

The copyright © of this thesis belongs to its rightful author and/or other copyright owner. Copies can be accessed and downloaded for non-commercial or learning purposes without any charge and permission. The thesis cannot be reproduced or quoted as a whole without the permission from its rightful owner. No alteration or changes in format is allowed without permission from its rightful owner.



**MEASURING FINANCIAL STRESS INDEX (MFSI) FOR
MALAYSIAN ECONOMY**



**A Master Project Submitted to
Othman Yeop Abdullah Graduate School of Business
University Utara of Malaysia
In Fulfilment of the Requirement for the Master Degree of Economics**

PERMISSION TO USE

In presenting this project paper in partial fulfilment of the requirements for a Post Graduate Degree from the University Utara of Malaysia (UUM), I agree that the Library of this university may make it freely available for inspection. I further agree that permission for copying this project paper in any manner, in whole or in part, for scholarly purpose may be granted by my supervisor or in their absence, by the Dean of Othman Yeop Abdullah Graduate School of Business where I did my project paper. It is understood that any copying or publication or use of this project paper parts of it for financial gain shall not be allowed without my written permission. It is also understood that due recognition shall be given to me and to the UUM in any scholarly use which may be made of any material in my project paper.

Request for permission to copy or to make other use of materials in this project paper in whole or in part should be addressed to:

Dean of Othman Yeop Abdullah Graduate School of Business

University Utara Malaysia

06010 UUM Sintok

Kedah Darul Aman

ABSTRACT

This study focuses on the construction of financial stress index in an emerging economy like Malaysia. This becomes imperative as a result of the repeated episodes of financial crises. This study measures financial stress index for Malaysian economy. We aggregate the identified financial and economic factors into a single index using the principal component analysis (CPA). The result shows that MFSI increases as a result of increase in banking sector fragility index, credit stress, external debt, stock market volatility and exchange market pressure index. Moreover, the weights of the variables reveal that the magnitude of the Malaysian financial stress is mainly driven by the fragility of the banking sector. The combine variables explain about 53 percent of the total variation in the Malaysian financial stress index (MFSI). Thus, the financial stress is determined to be the key player in the co-movement of the components used in the construction process. Furthermore, the aggregated components practically capture the known key aspects of financial stress in Malaysia. The implication of the finding is that authorities should focus more on banking sector stability than other components of the financial stress. This will help to reduce the overheating of the Malaysian financial stress.

ABSTRAK

Kajian ini memberi tumpuan untuk membina indeks tekanan kewangan dalam ekonomi baru seperti Malaysia. Ia menjadi penting akibat daripada krisis kewangan yang sering berulang. Kajian ini mengukur indeks tekanan kewangan bagi ekonomi Malaysia (MFSI). Pengiraan secara agregat faktor kewangan dan ekonomi yang dikenal pasti sebagai indeks tunggal telah digunakan dalam analisis komponen utama (CPA). Hasil dapatan menunjukkan bahawa MFSI meningkat apabila berlaku peningkatan dalam indeks kerapuhan sektor perbankan, tekanan kredit, hutang luar negeri, turun naik pasaran saham dan indeks tekanan pasaran pertukaran. Selain itu, pemberat kepada pembolehubah yang digunakan mendedahkan bahawa magnitud tekanan kewangan Malaysia sebahagian besarnya didorong oleh kerapuhan sektor perbankan. Gabungan pembolehubah dapat menjelaskan kira-kira 53 peratus daripada jumlah variasi dalam indeks tekanan kewangan Malaysia (MFSI). Oleh itu, tekanan kewangan ini telah dipilih untuk menjadi faktor utama dalam pergerakan bersama komponen yang digunakan dalam proses pembinaan indeks. Tambahan pula, komponen agregat tersebut secara praktikalnya telah menunjukkan aspek utama yang dikenal pasti dalam tekanan kewangan di Malaysia. Implikasi daripada dapatan mencadangkan pihak berkuasa memberi lebih tumpuan kepada kestabilan sektor perbankan daripada komponen lain daripada tekanan kewangan. Ini akan membantu untuk mengurangkan tekanan melampau kewangan Malaysia.

ACKNOWLEDGEMENT

All praise due to Allah SWT, the Lord of the world that makes it possible for me to complete this project. Blessing and salutation also be on Prophet of Allah SWT, Muhammad SAW. I would like to take this opportunity to express my gratitude and appreciation to the following individuals whose guidance and contribution in preparing this paper.

I am greatly indebted to my supervisor, Associate Professor Dr. Hussin bin Abdullah who has made a significant contribution until the completion of this project paper and deserves special thank for his kindness, patient, generosity and guidance. Special thanks also go to Professor Jauhari Dahalan and Mr. Mohammad Umar (PhD candidate from Nigeria) who has made a huge contribution on this study.

Finally, special respect and thanks to my beloved husband who inspires me to succeed and also to my parents for their unconditional love and encouragement. Last but not least, special thanks also go to my family members and friends for being supportive throughout my studies in University Utara Malaysia, Sintok, Kedah.

Thank you.

TABLE OF CONTENT

PERMISSION TO USE	i
ABSTRACT	ii
ABSTRAK	iii
ACKNOWLEDGEMENT	iv
TABLE OF CONTENT	v
LIST OF DIAGRAM	vii
LIST OF FIGURE	viii
LIST OF TABLE	ix
1.0 INTRODUCTION	
1.1 Introduction	1
1.2 Background of Study	1
1.3 The Financial System in Malaysia	3
1.4 The Central Bank	6
1.5 Conceptualizing Financial Stress	7
1.6 Problem Statement	8
1.7 Research Questions	13
1.8 Research Objectives	13
1.9 Significant of the Study	13
1.10 Scope of the Study	14
1.11 Organization of the Study	15
2.0 LITERATURE REVIEW	
2.1 Introduction	16
2.2 Theoretical and Conceptual Review	16

3.0	METHODOLOGY	
3.1	Introduction	23
3.2	Data Description	23
3.3	Measuring the Financial Stress Index for Malaysia	24
3.4	Banking Sector Risk	25
3.5	Stock Market Risk	26
3.6	Currency Market Volatility	26
3.7	Sovereign Bond Risk	27
3.8	Credit Stress	28
3.9	External Debt	28
3.10	Principal Component Analysis	29
4.0	EMPIRICAL RESULTS	
4.1	Introduction	31
4.2	Aggregation of the Components	31
4.3	Principal Component Analysis	32
5.0	CONCLUSIONS AND POLICY IMPLICATIONS	
5.1	Introduction	39
5.2	Conclusions and Policy Implications	39
5.3	Suggestion for Further Studies	41
	REFERENCES	42

LIST OF DIAGRAM

Diagram	Page
1.1 Schematic of Financial Stress	8



LIST OF FIGURE

Figure		Page
4.1	The Malaysia's Financial Stress Index	37



LIST OF TABLE

Table		Page
4.1	Correlation Coefficients of MFSI Components	32
4.2	Principal Component Analysis Results	33



CHAPTER ONE

INTRODUCTION

1.1 Introduction

This chapter outlines the introduction of this study consists the background of study problem statement, research questions and objectives, significant of study and scope and limitations of the study.

1.2 Background of the Study

The growing role of the emerging economies in the global landscape is having significant implications on global and regional trade and finance, the nature and direction of capital flows, and global governance in the areas of finance and economics. In the global economy, Asia is leading the recovery process today, and is expected to remain as the world's fastest growing region over this decade. The rapid transformation of the region over this decade will contribute to increasing its financial and economic potential.

Within Asia, the Association of Southeast Asian Nations (ASEAN) region is in a strategic position to leverage on the increasing opportunities emanating from the Asia-Pacific region. The integration of ASEAN as a single market will enhance the region's growth and dynamism. The sizeable population of about 600 million people in ASEAN presents a large and fast-expanding market. The region's focus on greater financial integration will further enhance regional economic growth and promote

The contents of
the thesis is for
internal user
only

REFERENCES

- Abiad, M. A. (2003). Early Warning Systems: A Survey and a Regime-Switching Approach, *IMF working paper No. 3/32*.
- Altunbas, Y., Gambacorta, L., & Marques-Ibanez, D. (2009). Securitisation and the Bank Lending Channel. *European Economic Review*, 53(8), 996-1009.
- Athukorala, P. C. (2010). Malaysian Economy in Three Crises. *The Australian National University, working papers in trade and development No. 2010-12*.
- Balakrishnan, R., Danninger, S., Elekdag, S., & Tytell, I. (2011). The Transmission of Financial Stress from Advanced to Emerging Economies. *Emerging Markets Finance and Trade*, 47 (sup2), 40-68.
- Berg, A., & Pattillo, C. (1999). Predicting Currency Crises: The Indicators Approach and an Alternative. *Journal of International Money and Finance*, 18(4), 561-586.
- Bernanke, B. S., Gertler, M., & Gilchrist, S. (1999). The Financial Accelerator in A Quantitative Business Cycle Framework. *Handbook of macroeconomics*, 1, 1341-1393.
- Bollerslev, T. (1986). Generalized Autoregressive Conditional Heteroskedasticity. *Journal of Econometrics*, 31(3), 307-327.
- Bordo, M. (1986). Financial Crises, Banking Crises, Stock Market Crashes and the Money Supply: Some International Evidence, 1870-1933. In *Forrest Capie and Geoffrey Wood edition, Financial Crises and the World Banking System The Macmillan Press: London*, 190-248.

- Bussiere, M., & Fratzscher, M. (2006). Towards a New Early Warning System of Financial Crises. *Journal of International Money and Finance*, 25(6), 953-973.
- Caprio, G., & Klingebiel, D. (1996, April). Bank Insolvency: Bad Luck, Bad Policy, or Bad Banking?. In *Annual World Bank conference on development economics*, 79. Washington, DC, World Bank.
- Cardarelli, R., Elekdag, S., & Lall, S. (2011). Financial Stress and Economic Contractions. *Journal of Financial Stability*, 7(2), 78-97.
- Cevik, E. I., Dibooglu, S., & Kenc, T. (2013). Measuring Financial Stress in Turkey. *Journal of Policy Modeling*, 35(2), 370-383.
- Cevik, E. I., Dibooglu, S., & Kutan, A. M. (2013). Measuring Financial Stress in Transition Economies. *Journal of Financial Stability*, 9(4), 597-611.
- Claessens, S., Köse, M. A., & Terrones, M. E. (2008). Financial Stress and Economic Activity. *Journal of BRSA Banking and Financial Markets*, 2(2), 11-24.
- Davig, T., & Hakkio, C. (2010). What Is the Effect of Financial Stress on Economic Activity?. *Federal Reserve Bank of Kansas City, Economic Review*, 95(2), 35-62.
- Demirgüç-Kunt, A., & Detragiache, E. (1998). Financial Liberalization and Financial Fragility. Mimeo, World Bank.
- Disyatat, P. (2001). Currency Crises and Foreign Reserves: A Simple Model. *IMF Working Paper No. 01/18*, 1-24.
Available at SSRN: <http://ssrn.com/abstract=879353>.
- Duca, M. L & Peltonen, T. A. (2011). Macro-Financial Vulnerabilities and Future Financial Stress Assessing Systemic Risks and Predicting Systemic Events. *European Central Bank Working Paper Series No 1311 / March 2011*.

- Enders, W. (2004). *Applied Econometric Time Series. USA: John Wiley & Sons.*
- Erbil, C., & Salman, F. (2006). Revealing Turkey's Public Debt Burden: A Transparent Payments Approach. *Journal of Policy Modeling*, 28(7), 825-835.
- Girton, L., & Roper, D. (1977). A Monetary Model of Exchange Market Pressure Applied to the Postwar Canadian Experience. *The American Economic Review*, 67(4), 537-548.
- Goldstein, M., & Xie, D. (2009). The Impact of The Financial Crisis on Emerging Asia. *Peterson Institute for International Economics Working Paper No. 09-11.*
- Guru-Gharana, K. K. (2012). Relationships Among Export, FDI and Growth in India: An Application of Autoregressive Distributed Lag (ARDL) Bounds Testing Approach. *Journal of International Business Research*, 11(1), 1-18.
- Hakkio, C. S., & Keeton, W. R. (2009). Financial Stress: What is it, How Can it be Measured, and Why Does it Matter?. *Economic Review*, 94(2), 5-50.
- Hanschel, E., & Monnin, P. (2005). Measuring and Forecasting Stress in the Banking Sector: Evidence From Switzerland. *BIS Papers*, 22, 431-449.
- Harding, D., & Pagan, A. (2002). Dissecting the Cycle: A Methodological Investigation. *Journal of Monetary Economics*, 49(2), 365-381.
- Hatemi-J, A. (2003). A New Method to Choose Optimal Lag Order in Stable and Unstable VAR Models. *Applied Economics Letters*, 10(3), 135-137.
- Hatemi-j, A. (2012). Asymmetric Causality Tests with an Application. *Empirical Economics*, 43(1), 447-456.
- Hollo, D., Kremer, M., & Lo Duca, M. (2012). CISS-A Composite Indicator of Systemic Stress in the Financial System. *ECB Working Paper No. 1426.* Available at SSRN: <http://ssrn.com/abstract=2018792>

- Hong, K., Lee, J. W., & Tang, H. C. (2010). Crises in Asia: Historical Perspectives and Implications. *Journal of Asian Economics*, 21(3), 265-279.
- Illing, M., & Liu, Y. (2006). Measuring Financial Stress in A Developed Country: An Application To Canada. *Journal of Financial Stability*, 2(3), 243-265.
- Kaminsky, G. L. (1999). Currency and Banking Crises: The Early Warnings of Distress (No. 99-178). *International Monetary Fund*.
- Kaminsky, G. L., & Reinhart, C. M. (1999). The Twin Crises: The Causes of Banking and Balance-Of-Payments Problems. *American Economic Review*, 89(3), 473-500.
- Cardarelli, R., Elekdag, S., & Lall, S. (2011). Financial Stress and Economic Contractions. *Journal of Financial Stability*, 7(2), 78-97.
- Kibritçioğlu, A. (2003). Monitoring Banking Sector Fragility. *The Arab Bank Review*, 5(2), 51-66.
- Lee, J., & Strazicich, M. C. (2003). Minimum Lagrange Multiplier Unit Root Test With Two Structural Breaks. *Review of Economics and Statistics*, 85(4), 1082-1089.
- Lee, J., & Strazicich, M. C. (2013). Minimum LM Unit Root Test with One Structural Break. *Economics Bulletin*, 33(4), 2483-2492.
- Misina, M., & Tkacz, G. (2009). Credit, Asset Prices, and Financial Stress. *International Journal of Central Banking*, 5(4), 95-122.
- Park, C. Y., & Mercado, R. V. (2014). Determinants of Financial Stress in Emerging Market Economies. *Journal of Banking & Finance*, 45, 199-224.
- Phillips, P. C., & Perron, P. (1988). Testing For a Unit Root in Time Series Regression. *Biometrika*, 75(2), 335-346.

- Reinhart, C. M., & Rogoff, K. S. (2014). Recovery From Financial Crises: Evidence From 100 Episodes. *National Bureau of Economic Research Working paper No. w19823*.
- Reinhart, C. M., Reinhart, V. R., & Rogoff, K. S. (2012). Public Debt Overhangs: Advanced-Economy Episodes Since 1800. *The Journal of Economic Perspectives*, 26(3), 69-86.
- Rey, H. (2009). Discussion of How Linkages Fuel the Fire. <http://www.internationalgrowthcentre.org/index.php?q=node/376>.
- Ronci, M. (2004). Trade Finance and Trade Flows: Panel Data Evidence From 10 Crises. *IMF working Paper No. 04/225*.
- Sims, C. A. (1980). Macroeconomics and Reality. *Econometrica: Journal of the Econometric Society*, 1-48.
- Siņenko, N., Titarenko, D., & Āriņš, M. (2013). The Latvian Financial Stress Index as An Important Element of the Financial System Stability Monitoring Framework. *Baltic Journal of Economics*, 13(2), 87-112.
- Stock, J. H., & Watson, M. W. (1993). A Simple Estimator Of Cointegrating Vectors in Higher Order Integrated Systems. *Econometrica*, 61(4), 783-820.
- Thomas, M. A. H. (2009). Financial Crises and Emerging Market Trade. *International Monetary Fund staff position note, No. 09/04*.
- Tng, B. H., & Kwek, K. T. (2015). Financial Stress, Economic Activity and Monetary Policy in The ASEAN-5 Economies. *Applied Economics*, 47(48), 1-17.
- Toda, H. Y., & Yamamoto, T. (1995). Statistical Inference in Vector Autoregressions with Possibly Integrated Processes. *Journal of Econometrics*, 66(1), 225-250.
- Van Roye, B. (2014). Financial Stress and Economic Activity in Germany. *Empirica*, 41(1), 101-126.

Yiu, M. S., Ho, W. Y. A., & Jin, L. (2010). A Measure of Financial Stress in Hong Kong Financial Market–The Financial Stress Index. *Hong Kong Monetary Authority Research Note*, 2, 2010.

