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The Cost Channel of Monetary Policy

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Central banks implement monetary policy in order to affect the cost and availability of money in the economy, with the aim of stabilising price levels and economic conditions. The monetary policy measures affect the economy through various channels, which are usually difficult to untangle. It is commonly agreed that increase in nominal interest rates, or in other words, tightening of monetary policy, dampens aggregate demand and output in the economy, which in turn slows down inflation. Although such demand-side impacts are dominant, supply-side effects of monetary policy could not be simply ignored. The increase in interest rate raises firms' borrowing cost, mainly through financing for working capital. Accordingly, firms may increase the prices of their products and pass on such costs to the households, fueling inflation, in contrast to the demand-side impact. This channel is usually called the Cost Channel of Monetary Policy, which has been studied widely in recent decades. The strength of the cost channel in an economy depends on how much a change in interest rate could affect the firms' cost of production and how much firms would pass on such costs to customers. Studies have demonstrated that the cost channel is important in many economies. However, it appears that there has been no comprehensive study conducted to measure the strength of the cost channel in the Sri Lankan economy. Yet, some past studies on monetary transmission mechanism and anecdotal evidence suggest that Sri Lankan firms incur a noteworthy increase in their production cost due to interest rate increases, and vice versa, pointing towards the presence of a cost channel. The aim of this brief note is to discuss the cost channel, its historical background, theoretical and empirical work, its applications in mainstream economic models and relevance to Sri Lanka.

Introduction

Understanding the monetary policy transmission mechanism is of paramount importance to the successful conduct of monetary policy. The monetary policy transmission mechanism comprises the channels through which monetary policy interventions impact on the real economy. Most economists agree that there can be important effects on real economic variables due to monetary policy disturbances, at least in the short-run. Traditional text book explanations state that the monetary authority uses the short-term policy interest rate to control inflation or output in at least three important ways, namely, the interest rate channel, the credit channel and the other asset price channels by influencing aggregate demand. The most conventional of these channels

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is the interest rate channel, where an increase in the policy rate increases the cost of capital, reducing investments and household spending on durable goods. Consequently, the reduction in aggregate demand causes a decrease in output and inflation. The credit channel affects the supply of bank loans. Asset price channels affect the prices of assets, other than interest rates such as foreign exchange rates and prices of equities.

There is, however, far less agreement regarding the supply-side effects of monetary policy disturbances on the real economy. The notion of the supply-side effects of monetary policy, which is also known as *the Wright Patman effect or Cavallo effect*, goes back to at least John Kenneth Galbraith (1957). Galbraith mentioned that monetary policy has two types of effects on individual firms: the well-known demand effect and the impact effect. The impact effect is the direct influence on the operations of firms due to changes in money supply or nominal interest rates. This impact of monetary policy on the supply-side of the economy is now popularly known as *the cost channel of monetary policy.*

The changes in short term interest rates, in cost channel economies, affect the marginal cost of production which in turn affect product prices and output. Accordingly, the dynamics of the inflation rate and the output gap (output gap is the difference between the current level of output and the potential output in an economy) behave differently following a monetary policy intervention in a cost channel economy. When the established demand-side channels suggest monetary tightening dampens inflation, the cost channel suggests the opposite; monetary tightening raises inflation. With regard to the output gap, both demand-side and supply-side channels suggest monetary tightening dampens the output gap.

Although scholars had mooted the idea of the effect of monetary policy on the supply-side of the economy earlier, they renewed the interest when the price puzzle was found in vector autoregression (VAR) studies. The price puzzle relates to the rise in the price level due to a monetary policy tightening. In a seminal paper, Barth and Ramey (2001) argued that the price puzzle is a result of the cost channel of monetary policy. Subsequent to the work of Barth and Ramey, many scholars have evaluated the importance of the cost channel of monetary policy. Most studies evaluating the cost channel, both theoretically and empirically, have concluded that it is an important channel to consider. On the theoretical front, using a New Keynesian model, which considers prices are sticky, Ravenna and Walsh (2006) showed that the cost channel introduces a trade-off between stabilising inflation and the output gap.

With regard to the cost channel of monetary policy, there are two main questions raised by monetary economists, policymakers and practitioners alike. The first question is: Does a cost channel of monetary policy exist? and the second question is: If so, does the existence of the cost channel have important implications for monetary policy? The answers for these two questions based on the literature, is yes for many economies.

Historical Background

"... the senselessness of trying to fight inflation by raising interest rates. Throwing gasoline on fire to put out the flames would be as logical."

Wright Patman in 1970 [cited by Seelig, 1974]

Although discussions of the supply-side effects of monetary policy goes back at least to Galbraith (1957), Steven A. Seelig was the first to test these effects in an economic model. Seelig was motivated

to study supply-side effects due to the high inflation that prevailed in the USA during mid 1950s and late 1960s. The comments of Congressman Wright Patman, cited above, also influenced Seelig to explore the supply-side effects of monetary policy. Seelig (1974) formulated a model with product markup pricing, directly affected by the nominal interest rate. The impact of the cost channel was empirically estimated for the period 1955-1969 for the USA using time series data from 41 industries. However, the results found by Seelig did not support the hypothesis that increases in interest rates lead to higher prices via markup pricing.

In 1981, Mathew Shapiro carried out a study titled "Identification and Estimation of the Wright Patman Effect" as cited by Barth and Ramey (2001). Shapiro has estimated a Cobb-Douglas markup equation to confirm significant interest rate effects on the price level. Van Wijnbergen (1982, 1985) are the last two studies, according to my reading, which directly assessed the impact of nominal interest rates on prices in the 20th century. He studied the effect of changes in nominal interest rates in the real cost of working capital in a structural macroeconomic model for the Korean economy. He found econometric evidence to show that this effect is significant and it has implications on inflation. Van Wijnbergen refers to this effect as the Cavallo effect as D. F. Cavallo in 1977 had studied the positive correlation between short-run interest rates and inflation.

Renewal of the Importance of the Cost Channel

Although a handful of studies were carried out to measure the importance of the cost channel in the 20th century, this was changed dramatically at the beginning of the 21st century. As mentioned above, the main motivation for this was the price puzzle uncovered in VAR studies in the 1990s. The price puzzle relates to the rise in the price level due to monetary policy tightening. The most commonly accepted explanation for the price puzzle is the fact that the amount of information available to the central bank has not been reflected in the variables used in VAR studies. One solution to minimise the impact of the price puzzle is to include commodity prices or other asset prices in the VAR as shown by Sims (1992) and others. Although, the inclusion of commodity or asset prices makes the price increase smaller following a monetary contraction, it does not solve the puzzle completely (Walsh, 2010). Under these circumstances, Barth and Ramey (2001) argued that actually there is no puzzle, but the increase in inflation due to monetary tightening is the result of the supply-side effects of monetary policy. This idea from Barth and Ramey's seminal paper paved the way for much research into the cost channel of monetary policy.

Empirical Evidence

The existence and importance of the cost channel is supported by most of the existing empirical evidence. The empirical studies can be broadly divided into four categories, based on the methodologies employed, namely, VAR studies, single equation methods, equilibrium models and those using firm-level data.

Using a VAR study, Barth and Ramey (2001) carried out an empirical test to examine the hypothesis that monetary policy shocks have important supply-side effects in addition to demand-side effects. They assumed, as is the common practice in the literature, working capital has to be financed externally. They considered manufacturing industries in the USA in the analysis and found that an increase in the nominal interest rate raises the cost of working

capital. Consequently, monetary tightening works as a positive cost push shock. In a broader study, including five OECD countries, Dedola and Lippi (2005) confirmed above results in a study that employed VAR.

The importance of the cost channel has been empirically evaluated using the new Keynesian Philips Curve (NKPC, which assumes the presence of nominal rigidities, such as price rigidity) augmented with the cost of working capital. This method is also called the single equation method. Ravenna and Walsh (2006), Chowdhury et al. (2006), Tillmann (2008) and Gabriel and Martins (2010) among others have tested the empirical relevance of the cost channel using these models, where labour is the only factor of production. Ravenna and Walsh (2006) carried out an empirical study for the USA from 1960 to 2001 using the general method of moment approach to confirm the importance of the cost channel. Chowdhury et al. (2006) found significant direct interest rate effects on inflation for the majority of G7 countries. Contrary to those findings, Gabriel and Martins (2010), showed that the cost channel effect is not significant in the USA, suggesting zero interest rate effects on inflation. They carried out an empirical study for the period 1960 -2004 and arrived at that conclusion by employing a newly developed method called efficient inference technique, that is robust to weak parameter identification.

Third, New Keynesian dynamic stochastic general equilibrium (DSGE) models have also been used to analyse the importance of the cost channel, yielding mixed results. Christiano et al. (2005), Castelnuovo (2012) and Christiano et al. (2015) are three such studies which show that the cost channel is important. In an estimated DSGE model with Bayesian method for the USA, Rabanal (2007) concludes that the cost channel impact is not significant, as the demand-side effect of monetary policy is much stronger.

The cost channel of monetary policy has also been evaluated using first hand firm level data. This method is not popular due to the requirement of extensive micro data. Gaiotti and Secchi (2006) carried out such a study using data from 2,000 Italian manufacturing firms. The central conclusion of their study is that the evidence is in favour of the presence of a cost channel. They show that the impact of the cost channel is proportional to the amount of working capital held by each firm. Further, they document that the cost channel is large enough to have nontrivial monetary policy implications.

The strength of the cost channel of monetary policy depends on how much firms borrow externally to finance their working capital. Considering post-war quarterly time series data from the USA, Christiano et al. (2015) estimated in a DSGE model that firms borrow around 56% of their total working capital requirements externally.

Applications

The cost channel has become a common building block in contemporary macroeconomic models. Initially, Fuerst (1992) and Christiano and Eichenbaum (1992, 1995) assumed that firms must borrow to fund their wage bill in a basic cash-in-advance (CIA) model. CIA models are built as a direct approach to generating a role for money in the economy. These models capture the role of money as a medium of exchange by requiring explicitly that money must be used to purchase goods. Since the introduction of CIA models, many scholars have incorporated the cost channel in optimising

agent models. Ravenna and Walsh (2006) were the first to show that the existence of the cost channel has important implications to the optimal conduct of monetary policy. They showed that the output gap stabilisation actions – in terms of nominal interest rates – lead to inflation fluctuations in cost channel economies.

Contemporary New Keynesian DSGE models have incorporated the cost channel of monetary policy extensively. In general, in these models too, the cost channel is introduced by assuming that the cost of working capital has to be financed externally intra-period. Among many applications such as Hulsewig et al. (2009), Christiano et al. (2010) and Christiano et al. (2013, 2015), a notable initial application of the cost channel is found in Christiano et al. (2005).

Using a New Keynesian model with a cost channel, Surico (2008) showed that a central bank that assigns a positive weight to the output gap in the reaction function makes the economy more prone to multiple equilibria compared to a no-cost channel economy. His results are robust to forward-looking, current and backward-looking policy rules. Surico further suggested that, when the cost channel is empirically important, trying to limit cyclical swings in real activity may result in undesired volatility of inflation and output.

Relevance to Sri Lanka

It appears that there has been no comprehensive study conducted to measure the strength of the cost channel in the Sri Lankan economy. However, the strength of the cost channel in an economy could be gauged to a certain extent by analsing the results of related VAR studies. The VAR studies conducted for Sri Lanka on monetary transmission mechanism demonstrates mixed results. Studies such as Perera and Wickramanayaka (2013), Perera (2016) and Vinayagathasan (2013) reveals that the immediate inflationary pressures in response to increase in interest rates is weak. Although this points towards a weaker cost channel, Amarasekara (2009) found positive evidence for a price puzzle.

Anecdotal evidence suggests that Sri Lankan firms incur a notable increase in their production cost due to interest rate increases, and vice versa, pointing towards a cost channel.

The lack of research on the cost channel in the Sri Lankan context opens up a new channel of research to measure the strength of the cost channel in the Sri Lankan economy. Shedding light on monetary transmission channels would be extremely helpful for policymakers to take informative policy decisions.

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Micro-prudential vs macro-prudential policies to maintain the stability of the financial system

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1. Overview

Core lessons learnt from 2008/09 global financial crisis are that maintaining financial system stability is vital for maintaining the macro-economic stability and the scope of the financial regulations and supervisions need to be extended beyond the micro based approach. Monetary policy, fiscal policy and prudential policy are the three main policies which need to be managed effectively in an economy for maintaining sustainable growth. The monetary policy and the fiscal policy are key to maintain the macro-economic stability while the prudential policy is directly connected with maintaining the financial system stability. Conventionally, the prudential policy focused only on micro-prudential regulation and supervision under which the financial system as a whole is assumed to be stable if each financial institution is safe and sound. However, subsequent to the Global Financial Crisis, policy makers widely accepted the macro-prudential policy as a part of the prudential policy to maintain financial system stability by maintaining a macro perspective on financial regulation and managing systems risk. The Basel III Accord has also proposed changes to prudential supervision with a view that to ensure the macro-prudential policy complement the micro-prudential policy to maintain financial system stability through a top-down approach.

The main focus of the micro-prudential policy is to maintain the stability of individual institutions as an idiosyncratic nature while the macro-prudential policy focuses on maintaining the stability of the financial system as a whole. The main idea of the macro-prudential approach is that the overall risk of the financial system is higher than the sum of risks arising from individual institutions (Barry Johnston, 2021). However, in practice, inter-relations and overlapping between micro-prudential policies and macro-prudential policies could be observed. Micro-prudential supervisors may also assess risks to overall financial system while macro-prudential supervisors may also consider about the soundness of individual financial institutions particularly on systemically important financial institutions. Nevertheless, the two different sets of tools are used by the two supervisors with different approaches for maintaining the stability

of the financial system. Further, micro-prudential supervisors focus on a bottom-up approach while macro-prudential supervisors rely on a top-down approach to maintain financial system stability. Hence, one policy becomes complementary to the other policy.

This article is intended to discuss the role of micro-prudential policy and macro-prudential policy for maintaining financial system stability of an economy and identify the complementarities and potential conflicts between the application of these two policies to address risks to maintain financial system stability.

2. Micro-Prudential Policy

Micro-prudential policy mainly focused on ensuring the safety and soundness of individual financial institutions and protecting its stakeholders; especially depositors, investors and policy holders from the risk of failure of financial institutions and financial markets (Barry Johnston, 2021). It mainly focuses on firm level regulations and supervisions to ensure that the balance sheet of individual financial institutions is adequately resilient to absorb shocks of an idiosyncratic nature rather than focus on the financial system as a whole. Conventionally, micro-prudential supervisors identify various risks emanating from the financial intermediation ranging from assets classification to corporate governance and the issuance of directions and guidelines from time to time, to mitigate these risks. The main motivation of the micro-prudential approach is the protection of financial consumer and the strengthening of consumer confidence at the individual and institutional levels; and thereby maintaining the confidence on the financial system as a whole. As such, it contributes to ensure the overall financial system stability by maintaining the stability of individual financial institutions. The micro-prudential supervisors have a number of tools to achieve their objective of safeguarding individual institutions from various risks. However, the Basel based capital adequacy requirement is the main regulatory tool used by micro-prudential supervisors to ensure the resilience of individual institutions to withstand any shock emanating from deteriorating asset quality.

Nevertheless, the micro-prudential regulatory approach has been criticized for neglecting the system wide implications arising from the herd behaviour of market participants which can result to financial crises. For example, system wide implications could be created if market players simultaneously buy or sell a particular category of assets. In addition, the micro-prudential supervisors examine the resilience of an individual institution to exogenous risks and does not take into consideration the possible endogenous risks. It also largely ignores interconnectedness of individual institutions with the rest of the financial system and risks arising from externalities (Brunnermeier et al, 2009). As a result, the sum of the micro-prudential risks is less than the systemic risk of the financial system as a whole. Further, as micro-prudential regulations do not account for risks emanating from externalities and these regulations are not overlooking the impact of such externalities on the financial system stability and the real economy. Contagion effects where the failure of one financial institution may cause the failure of another financial institution, due to interconnectedness and externalities is one such example. In addition, the micro-prudential approach, by focusing on risks emanating from the balance sheets of individual institutions on an exogenous basis, would not take into account the additional risks pose by the interconnectedness and externalities to the financial system as a whole. Hence, the following

shortcomings of the micro-prudential approach have been highlighted in research literature.

a) 1997 Asian Financial Crisis and 2008/09 Global Financial Crisis witnessed that international best practices of micro-prudential supervision failed to prevent financial crises.

b) Generally, regulations are designed based on the legal form of financial institutions such as licensed banks, licensed finance companies, insurance companies and stockbroker firms rather than their intermediation functions. As a result, risk of unregulated activities could pose a risk to the system since the intermediation falls outside the perimeters of the legal framework.

c) Silo based micro-prudential regulatory approach does not sufficiently capture risks arising from factors outside the regulatory perimeter, risk emanating from contagion effect and negative externalities created through the failures in financial institutions and markets on real economic activities.

d) The micro-prudential approach generally overestimates the capacity of financial institutions to handle their risks and rely on compliance with international standards and best practices without taking into account contagion and externalities.

e) Moral hazard could arise under micro-prudential supervision when agents are not fully responsible for risks associated with their own decisions making. When stakeholders think that the supervisors will safeguard the institutions, such stakeholders especially depositors, will not take into account financial information and analysis prior to investing with such institutions, which could increase the moral hazard.

In response to above issues, experts advocate that the micro-prudential approach should be supplemented with the macro-prudential approach with the aim of enhancing the resilience of the financial system as a whole. Further, the macro-prudential approach should focus on the safety and soundness of the financial system as a whole with the objective of identifying and mitigating systemic risk and limiting losses to the real economy.

3. Macro-Prudential Policy

The macro-prudential policy focuses on maintaining the stability of the financial system as a whole with the objective of mitigating systemic risk while limiting any potential loss of economic output/ Gross Domestic Product (GDP) emanating from financial crisis (Osinski et, al, 2013). As a result, the macro-prudential policy simultaneously inter-relate with the monetary policy with regard to limiting any potential loss of economic output while being inter-related with the micro-prudential policy with respect to maintaining financial system stability. The macro-prudential policy, through influencing the intermediation of financial institutions, smoothen economic output. When an economy is in an expansionary phase, the macro-prudential approach discourages excessive credit flow and encourages the same when the economy is in a downturn. In the case of maintaining financial system stability, macro-prudential supervision involves monitoring the factors that affect the stability of the financial system as a whole and use its prudential tools to prevent systemic risk. In addition, the macro-prudential approach considers the endogenous risk i.e. the effect of individual financial institutions/ markets on the financial system as a whole, through their interconnectedness and negative externalities.

Further, the macro-prudential approach assesses the systemic risk as a cross sectional risk and a time series risk. On evaluating cross-sectional risks, it takes into account how the structure of the financial system affects the distribution of risk from collective exposures of financial institutions or contagion and interconnectedness between them. As such, the systemic importance of the financial institutions is assessed based on the size of the institution and interconnectedness with other financial institutions. For an example, macro-prudential supervisors may require financial institutions to maintain higher capital in accordance with their systemic importance. Meanwhile, in evaluating time series risk, procyclicality is assessed between the financial system and the real economy. The basic idea is that the financial institutions should set aside more capital during good times where the risk is limited, to be used in the downward cycle. For an example, financial institutions are required to maintain higher capital adequacy ratio as a buffer during the expansionary phase of an economy and the capital requirements of the financial institutions are relaxed when economy is moving towards a recession.

The macro-prudential supervisors have a number of tools to achieve their objective of maintaining the stability of the financial system as a whole and limiting losses to the real economy from financial crisis. The main tools of the macro-prudential policy could be divided into three broad categories, credit related tools, liquidity related tools and capital related policy tools. Since macro-prudential is an evolving policy approach, there is no uniform set of tools like Basel based capital requirements and different jurisdictions use different sets of tools to achieve stability objectives. Junos et.al. (2019) highlights the generally accepted tools used by majority of the macro-prudential supervisors in the world (Please refer Table 01).

Table 01: Macro-prudential policy Tools

Measure	Tools
Credit Related	Loan To Value (LTV) Limit
	Debt To Income (DIT) Limit
	Debt Service To Income Limit
	Cap on Sector Lending
	Ceiling on Credit Growth
Liquidity Related	Limit on Net Open Position (NOP)
	Limit on Maturity Mismatch
	Liquidity Coverage Ratio
	Net Stable Funding Ratio
Capital Related	Capital Conservation Buffer
	Countercyclical Capital Buffers
	Systemic Capital Surcharge
	Dynamic Provisioning
	Cap on Leverage Ratio

Source: Junos et. al (2019)

The direction of these macro-prudential tools depends on economic conditions. When an expansionary phase of economic conditions prevails, the prudential tools are used to tighten credit supply of specific sectors and vice versa when economic conditions turned into a contractionary phase. For an example, Loan-To-Value (LTV) ratio for housing loans is tightened at the time of excursive credit supply in the economy, while same LTV ratio is relaxed by the macro-prudential supervisors during the period of low credit supply in the economy. Eventually, LTV as a prudential tool facilitates to smoothen out the financial cycle and hence the economic cycle.

Galati and Moessner (2011) highlights that the study on the effectiveness of macro-prudential policy tools including quantification of the effect of macro-prudential policy instruments in avoiding financial instability is vital for the future improvements of the prudential policies. Further, a validation of data and information is a prerequisite for a meaningful analysis of macro-prudential policy. Nevertheless, data availability is one of the main barriers for macro-prudential approach.

4. Macro-prudential vs Micro-prudential Policy: Supplementary and Overlapping

There is no clear demarcation between the micro-prudential policy measures and macro-prudential policy measures as both policies are supplementary to each other. A clear-cut consensus on the role of different policy instruments is not available in the prudential policy. However, five fundamental features such as ultimate objective, proximate objective, characterization of risk, common behavior across the institutions and calibration of prudential controls can be used to distinguish the macro-prudential policy from the micro-prudential policy (Bario, 2003). Please refer the Table 02 for the comparison between micro-prudential vs macro-prudential policy based on the above features.

Table 02: Comparison between micro-prudential vs macro-prudential policy[1]

Features	Macro-prudential	Micro-Prudential
Ultimate objective	Avoid loss of economic output	Depositor protection
Proximate objective	Focus on financial system wide distress	Focus on distress on individual institutions
Characterisation of risk	Endogenous: dependent on collective behavior of financial institutions	Exogenous: independent of individual institution's behavior
Correlations and common exposures across institutions	Important	Irrelevant
Calibration of prudential Control	Top-down approach	Bottom-up approach

Source: Bario (2003)

1 This comparison is compiled based on Financial Stability Review, No 13 – The future of financial regulations published by Banque de France in September 2009.

Nevertheless, there are a number of areas where the mandates of micro-prudential policy and macro-prudential policy overlap each other and create a tense situation between the two authorities.

a) Even though, approaches are different in both prudential policies, the broad objective of both supervisors are maintaining the stability of the financial system. Hence, it creates a confusion as to who is ultimately responsible for addressing emerging system wide risks and which approaches need to be followed to preserve system stability.

b) Micro-prudential regulations mainly focus on the safety of individual institutions while ensuring the stability of the entire system. Similarly, macro-prudential policy mainly focuses on the stability of system as a whole while ensuring the stability of individual institutions particularly the systemically important institutions. In case of a highly concentrated financial system, regulatory framework for both authorities could overlap each other.

c) Further, the micro-prudential supervisors make decisions concerning individual institutions considering the other system wide factors within which the institutions operate. This system wide risk assessment is a key element of the macro-prudential policy function. It creates a confusion between the authorities as to who is responsible for addressing system wide risk elements.

d) Certain policy instruments and tools of both micro-prudential and macro-prudential supervision ultimately affect the balance sheet of individual financial institutions though their purpose and approaches are different. As such, macro-prudential approach overlap the regulatory perimeter of the micro-prudential approach and create a confusion between both authorities.

Table 03: Regulatory Tools of Prudential Authorities

Instruments	Micro-prudential	Macro-prudential
Minimum Capital Requirement	X	
Capital Risk Weights	X	X
Countercyclical Capital Buffer		X
Capital Conservation Buffer	X	X
Systemic Capital Surcharge		X
Dynamic Provisioning	X	X
Leverage Ratio	X	X
Large Exposure Limits	X	X
Loan-To-Value Limits	X	X
Debt-To-Income Limits	X	X
Foreign Exchange Limit	X	X
Liquidity Requirements	X	X
Risk Management Standards	X	
Licensing Standards	X	

Source: Osinski et. al (2013)

e) Even though, the purpose and approach may differ, both policies are highly dependent on capital and liquidity based tools. Some instruments such as Loan To Value (LTV) ratio and Liquidity Coverage Ratio (LCR) are used by both authorities. Practically, these tools may not be under the control of either the micro-prudential or macro-prudential authorities. As such, it creates coordination issues among both authorities with respect to common regulatory tools. Table 03 below highlights some of these overlapping regulatory tools between both authorities in a practical sense[2].

5. Conclusion

The Global Financial Crisis created a growing consensus among policymakers that a macro perspective for regulation and supervision should be established in addition to micro based approach. Nevertheless, both micro-prudential policy and macro-prudential policy focus on ensuring financial system stability through different approaches. As the conventional prudential policy measures, the micro-prudential policy follows bottom-to-top approach where the financial system is assumed to be stable if the individual institutions are safe and sound. Meanwhile, macro-prudential approach follows a top-to-bottom approach, which focuses on maintaining the stability of the financial system as a whole, with the objective of mitigating systemic risk arising from interconnectedness and negative externalities. Even though, both approaches are complements each other, tense situations arise due to the overlap of their functions in a practical sense. Since the macro-prudential policy is evolving aspect, it is challenging for authorities to draw a clear border between micro-prudential and macro-prudential policies. However, there are strong complemetaries between both policies that should be exploited through coordination between two authorities. Such arrangements should be created through clear demarcation between their mandate and roll of the micro-prudential and macro-prudential authorities as well as the allocation of regulatory instruments between the two authorities. To achieve this, a clear coordination mechanism should be implemented through establishing an appropriate governance structure to ensure financial system stability.

2. This Table is prepared based on the Annex I of the IMF staff discussion note by Jacek Osinski et al. 2013.

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VALUE AT RISKS AS A RISK MEASUREMENT TOOL

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1. Introduction

Measuring the risk that a financial institution faces is an essential task. In the specific case of market risk, a possible method of measurement is the evaluation of losses likely to be incurred when the market value of the assets portfolio falls. This is what Value at Risk (VaR) does. The portfolio VaR represents the maximum amount an investor may lose over a given time period with a given probability.

Although the VaR concept is very simple, its calculation is not easy. The methodologies initially developed to calculate a portfolio VaR are the variance–covariance approach, also called the Parametric method, the Historical Simulation (Non-parametric method) and the Monte Carlo simulation, which is a Semiparametric method. As is well known, all these methodologies, usually called standard models.

VaR is a probability-based measure of loss potential. It is an estimate of the minimum loss that is expected to be exceeded in a specified time period with a given level of probability. Let's explain this in an easier manner.

What we need to remember three things when it comes to VaR are,

- Minimum Loss
- Specified Time Period
- Probability of exceeding that loss

For example, assume you have a portfolio of investments worth of LKR 150 million. In that portfolio a 3% VaR of LKR 50,000 over the next 1 week would mean that a minimum loss that would occur within the next 1 week is LKR 50,000 and the probability of this loss is 3%. Just to make things clearer, we can also restate the above statement as there is a 97% chance that our loss will not exceed LKR 50,000 within the next 1 week.

2. Measuring market risk using Value at Risk

Almost every investor who has invested or is considering investing in a risky asset asks at some point in time 'What is the most an investor can lose on an investment?' Value at Risk (VaR) could be used to provide an answer for this question, at least within a reasonable bound.

VaR gives the financial risk manager the worst expected loss under average market conditions over a certain time interval at a given confidence level. In other words, VaR gives the risk manager a sense of what he or she can expect to potentially lose in a given time interval, assuming "normal" market conditions.

When VaR model is used to measure market risk, it offers number of benefits. In general, VaR provides a consistent monetary measure of risk across instruments, products, risk factors, and

asset classes as well. Some benefits of measuring market risk using VaR model can be summarized as follows:

- VaR takes into account the correlations between risk factors.
- It can be aggregated across products, trading desks, business units, and up to group level.
- It allows limits to be set and performance to be monitored.
- It provides a basis to reward staff on a risk-adjusted return basis.
- It enables the comparison of the performance of different product types, trading units, and trading desks in terms of risk exposures, profit and loss contributions, and earnings volatility.

When it emerged, VaR was regarded as a simple and easy-to-understand measure of market risk. This was mainly due to VaR was originally developed in response to a desire for a single number to represent risk exposure. However, it was proven subsequent to the financial crisis in 2008 that a risk exposure representing single value was never likely to be sufficient.

3. VaR as a Risk Management Tool

VaR is not simply a measure of risk, it is also a useful risk management tool, provided its limitations are understood and taken into account. There are two features of VaR that are particularly helpful from a risk management perspective. These are,

- VaR is a comprehensive metric that provides a measure of risk across all risk factors,
- VaR can be calculated at different levels, from product up to bank (group) level.

VaR can be used in a variety of ways to inform and manage market risk. Single Measure of Risk or at group level, VaR can provide a single number that indicates what level of risk a portfolio of investment or value of a company is exposed to. If any investment or portfolio of investment has a VaR figure which is beyond the acceptable loss limit for an investor, one option that can be done is, either part of the portfolio can be sold and shift the proceeds to another investment which has lower VaR value or increase the cash value of the total portfolio.

4. Influences on VaR Calculations

The resulting value for VaR will vary according to the decisions made on the elements of which are described below.

4.1 Validity of Underlying Assumptions

When preparing/generating output from the VaR model, it is common to assume that probability distribution will form a normal distribution. However, this may not be the case in practice.

4.2 Type of VaR Model

There are three main types of VaR models, namely, variance-covariance, historical simulation and Monte Carlo simulation. Each of these three types has different approach and has different data requirements.

4.3 Time Horizon

When using VaR model, a time horizon refers to the holding period applied for measuring of VaR. The longer the holding period, the higher the VaR estimate.

1-day period is the most commonly used time horizon when using VaR model by many investors and portfolio managers. By using this time

horizon, VaR can be readily calculated at the end of each business day. This is more realistic as the composition of portfolio of liquid assets is likely to change more frequently and less data is required when measuring risk at shorter holding periods.

4.3.1 Time Horizon: Considerations

There are a number of considerations for time horizon, when deciding the length of the holding period in VaR calculation. VaR assumes no trading. However, the longer the period used in VaR model, the more likely there will be some trading activity. This means that the actual portfolio will differ from the one used to calculate VaR.

- The longer the period, the more data is required. Multiplying 1-day VaR by the square root of the number of days is the generally accepted shortcut for longer time horizons. For example, a 10-day VaR equates to 3.16 (square root of 10) times 1-day VaR.
- Portfolios with more illiquid assets are likely to require VaR to be calculated based on longer holding periods as a 1-day VaR may be meaningless.

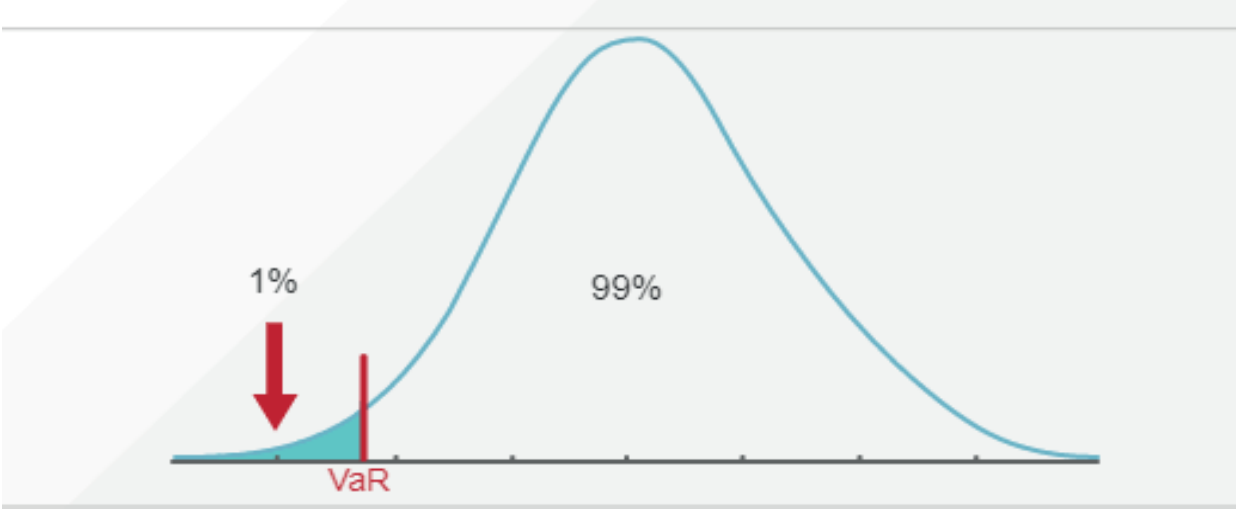
In recognition of the fact that more significant market movements are likely over longer time horizons, regulators for many years required the use of a 10-day time horizon when calculating VaR for capital calculation purposes. However, to account for market liquidity issues, varying time horizons that replaced the static 10-day horizon were included following the financial crisis.

4.4 Confidence Level

The confidence level is used to select the degree of certainty associated with the VaR estimate. It represents the likelihood that an actual outcome will be less than the VaR. A 95% confidence level, for example, suggests that the VaR would be exceeded about once a month (assuming a year contains about 250 trading days). Meanwhile, a 99% confidence level implies that the VaR would be exceeded on just one trading day in 100 (that is, 2–3 times a year).

In terms of a probability distribution, a 99% confidence level means that 99% of the output values are to the right side of the calculated VaR. In other words, there is a 1% probability that a loss will occur that exceeds the VaR (as shown by the shaded area of Figure 1).

Figure 1: 99% Confidence Level for VaR

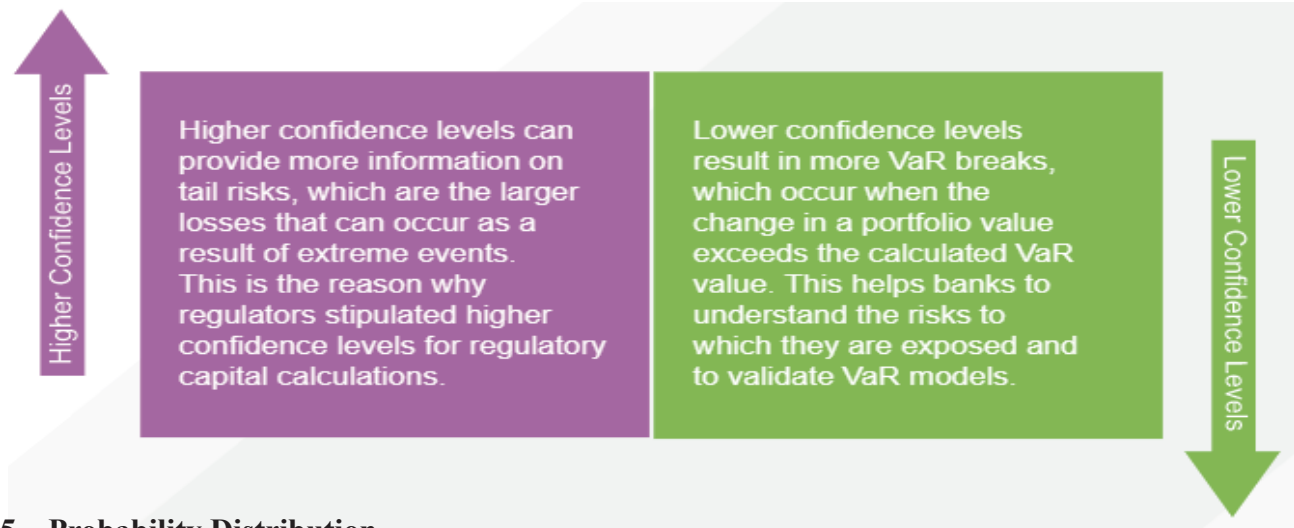


This is known as a one-tailed confidence level as the focus is on downside risk (losses). A two-tailed confidence level is used where there is an interest in extreme values at both ends of the distribution.

4.4.1 Confidence Level Trade-Offs

The higher the confidence level used, the higher the VaR estimate. This creates a trade-off.

Figure 2: Confidence Level Trade-off



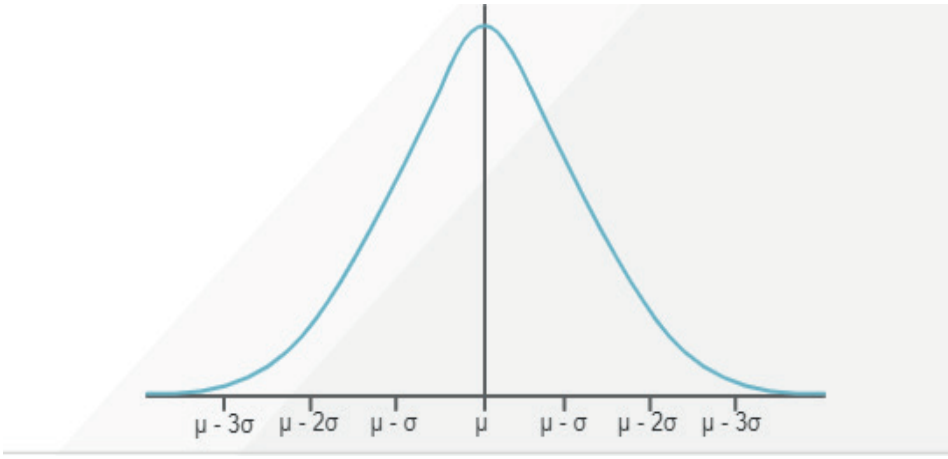
4.5 Probability Distribution

A key assumption of a VaR model is that the values generated by the model form a normal distribution. This is a probability distribution characterized by a continuous, bell-shaped curve and described in terms of just two parameters mean (μ) and standard deviation (σ).

If a large enough number of outputs are calculated by a VaR model and the distribution of these outputs is normal, then:

- The highest number of outputs will be observed for the average (mean) value of all outputs, which represents the most likely change in value for the portfolio.
- The number of outputs for other values will be evenly distributed around the mean.
- There will be fewer outputs the further the values deviate from the mean.

Figure 3: Normal distribution of data

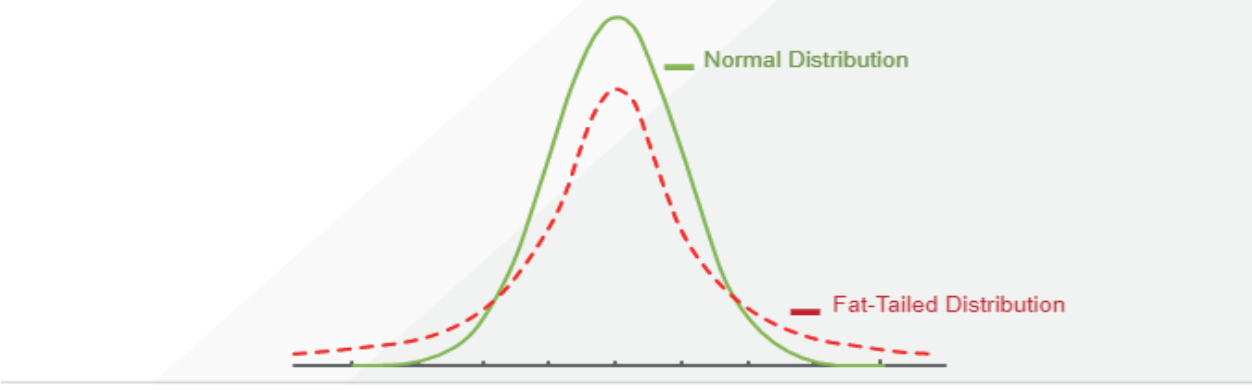


Using the normal distribution assumption means there is a high probability that an output value will be close to the mean and a low probability it will be far away from the mean. In other words, the normal distribution peaks at the mean and tails off at the extremes.

4.6 Fat Tails

Distribution of returns on most financial assets is usually not normal. Due to extreme events in the financial markets, real-world distributions tend to be "leptokurtic," exhibiting fatter tails and a narrower peak when compared to a normal distribution.

Figure 4: Leptokurtic distribution with Fat Tails



The implication of fat tails is that extreme losses are more frequent than implied by the normal distribution, leading to estimates of VaR that understate the true VaR.

4.7 Correlation

The higher the correlation, the higher the VaR estimate. This means that it can be reduced by constructing a portfolio that contains assets with low correlations. However, during the financial crisis showed that actual diversification benefits were lower than expected benefits (one of the reasons why actual losses exceeded VaR by significant margins). After the financial crisis, regulators tightened up requirements on constructing diversified portfolios in calculation of VaR for regulatory capital purposes.

4.8 Volatility

Volatilities are usually calculated based on historical data, which raises few issues. Data availability is one of the issues relating to volatility. While data is readily available for many portfolio risk factors, this is not always the case. Time Series can be considered as another issue relating to volatility as the volatility depends on the time series of data used. The longer the time series is better, but giving equal weight to all data items can result in volatility being understated if it is higher for more recent data samples/or if the time series does not include periods of market instability.

Volatilities are often reported in terms of Annualized Values. However, if VaR is calculated over a 1-day time horizon then an adjustment needs to be made for the volatility, as it is an annualized figure. This is carried out by dividing volatility by the square root of the number of trading days. For example, if a value for annual volatility is used, then this can be converted to a daily volatility measure by dividing by 15.81 (square root of 250, which is the number of trading days for the year).

Using historical volatilities implies that future movements in risk factors will be the same as

the past period which used for the calculating of values. Volatilities change over time (and not just during periods of market disruption as was seen during the financial crisis). This can be an issue as failure to take into account changes in volatilities may mean that VaR is understated.

5. Approaches to Calculate VaR

There are three approaches which are used when building a VaR model.

5.1 Variance-Covariance (Parametric) VaR

The variance-covariance approach is a relatively straightforward analytic approach in calculating VaR. This approach was used in the Risk Metrics methodology developed by J.P. Morgan (a Bank in USA) in the early 1990s. The approach involves estimating volatility and correlation of data and constructing a variance-covariance matrix to calculate VaR.

A key feature of this methodology is that it makes a simplifying assumption that all risk factors and portfolio value inputs are normally distributed. As a result, it understates VaR, if actual distributions are fat tailed.

This method uses the expected return and the standard deviation of the stocks in computing the VaR assuming that the returns of the subject asset/ portfolio exhibit a 'Normal Distribution'. Basically, a level of confidence is selected, and the Z value is matched according to the selected probability. For this purpose, a one-tailed Z table is referred to, as we are just concerned with the negative side of the distribution.

For example, if the portfolio value is $20,000 and if 1-month average return and the standard deviation is 10% and 15% respectively. daily VaR at 5% level of significance can be calculated as-

$VaR = [Rp - (Z)(\sigma)] Vp \Rightarrow VaR = [0.1 - (1.65)(0.15)] 20000 \Rightarrow -\$3000$ (rounded) => 15% of the Portfolio.

Where,

Rp = Return of the portfolio.

Z= Z value for 5% level of confidence in a one-tailed test.

σ = Standard Deviation of the portfolio.

Vp= Value of the portfolio

5.2 Historical Simulation VaR

Historical simulation is a non-parametric approach used in calculating VaR, which uses actual historical data to revalue a bank's current portfolio and produce a range of outputs from which the VaR can be determined. The key assumption on normal distribution, that underpins the variance-covariance approach, is not required for the historical simulation method. Further, there is no need to estimate volatilities and correlations as it does not rely on valuation models. This approach is not subject to the risk that such volatility and correlation models are wrong.

Total reliance on the quality of the historical data set is one of the limitations of the historical simulation VaR approach, in addition to the fact that equal weighting of items in the data set, which results in under/overstated VaR figure. Historical simulation is conceptually simple and relatively easy to implement, making it the most popular approach among investors when it comes to calculating VaR.

Historical simulation is based on order statistics. Given 100 observations, the 99 percent quantile of the d–day returns is simply the lowest observation.

For Example, to compute the 5% monthly VaR, we look at the 5th percentile of the monthly return distribution.

$$\text{Value at Risk} = v_m \frac{v_i}{v_{i-1}}$$

Where;

V_i is the number of variables on day i

V_m is the number of days from which historical data is taken

let's discuss historical VaR using a detailed example. Assume one called Christine decides to use the last 10 years of monthly returns on a public listed company, which is, let's say COCO Lanka PLC (CLP) in Colombo Stock Exchange (CSE). She wants to establish what the biggest monthly losses at a 95% confidence level would be. To accomplish this, she uses these steps:

i). Look up the data. Christine goes to her financial database and finds the last 10 years' worst monthly returns on the CLP; that's 120 data points.

ii). Next, she needs to rank the monthly returns from lowest to highest. An Excel spreadsheet can help with this. The ten worst monthly returns are as follows:

-14.06%, -11.72%, -7.92%, -6.57%, -6.21%, **-6.03%,** -5.50%, -5.30%, -4.31%, -4.28%

iii). Christine then needs to figure out what number of items in the data set matches his desired confidence level. To find a 95% confidence level for the biggest monthly loss, take 100% - 95% = 5%. Christine then multiplies 5% times 120 data points to get **6**.

iv). Now count right 6 data points on your worst monthly returns list and you get -6.03%. The other 95% of data points will have returns greater than -6.03%, so that is Christine 's answer!

So, the VaR calculated using Historical simulation method is in this example is 6.03% with 95% confidence interval.

5.3 Monte Carlo VaR

The Monte Carlo approach involves generating of a simulated distribution by running a series of scenarios (usually thousands) using a random number generator rather than historical data. Each scenario gives a possible value for the portfolio at the end of the relevant period. The basic idea is that, after enough simulations have been performed, the distribution of portfolio values (from which the VaR estimate is inferred) should converge to the portfolio's unknown true distribution.

When simulating random numbers, the random number generator follows a specific theoretical distribution. This is usually the normal distribution, which may be a weakness of the approach compared to historical simulation (which uses the empirical distribution). The Monte Carlo method is very computer intensive, as the simulation may have to be replicated a substantial number of times to get the required level of accuracy. As a result, the costs of the Monte Carlo approach may outweigh the benefits. Model risk is also a significant concern in Monte Carlo VaR simulation. Despite these drawbacks, the Monte Carlo approach has a number of attractions, notably its ability to cater

for non-linear data sets (such as derivative products like options).

The different approaches explained above produce different results for the same portfolio and, each approach has its own pros and cons. Unfortunately, there is no simple answer on which approach is most suitable and it largely comes down to what works best for each investor/portfolio. Larger and more sophisticated institutions are more likely to use model-based approaches such as Monte Carlo simulation. By contrast, smaller institutions and those with less exposure to market risk are more likely to use other methods and/or use data (such as correlation and volatility data) obtained from external sources to simplify calculations and reduce costs.

In practice, **historical simulation** tends to be the most widely-used approach due to its simplicity and ease of understanding. But whatever the approach used, institutions need to be aware of its limitations and actual values should be regularly back tested in order to confirm the methodology used is valid and is producing accurate estimates of VaR.

For example, for a portfolio of 100 stocks, we have to input the standard deviation of all the stocks along with the correlations among all of them to calculate the standard deviation of the portfolio. Nearly 5,000 correlations are required for this. So, we can say that this method is as good as its inputs.

6. Advantages of VaR

i. **Comparability** - It is a measure which can be used to measure the market risk of asset classes exhibiting different risk characteristics. For example, Fixed income securities (bonds) and Equity differ a lot in their risk characteristics, still, VaR for both can be compared after calculating them separately. But we need to keep in mind the fact that the VaR of different securities is not additive. Which means you cannot calculate the VaR of two different assets and add them up to get the VaR of a combined portfolio because when two or more securities are combined, their standard deviation decreases due to diversification.

ii. **Risk Budgeting Process-** It is often used in the risk budgeting process of fund management firms/ institutions where the upper management allocates VaR across the divisions and the manager's goal is to maximize the return given the allocated VaR. This helps the institutions to compare the performance of different divisions according to the allocated VaR.

iii. **Acceptability-** One of the biggest advantages of VaR is, its acceptability among the regulatory authorities.

iv. **Easy to Interpret-** As VaR is measured in terms of currency or as a percentage.

Calculation of VaR is also a part of many financial software. You just have to set a few parameters and the software does the rest for you. You don't have to be a statistical expert to calculate it.

7. Limitations of VaR

i. Large portfolios - Calculation of VaR for a portfolio not only requires one to calculate the risk and return of each asset but also the correlations between them. Thus, the greater the number or diversity of assets in a portfolio, Calculation of Var is more difficult..

ii. Difference in methods - Different approaches to calculating VaR can lead to different results for the same portfolio.

iii. Assumptions - Calculation of VaR requires one to make some assumptions and use them as inputs. If the assumptions are not valid, then neither the VaR figure is accurate.

iv. It does not tell you the expected loss if the loss goes beyond the minimum threshold.

v. Even the risk of liquidity is not considered directly, it just focuses on the market risk.

8 Conclusion

VaR is an important risk measure used by portfolio managers across the globe. Its ease of understanding and wide acceptance by the regulatory authorities makes it even more favorable for most of the portfolio managers and investment companies to adopt. It is very easy for people to understand and bring into the financial market to measure the risk of a company or an investment. Also, it makes the risk much easier to clarify.

We need to consider using the econometric method to calculate the VaR. We briefly reviewed the statistical techniques and economic concepts applied in this method. In most instances, historical simulation tends to be the most widely used approach due to its simplicity and ease of understanding.

Though its advantages clearly weigh more than the disadvantages, however, one should consider its limitations while using it.

In order to increase the credibility of the VaR figure actual values should be regularly back tested in order to confirm the methodology used is valid and is producing accurate estimates of VaR.

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Financial Literacy: A Closer Look at Sri Lanka

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Introduction

Financial literacy is of paramount importance for inclusive growth and participatory economic development that has become an integral part of the research agenda and national policy framework in all countries around the world. Research has confirmed that people with high levels of financial literacy tend to make more rational decisions regarding financial transactions, save more, borrow at affordable costs from the formal financial sector, and make suitable investment decisions and appropriate retirement plans in a timely manner. This will help accumulate assets and ensure their financial well-being at any stage of life. Financial illiteracy, on the other hand can pose a serious threat to their well-being and financial stability in the future. Financial literacy has been identified as a key contributor to the development of a country's financial inclusion, which ultimately contributes significantly to the stability of the financial system. Financial system stability eventually sets the stage for economic stability as well as participatory development. Therefore, having considered its importance, developed, emerging, and many developing countries have included financial literacy in their development agendas.

Although Sri Lanka recorded a high print literacy rate of 92.9 per cent in 2020; the highest in the South Asian region; its financial literacy rate remains unsatisfactory at 35 per cent (S&P Global FinLit survey, 2018). As per the survey, on average, 65 per cent of adults in the major advanced economies are financially literate. As highlighted there, Sri Lanka records the largest gap between print literacy and financial literacy in the region. Although the ability to read and write facilitates access and use of financial services, the low level of financial literacy is having an unfavorable effect on the country's efforts to enhance financial inclusion. This article intends to look at what financial literacy is, why it is important, how financial literacy affects the society in general, how it affects SMEs, savings and borrowings and finally how to improve financial literacy in the country in order to achieve financial inclusion for every citizen and to move towards a higher GDP per capita as a developing country.

What is Financial Literacy?

In general, financial literacy refers to the combination of knowledge, skills, attitudes, and behaviors required to make rational financial decisions and ultimately to achieve the financial security of individuals and households. Thus, financial literacy involves imparting financial knowledge and skills to individuals and households so that they can make rational financial decisions and take effective action regarding their personal money management.

Financial literacy, to put more simply, is the knowledge and skills that a person or family has in relation to earning incomes, managing expenses, borrowing, maintaining savings, formulating a formal retirement plan, and investing for a high standard of living. The primary goal is to shape people's basic attitudes and principles so that a change in financial behavior can enable them to reach a future of financial freedom and security.

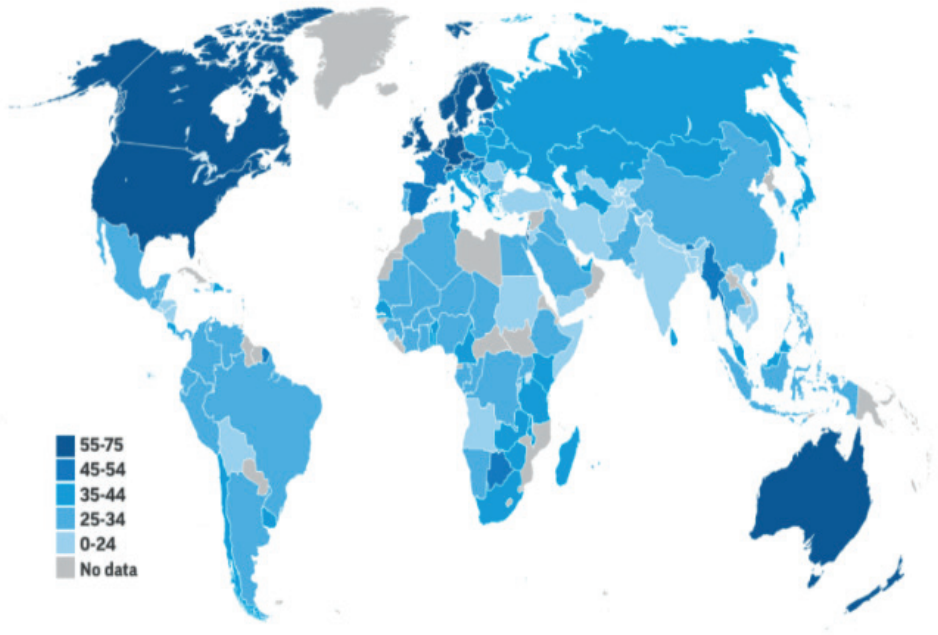
As stated by the United States Treasury's Financial Literacy and Education Commission, financial literacy is ***"the ability to use knowledge and skills to manage financial resources effectively for a lifetime of financial wellbeing."***

As defined by the World Bank "***financial literacy represents the level of aptitude in understanding personal finance. It often refers to awareness and knowledge of key financial concepts required for managing personal finances and is generally used as a narrower term than financial capability."***

Importance of Financial Literacy

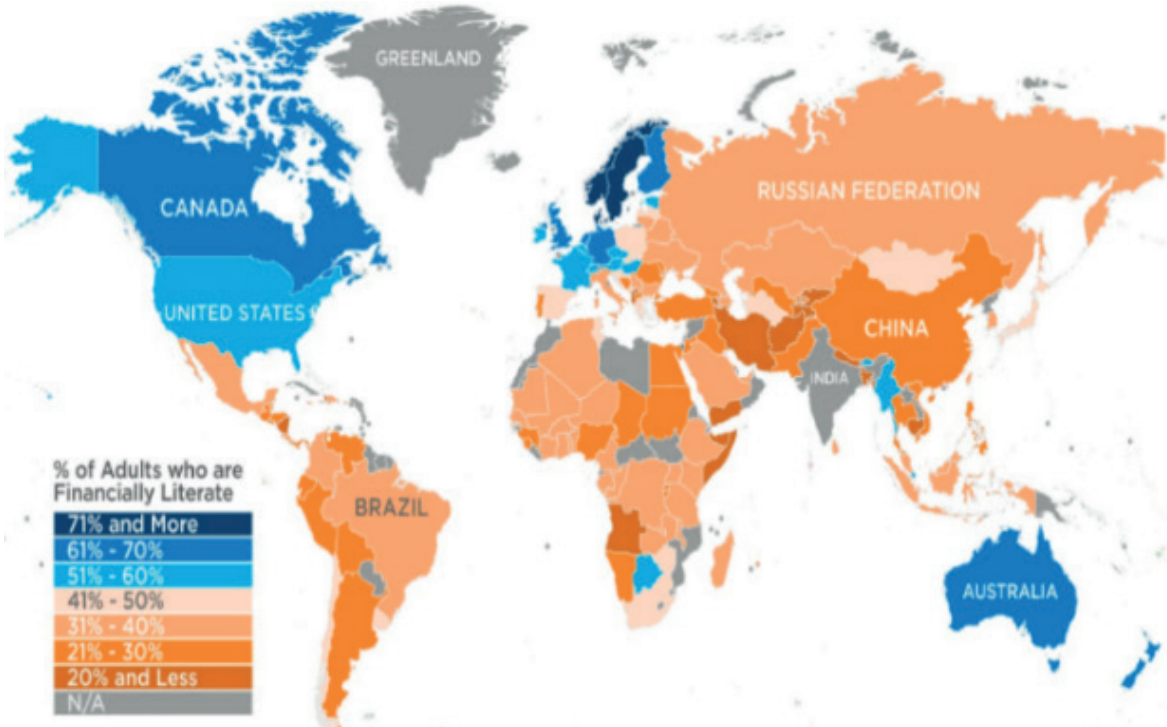
Improving financial literacy can enhance the ability of an individual or household to use their financial resources effectively and efficiently. As a result, their income levels will rise, and a person's economic well-being and social well-being will be maximized. Financial literacy in Sri Lanka, as in many developing countries, is significantly low. Figures 1 and 2 below depict the financial literacy levels across the globe. It clearly shows that developed countries such as the USA, Canada, European countries and Australia have higher financial literacy levels compared to the developing countries. When comparing Figures 1 and 2 with Figure 3, it shows a direct correlation between financial literacy and the GDP per capita of the country.

Figure 1: Global Variations in Financial Literacy



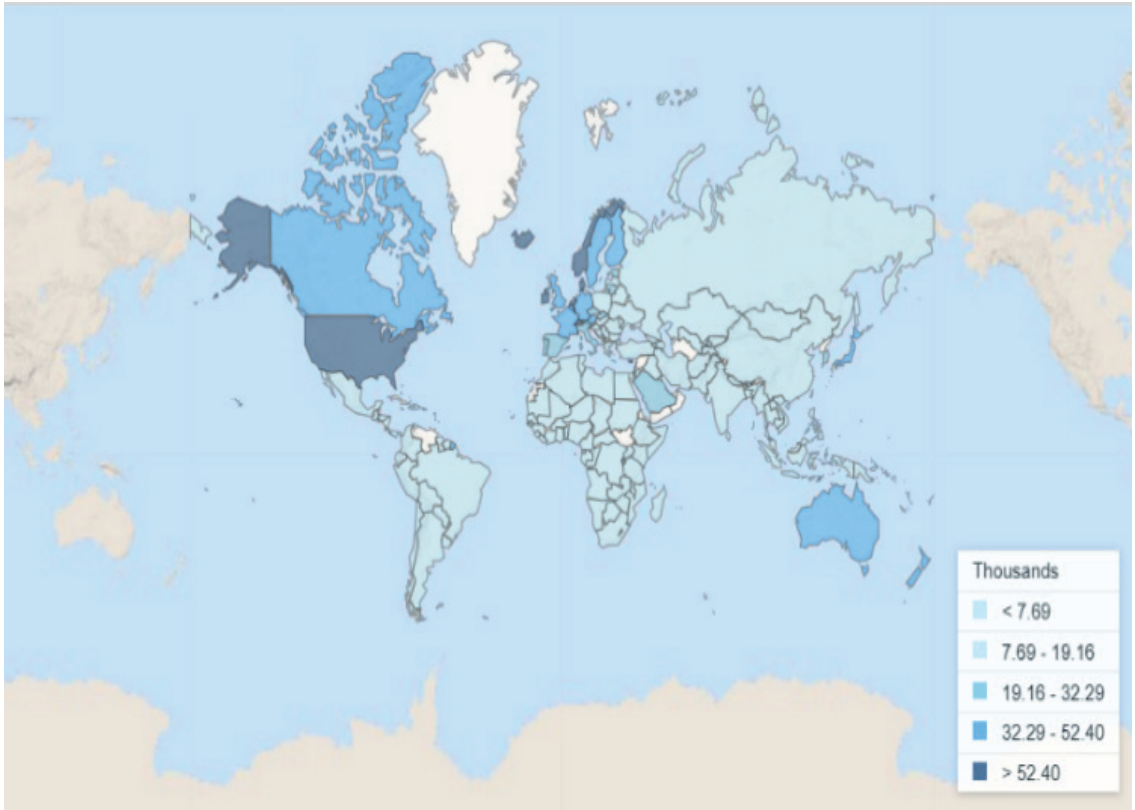
Source: S&P Global FinLit Survey

Figure 2: Financial Literacy Around the World



Source: Global Financial Literacy Excellence Center-http://gflec.org/

Figure 3: GDP per Capita (US$)



Source: https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?view=map)

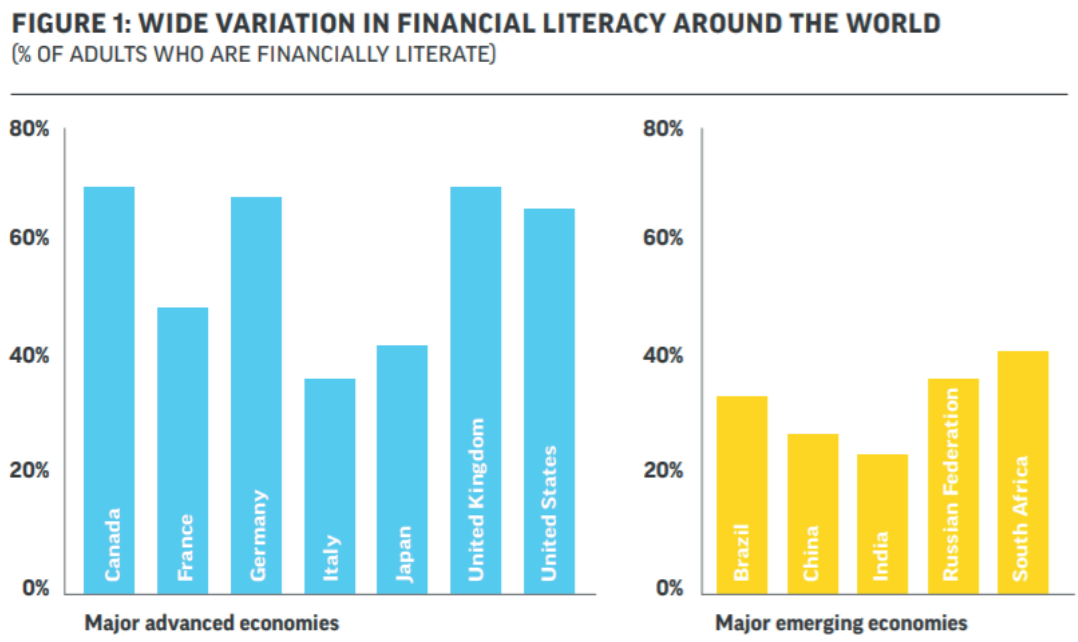
The most important factors that determine the level of financial literacy of rural communities are their level of education, access to financial services and the number of financial services available. Financial literacy is one of the major factors influencing the access of low-income people and vulnerable groups to financial services in rural areas.

Increasing financial literacy involves providing the knowledge that enables people to evaluate the cost of financial services and products, as well as to understand debt, savings, investments, expense management, formal and informal financial sources and more, to achieve economic and financial stability. Without an understanding of the basic financial concepts and the goods and services available in the financial markets, people will not be able to make rational decisions related to financial management.

Financial Inclusion

Maintaining a high level of financial inclusion is crucial for inclusive development. By improving financial inclusion, it is possible to permit groups that have been excluded from the formal financial sector for various reasons, to gain access to the formal financial sector. Knowledge of money market, financial products, formal and informal financial institutions are very important in developing the financial inclusion of a country. High financial literacy levels facilitate access to financial services through greater understanding, that enables people to choose the financial services that suit them and to make the most rational financial decisions in their best interests. It can raise their income levels and thereby improve their standards of living. Therefore, financial inclusion involves providing the necessary access to financial services at reasonable and affordable prices.

Figure 4: Wide variation in financial literacy around the World (% of adults who are financially literate)



Source: S&P Global FinLit Survey

A financially literate person will try to increase their wealth in a more rational way by improving the existing revenue activities and seeking alternative revenue streams. If a person does not have the savings necessary to invest as capital, he/she may be compelled to obtain their capital requirement by borrowing from the formal financial sector. A person who is financially literate can obtain the required financial services at an affordable price from the formal sector, would need to ensure that the loan obtained is used for the required purpose, without being misused.

Education and awareness to enhance financial literacy is at the core of helping our underserved communities to make smart and effective financial decisions as well as to protect their consumer rights and to protect them from predatory lenders. Financially literate individuals have a greater ability to cope with emergency expenses and income shocks as they are more prepared for such events, based on the knowledge they have gained on finance.

Financial Literacy Leads to Financial Inclusion

Financial literacy is treated as one of the influential components for financial inclusion. The importance of financial literacy has come to play especially from 2002 since the financial markets became complex and the general population struggles to make informed decisions. Financial inclusion could be risky when the people do not make informed financial decisions. For example, in the microfinance area, many poverty-stricken people take loans without having a plan to pay back or invest; sometimes leading to suicide with unpayable debts. Creating wealth for investors and the economy is going to remain as a farfetched idea until the general population becomes wiser and more informed about financial decision making. The population that remains as savers must be converted into wise investors for the country's economy to grow.

In Sri Lanka, the average person who has not had a financial education through formal education (Eg: A university degree in a finance related subject) does not have the means or knowledge about diversifying their income through various financial instruments. The average Sri Lankan does not receive education on investing in bonds, stock market, index funds etc. through schooling. If the people were educated in investing wisely that would make their lives better in the long run, while affecting positively on the country's economy as a whole.

Financial Literacy and Society

Financial literacy is seen as a tool for making logical decisions in the selection of financial products and services. The level of financial literacy of the rural people represents their knowledge of financial services and activities in the formal and informal financial sectors. The level of financial literacy varies from one section of society to another and the level of financial knowledge of the rural group is different from that of the urban social group.

The low level of financial literacy among the general population will directly and adversely affect the management of income and expenditure, borrowings, savings, formal and informal sources of choice, credit card management, consumer choices and overall personal financial security.

The impact of low financial literacy is gradually increasing among the rural population and the

micro, small and medium enterprises (MSME) business community. With respect to managing their personal finances, people have failed in their debt management, especially credit card debt management. They get high discounts offered by financial institutions and tend to spend more than their total income. In addition, money is borrowed and spent, even from informal financial institutions and individuals at high interest rates. Moreover, they often do not repay their loan installments before the due date, which are settled later with penalties.

In terms of personal savings, despite the presence of state and private banks and formal non-bank financial institutions in Sri Lanka, people in the rural areas continue to maintain savings with unregistered financial institutions or individuals, expecting higher returns through high interest rates. Lack of awareness of financial institutions, inadequate registered financial institutions and lack of understanding on savings products can lead to a situation where people are unable to reap the maximum benefits from their surplus funds and sometimes, savings are completely lost. Although there are many opportunities for people to reap the maximum benefits from investing in a variety of savings products offered by trusted and well-established financial institutions regulated by the Central Bank, due to lack of knowledge on such products and proper understanding of them, lucrative opportunities may be missed.

Moreover, many people in the society do not have enough knowledge about the interest rate, particularly how to calculate the interest rate. Therefore, it is imperative that the people should be fully aware of the terms of the transaction before signing any document regarding such transaction.

Further, there is no conception of a proper retirement plan for the elderly living in the country. They spend their entire income on daily activities and do not focus on developing a suitable retirement plan. Although there are various retirement plans, life insurance schemes and medical insurance schemes available in the financial market, such opportunities are missed due to insufficient knowledge. Such behavior has left people in rural areas financially insecure after retirement. Most people have a minimal understanding of risk diversification in investment. People have had the bitter experience of saving money in various financial institutions with the aim of earning high interest income. Such credit risk can be minimized if there is knowledge of diversification.

Financial Literacy and Micro, Small and Medium Enterprises

More than 90 percent of the country's total industries are MSMEs; of which, majority are located outside the Western Province. Financial literacy is very important for MSMEs to budget their business, manage expenditure, make right decisions on investments, plan further expansions of the business, and to meet capital and working capital requirements from the formal financial sector. The key is to get the capital requirement for business development from the formal financial sector at an affordable interest rate. Achieving the required qualifications to be eligible to obtain loans or any funding from the formal financial sector is very important for MSMEs. Otherwise, entrepreneurs will have to fund their businesses through the informal financial markets at usurious rates. Currently, many MSMEs in Sri Lanka are funded by the informal sector and their interest rates

are too high for the businesses to bear. Therefore, in the end, many businesses fail with a heavy debt burden. When the MSMEs continue to shut down their business activities, the overall production of the country will decline. Further, in such a scenario, individual incomes will be decreased and as a result, their living standards will deteriorate. Therefore, entrepreneurs should have a clear understanding on financial market behavior, financial products available in the financial markets, new financial products, budgeting, cost management, borrowing, investment and insurance, government taxation, price levels, interest rates, etc. Otherwise, it will be an obstacle to their business development. Moreover, financial literacy helps the entrepreneurs to create value in the business by optimizing decisions on capital investments, working capital, borrowing, pricing, etc.

Financial Literacy for Women

In the Sri Lankan context, women play a vital role in a family by engaging in many jobs covering almost all the sectors of the economy. Therefore, the role of women is crucial in the process of empowering individual households and ultimately achieving the national objective of prosperity of the country. Hence, there is a crucial need for economic empowering through enhancing the level of the financial literacy. It will help women to manage their incomes and contribute to the society. Moreover, financial institutions must develop financial products and services to cater to women's needs.

Financial Literacy and Personal Financing

Financial literacy skills are very important for MSMEs and people living in rural areas as knowledge on financial transactions and financial concepts is vital for proper budgeting in their households or businesses to accommodate timely payments. Financially literate people should be able to distinguish between the financial institutions from which the loans should be taken for asset enhancement or investment purposes and the financial institutions in which surplus funds should be saved or invested. The decisions taken without having proper financial knowledge may end up in loss of personal assets of individuals or SMEs which could have repercussions on economic stability.

Financial Literacy and Savings

Attitudes towards savings and people's behavior towards savings are crucial when it comes to financial literacy. Financially literate people, households tend to maintain a certain amount of their income as savings in a formal financial institution for future financial security, without spending their income in full. People who are well-informed about financial market maintain their savings only in the formal financial sector and always pay attention to their savings. We know that there are more than enough examples of such circumstances. People who are not financially literate tend to take greater risks by keeping their savings in the informal financial sector.

Financial Literacy and Borrowings

If individuals do not have adequate savings, they will have to obtain funding from another source to fulfill their various requirements. If the public knows and understands the debt instruments available in the money market, they will be able to get the amount of funds when needed from a

formal financial institution at an affordable price. By using the loan for the purpose for which it was obtained, the expected goals can be achieved and the difficulty of repaying the loan can be minimized. If the individuals or MSMEs maintain an acceptable financial discipline, borrowing will not be a problem for them. There is a tendency to pursue loans at high interest rates, mainly due to non-fulfillment of the requirements for obtaining loans from the formal sector, inability to meet certain conditions in the formal financial sector and very easy access to loans from the non-formal sector due to the fewer of documents required. Such lending institutions are active on a large scale throughout the country and many people in the country have fallen victim to these institutions, particularly women in the rural areas.

Financial Literacy and Investing

Simply, investment is putting money in various financial instruments, shares, properties etc. with the expectation of generating profits in the future. A large proportion of the Sri Lankan general public does not have an understanding about all the financial instruments available for them to invest their saved money. This stems from the lack of financial literacy. Except for the students who follow finance related degrees, the general public does not have the basic financial knowhow to save a percentage of their income on a regular basis, build up an emergency fund and invest a portion of their income in various financial instruments as a risk diversification method. Educating the general public about the investment approaches would enable them to use their savings to generate a positive impact on the economy, helping the country to achieve a higher GDP.

How to Improve Financial Literacy Level in Sri Lanka?

Many governments and private institutions have taken various initiatives to enhance the level of financial education among the public. In particular, having identified its importance, the Central Bank of Sri Lanka (CBSL) has given high priority in its Strategic Plan to enhance the financial literacy levels in the country. The CBSL has identified Financial Literacy and Capacity Development as one of the key areas in the National Strategy for Financial Inclusion implemented in collaboration with the Government of Sri Lanka. In addition to the CBSL, government agencies such as the Colombo Stock Exchange, public / private financial institutions and professional accounting firms implement knowledge exchange programs targeting various segments of the society. Despite the measures that have been taken by the government and other institutions to increase the financial literacy level of the country there is an ample space for further improvement. Nevertheless, the role played by these institutions should be appreciated and their efforts to enhance financial literacy in Sri Lanka should be coordinated and expanded. Promoting financial education should be a part of the development agenda for which a comprehensive program should be formulated. In addition, various other international organizations, and Non-Government Organizations (NGOs) operating in Sri Lanka are implementing financial education development programs for various sections of the society. However, it is observed that most of these initiatives are scattered and implemented in line with the mandates of the respective entities. In order to achieve the desired results, those isolated efforts require to be well coordinated and

monitored through a centralized mechanism. The CBSL is in discussions with all parties within the National Strategy for Financial Inclusion and is developing a common mechanism.

At present, the access to technology has expanded while special attention should be paid to certain lagging areas to prevent widening inequity. Therefore, special attention should be given to areas that are already economically marginalized.

Financial Education for School Core Curriculum

Compared with the other countries in the South Asian region, Sri Lanka has a well-established free education system and the highest literacy rate in the region. But, according to a research done recently, Sri Lankan university undergraduates with non-financial majors have a financial literacy of 42.83 percent only and knowledge in investment sub dimension it is as low as 28.16 percent. (Edirisinghe S. et al, 2020). This gap could be improved by using the school curriculum to educate adolescents on financial literacy.

Financial education must be methodically included in school workbooks. Maintaining bank accounts in all public and private sector schools, such as savings, borrowing, budgeting, cash flow planning and investment, macroeconomic fundamentals such as government tax revenue, GDP, government expenditure, inflation and consumer education should be included in the school curriculum. Children and adolescents need to be made aware of the need for a formal retirement plan for future financial security.

The Ministry of Education is currently preparing the basis for such an approach. Every citizen of the country plays a direct or indirect economic role and involves in financial dealings. Therefore, not only children but all segments of the society like politicians, farmers, the workers in the public and private sectors, housewives, entrepreneurs of the country should be financially literate. Thus, programs related to financial education should be conducted using electronic, print and social media, covering the entire country. It is also important to make books, magazines and cartoons available in all media on topics related to financial literacy. All higher education institutions, vocational training institutes, in addition to their core field of study, should include subjects on personal finance in their curriculum. People need to be familiar with electronic financial transactions. Financially educated citizens can manage their personal finances properly and have a positive impact on the overall economy, while balanced and participatory development also has a positive impact on maintaining a stable financial system. This will be a step towards reducing poverty in the country.

National Financial Inclusion Strategy

The primary objective of implementing a National Financial Inclusion Strategy (NFIS) is to create a well-informed and equitable approach to access the highest quality, the safest and the most affordable financial services accessibility to all individuals and households through the expansion of financial education. Enhanced financial inclusion provides timely financial services to all individuals, in particular entrepreneurs in the society at an affordable cost. Also, financial inclusion empowers households to manage formal cash flows and increase investment in entrepreneurial activities.

Furthermore, it encourages investments in new and more productive economic activities that contribute

to economic growth and job creation, enhancing access to formal sector finance for MSMEs. It also provides opportunities for financially disadvantaged people to have a better quality of life, as well as access to and use of financial services and products that help them to plan ahead and better manage their finances. This NFIS aims to facilitate the provision of a wide range of financially accessible services to suit the financial needs of every individual and institution in the country, including those who are still outside the formal financial system, leading to economic growth.

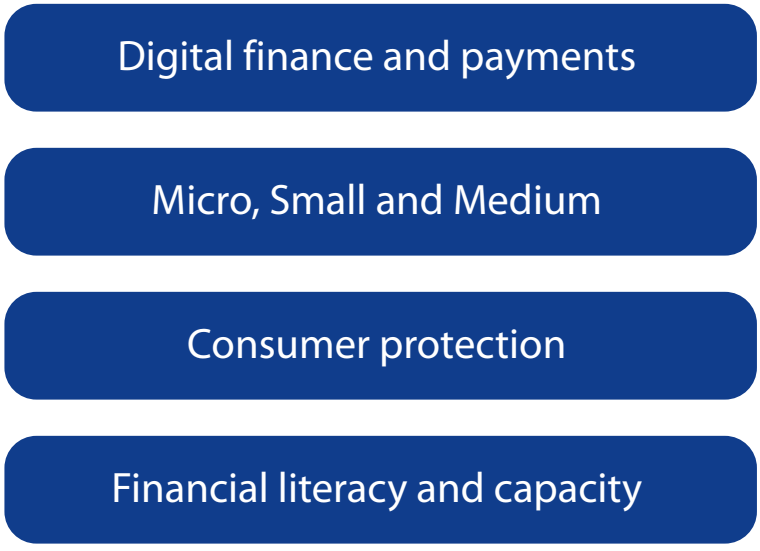
The NFIS for Sri Lanka has been articulated with the participation of many stakeholders in the public sector, private sector and the academic sector. There are four pillars under NFIS as shown in Figure 5.

Furthermore, since financial education has been highlighted as a major catalyst in the overall process of financial inclusion, priority has been given to intensify the relevant activities in the field under the NFIS. Such policies are included in the action plan of the NFIS with the consent of all stakeholders, including the institutions directly responsible for the implementation of the relevant policies. A coordinating and implementation control structure has been established to ensure the effective implementation of the NFIS. Realizing that Sri Lanka needs more than just easy access to financial products and services for financial inclusion, it has already taken the necessary steps to improve financial awareness. These include capacity development programs on financial literacy conducted by the CBSL through various Ministries and Government Institutions, skills development programs on MSMEs on financial management and low income and risk areas.

Conclusion

This article clearly explains how important financial literacy is for different individuals, households, institutions, and society. Financial literacy has a positive correlation with financial stability and future financial security of a country. It shows that financial literacy of the society makes a positive contribution to the balanced

Figure 5 : Pillars of NFIS



and participatory development of a country and financial education is extremely important to increase financial literacy. All sections of the society should have the knowledge of financial transactions, financial markets, financial products, and simple financial concepts. Improving personal financial management involves making regular savings as a habit, exercising prudence in burrowing and well-informed investment decision making, all of which would help build up financial assets over time and develop suitable buffers such as contingent funds and retirement plans. Engaging in financial transactions without such knowledge and information could have socioeconomic consequences.

Many people who are living in the rural areas of Sri Lanka, especially the low-income segments, have been excluded from the formal financial sector due to lack of financial literacy. Financial literacy facilitates the understanding of what is needed to achieve a financially balanced, sustainable, and decent lifestyle. Improving financial education can benefit people in all walks of life, at all ages and in different income groups with different priorities.

The discipline created through proper financial education, enables individuals to entertain a greater economic security and stability during the latter part of their life while increasing their incomes, savings, assets, and investments. It helps people to plan their pensions and savings wisely and provides them with the information and skills they need to make prudent investment choices to ensure they have adequate savings for a contented retirement.

A comprehensive public integration program is needed to improve financial literacy. The CBSL, in collaboration with the Government, is currently implementing the NFIS. Financial education is given high importance in this program and steps are being taken to include financial literacy related subjects in the school textbooks. The presence of people with financial literacy is crucial for the participatory and balanced development of a country. The steps to increase the levels of financial literacy must be taken since it will positively affect the country's GDP per capita and is bound to have positive effects ripple across the country to help people withstand economic shocks.

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Covid-19 – The catalyst of change in the payments systems in Sri Lanka

Introduction

While the Covid-19 pandemic has created catastrophic health, economic and social impacts around the globe, governments and economists are collectively working on macroeconomic policy actions to address this unprecedented crisis to restore economic and financial system stability in an effective manner. The National Payment and Settlement Systems (NPSS), which underpins the operations of economy and financial system by facilitating not only the large value transactions among financial institutions, but also the smaller transactions between consumers and small and medium enterprises, must operate securely, effectively, and consistently to support economic growth (Auer, Cornelli , & Frost , 2020). This article discusses the decline in transactional use of cash and the rapidly growing landscape of digital payments due to the contagious effects of Covid-19 across the world.

Trends of Cash Circulation during Covid-19

The Covid-19 pandemic has significantly influenced the cash demand of many countries. Despite the sharp decrease in the use of cash for daily transactions, the demand for cash was extremely high during the pandemic (Guttmann, Pavlik, Ung, & Wang, 2021). Generally, at times of economic turbulence, cash tends to be widely used for precautionary purposes, and it is wise to maintain substantial stocks of bank notes. Further, the continuing low interest rate environment brought about by accommodative monetary policy stances taken by central banks across the world has also reduced the opportunity cost of holding banknotes, that people opted to hold more cash. The Covid-19 pandemic has intensified the need for cash as a store of value while the use of cash for transactions has decreased in many countries. In December 2020, the increase in bank note issuance in the euro area recorded 130.0 per cent growth in comparison to December 2019; an unusual event that has been called the 'paradox of banknotes[1]' (Zamora-Pérez, 2021).

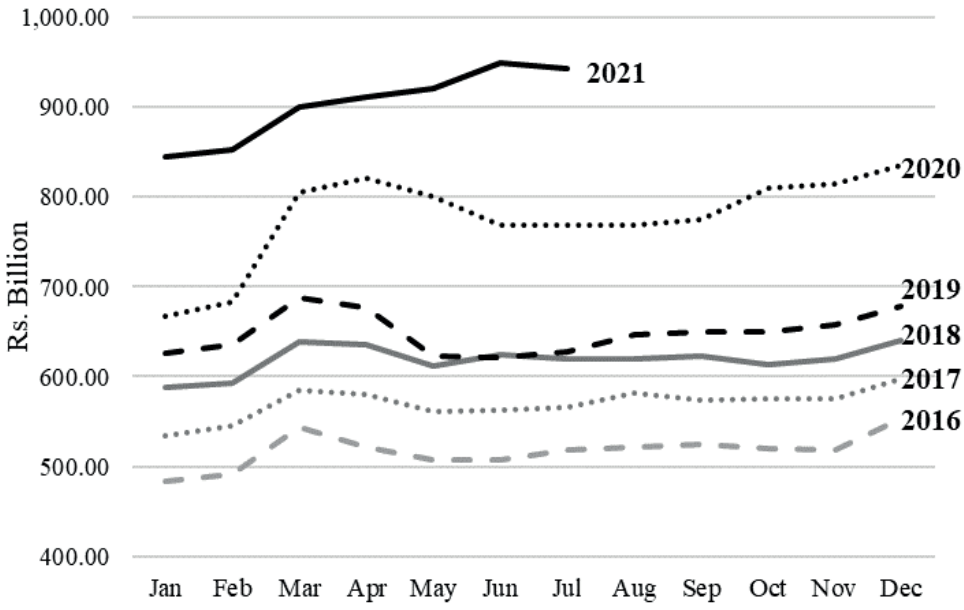
Further, recent research studies emphasised several other reasons for the increase in currency in circulation during this pandemic; such as the withdrawal of cash by banks from central banks and the maintenance of higher stocks of currency

1. Continued demand for higher value banknotes as a store of value

as a contingency measure to manage spikes in demand, the withdrawal of cash by consumers as a contingency and the inability to deposit and spend cash by consumers and merchants due to lockdown restrictions (Cash in the time of Covid, 2020).

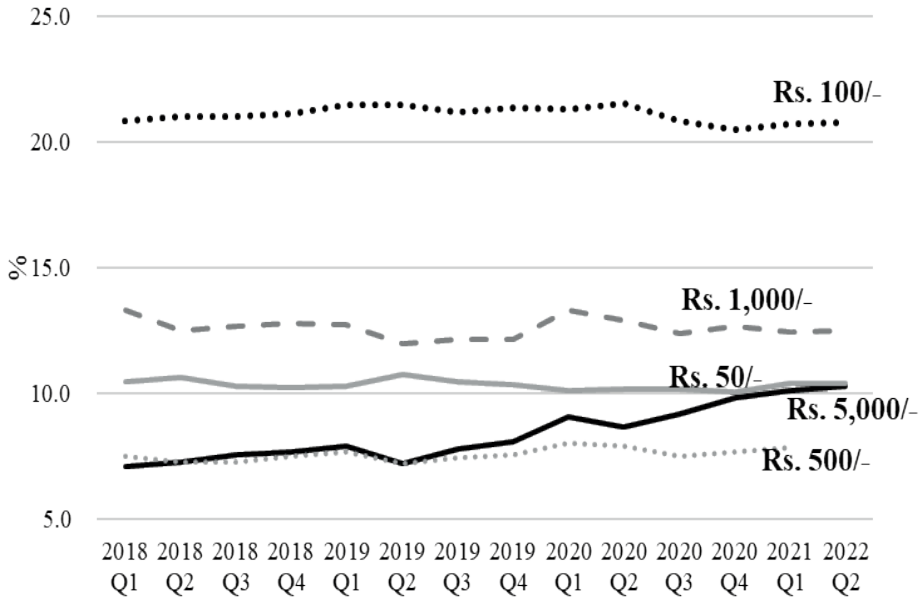
In Sri Lanka, the sharp hike in currency demand started in mid-March 2020 when the annual average growth in currency in circulation registered 19.8 per cent in comparison to 4.7 per cent in 2019. Further, the annual average growth of currency

Chart 1: Currency in Circulation



Source: Central Bank of Sri Lanka

Chart 2: Currency Notes in Circulation by Denominations (in Volume Terms)



Source: Central Bank of Sri Lanka

in circulation during first seven months of 2021[2] registered 18.9 per cent (*Chart 1*). As in many other countries, Sri Lanka also showed continuous growth in demand for its highest denomination note of Rs. 5,000/-, since first quarter of 2020 (*Chart 2*). Thus, it appeared that the 'paradox of banknote' theory prevailed in Sri Lanka during the Covid-19 pandemic.

This exceptional growth in currency in circulation in Sri Lanka has been a clear indication of the tendency of the general public, business entities and financial institutions to hold cash in hand as a store of value during Covid-19 pandemic. In a normal year, currency in circulation increases during festive periods[3] as is evident by the higher levels of cash withdrawals, which quickly subside as they are returned to the banking system soon afterwards. But during the pandemic, the public held onto more currency rather than returning it to the banking system. Further, the substantial reduction in the statutory reserve ratio applicable on all rupee deposit liabilities of licensed commercial banks, also led to increasing the currency in circulation in Sri Lanka (Central Bank of Sri lanka , 2020).

Reduction in Cash Usage for Transactions

The Covid-19 pandemic has changed every aspect of our lives. Consumer expenditure data showed a declining trend due to the expectation that household income would continue to fall in the coming months, with the economic consequences of the pandemic. Accordingly, the way consumers use cash has changed drastically: where less cash is being used for transactions (Jones, 2020). Meanwhile, the lockdown and social distancing rules have led to a drop of cash withdrawals from automated teller machines.

During the Covid-19 pandemic, central banks reported a large number of queries from the public on the chances of contamination from using cash. Meanwhile, internet search intensity pertaining to the 'virus and cash usage' has increased drastically during 2020 in comparison to 2009- H1N1 pandemic, 2012 - Mers-Cov and 2013-Ebola. As per the scientific study of Corona virus behavior on banknotes, the risk of handling a polymer note is said to be less than touching plastic or stainless-steel surfaces. (Cash in the time of Covid, 2020) Further, the risk of transmission of virus by surfaces is very low, where infection mostly occurs via aerosols or droplets. Accordingly, the risk of transmission of Covid-19 Virus via banknotes and coins is very low, and it was clearly established that cash is safe to use (Tamele , et al., 2021). Meanwhile, throughout the pandemic, some central banks promoted trust in using cash to build public confidence. However, irrespective of whether concerns are justified or not, the Covid-19 pandemic hastened the decline in the use of cash as a medium of exchange (Auer, Cornelli , & Frost , 2020).

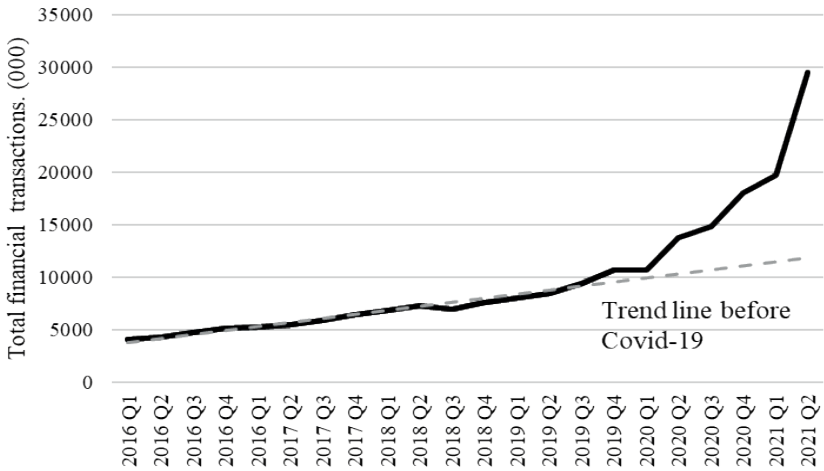
Intensified Digital Payments during Covid-19 Pandemic

Central banks around the globe have taken policy measures to promote the usage of digital payment systems in response to the aforementioned repercussions that arose from the Covid-19 Pandemic situation, whilst developing macroeconomic policies to recover from the economic downturn. Countries have taken several policy measures including the declaration of cash-in/cash-out networks as essential services, the enhancement of transaction limits of banks, the

2 This article analysis published CBSL data up to July 2021.

3 Mid-March to mid-April and during month of December in a given year

Chart 3: Internet based Payment Systems[4]



Source: Central Bank of Sri Lanka

temporary relaxation of Know Your Customer (KYC) procedures and the reduction or removal of fees to provide continued access to digital payment channels during lockdown (Boakye-Adje, 2020).

The Central Bank of Sri Lanka (CBSL) also took measures to ensure uninterrupted operations of the payments and settlements whilst actively promoting and facilitating digital payment systems during the Covid-19 Pandemic. In April 2020, CBSL increased the maximum transaction value limit from Rs. 10,000 to Rs. 25,000 for mobile application-based transactions carried out through the "JustPay" payment solution of Lanka Clear (Pvt) Ltd.

In March 2020, considering the lockdown measures and risks associated with cash handling, CBSL granted approval to financial institutions to open e-wallets or wallet facilitation accounts by digitally fulfilling KYC requirements subject to physical presence within a stipulated time period.

Further, CBSL granted approval to increase the e-money wallet limit from Rs. 10,000 to Rs. 25,000 to facilitate e-money account holders and enhanced merchant limits for mobile phone-based e-money system during this period.

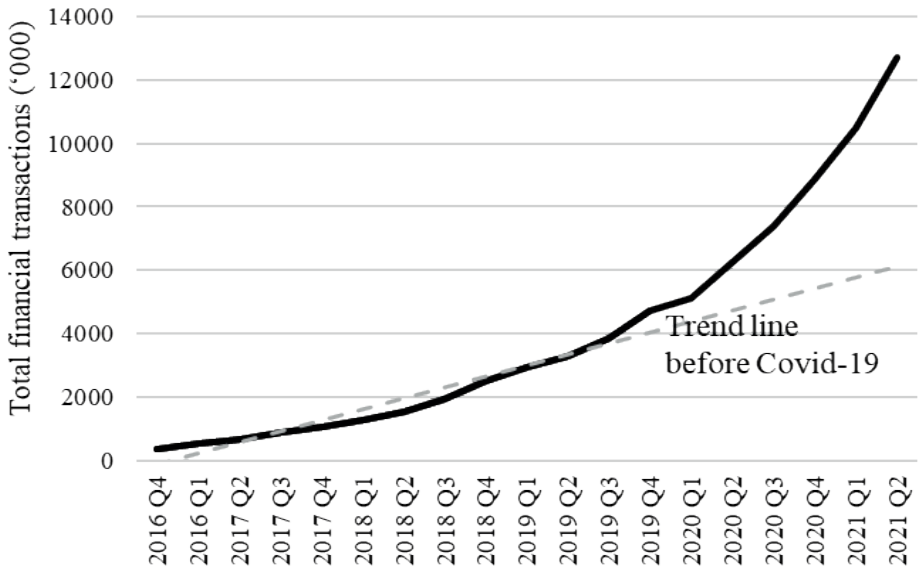
In addition, CBSL issued instructions to financial institutions to waive off registration fees and other charges. Meanwhile, existing customers were allowed to register for online banking products without visiting the bank branches. In 2020, CBSL issued circulars to licensed commercial banks incorporated in Sri Lanka and licensed mobile phone-based e-money operators mandating to join LANKAQR systems as well. (Central Bank of Sri Lanka, 2020).

4. Internet banking allows bank customers to access banking services through Internet. In Sri Lanka, financial institutions facilitate customers to obtain account information, apply or subscribe for financial products/services, perform own account/ third party fund transfers and pay utility bills via Internet banking

CBSL policy measures to encourage the use of digital finance such as, higher transaction limits, relaxed KYC regulations and wavier in digital transaction charges has broadened opportunities for more consistent use of digital payment systems in Sri Lanka during the pandemic period. The rapid growth in volume of transaction in internet-based payment systems was observed in Sri Lanka during this time in comparison to the pre-Covid-19 era (Chart 3). Further, total financial transactions of Common Electronic Fund Transfer Switch (CEFTS) also showed rapid growth during Covid-19 pandemic (Chart 4).

Although central banks eased regulations pertaining to digital payment systems due to the unprecedented nature of the Covid-19 pandemic, maintaining financial system stability and consumer protection through mitigation financial crimes must be at the forefront of all policy decisions (Boakye-Adje, 2020). CBSL is also continuously conducting awareness sessions to avoid financial crimes and scams by educating financial institutions and customers on new initiatives of payments systems. Further, CBSL instructed financial institutions to strictly adhere to the circular on 'Providing real time notifications for transactions effected through

Chart 4: CEFT transactions[5]



Source: Central Bank of Sri Lanka

5. Lankapay CEFTS provides the real-time, retail fund transfer facilities to customers of LankaPay CEFTS members through payment channels such as Internet Banking, Mobile Banking, Kiosks, Over the Counter (OTC) and Automated Teller Machines (ATM), was launched in 2015.
   a. In 2017, LankaPay Online Payment Platform (LPOPP) was introduced to facilitate online real time payments to Government Institutions
   b. In 2017, the 'JustPay' payment product was introduced to facilitate low value payments below Rs. 10,000. This limit is now Rs. 50,000 and as at end of the second quarter 2021
   c. In 2018, LANKAQR specifications and LANKAQR off-us transactions also settled through CEFTS.

electronic payment instruments/mechanisms' to ensure customers are aware of their digital payment information in a timely manner. During 2020, CBSL incorporated timely amendments to the 'Guideline on minimum Compliance Standards for payment Related Mobile Application' to secure customers from aforementioned financial crimes.

Financial Inclusion and Covid-19 Pandemic

The consumer and policy maker's response to the Covid-19 pandemic has been encouraging rapid acceleration in digital financial inclusion with the use of technology (Benni, 2021). In view of the lockdowns and other social distancing measures to contain the spread of the virus and due to growing preference for contactless digital transactions, FinTechs supported people and firms to access financial services. Even though, digital financial services are still small in comparison to traditional financial services, it is expanding rapidly among countries. Currently, as digital payment systems are more efficient, effective, and bearing low transaction costs in comparison to traditional financial services, it is progressively reaching to the lower income households and the Small and Medium Scale Enterprises (SME) sector. According to the empirical evidence, well-regulated financial inclusion improves macroeconomic policies while lowering inequality. Hence, currently, Covid-19 shock is said to be creating benefits to the macroeconomic growth in countries (Sahay, et al., 2020).

However, maintaining the financial system stability by mitigating financial misconduct such as money laundering and terrorism finance must be at the top level of all relevant policy making to assure consumer protection. Safeguarding the gains and promoting the use of digital payment systems would help countries to achieve higher level of financial inclusion (Boakye-Adje, 2020).

Developments of New Payment Systems in Sri Lanka

CBSL is continuously engaging in promoting digital payment systems to move Sri Lanka into a less-cash society. Accordingly, the year 2020 was designated as the year of digital transactions to promote the usage of digital payment mechanisms by the public, and many promotional activities were carried out throughout the year 2020. CBSL approved a 'Digital Road Map for 2020-2022', with the aim of expanding the potential of the interbank payment infrastructure, promoting e-payments, strengthening payment system security, and ensuring conducive regulatory environment. Further, the CBSL has ventured into many initiatives such as standardized LANKAQR payment code for Sri Lanka, Digital Banking, Central Bank Digital Currencies to reduced dependency on cash, Shared-KYC proof of concept using Blockchain Technology, Sri Lanka National Remittance Mobile Application to facilitate foreign employed Sri Lankans to remit their money in an efficient, effective and secure manner, Open Banking provided faster and easier payments with greater financial transparency while Fintech Regulatory Sandbox offered controlled environment to test new financial products and services. Hence, Sri Lanka also believe that Covid-19 pandemic has given an unexpected opportunity to make further use of digital channels to reach these underserved groups, improving digital financial inclusion.

Conclusion

As the Covid-19 pandemic has accelerated the digital payments which are faster, more

convenient, and safer compared to the traditional payment systems, the monetary authorities should facilitate the rapidly changing payment landscape, with appropriate policies while ensuring consumer protection. If policy makers use this boom in digital payments during the Covid-19 pandemic as an opportunity and take appropriate policy actions to promote digital payment systems and be mindful on the policy trade-offs, countries can foster more efficient and effective digital payment systems in the post-pandemic era. Such digital financial endeavors are bound to boost financial inclusion which in turn, will catalyze changes that would lead to higher economic growth of countries.

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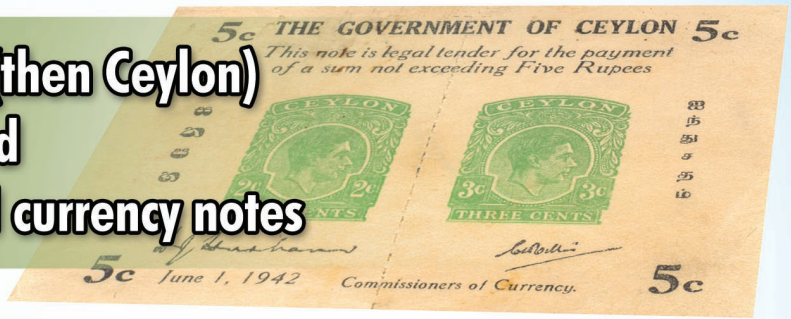
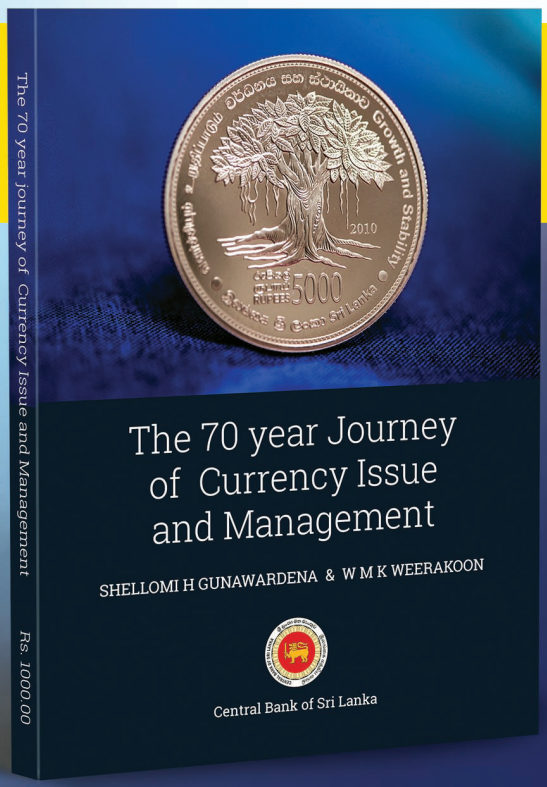
Did you know...

Sri Lanka (then Ceylon) once issued perforated currency notes



Ceylon also issued a Rs. 10,000 currency note!

Find out more interesting facts about our currency notes and coins from the publication



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