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THE IMPACT OF MONETARY POLICY ON STOCK MARKET LIQUIDITY IN EMERGING MARKET ECONOMIES

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1. RESEARCH BACKGROUND

Analysing the role of macroeconomic policies in the development of financial markets and the practical cases can provide a valuable reference for the applied policies in financial markets. Indeed, in macroeconomic policies, monetary policy (MOP) always plays a crucial role in each country's economy, pursuing significant targets, including price stability, economic growth, and full employment. It is said that changes in MOP in the short or long term are known as one of the primary reasons causing different movements of funds flows in the investment channels via direct finance (directly from financial markets) and indirect finance (indirectly from financial intermediaries). The stock market - a type of financial market - is one of the most vital areas of an economy, with an essential economic function providing significant capital for an economy. In reality, the conduct of MOP has affected significantly the stock market performance and development in general and stock market liquidity (SML) in specific (e.g. Fujimoto & Watanabe, 2004; Goyenko & Ukhov, 2009; Octavio et al., 2013; Chu, 2015; Jieun et al., 2016; Kurihara, 2017; Chowdhury et al., 2018; Debata & Mahakud, 2018; and others).

Accordingly, in emerging market economies (EMEs), the terms "monetary policy" and "stock market liquidity" are the first attention of investors who try to get back capital and make the best profit on their investment or regulators who look for and ensure economic growth. It is clearly seen that these issues have become crucial in recent decades as EMEs are taking a more significant force and role in the global economy. In the wake of the 2007-2009 Global Financial Crisis (GFC), developed countries slowly recovered, and emerging and developing countries

continued to lead global economic growth, contributing about 80% of Gross Domestic Product (GDP) growth and 85% of consumption growth. It is a favourable factor creating optimistic prospects for the world economy, but the main characteristics of EMEs cause investors deep concerns when making investment decisions. Moreover, the MOP role has broadened as the economic structure and the changes in the structure of financial markets have become more complex, specifically since the GFC of 2007-2009. Take China as an example; China's Stock Market Crash in 2015, including 190% of growth in a year and a 30% decline in a month, is a meaningful lesson for EMEs regarding the lack of uniformity and tightness in the economic operations. However, it is not easy to reduce the probability of stock market crashes (financial collapses), increase SML or conduct the MOP effectively in EMEs in the era of globalisation.

To conclude, there are two important motivations for this research. First, theoretically in MOP and the stock market, the research complements "a small part" of a research model in the empirical literature. Second, empirically, the research provides practical implications for MOP influence on SML in EMEs. More specifically, it provides comprehensive insight and indicates a good understanding of the relationship between MOP and SML in the selected EMEs context. The research's findings have the potential to support not only the investors making their decisions in the stock markets but also the regulators and policymakers in improving the effectiveness of MOP in the financial system.

2.   RESEARCH   QUESTIONS, OBJECTIVES AND HYPOTHESES

2.1. SCOPE AND FOCUS OF THE STUDY

With the increase in the effects of financial globalisation on the economy in general and financial markets (e.g. a stock market) in particular at the country level, there has been a corresponding increase in its incorporation in the MOP implementation and especially in EMEs. Accordingly, the GFC of 2007-2009 has been ample evidence to illustrate the consequences of overheating the economy and macro-financial imbalances and referring to the period of extreme stress in global financial markets. Given this situation, the research assesses the role of MOP on the SML in EMEs, especially during Crisis and Non-Crisis periods. To this end, the research will cover MOP's impact on SML from 01st Jan 2000 to 31st Dec 2018. The scope of the research is identified to capture the overall influence of MOP on all SML characteristics. In addition, the empirical analyses in this research are restricted to seven selected major stock exchanges located across seven EMEs.

2.2. PROBLEM STATEMENT

The general problem addressed in this research is "the correlation between macroeconomic performance (i.e. MOP), financial markets (i.e. SML), EMEs and the globalisation phenomenon (i.e. a financial globalisation)". In other words, the author considers whether MOP influences SML in EMEs, whether financial globalisation affects the linkage of MOP and SML in EMEs and which MOP indicator affects SML in EMEs in normal and turbulent periods in the short and long run. Besides, the author presumes whether MOP's relation is causal and exists

in the short and long term. Furthermore, the Global Financial and Economic Crisis of 2007-2009, which surprised many economists and financial authorities, indicated a deficiency of the classical and neoclassical approach to understanding financial problems in the economy (Kolozsi, 2013).

Additionally, the literature has not addressed the overall impact of MOP on the equity market in general and the stock market liquidity in particular. As a result, the specific problem in this research is the overall impact of MOP indicators on each major SML characteristic in EMEs, especially during Crisis and Non-crisis times. Also, the research discovers the relationship between MOP and SML in the short and long run and their causality.

It is crucial to address this problem because the effect of MOP on the economy and economic resource allocation via the stock market is significant. This research empirically provides specific answers to the problem.

2.3. RESEARCH QUESTIONS

The following groups of research questions are identified and addressed to guide the acquisition of data required to satisfy the problem statement:

1. To what extent does MOP affect SML in EMEs based on the theoretical and empirical literature? Answering this question will achieve the overall aim and specific objectives 1.

2. To what extent does MOP affect SML in EMEs during Crisis and Non-crisis periods? Answering this question will achieve the overall aim and specific objectives 2 and 3.

3. To what extent does short- and long-run causality between MOP and SML exist in EMEs during Crisis and Non-crisis periods? The answer to this question will address objective 4.

2.4. RESEARCH OBJECTIVES

The general objective of this research is to evaluate and determine the impact of MOP on SML at the country level in the selected major stock exchanges of the seven EMEs in the Crisis and Non-crisis periods from 2000 to 2018, along with the consideration of causality. Thereby, the findings regard recommendations for researchers, regulators, policymakers, and investors. It is achieved through the specific objectives as follows:

1. To systematise the different theoretical properties of MOP that can influence SML in EMEs and the association between MOP and SML in theory and practice.

2. To develop a theoretical model of the relationships between the MOP's variables and SML in EMEs.

3. To assess the proposed model empirically and discover the linkage of MOP and SML in EMEs, especially during Crisis and Non-crisis periods.

4. To identify and empirically evaluate the effect of MOP on SML in EMEs in the short and long run and their causality.

2.5. MODEL OF THE STUDY

In this research, the author conducts two different models to investigate the impact of MOP on SML in EMEs from 2000 to 2018, including the Fixed-Effects Model (FEM) - a static model approach and the Cross-Sectionally augmented Error Correction Model (CS-ECM) - a dynamic model approach. (See Figure 2.1)
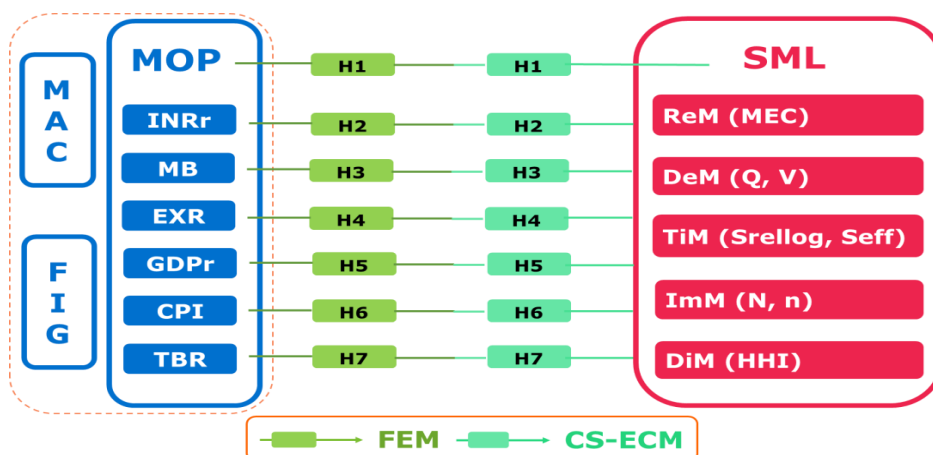
Figure 2.1. Proposed research model approaches
Source: Author's own construction

Note: Hypothesis 1 = H1, Hypothesis 2 = H2, Hypothesis 3 = H3, Hypothesis 4 = H4, Hypothesis 5 = H5, Hypothesis 6 = H6, Hypothesis 7 = H7.

3. RESEARCH MATERIALS AND METHODS

3.1. RESEARCH DESIGN

This research utilised a quantitative methodology. Moreover, the research used secondary data to address the proposed purpose and objectives. This research was quantitative with an experimental design. The author utilised existing panel data to investigate the relationship between an explanatory variable and an explained variable.

3.2. OPERATIONALISATION OF VARIABLES

3.2.1. Explanatory variable

In this research, the author designed one explanatory variable: Monetary policy. To investigate the impact of MOP on SML for this research, the

author identified several MOP variables that could capture the overview of MOP's features and influences. They included the real interest rate, money base, exchange rate, real economic growth rate, inflation rate (Consumer price index - CPI) and Treasury bill rate.

3.2.2. Explained variable

The explained variable for this research is: Stock market liquidity. For this research, the author designed five different measures to capture all characteristics of SML: Market Resiliency (price-related measure), Market Depth (volume-related measure), Market Tightness (spread-related measure), Market Immediacy (time-related measure) and Market Diversity. One-dimensional liquidity measures were used and assessed by yearly data in this research.

3.2.3. Control variable

Market capitalisation and financial globalisation can significantly influence the MOP-SML nexus. Therefore, the author considered the effect of these market conditions as control variables in the research.

All SML, MOP, and control variables are categorised and described in Table 3.1.

Table 3.1. Categorisation of indicators of SML, MOP and control variables

Variables	Indexes	Measurement*
1. Stock market liquidity		
Resiliency (**ReM**)	Market-Efficiency Coefficient: MEC	**MEC**
Depth (**DeM**)	- Trading volume: Q_t - Turnover: V_t	**LnQ** **LnV**
Tightness (**TiM**)	- Log Relative spread of log prices: $LogSrellog_t$ - Effective spread: $Seff_t$	**LogSrellog** **LnSeff**
Immediacy (**ImM**)	- Number of transactions per time unit: N_t - Frequency of transactions: n_t	**LnN** **Lnn**
Diversity (**DiM**)	The Herfindahl-Hirschman index: HHI	**LnHHI**
2. Monetary policy		

Real interest rate	INRr	**INRr**
Money base	MB	**MB**
Exchange rate	EXR	**LnEXR**
Real economic growth rate	GDPr	**GDPr**
Inflation rate	CPI	**CPI**
Treasury bill rate	TBR	**LnTBR**
3. Control variables		
Market capitalisation	MAC	**LnMAC**
Financial globalisation	FIG	**FIG**

Source: Summarised by the author.

Note: 1. * Data transformation is applied with natural logarithmic form for most of the research variables.

2. "Measurement" of each variable (MOP, SML, MAC and FIG) is used as a name of each variable in this study.

3.3. DESCRIPTION OF THE STUDY AREA

The selected EMEs presently consist of seven countries: China, India, Mexico, Russia, Indonesia, Turkey, and Poland. According to the Morgan Stanley Capital International Emerging Market Index, these developing countries qualify as emerging markets[1].

On behalf of SSE Partner Exchanges, the Sustainable Stock Exchanges (SSE) overview the seven selected stock exchanges[2].

3.4. POPULATION AND SAMPLING PROCEDURE

The research took place in the stock markets located in seven countries of EMEs, namely China, India, Mexico, Russia, Indonesia, Turkey and Poland. The population included all stock markets of the selected EMEs, which seems to provide a corresponding sample for collecting and analysing data. The research conducted non-probability sampling based on the selective sampling method, which is appropriate for the scope and nature of the research. The sample frame for the research, including

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[1] https://www.thestreet.com/markets/emerging-markets/what-are-emerging-markets-14819803

[2] https://sseinitiative.org/exchanges-filter-search/

selected significant stock exchanges of seven EMEs, were targeted to provide a corresponding sample for implementing data collection and analysis.

3.5. DATA COLLECTION PROCEDURE

The author collected panel data relating to MOP and SML measures, the data of all seven major stock exchanges in EMEs from 01st Jan 2000 to 31st Dec 2018. For variables measuring SML, data were collected from Bloomberg and stock exchange websites. For all macroeconomic variables concerning the conduct of MOP of seven selected EMEs, data were from Bloomberg and the World Development Indicators database of the World Bank.

3.6. DATA ANALYSIS PROCEDURE

Data analysis was employed to address the research questions, objectives and hypotheses. Data analysis was conducted using STATA 15, a general-purpose statistical software package developed by StataCorp.

3.6.1. Variable calculation

Before performing data analysis, the data preparation was completed by calculating, entering and cleaning the data. All variables were collected and computed in the empirical models according to the measure formula of each variable.

3.6.2. Data transformation

Data transformation was applied with the natural logarithmic form for most research variables to gain more constant variance and normalise the probable presence of non-linearity in the data.

3.6.3. Descriptive statistics

Descriptive statistics summarise statistical criteria to provide information for the initial generalisation of all variables in the empirical models. This

descriptive analysis includes several things, namely frequency distribution, measurement of central tendency, and measurement of variability.

3.6.4. Classic assumption tests

Before performing data analysis, the author examined the data properties relating to classical assumptions to ensure that the regression models satisfy OLS estimators' assumptions. Thus, in order to test the classic assumption deviation, several tests were used: Linearity, Unusual and influential data, Normality of residuals, Correlation, Multicollinearity, Model specification.

3.6.5. Model specification

The author specifies different research models employed based on the proposed research questions, objectives, and hypotheses, such as FEM and CS-ECM.

3.6.6. Regression diagnostics concerning the charateristics of the selected panel data models

Several tests were conducted to ensure regression diagnostics of the selected panel data model. However, depending on proposed research questions, objectives and hypotheses, more specific tests could be utilised in each type of the selected research model.

3.6.7. Estimation of the selected research model

The estimation of each research model was implemented following the identified model specification.

4. RESULTS

4.1. MONETARY POLICY AND STOCK MARKET LIQUIDITY IN EMERGING MARKET ECONOMIES: A LITERATURE REVIEW

How MOP influences the SML in EMEs has been of vital interest to policymakers, investors and scholars during normal times and even more so during times of crisis. The primary aim of this study is to systematically disclose the distinct influences of MOP on SML in EMEs. Based on theoretical and empirical studies, this research classifies and organises the literature and provides an important review of the relation between macroeconomic management policies (MOP in specific) and SML from different perspectives.

With the above brief overview about the importance of SML and crucial macroeconomic role of MOP in the field of financial research, the study has had an extensive review of the literature with the significant focus on the concept of MOP and liquidity measurement, transmission mechanisms of MOP and the stock market, factors impacting SML and the relationship between MOP and SML in EMEs in different timelines.

4.1.1. Monetary policy measures and transmission mechanism of monetary policy and stock market

4.1.1.1. Monetary policy measures

MOP is defined as monetary measures conducted by a Central Bank to impact economic activities, price stability, employment and stability of the long-term interest rates (Okpara, 2010). From different perspectives,

different researchers have investigated the relationship between MOP and SML in different quantity and quality of MOP measures, relating to influential features of MOP. Researchers have commonly employed several MOP measures as standard indicators that could capture the results of MOP's influence, such as the interest rate, monetary aggregates, exchange rate, economic growth rate, inflation rate (CPI) and the Treasury bill rate.

4.1.1.2. Transmission mechanism of monetary policy and stock market

MOP transmission is a process in which MOP changes are expected to affect aggregate demand, output and price level in the economy (Meltzer, 1995), and the stock market is no exception. There are at least six main subchannels in three channels relating to MOP transmission to economic activities (especially a stock market) (Mishkin, 2013).

4.1.2. Stock market liquidity measures and factors impacting stock market liquidity

4.1.2.1. Stock market liquidity measures

SML is an essential market characteristic whose presence enhances the well functioning of the market and vice versa. In the stock exchanges, SML reflects the investors' ability to buy and sell securities in the stock market with easy transfers. Liquidity is a large concept covering multiple dimensions. In general, there are five dimensions in market liquidity, including Depth, Tightness, Immediacy, Resiliency and Diversity (e.g. Kyle, 1985; Harris, 1990; Baker, 1996; Kutas & Végh, 2005; Váradi, 2012). Furthermore, liquidity measures are divided into one-dimensional and multidimensional ones (Wyss, 2004). These measures were evaluated based either on intraday (high-frequency) data or daily, weekly, monthly, quarterly and yearly (low-frequency) data.

4.1.2.2. Factors impacting stock market liquidity

For microeconomic factors, there are some common factors determining market liquidity such as market volatility, trading activity, foreign investors' sentiments, stock exchange mergers and developments in the trading systems, corporate governance. For macroeconomic factors, studies have found that macroeconomic policy announcements have significant impact on liquidity, including fiscal policy and MOP. Many economists consider MOP as the most critical macroeconomic policy (Maskay, 2007).

4.1.3. Emerging market economies

Emerging markets are the countries whose economies are increasing fast, and they are in a transition phase to a market economy (Simon, 1997). Generally, an emerging economy can be identified by five significant characteristics: low to middle per capita income, rapid growth, high volatility, currency swings and higher-than-average return.

4.1.4. Discussion on the relationship of monetary policy and stock market liquidity in emerging market economies

Mixed evidence of the impact of MOP on liquidity have been gathered in EMEs from the theoretical and empirical literature. More specifically, MOP variables may positively or negatively influence the SML in the short and long run, or during crisis periods; or no relationship between these two variables exists; or a causal relationship between them exists.

Many studies of the MOP-SML nexus tend to focus on a specific single market of EMEs to evaluate the precise impact of MOP on SML. Besides the single market, areas or groups of some correlated economies are commonly selected to investigate the potential correlation between MOP and SML. Moreover, a majority of studies examining the relationship

between MOP and SML have been conducted with a focus on advanced economies (e.g. Ciccarelli et al., 2013; Jannsen et al., 2019; and others). In addition, most of the research has no significant timeline separation for crisis periods, for instance, between the Global Financial Crisis period and the Normal period (e.g. Celebi & Hönig, 2019; Marozva, 2020).

Numerous authors have studied the linkage between MOP and liquidity in the stock market via different econometric models. Methodologically, with the data sample selection, most existing studies have investigated the connection between MOP and SML in developed, developing and EMEs, focusing entirely on time-series analysis. Especially some typical models preferred to apply are Vector Autoregressive (VAR), Ordinary Least Squares (OLS), or Vector Error Correction Model (VECM).

4.1.5. Conclusions

The current study has summarised literature on liquidity in stock markets of EMEs and the macroeconomic management of MOP using a systematic literature review methodology.

Firstly, this study gives a deeper understanding of liquidity and MOP by reviewing the existing theoretical and empirical research on the topic. Many researchers have created multiplicities of proxies (measures) on SML to summarise different characteristics and dimensions of liquidity. These measures have evaluated liquidity at various levels in various markets. On MOP, many measures with different angles have been applied to give an overview of MOP's impact and the Central Bank's role.

Secondly, different MOP implementations affect the stock market in general and SML in specific. Based on applying various methods, most scholars demonstrate that the relationship between MOP and SML variables is asymmetric, and MOP can have asymmetric effects for several reasons. Besides, empirical results showed that the nature of the

relationship is subject to liquidity measures used and tends to depend on the data sample of analysis.

Thirdly, in an attempt to analyse the relationship of MOP and the stock market with a lack of timeline separation between the Crisis period and the Non-crisis period, although the MOP effect varies among different countries, many researchers have similar result on impact level.

From an overall perspective, the noticeable findings given by researchers provide a panorama of the relation between MOP and SML in EMEs. Thus, a systematic literature review identifies directions and broadens future research.

4.2. MODELLING IMPACT OF MONETARY POLICY ON STOCK MARKET LIQUIDITY IN EMEs DURING CRISIS AND NON-CRISIS PERIODS: A FEM APPROACH

This study is expected to enrich the extant body of knowledge regarding the relationship between MOP and the stock market by looking at the issue from various angles. The big picture in the impact of MOP on SML is shown through overall capturing all MOP influential properties and all SML significant characteristics. The study presents evidence that the association of MOP and SML is explored in EMEs, considering similarities in MOP targeting and sustainable stock market objectives. The answer to whether and how MOP influences SML in EMEs in the Crisis and Non-crisis time is revealed through employing a static panel model approach, namely the FEM. The study is set out to address the unfilled gaps systematically. It would be a rational premise for the insightful overview and the predictability of SML in EMEs during the Crisis and Non-crisis periods via MOP role in the future.

4.2.1. Related literature review

4.2.1.1. Monetary policy and stock market liquidity in emerging market economies during Crisis and Non-crisis times

H1: There exists a significant impact of monetary policy on stock market liquidity in emerging economies in Crisis and Non-crisis times.

4.2.1.2. Interest rate and stock market liquidity

H2: Interest rate has a significant negative/positive impact on stock market liquidity in EMEs.

4.2.1.3. Monetary aggregates and stock market liquidity

H3: Monetary aggregates has a significant positive/negative impact on stock market liquidity in EMEs.

4.2.1.4. Exchange rate and stock market liquidity

H4: Exchange rate has a significant positive/negative impact on stock market liquidity in EMEs.

4.2.1.5. Economic growth rate and stock market liquidity

H5: Economic growth rate has a significant positive/negative impact on stock market liquidity in EMEs.

4.2.1.6. Inflation rate and stock market liquidity

H6: Inflation rate has a significant positive/negative impact on stock market liquidity in EMEs.

4.2.1.7. The Treasury bill rate and stock market liquidity

H7: The Treasury bill rate has a significant positive/negative impact on stock market liquidity in EMEs.

4.2.2. Empirical analysis and discussions

- Descriptive statistics

Along with visually describing the relationship between MOP and SML in EMEs during Crisis and Non-crisis periods, descriptive statistics were presented to provide the data state of all variables in general.

- Classic regression diagnostic tests

Simultaneously, the author investigated the data properties relating to classical assumptions. The test results showed that the data meet the assumptions underlying OLS regression.

   + *Linearity:* The augmented component-plus-residual plots of each SML variable exhibited linear relationships between variables even though some of them were slightly linear.

   + *Unusual and influential data*: The added-variable plots for all MOP variables computed by each SML variable quickly indicated that all data points seemed to be in range, few outliers were observed in the plots.

   + *Normality of residuals:* The standardized normal probability (P-P) plots illustrated no indications of non-normality because the points of the variables somewhat lay on a relatively straight line except for the presence of a few random errors of several variables (MEC, INRr, MB, LnEXR, CPI).

   + *Correlation:* The pairwise correlation was done between SML variables, MOP variables and control variables (LnMAC and FIG). According to the Pearson's correlation coefficients reported, the correlations between each SML variable and each MOP variable were relatively weak with different signs (+/-) at the statistical significance of 5%.

   + *Multicollinearity:* As the notice mentioned, the correlation coefficient matrix between SML variables shows that most of the

variables do not correlate, except some of them have a pretty strong correlation (such as MB, CPI and LnTBR). Moreover, the Variance Inflation Factors (VIF) test averaged 2.85 (compared to the recommended level of 10). The author can conclude that no perfect or negligible multicollinearity between the variables can affect the estimation results.

+ *Model specification:* The tests of _hatsq were not significant. It means we accept the assumption that the models are specified correctly or that there is no specification error in each equation. In addition, there were no omitted variables in each SML variable model. As a result, each SML variable model had no misspecification issues and no omitted variables.

- Preliminary tests concerning panel regression diagnostics

After the data selection and model specification (the Fixed-Effects Model), the author tested regression diagnostics concerning the charateristics of the panel data model.

+ *Cross-sectional dependence tests:* Breusch-Pagan LM test of independence is utilised to assess the correlation matrix of residuals. It can be seen clearly from the correlation matrix of residuals, it firmly rejected the null hypothesis for any confidence level, so the errors exhibited cross-sectional correlation.

+ *Panel unit root tests:* The results from the panel unit root tests are subject to the inclusion or exclusion of a time trend. The panel unit root tests of Breitung (2000), Levin et al. (2002) - LLC, Harris & Tzavalis (1999), and Im et al. (1997, 2003) - IPS, which assume cross-section independence and include individual effects, rejected the null hypothesis of a common unit root and vice versa. It means the data of each model variable are generally stationary and nonstationary in different considerations.

+ *Fixed effects test:* Based on the "F test that all u_i=0" results of each SML variable, the p-value was small enough (at <0.01 level) to reject the null hypothesis. So there was a significant fixed effect, and the FEM was preferred over a Pooled OLS model.

+ *Time-fixed effects tests:* The author runs the time-fixed effects tests to see whether time-fixed effects are needed. The results demonstrate that the null that all years coefficients are jointly equal to zero is rejected in each SML variable model; therefore time fixed effects are needed, except the LnHHI model. In other words, the estimation of the combined country (stock market) and time fixed effects model of the relation between SML and MOP is needed.

+ *Heteroskedasticity tests:* Based on the test results of each estimation, the overall statistic χ^2 (N) had a p=0.0000 in each SML variable regression. It led to firmly rejecting the null hypothesis for any confidence level. Thus, a phenomenon of heteroscedasticity was present.

+ *Autocorrelation within unit tests:* The P-value (<0.05) shown led us to vehemently reject the null hypothesis and validate the presence of autocorrelation of the first order.

+ *Endogeneity tests:* The Durbin-Wu-Hausman test reveals that no endogeneity problem exists in the model.

To sum up, according to the time fixed effects test results, the author specified a two-way fixed effects model with both individual and time-specific effects. The error structure of the study was characterised by Heteroskedasticity, Panel Autocorrelation and contemporaneous Correlation (HPAC). However, controlling for these standard errors complications depends upon the nature of the panel under study.

- Fixed-Effects Model regression

The regression results from the estimation demonstrate the impact of MOP on SML in the selected stock markets in EMEs during the Crisis and Non-crisis periods using two specific control variables (MAC and FIG).

Summing up, *the estimation results of the FEM indicate that the impact of MOP on SML in EMEs is varied for Crisis versus Non-crisis times.* More precisely, in Crisis time, the MOP variables are mainly nonsignificantly related to each SML variable. However, most have changes in an impact state (positive or negative effect), and some have different effects during the Crisis. Only the Treasury bill rate significantly negatively affect Market resiliency (via MEC) during the Crisis. Inflation rate and Economic growth rate positively impact Market depth (via LnQ and LnV) with different significance levels in the Crisis, whereas Interest rate has a slight negative impact (via LnQ). The Exchange rate slightly negatively influences Market tightness (via LnSeff) in the Crisis period. Only the Inflation rate positively affects Market immediacy (via LnN and Lnn) with a strong significance during the Crisis. Surprisingly, there is a nonsignificant impact of MOP on Market diversity (via LnHHI) during the Crisis time.

By contrast, in Non-crisis times, most MOP variables differently have a significant impact on SML characteristics, except for Market resiliency. Interestingly, for the characteristic of Market resiliency, there is a nonsignificant influence of MOP on Market resiliency during the Non-crisis. For the characteristic of Market depth, most MOP variables (except Economic growth rate) strongly and significantly affect Market depth (via LnQ and LnV) with different signs in the Non-crisis. Interest rate, Monetary aggregates, and the Treasury bill rate positively affect Market depth, while the Exchange rate and Inflation rate have a negative effect. For

the characteristic of Market tightness, like Market depth, MOP variables (except Economic growth rate) have a significant impact on Market tightness (via LogSrellog and LnSeff) with similar signs in the Non-crisis. However, only the Interest rate is varied with a negative sign. For the characteristic of Market immediacy, most MOP variables (except the Economic growth rate and the Treasury bill rate) still significantly influence Market Immediacy (via LnN and Lnn) with different signs in the Non-crisis. Only the Inlfation rate negatively affects Market Immediacy, whereas Interest rate, Monetary aggregates, and the Exchange rate have a positive effect. For the characteristic of Market diversity, Monetary aggregates significantly negatively impact Market diversity (via LnHHI), while the Exchange rate slightly positively impacts Market diversity during the Non-crisis periods.

Noticeably, there is a slight relationship between Market capitalisation, Financial globalisation and each SML characteristic (such as Market depth, Market tightness and Market immediacy), although they are positive or negative. Market capitalisation negatively affects Market diversity (via LnQ) and Market immediacy (via LnN and Lnn) with various significance levels, while Financial globalisation only has a significant positive effect on Market tightness (via LnSeff).

- Feasible Generalized Least Squares regression

In order to correct the error structure of this study called HPAC, the regression estimation with the Feasible Generalized Least Squares (FGLS) method was used to provide stable estimation results.

To sum up, *in the FGLS regressions, the estimation results reveal that the effect of MOP variables on each SML characteristic varies significantly during the Crisis versus Non-crisis time.* More specifically, during the Crisis time, the significant effects of MOP variables on SML characteristics

remarkably changed even though the Crisis had a nonsignificant impact on MOP or SML. It can be seen clearly that Economic growth, Interest rate, Exchange rate, Monetary aggregates and the Treasury bill rate affected SML characteristics in different directions and significance during the Crisis. Some MOP variables, namely Interest rate, Monetary aggregates, the Exchange rate and Economic growth rate, have a significant influence on Market tightness (via LogSrellog and LnSeff), except Economic growth has a slight influence. Others (Interest rate, Economic growth and the Exchange rate) affect Market Depth with various significance. Besides, Economic growth and the Treasury bill rate have a slightly negative effect on Market resiliency at this Crisis time.

In the Non-crisis, four MOP variables affect SML characteristics: the Exchange rate, Interest rate, Inflation rate, and Treasury bill rate. Among these MOP variables, the Exchange rate has a highly significant impact on SML characteristics (Market depth, Market tightness, Market immediacy and Market diversity) with a positive or negative sign. It can be clearly explained by the strong significance of Financial globalisation in the estimation. Similarly, Interest rate positively or negatively affects Market depth, Market Immediacy and Market diversity with a lower significance. The Inflation rate slightly influences Market depth and Market diversity, while the Treasury bill rate only has a highly positive impact on Market tightness.

Along with the special features of the FGLS regression allowing the error structure "HPAC", both Market capitalisation and Financial globalisation impact SML characteristics (except for Market resiliency) even though their signs are different. Interestingly, Financial globalisation strongly affects each SML characteristic, and it is a reasonable explanation for a

strong significant impact of the Exchange rate on each SML characteristic, except for Market resiliency.

4.2.3. Conclusions and recommendations

The study has shed light on the role of MOP as macroeconomic management of a nation in general and a stock market in particular. The author investigated the impact of MOP on SML in EMEs in Non-crisis and Crisis periods.

Brief to conclude, *selected sample MOP variables influence SML in EMEs during Crisis and Non-crisis times, confirming all hypotheses from H1 to H7 even though the impact levels and signs are different in each SML characteristic.* The static panel estimation results suggest that the selected EMEs conducted an expansionary MOP, significantly leading to a rise in SML during the Crisis period. Several major MOP variables revealing this easing MOP during the Crisis include the Interest rate, the Treasury bill rate, Inflation rate, Economic growth, and the Exchange rate. Moreover, the tendency to implement the tightening MOP for most EMEs is confirmed in the Non-crisis periods (Pre-crisis: 2000-2006 and Post-crisis: 2010-2018). It is detected through some main MOP variables such as the Interest rate, the Treasury bill rate, the Inflation rate, the Exchange rate and Monetary aggregates. More specifically, Interest rate and Inflation rate are considered essential MOP indicators to SML in Crisis and Non-crisis times. Along with the Interest rate, which is a vital tool of MOP, the Treasury bill rate often tends to noticeably affect SML in both Crisis and Non-crisis periods due to the "risk-free" characteristic of the Treasury bill, in particular on the financial markets of the EMEs. Because of financial globalisation, the Exchange rate also influences SML during Crisis and Non-crisis times; especially, it becomes more significant to most SML characteristics in Non-crisis times. Based on the "inflation targeting" framework in the

EMEs, which is focused primarily on achieving low and stable inflation, supportive of the economy's growth objective, Economic growth is crucial to SML in the Crisis, while Monetary aggregates are of great concern to enhance SML in the Non-crisis times.

4.3. THE CAUSAL LINKAGE BETWEEN MONETARY POLICY AND STOCK MARKET LIQUIDITY IN EMEs: A PANEL CS-ECM APPROACH

To the author's knowledge, the study improves the existing empirical literature to fully assess the causal relationship between MOP and SML in EMEs via all MOP properties and SML characteristics captured. Their causality is revisited in seven selected EMEs whose benchmark similarities in MOP targeting and stock market sustainable objectives, applying the dynamic panel model approach of "the CS-ECM". In addition, this causal correlation is taken into account the significant changes in market capitalisation guiding an investment strategy (Menaje, 2012) and changes occurring as a result of globalisation and financial openness (Hasan & Javed, 2009).

4.3.1. Related literature review

4.3.1.1. The causal relationship between monetary policy and stock market liquidity in emerging market economies

H1: There exists a significant causal relationship between monetary policy and stock market liquidity in emerging economies in the short and long run.

4.3.1.2. Interest rate and stock market liquidity

H2: There exists a significant causal relationship between interest rates and stock market liquidity in EMEs.

4.3.1.3. Monetary aggregates and stock market liquidity

H3: There exists a significant causal relationship between monetary aggregates and stock market liquidity in EMEs.

4.3.1.4. Exchange rate and stock market liquidity

H4: There exists a significant causal relationship between exchange rate and stock market liquidity in EMEs.

4.3.1.5. Economic growth rate and stock market liquidity

H5: There exists a significant causal relationship between economic growth rate and stock market liquidity in EMEs.

4.3.1.6. Inflation rate and stock market liquidity

H6: There exists a significant causal relationship between inflation rate and stock market liquidity in EMEs.

4.3.1.7. The Treasury bill rate and stock market liquidity

H7: There exists a significant causal relationship between the Treasury bill rate and stock market liquidity in EMEs.

4.3.2. Empirical analysis and discussions

- Descriptive analysis

The graphs visually provide an overall picture describing the relationship between MOP and SML in EMEs from 2000 to 2018. Overall, the correlation between MOP and SML is quite similar in EMEs from 2000 to 2018, except for Turkey. There is no consistent and harmonious pattern between MOP and SML adopted for all EMEs, but it seems changes aiming to primary goals eventually in EMEs.

- Stationarity test

+ *First-generation panel unit root test:* SML and control variables, four-panel unit root tests (Breitung, LLC, IPS and Hadri) were implemented to infer on nonstationarity of panel data for MOP. The

results from the first-generation panel unit root tests were subject to inclusion and exclusion of a time trend. The optimal lag lengths were chosen using the Bayesian Information Criterion (BIC). The mixed results of first-generation panel unit root tests for all variables were presented with the rejection and acceptance of the null hypothesis of the presence of a unit root at the 1%, 5% and 10% levels. Based on the results of these first-generation panel unit root tests, the author can generalise that the panel of SML, MOP and control variables is non-stationary.

   + *Second-generation panel unit root test:* The author conducted Pesaran's cross-sectional augmented Dickey-Fuller (CADF) test in order to supplement the robustness of the first generation test. In this case, the full battery of second-generation tests indicates that the SML, MOP and control variables were non-stationary, except INRr and LnEXR were stationary without a time trend at significance levels of 5% and 1%, and Lnn was stationary with a time trend at 5% level. The CADF test accepted the null hypothesis of "all series are non-stationary" at the 5 per cent level of significance, encouraging the results attained by the first-generation panel unit root tests above. That is to say, the panel of all research variables is non-stationary.

- Cross-sectional dependence test

Based on the opted and collected sample, the Breusch-Pagan Lagrange Multiplier (Breusch-Pagan LM) test of independence was conducted to evaluate the correlation matrix of residuals. It rejected the null hypothesis for any confidence level, so the errors exhibited cross-sectional correlation. Besides the Breusch-Pagan LM test, the CD test statistic (Pesaran, 2004) with the H0 hypothesis representing "there is no correlation between the units" was employed. As a result, it was induced that there is a correlation between the units. Therefore, it is enough

evidence to suggest the presence of cross-sectional independence in each estimation.

- Panel cointegration test

After confirming the presence of unit root for all research variables, a panel cointegration test was employed to reveal the relationship between the series in the long term. The result from the cointegration test will determine the existence of long-run relationships among the variables in the model. All tests of Kao (1999), Pedroni (1999, 2004) and Westerlund (2007) have a null hypothesis of no cointegration, but the alternative hypotheses are different. On the whole, the given results almost confirm the long-run relationship between MOP and SML.

- Granger causality test

The existence of cointegration confirmed long-run relationships between different variables of models. Subsequently, the author tried to determine the direction of causality among them by applying the Granger causality approach of Dumitrescu & Hurlin (2012). The Granger causality test results showed significant differences in the causal association between MOP and SML across the different SML characteristics. The results were reported for lag augmentations of the BIC from 1 to 4 (inclusive).

In essence, *the Granger causality results indicate the presence of the causal relationship between MOP and SML in EMEs, except for the Exchange rate running from SML to the Exchange rate.* All identified unidirectional and bi-directional causalities between research variables (especially MOP and SML) have a positive sign with the trend from 1 to 4-period lags even though their significance levels are different. Although most of the results tend to be dynamic in nature and support the existence of research literature, the direction of causality between MOP and SML is still mixed and ambiguous. Such results partly reflect the interactive

relationship between SML and factors considered as determinants like MOP, Market capitalisation and Financial globalisation, even with various significance levels. Accordingly, it has posed a challenge to how specific policies of MOP promoting the financial system interact with the decisions of economic agents at the micro-level and vice versa. In other words, it is necessary to specify a framework for each country and each related stock market.

- CS-ECM estimation

After ensuring the long-term equilibrium operationally by cointegration, the dynamics of SML were subsequently defined in the CS-ECM approach, and all coefficients were assumed to be heterogeneous. Following Lütkepohl (1993) and Chudik & Pesaran (2015), the number of lags p is called the order or lag length of the autoregression: $p = \left[T^{\frac{1}{3}}\right] = \left[19^{\frac{1}{3}}\right] = 2$ lags of the cross-sectional averages were added in this study. Standard errors and confidence intervals can be obtained by a simple bootstrap in which the cross-sectional units are drawn with replacement.

All things considered, *the results of the CS-ECM estimations disclose that the short- and long-run effects of MOP on SML in EMEs exist.* The CS-ECM estimations capture the short-term deviations of research variables from equilibrium and their long-run movements with the consideration of two lags in the cross-sectional averages. All research variables in each model of MEC, LnQ, LnV, LogSrellog, LnSeff, LnN, Lnn and LnHHI are strongly cross-sectional dependent on the estimated exponents (alpha), which are more than or equal to 0.5. The CD-test statistic yields the same conclusion: most variables contain solid cross-sectional dependence.

Both Market capitalisation and Financial globalisation differently impact SML characteristics in the short and long term. It notes that Financial globalisation mostly has a short-term effect on SML characteristics (except the characteristic of Market diversity), while both Market capitalisation and Financial globalisation affect some SML characteristics in the long term.

4.3.3. Conclusions and recommendations

This study has attempted to examine the causal linkage between MOP and SML in seven selected countries of EMEs in the short and long run from 2000 to 2018 by applying a dynamic panel model approach. MAC and FIG were utilised as control variables. The author employed different tests and techniques: beginning with stationarity tests, then cross-sectional dependence tests, cointegration tests, the Granger causality tests, and the CS-ECM technique.

All in all, the research results obtained by the cointegration tests, Granger causality tests and CS-ECM estimations confirmed hypotheses from H1 to H7 except for H4. However, the significance levels, directions and signs differed in each SML characteristic. In other words, *the causal link exists between MOP and SML in EMEs in the short and long term, except for the aspect of MOP, namely the Exchange rate*. Noticeably, the causality between MOP and SML asserts that MOP and SML are matters in which MOP is considered an essential determinant of SML, and SML plays a supportive role for MOP.

The findings of this study might have some necessary implications, especially for EMEs. Generally, Central Banks and investors should analyse variations in the sign and direction of the MOP-SML relationship in the short and long run before implementing any MOP or investment strategy.

Moreover, Central Banks and investors should also take into account that the correlation between the MOP and SML variables is different, with different SML characteristics, different features of monetary variables and different MOP goals and strategies. It must keep its eye on the ball and not lose sight of its core mandate. For instance, investors should consider that their investment strategies will depend on their investment horizons and the volatility of SML characteristics, while Central Banks should contemplate that monetary policies could have various positive and negative effects in the short and long term due to living under many guises.

Most selected MOP variables (except the Exchange rate) were identified as having an essential role in the financial market stability in general and SML in specific. In other words, SML could be highly boosted by managing some significant MOP variables in the short term (such as the Treasury bill rate, Monetary aggregates, Economic growth rate and Interest rate) and in the long term (such as the Treasury bill rate, Monetary aggregates and Inflation rate).

5. DISCUSSIONS AND CONCLUSIONS

5.1. OVERALL DISCUSSION AND CONCLUSIONS

The dissertation provides comprehensive insight into the overall impact of MOP on SML in EMEs by making a systematic theoretical and presenting empirical summary with static and dynamic approaches. The dissertation discloses significant empirical findings that considerably contribute to

addressing the research questions and hypotheses. This dissertation implements one review study and two empirical studies to do so.

The first study is presented in Section 4.1 (Chapter 3), summarising theoretical and empirical literature on liquidity in stock markets of EMEs, the macroeconomic management of MOP and their relationship using a systematic literature review methodology.

The second study is presented in Section 4.2 (Chapter 4), investigating the impact of MOP on SML in EMEs during Crisis and Non-crisis times with a static model approach. The results support that MOP affects SML in EMEs during Crisis and Non-crisis periods, and thus all the hypotheses from H1 to H7 are confirmed. The findings of this second study are in line with the suggestions of previous theoretical and empirical literature summarised systematically in Section 4.2 of Chapter 4. This second study concludes that MOP aspects impacts SML in EMEs during Crisis and Non-crisis times, although the impact levels and signs are different in each SML characteristic.

The third study is presented in Section 4.3 (Chapter 5), shedding light on how MOP impacted SML in EMEs from 2000 to 2018 with a dynamic model approach. This third study obtains several significant findings conceding all hypotheses from H1 to H7, but H4 is an exception. The findings of this third study are consistent with the statements of previous theoretical and empirical literature summarised systematically in Section 5.2 of Chapter 5. This third study presents evidence that the causal relationship between MOP and SML in EMEs exists in the short and long run (except for the MOP aspect named Exchange rate), even though the significance levels, directions and signs differ in each SML characteristic.

5.2. THEORETICAL IMPLICATIONS

Regarding the theoretical contribution, the dissertation addresses the gap and under-explored issues in the literature in several ways.

First, this dissertation gives a deeper understanding of SML, MOP and their relationship in EMEs by systematically summarising the existing theoretical and empirical literature.

Second, this dissertation contributes to the emerging knowledge on the linkage between MOP and SML by providing an empirical model that captures the overall impact of MOP on SML.

Third, this dissertation empirically provides a static picture of the relationship between MOP and SML in EMEs from normal (Non-crisis) to turbulent (Crisis) periods by applying the FEM approach.

Fourth, this dissertation seeks to understand the insight and empirically create a dynamic panorama of the association between MOP and SML in EMEs by employing the CS-ECM approach.

5.3. PRACTICAL IMPLICATIONS

Besides the theoretical implications, the author's work provides vital practical implications in the financial markets of EMEs (especially the stock markets) relating to the macroeconomic management of MOP of Central Banks and the investment strategy of investors.

Firstly, the author complements small literature linking MOP and SML. Indeed, the relationship between MOP and SML has been documented in empirical studies. However, academic research is still being determined concerning an overall linkage between them in EMEs, especially during Crisis and Non-crisis times. The author contributes to the MOP-SML literature by exploring their comprehensive relationship based on capturing overall MOP aspects and major SML characteristics.

Secondly, from a static perspective, the author concurred on the significance of MOP in the financial system in general and in the stock market in specific and how its responses affect the characteristics of SML in EMEs. The findings can help Central Banks identify clear MOP indicators that ensure the pursuit of their primary goals and enhance SML in both normal and turbulent periods, making it more attractive for capital investment. Accordingly, it supports investors in outlining and designing a strategy for their investment and makes final investment decisions easier.

Thirdly, from a dynamic perspective, the author provides significant insight and demonstrates a good understanding of the relationship between MOP and SML in EMEs. Accordingly, the causality between them indicates that MOP and SML are both matters in which MOP is considered an essential determinant of SML, and SML plays a supportive role for MOP. Indeed, MOP and SML are interdependent and mainly have positive bi-directional causality even though the causal effects from MOP to SML and the reverse effects do not fully appear in all SML characteristics and the same SML characteristics. Besides, the short- and long-run effects of MOP on SML are discovered in EMEs. The findings help Central Banks draw an insightful panorama of their correlations and develop appropriate strategies for capital flows' attraction and financial stability through a stock market channel.

In conclusion, from three studies, it can be observed that there exist significant interactions between macroeconomic variables of MOP and characteristics of SML in the EMEs in the normal time and turbulent times, in the short and long time. Accordingly, MOP affects SML as a macroeconomic determinant, and in turn, SML enhances MOP responses and its credibility as a microeconomic supporter. These relationships can be positive or negative depending on the variable being considered. In

other words, it is necessary to incorporate a MOP environment for predicting SML. The author's work corroborates the fact that the macroeconomic environment (i.e. MOP) is crucial and should be closely monitored to ensure stability. Regions with stable macroeconomic environments enjoy increased activity at the stock market and thus an increased performance (i.e. SML). Regulators and policymakers may regard the relationship between MOP and SML as an essential source of information for policy formulation and implementation. Nevertheless, the macroeconomic management for promoting SML should consider the features of the critical MOP indicators to apply in normal and turbulent times, in the short and long run, and the causal relationship between MOP and SML. Attaching financial channels like SML (e.g. Chordia et al., 2000; Næs et al., 2011; Apergis et al., 2015) to macroeconomic modelling may be helpful for policymakers since liquidity encompasses vital information about the economy's condition. In parallel, investors may consider the correlation between MOP and SML as a reliable source for business advice and investment because an appropriate MOP creates a safer investment environment (Hajilee & Niroomand, 2018). As such, investors may build their investment models in the financial markets with the support of well-known financial models and improve their investment decisions. In contrast, it can not be ignored that the function of financial markets (i.e. SML) is generally known as the "barometer" of the national economy and react to MOP first before economic activities, which relates to setting up MOP strategies and directing MOP responses.

5.4. LIMITATIONS AND FUTURE RESEARCH

Like other studies, despite the theoretical and practical contributions, the author's work imposes some limitations that can provide future research opportunities.

First, the data sample size is relatively small for some reasons. The author used the yearly data for research because of the characteristic of MOP data. The findings will be more reliable if the sample size is big enough. The monthly or quarterly data can increase the sample size in future research. In addition, the number of countries studied still needs to be bigger to represent the area of EMEs even though they are opted with some criteria. The country selection can conduct for all continents, for instance, at least two countries in each continent. This selection will help address the linkage between MOP and SML and assess characteristics for each continent and the area of EMEs. It could be interesting to make similar studies using an alternative extended sample to ensure that the conclusions reached do not lead to different outcomes (Oskooe, 2010).

Second, the relationship between MOP and SML is addressed, focusing on the whole group of selected EMEs. The answers to how MOP influences SML in each selected country of EMEs still need to be solved.

Third, the relationship between MOP and SML is not consistently examined for both Crisis and Non-crisis periods in the entire research.

Fourth, the effect of MOP on SML relating to the location with a spatial approach needs to be clarified, although financial globalisation has a noticeable impact on their relationship. How spillover effects of MOP on SML are in EMEs by applying a spatial model approach should be clarified.

Fifth, all studies of the author's work only focus on how MOP affects SML in the EMEs in Crisis and Non-crisis times and their causal relationship in the short and long term. Despite the importance of knowledge on channels of MOP transmission, identifying the channels of the monetary transmission mechanism which are effective and providing

some general inferences concerning which channels of MOP are working are not investigated and should be answered in future research.

Sixth, the impact of MOP on SML in the EMEs should be clearly investigated in the conventional and unconventional regimes of MOP. Understanding the different effects of conventional and unconventional policies on SML in the EMEs in normal and abnormal times is necessary.

Seventh, the author acknowledges the significance of considering goodness-of-fit measures for the parametric ranking model and model selection criteria. It should be appropriately conducted to boost the research reliability.

6. THE NEW SCIENTIFIC RESULTS

In general, several new scientific findings on the comprehensive relationship between MOP and SML literature in EMEs from 2000 to 2018 have been obtained (chiefly the impact of MOP on SML), which could be taken into consideration by researchers, regulators, policymakers and investors as follows:

1. The relationship between MOP and SML is appropriately clarified based on capturing overall aspects of MOP and major characteristics of SML, especially with a timeline separation between the Crisis and Non-crisis periods.

Accordingly, from theory to practice, the dissertation provides "a small complement" for the research model relating to the relationship between MOP and SML in EMEs in the existing empirical literature. This complement is proven to capture all MOP aspects and major SML

characteristics through one theoretical study (in Chapter 3) and two practical studies (in Chapter 4 and 5) conducted by the author.

2. The linkage between MOP and SML is mixed and asymmetric (particularly the effect of MOP on SML), varying in different periods from normal to turbulent times, from short run to long run, in different SML characteristics, in different approaches and analysis methods.

More precisely, starting with the first study of the dissertation (in Chapter 3), the study compiles some central reviews and discussions about the linkage between MOP and SML in the extensive theoretical and empirical literature.

Based on the literature review and drawbacks revealed in this first study, through two subsequent studies, the theoretical research model is proposed and investigated to evaluate their overall relationship in EMEs with static and dynamic approaches as well as the consideration of timeline separation between the Crisis and the Non-crisis periods.

From a static perspective, the second study (in Chapter 4) indicates that MOP affects SML in EMEs during Crisis and Non-crisis times with various significance levels and signs in each SML characteristic, which means "different MOP implementations in different periods, then different SML states". In other words, this second study validated all hypotheses proposed from H1 to H7 in the static model approach, conducted through the Fixed-Effects Model and Feasible Generalized Least Squares. Accordingly, there is a significant effect of MOP on SML in EMEs during Crisis and Non-crisis periods (H1 accepted). Specifically, Interest rate, Monetary aggregates, the Exchange rate, Economic growth rate, Inflation rate and Treasury bill rate have a negative or a positive impact on SML with different significance levels, respectively (H2, H3, H4, H5, H6 and H7 accepted).

From a dynamic perspective, the third study (in Chapter 5) reveals the interactive roles of MOP and SML in EMEs in light of the country's economy in general and the national financial system in particular via their unidirectional and bi-directional causalities in EMEs. Moreover, the importance of MOP implementation for enhancing SML (even being able to forecast the volatility of SML) to achieve a stable and efficient financial system in EMEs in the short and long run is statistically asserted through short- and long-run effects of MOP on SML in this third study. By way of explanation, the third study asserted most hypotheses proposed from H1 to H7 (except H4) in the dynamic model approach, carried out via the Granger causality and Cross-Sectionally augmented Error Correction Model. Accordingly, a significant causal relationship exists between MOP and SML in emerging economies in the short and long term (H1 accepted). Precisely, Interest rate and Economic growth rate have a negative causal influence on SML in EMEs in the short run (H2 and H5 accepted). In contrast, the Inflation rate has a negative causal one in the long run (H6 accepted). There is a positive causal effect of Monetary aggregates on SML in EMEs in the short and long time (H3 accepted). Treasury bill rates have mixed causal impacts (i. e. negative and positive impacts) on SML in EMEs in the short and long run (H7 accepted). Only the Exchange rate exists a reverse relationship from SML to Exchange rate and no effects on SML in EMEs in both the short and long term (H4 rejected).

3. The causal correlations between MOP and SML in EMEs mostly concur that MOP and SML are both matters in which MOP is considered an essential determinant of SML, and SML plays a supportive role for MOP.

More specifically, the primary reviews of the association between MOP and SML are summarised and detected in the first study (in Chapter 3), as well as the various impacts of MOP on SML in EMEs during Crisis and Non-crisis times conceded in the second study (in Chapter 4). In line with the findings of both studies, their causalities are precisely disclosed in the third study (in Chapter 5). Accordingly, it reflects that not only does MOP promote SML as a determinant, but SML also assists MOP responses as a supporter with the function of the national economy "barometer".

7. PUBLICATIONS RELATED/ NOT RELATED TO THE TOPIC OF THE DISSERTATION

Publications related to the dissertation

Hoang Ton, U. T., & Tatay, T. (2022). Monetary policy lessons learned from 2007-2009 Financial Crisis in SouthEast Asia. *Selye E-Studies, Faculty of Economics, J. Selye University, Slovakia*, *13*(2), 13–35.

Hoang Ton, U. T., & Tatay, T. (2021). Monetary policy and stock market liquidity in emerging market economies: A literature review. *Regional and Business Studies*, *13*(2), 55–68. https://doi.org/10.33568/rbs.2916

Hoang Ton, U. T., & Tatay, T. (2019). Attracting foreign capital to Viet Nam's banking sector. *Gazdaság És Társadalom*, *12*(2), 23–41. https://doi.org/10.21637/gt.2019.2.02

Publications not related to the dissertation

Books

Hoang Ton, U. T. (2022). Brand, culture and employee engagement: The study of Bosch Group. In *Organizational behaviour and leadership theory in practice, Kaposvár, Hungary: Magyar Agrár-és Élettudományi Egyetem Kaposvári Campus* (pp. 33–45).

Full papers in conference proceedings

Hoang Ton, U. T. (2021). Monetary policy effects on stock market liquidity during Financial Crisis and Non-crisis period: A literature review. *The 15th Annual International Conference on Economics and Business: Challenges in the Carpathian Basin, Sapientia Hungarian University of Transylvania, Romania*, 1–18.

Hoang Ton, U. T., & Tatay, T. (2018). Applying inflation targeting for monetary policy framework in Vietnam: Challenge and Response. *The 3rd Business and Enterpreneurial Economics Conference 2018, University of Zagreb, Faculty of Economics and Business, Sibenik, Croatia*, 1–17.

Tatay, T., & Hoang Ton, U. T. (2017). Kockázat, kockázatkezelés, értékpapírosítás és annak makrogazdasági hatásai. *Kautz Szakkollégiumi Konferencia, Széchenyi István University*, 1–24.

Hoang Ton, U. T., & Tatay, T. (2017). The relationship between corporate social responsibility and corporate financial performance. *The 5th International Scientific Correspondence Conference on "Legal, Economic, Managerial and Environment Aspects of Performance Competencies by Local Authorities", Slovak University of Agriculture in Nitra, Slovakia*, 1–12.

Abstracts in Conference proceedings

Hoang Ton, U. T. (2020). Effects of monetary policy on stock market liquidity: A review. *ATLAS 7th International Social Sciences Congress, Tomori Pal College, Budapest, Hungary*, 1.

Hoang Ton, U. T., & Tatay, T. (2018). Stock market seasonal effects: Evidence from emerging market economies. *The 3rd International Young Researcher Scientific Conference on "Sustainable Regional Development - Challenges of Space and Society in the 21st Century", Szent István University, Gödöllő, Hungary*, 1.