) - R_f) \quad (5)$$

The portfolio theory model and its improvement in the CAPM contain intrinsic and inherent constraints that prevent the discussions and inclusions of market risks. The model just encourages the isolation of markets risks.

Consequently by adding the Ricker wavelet to either side of the equation will now account for the inherent risk of the market. The equation will now be robust and will account for market risks (6), by adding the wavelet (equation 1) being the mathematical equation that will allow the risk premiums to balance but the intrinsic risk factor as well.

$$\psi t + E(R_i) - R_f = \beta_i (E(R_M) - R_f) + \phi t \quad (6)$$

Once market risks can also be addressed and perhaps diversified then the usual graph of systematic and unsystematic risks will now change and removing the need to have a line that approximates risk free trade. It is now therefore possible to trade depending on the standard deviation and the Beta below the risk free line. Just think of the possibilities with respect to the capital market in ASEAN. An active capital market in Southeast Asian countries will help promote inclusive growth as the capital base will expand to reach the ordinary citizens and will unlock their investment opportunities and empower them to invest in the publicly listed companies. This will be a strong step in the right direction for helping solve the inequality and diversity between the rich and the poor.

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