HALAMAN PENGESAHAN

Judul	: Behavior Financial (Theory and Implementation in International Journal)
Jeni Buku	: Refrensi
Penulis	: Suripto dan Supriyanto
Instansi	: Fakultas Ilmu Sosial dan Ilmu Politik Universitas Lampung
Penerbit	: Global Aksara Pres
ISBN	: 978-623-62462-7-6
Edisi Cetakan	: Pertama, Juli 2021

Bandar Lampung, Agustus 2021

Mengetahui/Menyetujui
Dekan,

Penulis,

Dra. Ida Nurhaida, M.Si.
NIP. 19610807 198703 2 001

Dr. Suripto, S.Sos., M.AB.
NIP. 19690226 199903 1 001

Mengetahui,
Ketua LPPM Universitas Lampung

Dr. Lusmeilia Afriani, S.T., DEA.
NIP. 196505101993032008

Behavior Financial

(Theory and Implementation in International Journal)

Dr. Suripto, S.Sos., M.A.B.
Supriyanto, S.A.B., M.Si.

Dr. Suripto, S.Sos., M.A.B. & Supriyanto, S.A.B., M.Si.

Behavior Financial

Wonocolo Utara V/18 Surabaya
+628977416123
globalaksarapers@gmail.com

ISBN 978-623-6246-27-6

Kata Pengantar
Buku Referensi Behavior Financial

Puji syukur penulis panjatkan kepada Allah SWT atas Rahmat dan Karunianya sehingga buku referensi ini dapat diselesaikan dengan baik. Berawal dari sebuah keinginan untuk dapat memberikan kemanfaatan lebih untuk khalayak, kami mencoba untuk berbagi ilmu pengetahuan yang telah dititipkan-Nya melalui media buku referensi ini.

Sebagian besar mahasiswa dan masyarakat sulit untuk memperoleh buku terkait dengan *Behavior Financial: Theory and Implementation in International Journal*, oleh karena itu diharapkan buku ini mampu menjawab segala persoalan dan kebutuhan terkait dengan pemahaman teori tentang jurnal, aplikasi analisis manajemen keuangan.

Kami mengucapkan terima kasih kepada seluruh rekan- rekan dosen Fakultas Ilmu Sosial dan Ilmu Politik Universitas Lampung. Kami juga mengucapkan terima kasih kepada semua pihak yang turut memberi kontribusi dalam proses penyelesaian buku referensi ini. Akhir kata, dengan kerendahan hati, penulis juga mengharapkan saran dan masukan yang konstruktif dari para pembaca. Semoga buku ini bermanfaat.

Bandar Lampung, Mei 2021

Suripto, Supriyanto

Daftar Isi

KATA PENGANTAR

Puji syukur penulis panjatkan kepada Allah SWT atas Rahmat dan Karunianya sehingga buku referensi ini dapat diselesaikan dengan baik. Berawal dari sebuah keinginan untuk dapat memberikan kemanfaatan lebih untuk khalayak, kami mencoba untuk berbagi ilmu pengetahuan yang telah dititipkan-Nya melalui media buku referensi ini.

Sebagian besar mahasiswa dan masyarakat sulit untuk memperoleh buku terkait dengan *Behavior Financial: Theory and Implementation in International Journal*, oleh karena itu diharapkan buku ini mampu menjawab segala persoalan dan kebutuhan terkait dengan pemahaman teori tentang jurnal, aplikasi analisis manajemen keuangan.

Kami mengucapkan terima kasih kepada seluruh rekan- rekan dosen Fakultas Ilmu Sosial dan Ilmu Politik Universitas Lampung. Kami juga mengucapkan terima kasih kepada semua pihakyang turut memberi kontribusi dalam proses penyelesaian buku referensi ini. Akhir kata, dengan kerendahan hati, penulis juga mengharapkan saran dan masukan yang konstruktif dari parapembaca. Semoga buku ini bermanfaat.

Bandar Lampung, Mei 2021

Penulis

BAB I

BEHAVIORAL FINANCE

Teori Keuangan Konvensional untuk memaksimalkan kekayaan adalah rasional untuk seluruh dunia. Jika kita menggunakan ide ekonomi 'konvensional' atau 'modern' untuk menggambarkan keuangan, kita akan berbicara tentang jenis pembiayaan yang didasarkan pada teori rasional dan logis, seperti Capital Asset Pricing Model (CAPM) dan Efficient Market Hypothesis (EHM)). Konsep ini mengasumsikan bahwa kebanyakan manusia berperilaku rasional dan dapat diprediksi.

Dimana ketika pemikiran dan psikologi seseorang berdampak pada dirinya dalam membuat pilihan maka menyebabkan orang tersebut berperilaku tidak rasional. Para ahli di bidang keuangan dan ekonomi mulai menemukan penyimpangan dan perilaku yang seharusnya tidak dijelaskan dengan menggunakan teori-teori yang ada. Peristiwa ekonomi tersebut terdiri dari anomali keuangan berupa volatilitas saham yang berlebihan di pasar modal seperti January Effect, Day of the week effect, return over trading dan non trading period, volatilitas return saham dan fenomena internet. Saat itu pasar pernah terbukti berperilaku tidak terduga atau irasional, sedangkan teori konvensional atau modern yang ada pada saat itu mungkin hanya ingin memberikan penjelasan untuk situasi terbaik atau dapat diprediksi. Oleh karena itu, muncul teori yang dikenal dengan konsep behavioral finance yang membahas tentang perilaku yang tidak dapat diprediksi.

Inilah yang sekarang tidak dilindungi dalam teori ekonomi konvensional. Karena terdapat unsur psikologis yang dapat mempengaruhi karakter dalam menentukan pilihannya sedangkan konsep pada masa itu tidak dapat menjelaskannya, maka ilmu keuangan disebut perilaku atau keuangan (*behaviour finance*).

Keuangan perilaku adalah subjek ilmu yang sangat baru yang bertujuan untuk mencampur teori perilaku dan psikologi kognitif dengan ekonomi tradisional dan keuangan untuk memberikan klarifikasi mengapa manusia membuat keputusan keuangan yang tidak rasional. Perilaku keuangan berkaitan dengan akuntabilitas ekonomi seseorang dalam hal bagaimana memanipulasi keuangan mereka. Tanggung jawab finansial adalah bagaimana cara pengelolaan uang dan harta benda dilakukan secara produktif.

Studi ini berpendapat bahwa masyarakat hampir tidak rasional seperti yang telah dibuat dalam teori keuangan standar. Pemikiran bahwa psikologi mendorong pergerakan pasar saham mengganggu teori-teori terkini bahwa pasar itu efisien. Penganut teori perilaku menjelaskan bahwa perilaku irasional merupakan masalah yang biasa terjadi, bukan anomali.

Buku referensi ini akan membahas tentang sejarah singkat perilaku moneter, penyimpangan yang muncul dalam dunia keuangan, konsep prospek dan contoh penelitian yang membahas tentang perilaku keuangan.

A. Sejarah Perkembangan Behaviour Finance

Awalnya, munculnya perilaku ekonomi bermula dari penolakan terhadap teori pasar ramah lingkungan. Robert J. Shiller seorang profesor dari Yale University adalah seorang pria atau wanita yang memiliki peran besar dalam perilaku moneter karena dia mengungkapkan bahwa pasar sekarang tidak pasti efisien. Pada tahun 1981, dengan buku berjudul "Lakukan Pergerakan Harga Saham Terlalu Banyak untuk Dibenarkan Melalui Perubahan Dividen Selanjutnya" yang diposting di The American Economic Review, Robert menegaskan bahwa telah terjadi volatilitas yang berlebihan antara harga saham dan fundamental yang mendasarinya. Pencarian ini kemudian menyebabkan perdebatan yang fantastis di antara para akademisi. Karena saat itu Shiller belum mengetahui faktor-faktor apa saja yang menyebabkan pasar menjadi tidak efisien.

Dalam membuktikan ketidakstabilan ini, Shiller mendapat bantuan dari istrinya. Pasangan Shiller yang merupakan sarjana doktor di bidang psikologi di Daleware University mencoba membantu Shiller dengan menjelaskan inefisiensi pasar dengan strategi ilmu sosial dan dalam makalah berjudul "Harga Saham dan Dinamika Sosial 'pada pertemuan di Brooking Institute. Tapi sebaliknya dia punya, tidak ada ejekan hanya datang secara lisan pasa di beberapa tahap konferensi. Ada juga ejekan tertulis, G. William Schwert, seorang pendukung gagasan pasar ramah lingkungan, menjuluki Shiller sebagai 'sosiolog amatir'. Hasil konferensi tersebut menyatakan bahwa setiap pergerakan pasar persediaan harus memiliki dasar yang rasional. Tapi Shiller memiliki pandangan berbeda tentang hasil konferensi, mengumumkan kesimpulan pernah menjadi kesalahan "salah satu kesalahan terbesar dalam catatan pemikiran ekonomi".

Pemain utama lainnya dalam keuangan perilaku adalah Richard H. Thaler, seorang profesor ilmu ekonomi dan perilaku di Universitas Chicago. Thaler menulis disertasi doktoralnya sepenuhnya berdasarkan paradigma pasar yang efisien, namun pada akhirnya ia tumbuh menjadi bulat melalui pertumbuhan keuangan perilaku. Akhirnya, Thaler tumbuh menjadi anomali di perguruan tinggi karena fakta ia menyimpang dari gagasan keuangan neoklasik yang dikembangkan dari perguruan tinggi pemikiran moneter.

Dengan adanya bantuan ekonomi dari Russell Sage Foundation, mengingat tahun 1991 Thaller dan Shiller telah mengkoordinasikan lokakarya di National Bureau of Economic Research (NBER). Sejak saat itu, penelitian bertema perilaku moneter berkembang pesat. Perkembangan ini ditandai dengan semakin banyaknya kertas kerja bertema perilaku ekonomi. Jurnal ilmiah ilmu moneter terkemuka telah menjadi media publikasi hasil pencarian tentang perilaku moneter, seperti The Journal of Finance dan Journal of Financial Economics. Perbaikan perilaku moneter ini telah berkembang menjadi cara baru dalam mempertanyakan persepsi atas fenomena ekonomi keuangan dan hal ini menunjukkan bahwa dosen keuangan sudah terbiasa dengan adanya teori perilaku moneter.

Daniel Kahneman, sebagai hasil akhir dari integrasi psikologi ke dalam ekonomi keuangan, membuatnya mendapatkan Hadiah Nobel di bidang ekonomi pada tahun 2002. Hal ini disebabkan karena ia memodelkan perilaku manusia untuk membawa bahaya dari psikologi ke ekonomi yang disebut teori prospek.

Prinsip perilaku ekonomi bagaimanapun dianggap muda, bila berbeda dengan ilmu moneter pada masa itu sebelumnya. Namun, saat ini perilaku keuangan tidak hanya sebatas konsep tetapi sudah menjadi metode operasional untuk menganalisis dan menjelaskan tentang keberadaan dari *mispricing* harga saham, menjelaskan mengapa individu tidak melakukan diversifikasi dan bagaimana *noise trader* menciptakan pasar yang tidak efisien.

Saat ini, dalam melakukan aktivitas pendanaan, pembeli tidak hanya menggunakan perkiraan prospek untuk perangkat pendanaan tetapi juga memasukkan faktor psikologis. Bahkan banyak yang menyebutkan bahwa psikologi investor memiliki posisi terbesar dalam menentukan investor untuk berinvestasi. Contoh menarik dari investasi adalah rasionalitas yang dibatasi. Di sisi lain, hal ini juga terjadi, pedagang menjual saham dengan cepat ketika harga saham tinggi (menghasilkan keuntungan) dan dapat mempertahankan saham untuk waktu yang lama ketika harga saham turun (rugi). Unsur-unsur psikologis ini berpengaruh pada investasi dan juga berpengaruh pada hasil yang ingin dicapai. Oleh karena itu, analisis pendanaan yang menggunakan konsep psikologis dan konsep keuangan dikenal dengan istilah behavioral finance.

Ciri manusia yang paling sering adalah ketakutan, amarah, keserakahan, keegoisan dalam menentukan pilihan tentang uang. Tingkah laku manusia umumnya sekarang tidak proaktif, namun lebih reaktif. Perilaku keuangan sangat nyaman untuk memberikan penjelasan mengapa seseorang membuat keputusan, namun lebih memperhatikan mengukur apa konsekuensi dari pemilihan itu baginya. Penelitian perilaku keuangan berpengaruh terhadap faktor sosial, kognitif dan emosional terhadap keputusan moneter yang bersifat karakter.

Adapun perkembangan perilaku keuangan yang memasukkan faktor kekuatan emosi dan psikologi investor di pasar keuangan adalah:

1. Mackay (1841) menyajikan kronologis tentang kepanikan yang terjadi di pasar keuangan sebagai cerminan dari adanya aspek psikologis investor.
2. Bon (1895) mengajukan gagasan tentang prean 'crowds' yang dapat diartikan sebagai investor di pasar, dan perilaku dari

   perilaku kelompok yang mencoba kemampuan di bidangkeuangan, psikologi, sosial, sosiologi dan sejarah.
3. Selden (1912) menerapkan perilaku keuangan dalam konteks psikologi di pasar modal.

B. Pengertian Behaviour Finance

Banyak ahli yang telah mendefinisikan perilaku keuangan, berikut adalah beberapa definisi perilaku keuangan :

1) Shefrin (2000), perilaku keuangan adalah studi yang mempelajari bagaimana fenomena psikologi mempengaruhi tingkah laku keuangannya. Tingkah laku dari para para pemain saham tersebut disebut tingkah laku para praktisi.
2) Nofsinger (2001), perilaku keuangan yaitu mempelajari bagaimana manusia secara actual berperilaku dalam sebuah penentuan keuangan (*a financial setting*).
3) Litner (1998), perilaku keuangan merupakan suatu ilmu yang mempelajari bagaimana manusia menyikapi dan bereaksi atas informasi yang ada dalam upaya untuk mengambil keputusan yang

dapat mengoptimalkan tingkat pengembalian dengan memperhatikan risiko yang melekat di dalamnya (unsur sikpa dan tindakan merupakan faktor penentu dalam berinvestasi).

4) Fuller (2000) mendefinisikan perilaku keuangan kedalam tiga poin cara, yaitu:
   a. Perilaku keuangan adalah penggabungan antara ekonomi klasik dan keuangan dengan psikologi dan ilmu pengambilan keputusan, dan perlu diketahui bahwa ilmu pengambilan keputusan juga berkembang mengikuti perkembangan zaman, sehingga penerapan teori ekonomi klasik yang relatif bersifat baku, berbeda-beda seiring dengan perkembangan zaman.
   b. Perilaku keuangan adalah suatu percobaan untukmenjelaskan apa penyebab beberapa anomali-anomali keuangan yang sudah terlihat dandibukukan dalam literasi keuangan. Banyaknya studi kasus dan observasi dari kejadian sebelumnya diharapkan dapat menjadi dasar pengembangan teori perilaku keuangan dimasa depan. Diharapkan anomali-anomali keuangan tersebut dapat dijelaskan melalui teori-teori baru.
   c. Perilaku keuangan adalah suatu bidang studi yang menjelaskan bagaimana investor secara sistematis membuat *judgement* yang salah atau '*mental mistakes*'

Shefrin (2000) menyatakan ada tiga tema yang dibahas dalam perilaku keuangan, dimana tema tersebut dibuat dalam bentuk pertanyaan, yaitu:

1. Apakah praktisis keuangan mengakui adanya kesalahan karena selalu berpatokan kepada aturan yang telah ditentukan (*rules of thumb*). Bagi penganut perilaku keuangan mengakuinya sementara keuangan tradisional tidak mengakuinya. Penggunaan *rules of thumb* ini disebut dengan *Heuristics to Process Data*. Penganut keuangan tradisional selalu menggunakan alat statistik secara tepat dan benar untuk memperoleh data. Sementara penganut perilaku keuangan melaksanakan *rules of thumb* seperti '*back-ofothe-envelope calculation'* dimana ini secara umum tidak sempurna. Akibatnya, praktisi memegang '*biased beliefs*' yang mempengaruhi memenuhi janji terhadap kesalahan tersebut. Tema ini dikenal dengan *Heuristics-driven bias*.
2. Apkah bentuk termsuk inti persoalan (*subtance*) mempengaruhi praktisi? Penganut perilaku keuangan menyatakan bahwa persepsi praktisi terhadap risiko dan tingkat pengembalian sangat dipengaruhi oleh bagaimana '*decision problem*' dikerangkanya (*framed*). Sementara penganut keuangan tradisional memandang

semua keputusan berdasarkan transparan dan objektif. Tema ini dikenal dengan *frame dependence*.

3. Apakah kesalahan dan kerangka mengambil keputusan mempengaruhi harga yang dibangun pada pasar? Penganut perilaku keuangan menyatakan '*heuristics-driven bias*' dan pengaruh framing menyebabkan harga jauh dari nilai fundamentalnya sehingga pasar tidak efisien. Sementara pengantu keuangan tradisional mengasumsikan pasar efisien seperti yang diuraikan Fama (1970). Tema ini dikenal dengan pasar tidak efisien (*inefficient market*).

C. Homo Economicus

Terdapat satu asumsi paling utama adalah bahwa ekonomi dan keuangan tradisional dibuat untuk manusia rasional yang berusaha keras untuk meningkatkan kesejahteraan mereka. Menurut ilmu ekonomi konvensional, pemikiran dan faktor eksterior lainnya tidak lagi berdampak pada manusia saat membuat keputusan keuangannya.

Dalam banyak kasus, asumsi ini sekarang tidak mencerminkan bagaimana orang berperilaku di dunia nyata. Faktanya, orang sering beranggapan secara tidak rasional. Hal ini dapat dilihat dari banyaknya orang yang membeli tiket lotere dengan harapan mendapatkan jackpot besar. Dari sudut pandang faktor logis, ini pada kenyataannya tidak masuk akal. Beli tiket lotere dengan peluang menang kecil dan harus bersaing dengan pemegang tiket lainnya (seperti 1 banding seratus juta). Meski begitu, puluhan juta orang tetap membelanjakan uangnya untuk kegiatan ini.

Penyimpangan ini mengarahkan para profesional untuk melihat psikologi kognitif tentang perilaku irasional dan tidak logis. Bahwa sebenarnya keuangan kontemporer gagal memberikan penjelasan atas prasyarat yang muncul di pasar. Keuangan perilaku berupaya memberikan penjelasan atas tindakan, sedangkan keuangan saat ini berupaya memberikan penjelasan atas pergerakan "orang-orang ekonomi".

D. Kontribusi Para Ahli

Psikolog kognitif Daniel Kahneman dan Amos Tvesky dianggap sebagai bapak ekonomi perilaku atau keuangan. Kahneman dan Tvesky melakukan evaluasi terhadap kondisi ketidakpastian yang dapat menghasilkan heuristik atau bias. Kahneman dan Tvesky pada tahun 1979 dengan konsep prospek dan didampingi pada tahun 1992 tentang teori prospek unggul. Kahneman sebagai salah satu promotor ide ini pernah dianugerahi Hadiah Nobel pada tahun 2002 yang memberikan evaluasi pilihan di bidang ekonomi dan keuangan. Kahneman dan Tvesky menyampaikan teori prospek. Ide ini dimulai dengan mengkritik teori utilitas yang paling banyak digunakan dalam memeriksa investasi, terutama dalam kondisi yang tidak stabil. Manusia berperilaku dalam menentukan pilihan sesuai dengan psikologi.

Richard Thaler merupakan pengembang bidang perilaku keuangan, selama studinya Thaler menjadi lebih sadar akan kekurangan teori-teori ekonomi konvensional yang berkaitan dengan perilaku masyarakat. Thaler menyadari bahwa tidak seperti ekonomi konvensional, teori psikologi dapat menjelaskan ketidakrasionalan.

Meskipun perilaku keuangan telah mendapat dukungan, namun hal ini tidak lepas dari adanya kritik. Kritikus yang paling menonjol dari perilaku keuangan adalah Eugene Fama, pendiri teori efisiensi pasar. Profesor Fama menunukkan bahwa meskipun ada beberapa penyimpangan yang tidak bisa dijelaskan dengan teori keuangan modern, efisiensi pasar tidak harus benar- benar ditinggalkan demi perilaku keuangan. Ia mencatat bahwa banyak penyimpangan yang ditemukan dalam teori konvensional bisa dianggap peristiwa kesempatan jangka pendek yang pada akhirnya diperbaiki dari waktu ke waktu. Fama berpendapat bahwa banyak dari temuan dibidang perilaku keuangan tampaknya bertentangan antara satu dengan yang lain, dan bahwa semua perilaku keuangan ini sendiri tamoaknya menjadi koleksi penyimapangan yang dapat dijelaskan oleh efisiensi pasar.

E. Penyimpangan

Adanya penyimpangan yang terjadi dalam ekonomi konvensional menjadi kontribusi besar untuk pembentukan perilaku keuangan. Berikut ini beberapa penyimpangan yang ditemukan dalam literatur keuangan:

1. Efek Januari

Efek bulan Januari adalah sebuah fenomena dimana harga dari sebagian saham yang diperdagangkan akan cenderung bergerak naik pada minggu-minggu awal bulan tersebut. Hal ini bertentangan dengan hipotesis pasar yang efisien yang mempredikasi bahwa saham harus bergerak pada “random walk”. Salah satu penjelasannya adalah bahwa lonjakan return Januari adalah hasil dari investor yang menjual saham yang turun pada

Bulan Desember untuk menghindari kerugian pajak, mengakibatkan return bangkit kembali pada Bulan Januari ketika investor memiliki.

F.Teory Event Study

Event Study Theory merupakan penelitian yang mengamati dampak dari pengumuman informasi terhadap harga sekuritas. Penelitian event study umumnya berkaitan dengan seberapa cepat suatu informasi yang masuk ke pasar dapat tercermin pada harga saham. Studi peristiwa (event study) menggambarkan sebuah teknik riset keuangan empiris yang memungkinkan seorang pengamat menilai dampak dari suatu peristiwa terhadap harga saham perusahaan. Seorang analis pasar modal mungkin hendak menguji dampak dari kebijakan perubahan dividen terhadap harga saham, misalnya. Sebuah studi peristiwa mungkin akan menguantifikasi hubungan antara perubahan dividen dengan imbal hasil saham. Dengan menggunakan hasil dari studi seperti itu bersamaan dengan berbagai alat yang superior untuk memprediksi perbuhan dividen, maka secara prinsip seorang analis dapat memperoleh laba perdagangan yang superior.

Event study dapat digunakan untuk menguji kandungan informasi (information content) dari suatu pengumuman dan dapat juga digunakan untuk menguji efisiensi pasar bentuk setengah kuat. Pengujian kandungan informasi dan pengujian efisiensi pasar bentuk setengah kuat merupakan dua pengujian yang berbeda. Pengujian kandungan informasi dimaksudkan untuk melihat reaksi dari suatu pengumuman. Jika pengumuman mengandung informasi (information content), maka diharapkan pasar akan bereaksi pada waktu pengumuman tersebut diterima oleh pasar. Reaksi pasar ditunjukkan dengan adanya perubahan harga dari sekuritas bersangkutan. Reaksi ini dapat diukur dengan menggunakan return sebagai nilai perubahan harga atau dengan menggunakan abnormal return. Jika digunakan abnormal return, maka dapat dikatakan bahwa suatu pengumuman.

Contontoh Jurnal:

The Effect of the COVID-19 Pandemic on Stock Prices with the Event Window Approach : A Case Study of State Gas Companies, in the Energy Sector

Suripto[1]*, Supriyanto[2]

[1,2]Department of Business Administration, Faculty of Social and Political Science, Lampung University, Indonesia
*Email: suriptob.1969@fisip.unila.ac.id

ABSTRACT

Stock price data at State Gas Company is defined as the time-series data comprising varying volatility and heteroscedasticity. One of the best models used to solve the problem of heteroscedasticity is the GARCH (generalized autoregressive conditional heteroscedasticity) model. Therefore, this study aims to build the most suitable model for predicting the 186 days before and 176 days after the Covid-19 pandemic, as well as to provide recommendations to reduce the impact of daily stock price movements. Data were obtained by examining the daily stock price data in Indonesian National Gas Companies from 2019 to 2020. The study also discusses the Event Window, with the best model identified as AR (1) -GARCH (1,1). The result showed that an error of less than 0.0015 is AR (1) - GARCH (1,1), provided the best model for price forecasting of Indonesian National Gas Companies.

Keywords: Stock Price, Heteroscedasticity, GARCH Model, Event Window
JEL Classifications: C5, O42, Q4, Q47

1. INTRODUCTION

Forecasting is an estimation or prediction of a future occurrence by evaluating previous circumstances' information and data. Based on this instance, financial analysts as information mediators play an extensive role by examining useful data related to earnings and stock forecasts (Jahangir, 2013; Chunhui et al., 2013). They are also regarded as intermediaries because they carry out a retrospective analysis of the company's personal and financial information to predict future occurrences. Estimates made by financial analysts and the associated management aids to evaluate and assess companies as well as improve the quality of their financial reporting, which is a forecast of the expected revenue in the subsequent year (Beaver et al., 1980).

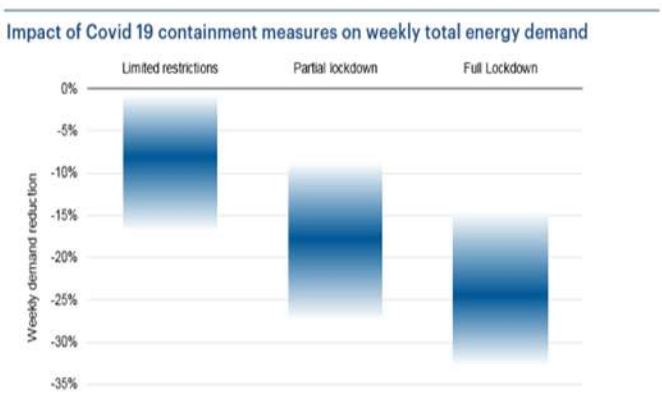
Forecasting is classified into three types of methods based on time, namely short, medium, and long term (Montgomery et al., 2008). Short-term is adopted for daily, weekly, and monthly forecasting. Specifically, it aids the administration to make certain decisions regarding human resources, inventory control, and cash flow management (Fildes & Goodwin, 2007; Fama, Fisher, Jensen, & Roll, 2005; Liu, Yi, & Yin, 2020). Several studies relating to forecasting has been carried out, such as market models (Neslihanoglu et al., 2017), a country's recession, which is the major activity carried out by numerous economic institutions (Fornaro, 2016; Morana, 2017), volatility using the GARCH model (1,1) (Chia et al., 2016; Tsung-Han and Yu-Pin, 2013), etc. The public presumes that volatility is similar to market risks.

The least stock price in the market is increased by volatility. Therefore, in order to realize capital gains, investors need to purchase these stocks as a long-term investment (Planning, National & Indonesia, 2020). The highest volatility depicts maximum uncertainties or returns. This situation is commonly referred to as the "Risk and Return Tradeoff."

The COVID-19 pandemic did not only affect the health sector, it also eroded the global economy, including Indonesia (Baig, Butt, Haroon, & Rizvi, 2020), (Chen, Yang, & Lin, 2020), (Just & Echaust, 2020), (Ortmann, Pelster, & Wengerek, 2020), (Singh, 2020) . It affected the exchange rate, as well as caused a decline in the Composite Stock Price Index (IHSG), which eventually went into freefall. Furthermore, everything was beyond predictions and difficult to control. Prior to the confirmation of the first phase of COVID-19 in the country, the IHSG was at the level of 6,244 (24 Jan), which was reduced to 5,942 (20 Feb) and 5,361 (2 March). On March 12, when the WHO declared COVID-19, a global pandemic, the IHSG fell to 4.2 percent or 4,937 during the Thursday session, a level that had not occurred in almost four years. Conversely, on March 13, stock trading was halted for the first time since 2008 due to the pandemic. (Planning et al., N.d.)

In addition, all human activities were restricted in order to curb the spread of the virus. Several countries adopted partial and simultaneous restriction policies, which had an impact on energy demand.

Figure 1: Impact of COVID-19 on Energy Demand World



Countries with full lockdown policies experienced lesser energy demand than those with partial lockdown rules. In 2020, a 6% decline was predicted in the previous year. This is presumed as the worst condition in 70 years after the second world war. Indonesia is one of the nations with limited restriction policies, which also impacted energy demand (Ibrahim, Myrna, Irawati, & Kristiadi, 2018) .

However, supposing the daily volatility of energy is high, there tends to be either an enormous increase or decrease in stock price, thereby leading to the provision of trade benefits, which is referred to as "High-Risk High-Returns" (Hull, 2015; Zali, Yudi Heryadi, Nurlaila, & Fanani, 2018; Lyócsa, Baumöhl, Výrost, & Molnár, 2020, (Ayinde, Celik, & Gylych, 2019). Investors that usually adopt strategic trading plans prefer high volatility (risk taker). On the contrary, those that tend to invest long-term prefers low volatility because stock prices are bound to increase in the future (risk of harm) (Chan & Wai-Ming, 2000; He, Sun, Zhang, & Li, 2020; Lin, Hung, Chou, & Lai, 2019). Several economic and statistical studies are currently used to predict market conditions (Dzikevičius & Šaranda, 2011; Gontijo, Rodrigues, De Muylder, la Falce, & Pereira, 2020).

Numerous studies have been carried out to discuss the effect of energy on economic growth and price forecasting. Tehran and Seyyedkolaee (2017), (Shinkevich et al., 2019) researched the relationship between oil price volatility and economic growth in Iran, an oil-exporting country. They also reviewed the impact of oil price volatility on domestic economic growth. Meanwhile, Vijayalakshmi et al. (2014) investigated the effect of price forecasts on the deregulated wholesale spot electricity market.

Weron and Misiorek (2006; 2008) studied the modeling of load forecasting and electricity prices. However, volatility in the stock market simply means the difference between an explosive increase or decrease in stock prices where there are moments when it goes up and down. Subsequently, when it is high, it implies that the stock price rises and falls significantly within one second. Volatility (price changes) in the capital market notably affects the return on investment. This circumstance also in accordance with risk and return trade-off theory known as "high-risk high-return." It is also considered as the basis for pricing assets and the acquisition of relevant information related to investment (Kongsilp & Mateus, 2017).

2. METHODOLOGY AND DATA

In this study, the data used was obtained from the stock price of State Gas Compan, the largest state-owned company in Indonesia. They are involved in the transmission and distribution of natural gas. Its business activities include planning, development, and management of downstream natural gas, processing, transportation, storage and trading, construction, production, as well as the supply, and distribution of artificial gas, etc (State Gas Company, 2020), (Ali, Abu Al-Rub, Shboul, & Moumani, 2020), (Arafah, Nugroho, Takaya, & Soekapdjo, 2018), (Fadol, 2020), (Faizah & Husaeni, 2018), (Farhat, Ghaddar, & Ghali, 2014), (Kapitonov & Voloshin, 2017) .

The ability of the GARCH (p, q) model to fit properly is the main objective of this methodology. A brief introduction of this model and its equations, which are reported in full, before introducing the econometric considerations that need to be applied in this process are stated as follows.

2.1. Planning Data

The first stage of time series modeling is identification. It involves the calculation of ACF (autocorrelation function), PACF (partial autocorrelation function), and inverse autocorrelation from the time series data. Dickey and Fuller (1979) stated that supposing a distinction is required, it is relevant to carry out a stationary procedure.

2.2. Testing Stationary Data

The Augmented Dicky Fuller test (ADF) was used to evaluate stationary data, plot time-series graphs, and statistical analysis. However, some of the data tend to be non-stationary, such as price series, because they are not fixed. In addition, they are referred to as a unit-root non-stationary time series (Tsay, 2005). Unit-root is one of the features of certain stochastic processes that cause problems in time series modeling. The ADF test process is reported as follows (Brockwell & Davis, 2002; Tsay, 2005).

x1, x2 ... ,, xn are time series data and {xt} follows the AR (p) model with mean μ. The model's mathematical expression is stated in equation (1).

$$Xt(\mu + \varphi 1Xt - 1) = \sum_{i=1}^{p-1} \varphi 1 \Delta Xt - 1 + \ \varepsilon t \quad (1)$$

Where the difference in sequence xt, εt is white noise with 0 mean and variance σ2 (εt ~ WN (0, σ2)). The ADF analysis is a unit-root test that was realized by calculating the statistical value τ as follows:

Ho: ϕ 1 = 1 (non-stationary data).

Ho: ϕ 1 < 1 (stationary data). Statistics.

Statistical test (ADF test):

$$\tau = \frac{\varphi 1}{Se\ \varphi 1} \quad (2)$$

Therefore, for the significance level ($\alpha = 0.05$), Ho is rejected supposing $\tau < -2.57$ or $P < 0.05$ (Brockwell & Davis, 2002).

2.3. Checking for White Noise

Subsequently, the use of a time series consisting of uncorrelated observations (data) has a constant variance, which is presumed to be white noise (Montgomery et al., 2008). On the contrary, when these time-series observations are normally distributed, it is referred to as the Gaussian white noise. Furthermore, when the time series is reported as white noise, the distribution of a large sample autocorrelation coefficient at lag k is similar to a normal distribution with 0 mean and a variance of 1/T, where T is the number of observations (Montgomery et al., 2008; Brockwell & Davis, 2002; Pankratz, 1991). The following expressions are reported in Equation (3).

$r \sim N(0, \frac{1}{T}$

Based on Equation (3), it is possible to test the autocorrelation lag hypothesis k Ho: ρ k = 0 against Ha: ρ k ≠ 0 by using the test statistics reported in Equation (4).

$$Z = \frac{rk}{\sqrt{1/T}} = rk\sqrt{T} \qquad (4)$$

Ho is rejected when| Z | > Z $_{\alpha/2}$ is on top of α/2 percent of the standard or when P <0.05. The test statistic realized from Equation (4) is used to evaluate the ACF and PACF (Wei, 2006). However, when the ACF is extremely slow decay, the time series is presumed to be non-stationary.

The aforementioned procedures are carried out, one at a time, specifically, the level of significance applies to autocorrelation and is considered individually. This study evaluates a set of autocorrelations together when the time series is reported as white noise. Therefore, to solve this problem, a statistical expression, adopted from the Box-Pierce statistic (Box-Pierce, 1970), was applied, as shown in Equation (5).

$$Q_{BP} = T \sum_{k=1}^{K} r^2 \mathrm{k} \qquad (5)$$

It is roughly distributed as chi-squared with degrees of freedom K, under the null hypothesis that the time series is white noise (Montgomery et al., 2008). Ho is rejected supposing Q_BP>X_ (a, K)^2, it was concluded that the time series is not white noise. It is also possible to use the p-value in order to cause Ho to be rejected when P <0.05.

Subsequently, supposing the data is not stationary, it becomes relevant to carry out the differentiation and transformation processes.

2.4. Testing the ARCH Effect

This step involves the estimation and examination of parameters, diagnoses, and test residuals, as well as selecting the best model based on certain criteria, such as determining the minimum value of AIC or SC. The residuals obtained from the best ARMA model were examined using the LM test to determine ARCH's effect. Although, when there is an ARCH effect, the data is modeled using the ARCH or GARCH method. The sequence of these models is discovered by plotting the square of the PACF residuals.

2.5. ARCH Model

The basic idea of the least square model assumes that the expected values for all squared errors are similar at some point, and this assumption is referred to as homoscedasticity (Engle, 2001). Meanwhile, the ARCH or GARCH model is based on the heteroscedasticity assumption that the variance is not constant. These models handle heteroscedasticity as a variant that needs to be modeled (Engle, 2001; Bollerslev, 1986). Engle (1982) introduced a time-variance model with an autoregressive conditional heteroscedasticity (ARCH) model using lagged disturbances. ARCH is an autoregression function that presumes that the variance is not constant over time and is also affected by previous data(Arch, 2006). The idea behind this model is to determine the relationship between the current and previous random variables.

2.6. Generalized ARCH (GARCH) Model

The GARCH (Generalized Autoregressive Conditional Heteroscedastic) model is a general form of ARCH. It was built to avoid an extremely high sequence. The GARCH model not only observes the relationship between several residuals, rather it also depends on some previous residuals (Eliyawati, 2014), and it was introduced by Bollerslev (1986), (Hsieh & Ritchken, 2005), (Virginia, Ginting, & Elfaki, 2018) . The GARCH model with degrees p and q is defined as follows:

$$X_t|F_{t-1}| \sim N(0, \sigma^2{}_t) \qquad (6)$$

The GARCH model permits conditional variants based on previous lag, and this is reported in Equation (7).

$$\sigma^2{}_t = \omega + \sum_{i=1}^{q} \lambda_{i\varepsilon_{t-i}^2} + \sum_{j=1}^{p} \beta_{j\sigma_{t-j}^2} \qquad (7)$$

The present value of the conditional variant is parameterized based on the q and p lags of the squared residual and conditional variant. This is written as GARCH (p, q). Therefore, the conditional variance that varies from the GARCH model is heteroscedastic in accordance with the autoregression and MA (Wang, 2009). This model is reported in equation (8).

$$X_t = \delta + \sum_{i=1}^{p} \emptyset_1 X_{t-i} - \sum_{i=1}^{q} \theta_1 \varepsilon_{t-i} + \varepsilon_t \qquad (8)$$

$$\varepsilon_t \sim N(0, \sigma^2)$$

$$\sigma^2{}_t = \omega + \sum_{i=1}^{q} \lambda_{i\varepsilon_{t-i}^2} + \sum_{j=1}^{p} \beta_{j\sigma_{t-j}^2}$$

x_t is the equation of conditional mean (Bollerslev, 1986).

2.7. Model Selection Criteria

In selecting the ideal model, AIC criteria are used to discover the best predictions, and they are stated as follows:

$$AIC = -2\left(\frac{1}{T}\right) + 2\left(\frac{K}{T}\right),$$

Where,

$$I = -\frac{Td}{2}\,(ln 2\pi) - \frac{T}{2}\,ln|\Omega|, |\Omega| = \det\left(\sum_t \varepsilon_t\, \varepsilon_t'/T\right)$$

l is the log-likelihood function, k is the number of parameters to be estimated, and T is the number of observations.

2.8. Checking the Event Window

Conceptually, the event window is the short-term deviation of a financial variable from its long-term level (Owens & Wu, 2011). The long and short-term levels depict the respective year and month sequentially. Therefore, the average year and month need to be calculated. In addition, the month's deviation from the mean of the year also needs to be discovered. Subsequently, the deviation is divided by the mean of the year and multiplied by 100 to determine the% deviation (K.Sahoo, K. Chottray, & Pattnaiak, 2012) . Based on this concept, stock price behavior is compared to determine its average in a year.

3. RESULTS AND DISCUSSION

The data acquired from the stock price of State Gas Company before and after Covid-19 was utilized in this research. Before it was analyzed, a stationary data set was examined, and this was carried out in two ways, namely by (1) determining the data subjectivity plot and assessing whether or not the information is stationary (2) evaluating the stationary data using the ADF test.

The State Gas Company plot data is shown in fig. 1. The graph shows that the data is stationary, however three hundred and sixty-two of them portray an upward trend, which later moved downward to the final information. This behavior confirms that the data realized from the State Gas Company is constant at a certain number. Based on Table 1, the ADF unit-root test statistics for stationary data are reported in accordance with the test (P-value), which shows that the information acquired from the State Gas Company is 0.2097. It is, therefore ascertained that the data is stationary. Meanwhile, table 2 shows that the test statistic for the intercept (Ho: Intercept = 0) is extremely significant with a P value> 0.0001. This means that its tapping is different from zero. In addition, the correlation analysis of the data is shown in Figure 2. Based on these plots, there is a possibility of determining whether or not the State Gas Company data series is stationary. Therefore, the ACF indicates that the circuit is stationary because it decays extremely rapidly. Table 3 is used to determine the stationary data by checking WhiteNoise.

The White Noise behavior was used to check for data stationarity. This analysis is an approximate statistical test of the hypothesis, which indicates that there is no autocorrelation from the series to a specific break that is significantly different from zero. Although when this is true for all lags, then there is no information about the series. Autocorrelation was examined in six groups (Table 3) in which the hypothesis based on the white noise was strongly detected (P> 0.0001), which is to be expected because the State Gas Company data series (Figure 3) is stationary.

Table 1: Augmented Dickey-Fuller unit root test

Type	Data	Lags	Tau	P-Value
Mean	PGAS Tbk	2	0,9591	0,2097

Table 2: Estimated parameters for tapping

Variable	Data	DF	Estimate	Standard Error	t-value	p-value
Intercept	PGAS Tbk	1	0.994	0.994	359.56	0.000

Table 3: Checking white noise on State Gas Company data

To Lag	P-Value	AC	Pac	Q-Stat	Prob
1	<0,0001	0.994	0.994	359.56	0.000
2	<0,0001	0.987	-0.078	715.02	0.000
3	<0,0001	0.981	0.110	1067.4	0.000
4	<0,0001	0.975	-0.048	1416.3	0.000
5	<0,0001	0.968	-0.028	1761.5	0.000
6	<0,0001	0.961	-0.075	2102.5	0.000
7	<0,0001	0.953	-0.013	2439.0	0.000
8	<0,0001	0.945	-0.064	2770.6	0.000
9	<0,0001	0.937	-0.032	3097.2	0.000

10	<0,0001	0.928	-0.029	3418.5	0.000
11	<0,0001	0.919	0.005	3734.5	0.000
12	<0,0001	0.910	-0.002	4045.4	0.000
13	<0,0001	0.901	-0.015	4350.9	0.000
14	<0,0001	0.892	0.056	4651.5	0.000
15	<0,0001	0.884	-0.026	4947.2	0.000
16	<0,0001	0.875	0.041	5238.1	0.000
17	<0,0001	0.866	-0.047	5524.0	0.000
18	<0,0001	0.857	-0.061	5804.4	0.000
19	<0,0001	0.846	-0.086	6078.8	0.000
20	<0,0001	0.836	0.036	6347.5	0.000
21	<0,0001	0.826	-0.024	6610.6	0.000
22	<0,0001	0.817	0.077	6868.7	0.000
23	<0,0001	0.808	-0.038	7121.6	0.000
24	<0,0001	0.797	-0.035	7368.8	0.000
25	<0,0001	0.788	0.050	7610.9	0.000
26	<0,0001	0.778	-0.037	7847.6	0.000
27	<0,0001	0.767	-0.058	8078.5	0.000
28	<0,0001	0.756	-0.051	8303.4	0.000
29	<0,0001	0.745	0.012	8522.6	0.000
30	<0,0001	0.734	-0.005	8736.1	0.000
31	<0,0001	0.723	-0.046	8943.8	0.000
32	<0,0001	0.712	0.009	9145.6	0.000
33	<0,0001	0.701	0.059	9342.2	0.000
34	<0,0001	0.691	0.027	9533.7	0.000
35	<0,0001	0.681	-0.006	9720.1	0.000
36	<0,0001	0.670	-0.043	9900.9	0.000

Figure 2: State Gas Company data plot

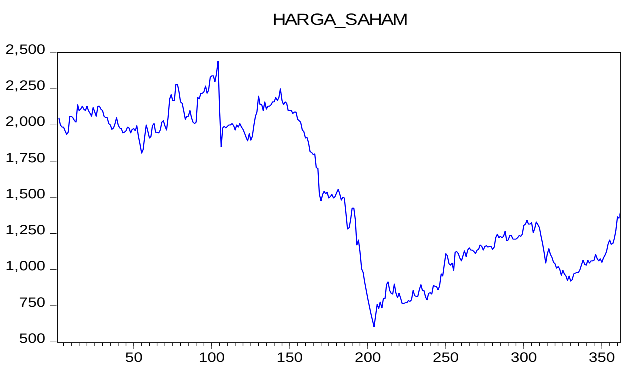
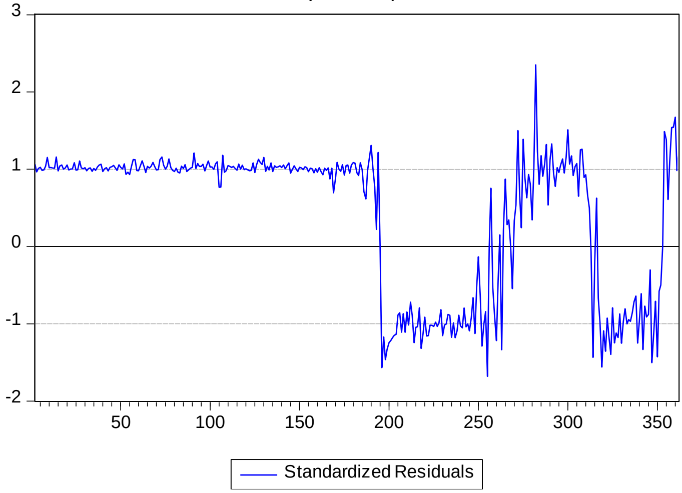


Figure 3: Correlation analysis of State Gas Company data



3.1. Identify the Different Series of Data State Gas Companies

Since the data series obtained is not stationary, the next step is to convert it to stationary using differentiation. Conversely, by using the result from the differentiation as well as lag = 2 (d = 2), the State Gas Company data was obtained to be stationary. This is evident in residual data behavior after differentiation, which was approximately zero, as shown in Figure 3. Furthermore, this is also evident in the ACF plot's behavior, which was reported to decrease rapidly (Figure 3).

3.2. Testing the ARCH Effect

One of the key assumptions of ordinary least squares regression (OLS) is that the errors have similar variance (homoscedasticity). Although, when it is not constant across samples, the data is presumed to be heteroscedastic. This is because the OLS assumes constant variance, while the presence of heteroscedasticity makes its application inefficient for estimation. The models that take heteroscedasticity into account need to be applied to make the data more efficient. In regression analysis, a general linear model (GLM) is used to eradicate this issue. Conversely, during the time series analysis, several methods, such as the GARCH model, were applied. Therefore, before using this model, it is necessary to check for the presence of heteroscedasticity, and the ARCH LM test is also be used.

Table 4: LM ARCH test data for State Gas Company

Testing for ARCH interference based on OLS residue				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.969870	0.060801	15.95163	0.0000
WGT_RESID^2(-1)	0.067770	0.052845	1.282444	0.2005
R-squared	0.004573	Mean dependent var		1.040270

Adjusted R-squared	0.001792	S.D. dependent var	0.496404
S.E. of regression	0.495959	Akaike info criterion	1.440894
Sum squared resid	88.05921	Schwarz criterion	1.462483
Log likelihood	-257.3608	Hannan-Quinn criter.	1.449478
F-statistic	1.644662	Durbin-Watson stat	1.994044
Prob(F-statistic)	0.200517		

Table 4 shows that the Q statistic is calculated based on the squared residual and is used to test for nonlinear effects (e.g., GARCH effect). The null hypothesis (Ho) is tested against Ha, as shown in Table 4:

Ho: OLS State Gas Company's residual data is white noise (or no ARCH effect was detected).

Against Ha: State Gas Company's OLS residual data is not white noise (or there is an ARCH effect).

Table 5: GARCH State Gas Company estimated data statistics

Testing the GARCH Estimate				
C	Coefficient	Std. Error	t-Statistic	Prob.
	454.0191	246.7424	1.840053	0.0658
RESID(-1)^2	0.704713	0.261167	2.698325	**0.0070**
GARCH(-1)	0.301634	0.094929	3.177472	**0.0015**
R-squared	-0.620968	Mean dependent var		1534.529
Adjusted R-squared	-0.620968	S.D. dependent var		511.2199
S.E. of regression	650.8711	Akaike info criterion		14.48315
Sum squared resid	1.53E+08	Schwarz criterion		14.52624
Log likelihood	-2610.209	Hannan-Quinn criter.		14.50028
Durbin-Watson stat	0.005715			

Table 6: State Gas Company MAPE data statistics

Variable	Coefficient	Std. Error	t-Statistic	Prob.
HARGA_SAHAM(-1)	0.959112	**0.010591**	90.56202	0.0000
D(HARGA_SAHAM(-1))	0.135679	0.051696	2.624555	0.0091
D(HARGA_SAHAM(-2))	-0.145159	0.051653	-2.810270	0.0052
C	85.10233	22.21289	3.831214	0.0002

INCPTBREAK	-41.47803	10.97470	-3.779423	0.0002
BREAKDUM	37.57067	48.86662	0.768841	0.4425
R-squared	0.991423	Mean dependent var		1530.531
Adjusted R-squared	0.991302	S.D. dependent var		511.4746
S.E. of regression	47.70278	Akaike info criterion		10.58447
Sum squared resid	800995.3	Schwarz criterion		10.64951
Log likelihood	-1888.621	Hannan-Quinn criter.		10.61034
F-statistic	8138.011	Durbin-Watson stat		1.975206
Prob(F-statistic)	0.000000			

Based on Table 5, it was discovered that AR (1) -GARCH (1,1) has a probability of 0.0070 and 0.0015. This is because the RMSE is extremely large, and this means that the model has better predictability. This is also supported by the forecasting and real value graph, which are extremely close (Figure 2). The Means Absolute Error (MAE) of 0.094 (Table 5) is also relatively small compared to the predicted stock price (H-1) (Table 6). The MAPE is 0.010 (Table 6), which is relatively small, indicating an ideal prediction accuracy.

In accordance with the Portmanteau Q test statistics and LM test, Ho was accepted because the p-value in Table 5 is p> 0.0001 (0.0015> 0.0001). It was therefore concluded that GARCH affects data acquired from the State Gas Company. This was also supported by the conditional variance behavior (Figure 6). Therefore, a model is needed to solve the issue of heteroscedastic variance. In this instance, the ARCH or GARCH model is used to explain the behavior of the data.

3.3. Windows Event Analysis

Table 7 Windows Event Testing Data

Checking Windows Events After Covid-19						
Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob*
.|*******	.|*******	1	0.917	0.917	305.92	0.000
.|****** |	.|* |	2	0.873	0.203	583.99	0.000
.|****** |	.|** |	3	0.876	0.343	865.06	0.000
.|****** |	.|. |	4	0.845	-0.056	1126.9	0.000
.|****** |	.|* |	5	0.831	0.148	1380.8	0.000

.|****** |	*|. |	6	0.801	-0.147	1617.6	0.000
.|****** |	.|. |	7	0.774	0.041	1839.1	0.000
.|***** |	.|. |	8	0.758	-0.040	2052.4	0.000
.|***** |	.|. |	9	0.725	-0.046	2248.0	0.000
.|***** |	.|. |	10	0.700	-0.014	2431.1	0.000
.|***** |	.|. |	11	0.677	-0.030	2602.6	0.000
.|***** |	*|. |	12	0.637	-0.096	2755.1	0.000
.|**** |	.|. |	13	0.620	0.065	2900.0	0.000
.|**** |	.|. |	14	0.610	0.062	3040.4	0.000
.|**** |	.|* |	15	0.593	0.083	3173.5	0.000
.|**** |	.|. |	16	0.574	-0.015	3298.7	0.000
.|**** |	.|. |	17	0.549	-0.023	3413.6	0.000
.|**** |	.|. |	18	0.527	-0.056	3519.9	0.000
.|**** |	*|. |	19	0.493	-0.151	3612.8	0.000
.|*** |	.|. |	20	0.475	0.068	3699.7	0.000
.|*** |	.|. |	21	0.458	-0.056	3780.6	0.000
.|*** |	.|. |	22	0.432	0.037	3852.8	0.000
.|*** |	*|. |	23	0.406	-0.092	3916.8	0.000
.|*** |	.|. |	24	0.383	0.022	3973.8	0.000
.|*** |	.|* |	25	0.380	0.108	4030.0	0.000
.|** |	*|. |	26	0.350	-0.094	4077.9	0.000
.|** |	*|. |	27	0.305	-0.093	4114.5	0.000
.|** |	.|. |	28	0.294	0.042	4148.6	0.000
.|** |	.|. |	29	0.272	-0.060	4177.7	0.000
.|** |	.|. |	30	0.243	-0.012	4201.1	0.000
.|** |	*|. |	31	0.213	-0.151	4219.1	0.000
.|* |	.|. |	32	0.188	0.061	4233.1	0.000
.|* |	.|. |	33	0.178	0.036	4245.8	0.000
.|* |	.|. |	34	0.156	0.045	4255.6	0.000
.|* |	.|. |	35	0.126	-0.046	4262.0	0.000
.|* |	*|. |	36	0.101	-0.082	4266.1	0.000

However, during the pandemic, from March to November, it was evident that the stock price was below its average in 2020. This has an AC value from the windows event test on the first day which was 0.917 till the 36th test when 0.101 was realized and kept declining. The percentage shows there is a possibility of a small event window due to the decline in stock price movements till December 2020.

4. CONCLUSION

In this study, the data from the State Gas Company of the Energy Sector was examined using the AR (p) -GARCH (p, q) time series analysis model. The results showed that the information is stationary. Furthermore, the differencing process was used with lag = 2 (d = 2) to convert the time series data to stationary. Conversely, by testing the effect of ARCH using the Q and LM tests, it was concluded that the GARCH model had an effect on the data realized from the State Gas Company. Based on this situation, AR (p) - GARCH (p, q) model was adopted.

The best model for the data acquired from State Gas Company is the AR (1) - GARCH (1,1) model. This is significant, and the R-squares are identified as 0.62 for the firm's model data. This prediction model's application is quite good based on the MAPE (the Mean Absolute Percentage Error) criterion for forecasting State Gas Company data that realized 0.094%. The model also needs to be used for forecasting in the next 176 days.

5. ACKNOWLEDGEMENT

The authors are grateful to the Ministry of Energy and Minerals and the Indonesia Stock Exchange for providing stock price data.

REFERENCES

Ali, H. H., Abu Al-Rub, F. A., Shboul, B., & Moumani, H. Al. (2020). Evaluation of near-net-zero-energy building strategies: A case study on residential buildings in jordan. International Journal of Energy Economics and Policy, 10(6), 325–336. https://doi.org/10.32479/ijeep.10107

Arafah, W., Nugroho, L., Takaya, R., & Soekapdjo, S. (2018). International Journal of Energy Economics and Policy Marketing Strategy for Renewable Energy development In Indonesia Context Today. International Journal of Energy Economics and Policy |, 8(5), 181–186. Retrieved from http:www.econjournals.com

Arch, A. (2006). Analisis ARCH dan GARCH menggunakan EViews. 1–17.

Ayinde, A. R., Celik, B., & Gylych, J. (2019). Effect of economic growth, industrialization, and urbanization on energy consumption in Nigeria: A vector error correction model analysis. International Journal of Energy Economics and Policy, 9(5), 409–418. https://doi.org/10.32479/ijeep.8175

Azimli, A., 2020. The impact of COVID-19 on the degree of dependence and structure of risk-return relationship: A quantile regression approach. Financ. Res. Lett., 101648.

Baig, A. S., Butt, H. A., Haroon, O., & Rizvi, S. A. R. (2020). Deaths, panic, lockdowns and US equity markets: The case of COVID-19 pandemic.

Finance Research Letters, (July), 101701. https://doi.org/10.1016/j.frl.2020.101701

Beaver, W.H., Lambert, R., Morse, D. (1980), The information content of security prices. Journal of Accounting and Economics, 2, 3-28.

Bollerslev, T. (1986), Generalized autoregressive conditional heteroscedasticity. Journal of Econometrics, 31, 307-327.

Box, G.E.P., Pierce, D.A. (1970), distribution of residual autocorrelations in autoregressive-integrated moving average time series models. Journal of American Statistics Association, 65, 1509-1526.

Brockwell, P.J., Davis, R.A. (2002), Introduction to Time Series and Forecasting. New York: Springer-Verlag.

Brooks, C. (2014), Introductory Econometrics for Finance. 3 ed. New York: Cambridge University Press.

Chan, K., Wai-Ming, F. (2000), Trade size, order imbalance, and the volatility–volume relation. Journal of Financial Economics, 57(2),247-73.

Chen, S., Yang, Y., & Lin, J. H. (2020). Capped borrower credit risk and insurer hedging during the COVID-19 outbreak. Finance Research Letters,36(September),101744. https://doi.org/10.1016/j.frl.2020.101744

Chia, C.L., Skindilias, K., Karathanasopoulos, A. (2016), Forecasting latent volatility through a Markov chain approximation filter. Journal of Forecasting, 35, 54-69.

Choi, S. Y. (2020). Industry volatility and economic uncertainty due to the COVID-19 pandemic: Evidence from wavelet coherence analysis. Finance Research Letters, (September), 101783. https://doi.org/10.1016/j.frl.2020.101783

Chunhui, L., Grace, O., Kwok-Kee, W., Lee, J. (2013), Ratio analysis comparability between Chinese and Japanese firms. Journal of Asia Business Studies, 7(2), 185-199.

Ciner, C. (2020). Stock return predictability in the time of COVID-19. Finance Research Letters, (May), 101705. https://doi.org/10.1016/j.frl.2020.101705

Dzikevicius, A., Šaranda, S. (2011), Smoothing Techniques for Market Fluctuation Signals, Business: Theory and Practice, 12(1), 63–74.

Eliyawati, W. (2014). Penerapan Model Garch (Generalized Autoregressive Conditional Heteroscedasticity) Untuk Menguji Pasar Modal Efisien Di Indonesia (Studi pada Harga Penutupan (Closing Price) Indeks Saham LQ 45 Periode 2009-2011). Jurnal Administrasi Bisnis S1 Universitas Brawijaya, 7(2), 79049.

Engle, R. (1982), Autoregressive conditional heteroscedasticity with estimates of the variance of United Kingdom inflation. Econometrica, 50, 987-1007.

Engle, R. (2001), GARCH 101: The use of ARCH/GARCH models in applied econometrics. Journal of Economic Perspectives, 15(4), 157-168.

Fadol, H. T. A. (2020). Study the possibility of address complex models in linear and non-linear causal relationships between oil price and gdp in ksa: Using the combination of toda-yamamoto, diks-panchenko and var approach. International Journal of Energy Economics and Policy, 10(6), 672–678. https://doi.org/10.32479/ijeep.10130

Faizah, S. I., & Husaeni, U. A. (2018). Development of consumption and supplying energy in Indonesia's economy. *International Journal of Energy Economics and Policy*, *8*(6), 313–321. https://doi.org/10.32479/ijeep.6926

Fama, E. F., Fisher, L., Jensen, M. C., & Roll, R. W. (2005). The Adjustment of Stock Prices to New Information. SSRN Electronic Journal. https://doi.org/10.2139/ssrn.321524

Farhat, R., Ghaddar, N. K., & Ghali, K. (2014). Investing in PV systems utilizing savings from building envelop replacement by sustainable local material: A case study in Lebanese Inland region. International Journal of Energy Economics and Policy, 4(4), 554–567.

Fildes, R., Goodwin, P. (2007), Against your better judgment? How organizations can improve their use of management judgment in forecasting. Interfaces, 37(6), 570-576.

Fornaro, P. (2016), Forecasting US recessions with a large set of predictors. Journal of Forecasting, 35, 477-492.

Gontijo, T. S., Rodrigues, A. de C., De Muylder, C. F., la Falce, J. L., & Pereira, T. H. M. (2020). Analysis of olive oil market volatility using the arch and garch techniques. International Journal of Energy Economics and Policy, 10(3), 423–428. https://doi.org/10.32479/ijeep.9138

Gunarto, T., Azhar, R., Tresiana, N., Supriyanto, & Ahadiat, A. (2020). Accurate estimated model of volatility crude oil price. *International Journal of Energy Economics and Policy*, *10*(5), 228–233. https://doi.org/10.32479/ijeep.9513

He, P., Sun, Y., Zhang, Y., & Li, T. (2020). COVID–19's Impact on Stock Prices Across Different Sectors—An Event Study Based on the Chinese Stock Market. Emerging Markets Finance and Trade, 56(10), 2198–2212. https://doi.org/10.1080/1540496X.2020.1785865

Hsieh, K. C., & Ritchken, P. (2005). An empirical comparison of GARCH option pricing models. Review of Derivatives Research, 8(3), 129–150. https://doi.org/10.1007/s11147-006-9001-3

Https://coaction.id/dampak-covid-19-terhadap-permintaan-energi-dunia/

Hull, J.C., (2015), Risk Management and Financial Institutions. Hoboken, New Jersey: John Wiley & Sons, Inc.

Ibrahim, M. A., Myrna, R., Irawati, I., & Kristiadi, J. B. (2018). Tax policy in indonesian energy sectors: An overview of tax amnesty implementation. *International Journal of Energy Economics and Policy*, *8*(4), 234–236.

Jahangir, A.K.A.M. (2013), Determinants and usefulness of analysts' cash flow forecasts: Evidence from Australia. International Journal of Accounting and Information Management, 21(1), 4-21.

Just, M., & Echaust, K. (2020). Stock market returns, volatility, correlation and liquidity during the COVID-19 crisis: Evidence from the Markov switching approach. *Finance Research Letters*, *37*(September), 101775. https://doi.org/10.1016/j.frl.2020.101775

Kapitonov, I. A., & Voloshin, V. I. (2017). Strategic directions for increasing the share of renewable energy sources in the structure of energy consumption. *International Journal of Energy Economics and Policy*, *7*(4), 90–98.

Kongsilp, W., Mateus, C. (2017), Volatility risk and stock return predictability on global financial crises. China Finance Review International, 7(1), 33-66.

K.Sahoo, P., K. Chottray, R., & Pattnaiak, S. (2012). Research Issues on Windows Event Log. *International Journal of Computer Applications*, *41*(19), 40–48. https://doi.org/10.5120/5650-8030

Li, Y., Liang, C., Ma, F., & Wang, J. (2020). The role of the IDEMV in predicting European stock market volatility during the COVID-19 pandemic. Finance Research Letters, 36(August), 101749. https://doi.org/10.1016/j.frl.2020.101749

Lin, L., Hung, P. H., Chou, D. W., & Lai, C. W. (2019). Financial performance and corporate social responsibility: Empirical evidence from Taiwan. Asia Pacific Management Review, 24(1), 61–71. https://doi.org/10.1016/j.apmrv.2018.07.001

Liu, H., Yi, X., & Yin, L. (2020). The impact of operating flexibility on firms' performance during the COVID-19 outbreak: Evidence from China. Finance Research Letters, (October), 101808. https://doi.org/10.1016/j.frl.2020.101808

Lyócsa, Š., Baumöhl, E., Výrost, T., & Molnár, P. (2020). Fear of the coronavirus and the stock markets. Finance Research Letters, 36(August), 101735. https://doi.org/10.1016/j.frl.2020.101735

Montgomery, D., Jennings, C., Kulachi, M. (2008), Introduction Time Series Analysis and Forecasting. Hoboken, New Jersey: John Wiley & Sons Inc.

Morana, C.J. (2017), The US dollar/euro exchange rate: Structural modeling and forecasting during the recent financial crises. Journal of Forecast, 36, 919-935.

Neslihanoglu, S., Sogiakas, V., McColl, J.H., Lee, D. (2017), Nonlinearities in the CAPM: Evidence from developed and emerging markets. Journal of Forecast, 36, 867-897.

Ortmann, R., Pelster, M., & Wengerek, S. T. (2020). COVID-19 and investor behavior. *Finance Research Letters*, *37*(August), 101717. https://doi.org/10.1016/j.frl.2020.101717

Owens, E., Wu, J.S. (2011), Window Dressing of Financial Leverage. Available from: https://www.pdfs.semanticscholar.org/7669/e94d07af8aec27e068ae95d972a8b7b18098.pdf. [Last retrieved on 2017 Nov 06].

Pankratz, A. (1991), Forecasting with Dynamic Regression models. Canada: Wiley Intersciences Publication.

Perencanaan, K., Nasional, P., & Indonesia, B. R. (2020). Dampak Covid-19 terhadap Pergerakan Nilai Tukar Rupiah dan Indeks Harga Saham Gabungan (IHSG). Jurnal Perencanaan Pembangunan: The Indonesian
Journal of Development Planning, 4(2), 151–165. https://doi.org/10.36574/jpp.v4i2.114

PT Perusahaan Gas Negara Tbk. (2020), Available from: https://pgn.co.id/

Shinkevich, A. I., Kudryavtseva, S. S., Dyrdonova, A. N., Gallyamova, D. K., Farrakhova, A. A., & Vodolazhskaya, E. I. (2019). Assessment of the efficiency of energy- and resource-saving technologies in the model of open innovation. *E3S Web of Conferences*, *124*(5), 289–296. https://doi.org/10.1051/e3sconf/201912404004

Singh, A. (2020). COVID-19 and safer investment bets. *Finance Research Letters*, *36*(August), 101729. https://doi.org/10.1016/j.frl.2020.101729

Tehranchian, A.M., Seyyedkolaee, M.A. (2017), The impact of oil price volatility on the economic growth in Iran: An application of a threshold regression model. International Journal of Energy Economics and Policy, 7(4), 165-171.

Tsay, R.S. (2005), Analysis of Financial Time Series. Hoboken, New Jersey: John Wiley & Sons, Inc.

Tsung-Han, K., Yu-Pin, H. (2013), Forecasting volatility with many predictors. Journal of Forecasting, 32, 743-754.(Gontijo et al., 2020)

Vijayalakshmi, S., Ajaya, K.P., Badri, N.R. (2014), Forecasting electricity prices in deregulated wholesale spot electricity market: A review. International Journal of Energy Economics and Policy, 4(1), 32-42.

Virginia, E., Ginting, J., & Elfaki, F. A. M. (2018). Application of garch model to forecast data and volatility of share price of energy (Study on adaro energy Tbk, LQ45). *International Journal of Energy Economics and Policy*, *8*(3), 131–140.

Wang, P. (2009), Financial Econometrics. 2nd ed. New York: Routledge, Taylor and Francis Group.

Wei, W.W. (2006), Time Series Analysis: Univariate and Multivariate Methods. 2 ed. New York: Pearson.

Weiss, A.A. (1984), ARMA models with ARCH errors. Journal of Time Series Analysis, 5, 129-143.

Weron, R. (2006), Modeling and Forecasting Electricity Loads and Prices: A Statistical Approach. Chichester: Wiley Finance Publication.

Weron, R., Misiorek, A. (2006), Short-term electricity price forecasting with time series models. A review and evaluation. In: Complex Electricity Markets: The European Power Supply Industry. Lodz:IEPL & SEP. p231-254.

Weron, R., Misiorek, A. (2008), Forecasting spot electricity prices: A comparison of parametric and semiparametric time series models. International Journal of Forecasting, 24, 744-763.

Zali, M., Yudi Heryadi, A., Nurlaila, S., & Fanani, Z. (2018). International Journal of Advanced Multidisciplinary Research Madura cattle agribusiness performance and feasibility in Galis region, Madura. Int. J. Adv. Multidiscip. Res, 5(6), 45–55. https://doi.org/10.22192/ijamr

BAB II

ANCHORING DAN *MENTAL ACCOUNTING*

A. *Anchoring*

Anchor adalah suatu hal yang jika terjadi akan memicu suatu perasaan atau emosi tertentu. Dalam istilah psikologi klasik, anchor adalah suatu stimulus yang memicu reaksi khusus. Anchor dapat terjadi dengan sendirinya (alami), dapat pula di ciptakan secara sengaja. Ide-ide dan pendapat kita harus berdasarkan fakta yang relevan dan benar agar dapat dianggap sah. Namun hal ini tidak selamanya berlaku. Konsep *anchoring* mengacu kepada kecenderungan untuk melampirkan atau 'penahan' pikiran kita ke titik referensi. *Anchor* adalah sesuatu yang bisa mengingatkan kita tentang kejadian-kejadian yang pernah kita alami sebelumnya.

Salah satu contoh *anchor* alami adalah phobia. Phobia adalah reaksi takut yang berlebihan (tidak masuk akal) pada suatu stimulus (*anchor*) tertentu. Misalnya ketika melihat kecoa, langsung memicu takut dan tidak berani berjalan mendekatinya.

Anchor yang diciptakan dengan sengaja misalnya adalah lampu merah lalu lintas. Karena melihat asosiasi berkali-kali antara warna merah dan berhenti, maka mata kita mejadi terlatih. Begitu melihat warna merah lampu lalu lintas, maka secara otomatis kita akan berhenti. Disiplin psikologi sudah meletakkan dasar-dasar teknik anchor dengan sangat baik.

a) *Diamond Anchor*

Kebijakan konvensional menyatakan bahwa cincing berlian untuk pertunangan berharga gaji selama daua bulan. Percaya atau tidak, standar ini merupakan contoh paling logis dari *anchoring*. Sementara untuk menghabiskan gaji dua bulan berfungsi sebagai patokan. Banyak pria yang tidak mampu memberikan gaji dua bulannya untuk sebuah cincin karena dia masih memiliki beban biaya hidup. Akibatnya, banyak yang berhutang untuk memenuhi 'standar' tersebut.

b) Investment Anchoring

Anchoring juga dapat menjadi sumber frustasi dalam dunia keuangan, karena investor mendasarkan keputusan mereka pada angka yang tidak relevan dan statistik. Sebagai contoh, anggaplah saham ABC memiliki pendapatan yang sangat kuat tahun lalu, menyebabkan harga saham menanjak naik dari
$25 sampai $80. Sayangnya, salah satu pelanggan utama perusahaan yang berkontribusi 50% dari pendapatan ABC telah memutuskan untuk tidak memperpanjang perjanjian pembelian dengan ABC. Perubahan peristiwa ini menyebabkan penurunan harga saham ABC dari $80 menjadi $40. Dengan penahanan di ketinggian $80 dan harga saat ini sebesar $40, investor keliru bahwa ABC berada pada *under value*. Perlu diingat bahwa ABC tidak dijual pada harga diskon, melainkan penurunan harga saham tersebut diberikan pada perubahan fundamental ABC (kehilangan pendapatan dari pelanggan besar).

c) **Menghindari *Anchor***

Investor yang sukses tidak mendasarkan keputusan mereka hanya pada satu atau dua tolak ukur, mereka mengevaluasi setiap perusahaan dari berbagai perspektif dalam rangka untuk memperoleh gambaran sesungguhnya dari lahan investasi.

B. *Mental Accounting* (Akuntansi Mental)

Akuntansi mental mengacu kepada kecenderungan orang untuk memisahkan uang mereka ke dalam rekening yang terpisah (berbeda) berdasarkan kriteria subjektif, seperti sumber uang dan niat untuk setiap akun. Menurut teori, individu menetapkan fungsi yang berbeda untuk masing-masing kelompok aset, yang sering memiliki efek yang tidak rasional dan merugikan pada keputusan mereka. Meskipun banyak orang yang menggunakan akuntansi mental, mereka mungkin tidak menyadari betapa betapa tidak logis pemikiran ini. Misalnya, orang sering memiliki 'celengan' atau dana yang disisihkan untuk liburan atau membeli rumah, namun mereka masih membaawa kartu kredit.

Dalam hal ini, daripada menabung untuk liburan, tindakan yang paling logis adalah dengan menggunakan dana yang berada dicelengan (uang yang kemungkinan ada) untuk melunasi hutang daripada menggunakan kartu kredit. Hal ini tampak cukup sederhana tapi kenapa orang tidak berpikir seperti itu? Jawabannya terdapat pada nilai pribadi orang yang memiliki aset tersebut.

a) Dilema Acount yang Berbeda

Untuk menggambarkan pentingnya account yang berbeda yang berkaitan dengan akuntansi mental, perhatikan contoh berikut ini. Anda akan membeli sandwich seharga $6 untuk makan siang. Ketika anda sedang menunggu dalam antrian salah satu hal ini terjadi: (1) Anda menemukan bahwa saku anda bolong dan Anda kehilangan uang $6 anda; atau (2) anda telah membeli sandwich, namun ketika Anda sedang memakannya, Anda tersandung dan menjatuhkan sandwich tersebut ke lantai.

Dalam kedua kasus ini (dengan asumsi Anda masih memiliki uang yang cukup), akankah Anda membeli sandwichlain? Secara logis, jawaban Anda untuk kedua skenario tersebut memiliki nilai yang sama; dilemanya adalah apakah Anda harus menghabiskan $6 untuk sandwich. Namun, karena bias akuntansi mentak hal ini tidak terjadi. Karena bias akuntansi mental, kebanyakan orang di skenario pertama tidak akan mempertimbangkan uang yang hilang untuk membeli makan siang mereka karena uang tersebut belum terhaiskan atau dialokasikan untuk hal tersebut. Akibatnya, mereka akan cenderung membeli sandwich lagi, sedangkan pada skenario kedua uang yang mereka miliki telah digunakan untuk membeli.

b) Berbeda Sumber, Berbeda Tujuan

Aspek lain dari akuntansi mental adalah bahwa orang- orang juga memperlakukan uang secara berbeda tergantung kepada sumbernya. Misalnya, orang akan cenderung menghabiskan lebih banyak uang yang 'ditemukan', seperti bonus kerja dan hadiah, dibandingkan dengan sejumlah uang yang biasanya diharapkan seperti gaji mereka. Ini merupakan contoh lain bagaimana akuntansi mental dapat menyebabkanpenggunaan tidak logis terhadap uang. Secara logis, uang harus dipergunakan, terlepas dari manapun asal-usulnya. Memperlakukan uang secara berbeda karena berasal dari sumber yang berbeda merupakan pelanggaran terhadap premi logis. Dari mana uang itu berasal seharusnya menjadi faktor dalam berapa banyak Anda menghabiskannya. Bagaimanapu menghabiskan uang tersebut akan menurunkan kekayaan Anda secara keseluruhan.

a) Akuntansi Mental dalam Investasi

Bias akuntansi mental juga masuk kedalam investasi. Sebagai contoh, beberapa investor membagi membagi investasi mereka menjadi portofolio investasi yang aman dan portofoliospekulatif untuk mencegah return yang negatif yang dimiliki oleh portofolio spekulatif yang mungkin akan berpengaruh terhadap seluruh portofolio. Masalahnya dalam praktek ini adalah bahwa meskipun semua pekerjaan dan semua uang yang investor habiskan untuk memisahkan portofolionya, kekayan bersihnya tidak akan berbeda jika dibandingkan dengan ia telah menggabungkan semuanya menjadi portofolio yang besar.

b) Menghindari Akuntansi Mental

Kunci penting yang perlu dipertimbangkan untuk akuntansi mental adalah bahwa uang itu sepadan, terlepas dari mana asal-usulnya atau penggunaan yang dimaksudkan, semua uang itu sama. Anda dapat mengurangi pengeluaran yang sembarangan, dengan menyadari bahwa menemukan uang tidak ada bedanya dengan menghasilkannya dari bekerja. Sebagai perpanjangan dari persepsi uang itu sama, individu menyadari bahwa menabung dengan bunga yang rendah atau tanpa bunga akan sia-sia jika Anda memiliki hutang (dalam hal ini kartu kredit). Dalam banyak kasus, bunga atas hutang Anda akan mengikis keuntungan yang dapat Anda peroleh dari rekening tabungan. Walaupun memiliki tabungan itu penting, tapi adakalanya lebih masuk akal untuk menarik tabungan Anda untuk melunasi hutang.

C. Teori Earning Management

Scott (2003:369) mendefinisikan earning management sebagai ”the choice by a manager of accounting policies so as to achieve some specific objective” yang kurang lebih meiliki arti : pilihan yang dilakukan oleh manajer dalam menentukan kebijakan akuntansi untuk mencapai beberapa tujuan tertentu.

Menurut Sugiri (1998) yang dikutip oleh Widyaningdyah (2001), definisi earning management dibagi dalam dua definisi, yaitu:

a. Definisi sempit

Earning management dalam hal ini hanya berkaitan dengan pemilihan metode akuntansi. Earning management dalam arti sempit ini didefinisikan sebagai perilaku manajer untuk “bermain” dengan komponen discretionary accruals dalam menentukan besarnya earnings.

b. Definisi luas

Earning management merupakan tindakan manajer untuk meningkatkan (mengurangi) laba yang dilaporkan saat ini atas suatu unit dimana manajer bertanggung jawab, tanpa mengakibatkan peningkatan (penurunan) profitabilitas ekonomis jangka panjang unit tersebut.

Jika Sugiri (1998) memberikan definisi earning management secara teknis, maka Surifah (1999) memberikan pendapatnya mengenai dampak earning management terhadap kredibilitas laporan keuangan. Menurut Surifah (1999) earning management dapat mengurangi kredibilitas laporan keuangan apabila digunakan untuk pengambilan keputusan, karena earning management merupakan suatu bentuk manipulasi atas laporan keuangan yang menjadi sasaran komunikasi antara manajer dan pihak eksternal perusahaan.

Konsep earning management menurut Salno dan Baridwan (2000:19):

menggunakan pendekatan teori keagenan (agency theory) yang menyatakan bahwa ”praktek earning management dipengaruhi oleh konflik antara kepentingan manajemen (agent) dan pemilik (principal) yang timbul karena setiap pihak berusaha untuk mencapai atau mempertimbangkan tingkat kemakmuran yang dikehendakinya”. Agency theory memiliki asumsi bahwa masing-masing individu semata-mata termotivasi oleh kepentingan dirinya sendiri sehingga menimbulkan konflik kepentingan antara principal dan agent. Pihak principal termotivasi mengadakan kontrak untuk menyejahterakan dirinya dengan profitabilitas yang selalu meningkat. Agent termotivasi untuk memaksimalkan pemenuhan kebutuhan ekonomi dan psikologisnya, antara lain dalam hal memperoleh investasi, pinjaman, maupun kontrak kompensasi. Konflik kepentingan semakin meningkat terutama karena principal tidak dapat memonitor aktivitas manajemen sehari-hari untuk memastikan bahwa manajemen bekerja sesuai dengan keinginan pemegang saham (pemilik).

Dalam hubungan keagenan, principal tidak memiliki informasi yang cukup tentang kinerja agent. Agent mempunyai lebih banyak informasi mengenai kapasitas diri, lingkungan kerja, dan perusahaan secara keseluruhan. Hal inilah yang mengakibatkan adanya ketidakseimbangan informasi yang dimiliki oleh principal dan agent. Ketidakseimbangan informasi inilah yang disebut dengan asimetri informasi. Adanya asumsi bahwa individu-individu bertindak untuk memaksimalkan dirinya sendiri, mengakibatkan agent memanfaatkan adanya asimetri informasi yang dimilikinya untuk menyembunyikan beberapa informasi yang tidak diketahui principal. Asimetri informasi dan konflik kepentingan yang terjadi antara principal dan agent mendorong agent untuk menyajikan informasi yang tidak sebenarnya kepada principal, terutama jika informasi tersebut berkaitan dengan pengukuran kinerja agent. Salah satu bentuk tindakan agent tersebut adalah yang disebut sebagai earning management (Widyaningdyah, 2001).

Menurut Healy dan Wahlen yang dikutip oleh Riduwan (2001)menyatakan bahwa earning management terjadi ketika para manajer menggunakan keputusannya dalam pelaporan keuangan dan dalam melakukan penyusunan transaksi untuk mengubah laporan keuangan baik untuk menimbulkan gambaran yang salah bagi stakeholder tentang kinerja ekonomis perusahaan, ataupun untuk mempengaruhi hasil kontraktual yang bergantung pada angka-angka akuntansi yang dilaporkan.

Ada dua cara memahami earning management (Sari, 2005), yaitu sebagai berikut:

1. Memandang earning management sebagai perilaku oportunistik manajer untuk memaksimalkan utilitasnya dalam menghadapi kontrak kompensasi, utang, dan kos politik.

2. Memandang earning management dari perspektif kontrak efisien, artinya earning management memberi fleksibilitas bagi manajer untuk melindungi diri dan perusahaan dalam mengantisipasi kejadian-kejadian tak terduga untuk keuntungan pihak-pihak yang terlibat dalam kontrak. Dengan demikian, manajer mungkin dapat mempengaruhi nilai pasar perusahaannya melalui earning management.

Menurut Watt dan Zimmerman (yang dikutip oleh Indarti et. al., 2004) tujuan yang akan dicapai oleh manajemen melalui earning management meliputi: mendapatkan bonus dan kompensasi lainnya, mempengaruhi keputusan pelaku pasar modal, menghindari biaya politik.

Berdasarkan pertimbangan biaya dan manfaat, manajemen diperbolehkan memilih dan menerapkan metode-metode akuntansi. Hal ini menjadi penyebab utama manajer melakukan earning management. Menurut Scott (2003:377) beberapa motivasi yang mendorong manajemen melakukan earning management, antara lain sebagai berikut:

1. Motivasi bonus, yaitu manajer akan berusaha mengatur laba bersih agar dapat memaksimalkan bonusnya.

2. Motivasi kontrak, berkaitan dengan utang jangka panjang,

yaitu manajer menaikkan laba bersih untuk mengurangi kemungkinan perusahaan mengalami technical default.

3. Motivasi politik, aspek politis ini tidak dapat dilepaskan dari perusahaan, khususnya perusahaan besar dan industri strategis karena aktivitasnya melibatkan hajat hidup orang banyak.

4. Motivasi pajak, pajak merupakan salah satu alasan utama perusahaan mengurangi laba bersih yang dilaporkan.

5. Pergantian CEO (Chief Executive Officer), banyak motivasi yang timbul berkaitan dengan CEO, seperti CEO yang mendekati masa pensiun akan meningkatkan bonusnya, CEO yang kurang berhasil memperbaiki kinerjanya untuk menghindari pemecatannya, CEO baru untuk menunjukkan kesalahan dari CEO sebelumnya.

6. Penawaran saham perdana (IPO), manajer perusahaan yang going public melakukan earning management untuk memperoleh harga yang lebih tinggi atas sahamnya dengan harapan mendapatkan respon pasar yang positif terhadap peramalan laba sebagai sinyal dari nilai perusahaan.

7. Motivasi pasar modal, misalnya untuk mengungkapkan informasi privat yang dimiliki perusahaan kepada investor dan kreditor.

Banyak cara yang dapat dilakukan oleh manajer untuk mempengaruhi waktu, jumlah, atau makna transaksi dalam pelaporan keuangan dengan melakukan pemilihan metode akuntansi dan accounting judgment (Merchant dan Rockness, 1994), yang dikutip oleh Sari (2005). Menurut Scott (2003:383) berbagai pola yang sering dilakukan manajer dalam earning management adalah:

1. Taking a bath

Terjadinya taking a bath pada periode stress atau reorganisasi termasuk pengangkatan CEO baru. Bila perusahaan harus melaporkan laba yang tinggi, manajer dipaksa untuk melaporkan laba yang tinggi, konsekuensinya manajer akan menghapus aktiva dengan harapan laba yang akan datang dapat meningkat. Bentuk ini mengakui adanya biaya pada periode yang akan datang sebagai kerugian pada periode berjalan, ketika kondisi buruk yang tidak menguntungkan tidak dapat dihindari pada periode tersebut. Untuk itu

manajemen harus menghapus beberapa aktiva dan membebankan perkiraan biaya yang akan datang pada saat ini serta melakukan clear the desk, sehingga laba yang dilaporkan di periode yang akan datang meningkat.

2. Income minimization

Bentuk ini mirip dengan ”taking a bath”, tetapi lebih sedikit ekstrim, yakni dilakukan sebagai alasan politis pada periode laba yang tinggi dengan mempercepat penghapusan aktiva tetap dan aktiva tak berwujud dan mengakui pengeluaran-pengeluaran sebagai biaya. Pada saat profitabilitas perusahaan sangat tinggi dengan maksud agar tidak mendapat perhatian secara politis, kebijakan yang diambil dapat berupa penghapusan atas barang modal dan aktiva tak berwujud, biaya iklan dan pengeluaran untuk penelitian dan

pengembangan, hasil akuntansi untuk biaya eksplorasi.

3. *Income maximization*

Tindakan ini bertujuan untuk melaporkan net income yang tinggi untuk tujuan bonus yang lebih besar. Perencanaan bonus yang didasarkan pada data akuntansi mendorong manajer untuk memanipulasi data akuntansi tersebut guna menaikkan laba untuk meningkatkan pembayaran bonus tahunan. Jadi tindakan ini dilakukan pada saat laba menurun. Perusahaan yang melakukan pelanggaran perjanjian hutang mungkin akan memaksimalkan pendapatan.

4. *Income smoothing*

Bentuk ini mungkin yang paling menarik. Hal ini dilakukan dengan meratakan laba yang dilaporkan untuk tujuan pelaporan eksternal, terutama bagi investor karena pada umumnya investor lebih menyukai laba yang relatif stabil.

Teknik untuk merekayasa laba dapat dikelompokkan menjadi tiga kelompok (Setiawati dan Na'im, 2000). Pertama yaitu memanfaatkan peluang untuk membuat estimasi akuntansi, antara lain: estimasi tingkat piutang tak tertagih, estimasi kurun waktu depresiasi aktiva tetap atau amortisasi aktiva tak berwujud, estimasi biaya garansi. Kedua yaitu mengubah metode akuntansi. Perubahan metode akuntansi yang digunakan untuk mencatat suatu transaksi, contoh: mengubah metode depresiasi aktiva tetap yaitu dari metode depresiasi angka tahun ke metode depresiasi garis lurus. Ketiga yaitu menggeser periode

biaya atau pendapatan, misalnya: mempercepat atau menunda pengeluaran untuk penelitian dan pengembangan sampai periode akuntansi berikutnya, mempercepat atau menunda pengeluaran promosi sampai periode akuntansi berikutnya, mempercepat atau menunda pengiriman produk ke pelanggan, menjual investasi sekuritas untuk memanipulasi tingkat laba, mengatur saat penjualan aktiva tetap yang sudah tidak dipakai.

Pendekatan lain yang digunakan dalam mengendalikan net income (Lontoh dan Lindrawati, 2004): Pertama, dengan mengendalikan transaksi-transaksi akrual, dimana transaksi akrual memiliki pengaruh terhadap pendapatan dan biaya namun tidak tampil pada arus kas. Contoh: amortisasi dan depresiasi adalah sepenuhnya dikuasai oleh perusahaan dalam hal menentukan masa manfaatnya sehingga perusahaan dapat mengatur besarnya pembebanan pada biaya sesuai keinginan manajemen dalam rangka mencapai hasil akhir pada net income yang diinginkan. Terdapat dua konsep akrual yaitu: discretionary accrual dan non discretionary accrual. Discretionary accrual adalah pengakuan akrual laba atau beban yang bebas tidak diatur dan merupakan pilihan kebijakan manajemen, sedangkan non discretionary accrual adalah pengakuan akrual laba yang wajar, yang tunduk pada suatu standar atau prinsip akuntansi yang berlaku umum. Kedua, dengan mengubah kebijakan akuntansi, manajemen juga dapat menentukan net income yang diinginkan, namun hasrat manajemen untuk melaksanakan hal ini tidak sekuat accrual items. Alasannya adalah manajemen harus menjelaskannya dalam disclosure pada laporan keuangan tahunan. Dan alasan ini adalah bahwa standar akuntansi tentang konsistensi mencegah terjadinya perubahan kebijakan akuntansi sesering mungkin. Contohnya adalah merubah metode pencatatan dari LIFO menjadi FIFO.

Earning management merupakan fenomena yang sukar dihindari karena fenomena ini hanya dampak dari penggunaan dasar akrual dalam penyusunan laporan keuangan. Dasar akrual disepakati sebagai dasar penyusunan laporan keuangan karena dasar akrual memang lebih rasional dan adil dibandingkan dasar kas. Sebagai contoh, dengan dasar kas, pembelian aktiva tetap secara tunai senilai seratus juta rupiah mesti dibebankan sebagai biaya pada periode saat pembelian aktiva tersebut, meskipun aktiva tersebut akan bermanfaat bagi perusahaan selama 10 tahun. Jika laporan rugi laba disusun dengan dasar kas, maka besar kemungkinan dalam periode tersebut perusahaan dinyatakan mengalami rugi. Jadi pada dasarnya, basis akrual dipilih dengan tujuan untuk menjadikan laporan keuangan lebih informatif yaitu laporan keuangan yang benar-benar mencerminkan kondisi yang sebenarnya. Sayangnya, akrual yang ditujukan untuk menjadikan laporan yang sesuai fakta ini sedikit dapat digerakkan (tuned)sehingga dapat mengubah angka laba yang dihasilkan.

Characteristics of banks as determinants of profit management for islamic and conventional banks in ASEAN

Suripto [a,*], **Supriyanto** [b]

[a] Department of Business Administration, Lampung University, Indonesia
[b] Department of Business Administration, Lampung University, Indonesia

Keywords:
Earnings management
Sharia bank
Multiple discriminant analysis

A B S T R A C T

This study aims to analyze company characteristics as a determinant of conventional and Islamic bank earnings management in several ASEAN countries (Association of South East Asian Nations). The Multiple Discriminant Analysis was applied to determine the differences between Islamic and Conventional Banks. This test was conducted based on Capital Adequacy Ratio, Income Before Tax and Interest, Non-Performaning and Changing Loans, and Company's Size in the banks of Indonesia, Malaysia, and Brunei Darussalam from 2014-2018. The data obtained from 200 banking entities were analyzed discriminatively. The results showed that there were simultaneous differences between Capital Adequacy Ratio, Earnings Before Tax, Loan Loss Provision, Non-Performing and Changing Loans, and Company's Size as determinants of earnings management between Islamic and conventional banks. Also, it was found that Company's Size was the dominant variable determining the management differences. Based on Discriminant Analysis, there were significant differences in the determinants of conventional and Islamic earnings management. The Changing Loan variable showed the highest contribution in determining earnings management in Islamic banks. Overall, this study found that conventional banks dominated Islamic system in practicing earnings management.

1. Introduction

A critical question in the current banking system is how management behaves in providing valid and reliable financial information. This behaviour is closely related to earnings management, which determines the income size. In the context of current banking systems, there is profit sharing and interest-based system, which is well-known for Sharia and conventional banking, respectively. This difference affects management behaviour in terms of earnings. Therefore, there is a need to conduct a study on earnings management in both Sharia and conventional bank, in order to address the problem faced in controlling income (Lobo, 2017). Earnings management is a unique and interesting topic which develop more accurate proxies in bank settings, because of its relatively homogeneous sample (Garsva, Skuodas, & Rudzioniene, 2012).

Some studies were conducted on this topic by Elnahass, Izzeldin, & Steele, (2018), Mozayani & Parvizi, (2016), Packer & Zhu, (2012), and Savitri, Andreas, Syahza, Gumanti, & Abdullah, (2020). Meanwhile, Chan, Li, & Lin, (2019) found that Sharia banking status does not determine earnings management.

Furthermore, Othman & Mersni, (2014), (Kao, Chen, & Lu, 2018) examine the factors influencing Sharia and conventional banking policies in three countries, namely Indonesia, Malaysia, and Brunei Darussalam. They explained that Sharia banking policy examined by DLLP, capital, and earnings management is more reliable than that of conventional. However, in terms of NPLs, it is weaker instead. This finding indicated that the behaviour of sharia banking earnings management is different from conventional.

The sharia banking is based on Profile and Loss Sharing (PLS), while conventional system regards interest. The principles of sharia banking operationally apply mudarabah and musharakah techniques sourced from classical jurisprudence to avoid (usury) interest. Therefore, Prima Sakti and Mohamad (2018) in their empirical study, stated that real and different economic activities support business transactions in Sharia banking.

Another difference in Sharia banking is examined from the types of financing products used, namely musharaka and mudarabah, which have high capital compared to its debt. Therefore, it chooses pro-cyclical model, which attempts to emulate conventional banking instruments by developing non Profile and Loss Sharing (PLS) (Soedarmono, Pramono, & Tarazi, 2017). Mohd Isa, Voon Choong, Yong Gun Fie, & Abdul Rashid, (2018) explained that the deposit rate in Sharia is similar with the conventional banking. The Sharia system avoids high-risk investments because it is conservative and more of profit management. (Farook, Hassan, & Clinch, 2014). Therefore, Islamic banking tends to have a smaller risk than conventional in earnings management. Inconsistent because the sample sizes are not represented (Othman & Mersni, 2014).

The research in Malaysia, Bangladesh, Indonesia, and Pakistan showed that Islamic banks performs less earnings management than the conventional system (Quttainah et al., 2013). Based on previous research, the importance of organizational religiousity in making decisions for Sharia-oriented companies produce accountable financial reports (Lassoued, Attia, & Sassi, 2018). The risk management in banking is very important, as Islamic system always reserves for loan losses, income smoothing, and investment risk which are regulated in the profit-loss sharing system (Boulila Taktak, Ben Slama Zouari, & Boudriga, 2010). The explanation of earnings management uses the agency theory, where banks managers receive rewards in line with the increase in the company's financial performance (Leventis et al., 2011).

Therefore, the reason for selecting the object of this research is that Sharia and conventional banking in ASEAN countries were established and developed together. In the HT & Rama (2018) empirical study, Indonesia, Malaysia, and Brunei Darussalam are part of the Southeast Asian countries that are ranked as the highest in managing Islamic banking. This is because they have the same characteristics, for example, the majority of the population in the country are Muslim. Therefore, the development of Sharia banking in these countries is quite rapid in contrast to previous research by Othman & Mersni, (2014), which examined 21 Islamic- and 18 interest-based banking systems for eight years with limited data from seven middle-east countries.

2. Literature review

2.1. Earnings management

Earnings management is the manipulation of reported income such that the profit and loss account does not represent the real economic conditions of banking activity. One of the practices of earnings management is the smoothing, which aims to reduce the composition of net income for each period. Managers increase loan loss provisions (LLP) when the condition of income before LLP has a high value, and decreases when the earning before LLP is low, to stabilize net the income (Curcio & Hasan, 2015), (Shu, Yeh, Chiu, & Yang, 2015), (Semaw Henock, 2019) . LLP is a cost item on the income reflecting an assessment for the management of possible expected losses due to unpaid loans. And keeping the records of LLP reduce net income. Furthermore, Managers use valuations in reporting transactions to change financial statements, making stakeholders unable to obtain information that should be about company performance (Ceccobelli & Giosi, 2019). Sharia banks differ from conventionals because they use a profit-sharing system known as Profit Loss Sharing or PLS (Pramono, Rosieta, & Soedarmono, 2017).

The earning management is practiced in order to improve bank performance, shown in CAMEL approach (Capital, Assets, Management, Earning and Liquidity). This means that the amount of CAMEL which is proxied by the capital adequacy ratio (Capital Adequate Ratio), Earning (Earning Before Tax and Provisions), and bad credit (Non Performance Loan) determine earnings management practices (Elnahass, Izzeldin, & Abdelsalam, 2014). According to Boulila Taktak, Ben Slama Zouari, & Boudriga, (2010), both conventional and Islamic banks carry out earnings management or LLP (Elnahass et al., 2014). However, no evidence of earnings management by Islamic system was found from this study to explain bank characteristics, which include CAR (Positive and Significant), Size (Negative and Significant), and Loans (Positive and Significant).

The business model of PLS in sharia banks limits the ability to manage earnings through LLP. Also, the agency cost factor is relatively higher because investors are not engaged in business decisions directly, nor do they have board of directors' representatives. These reasons require investors to monitor investment through the publication of financial statements. In protecting their investments, they attempt to convince bank regulators to evaluate and develop the governance mechanisms in the sharia bank. This behaviour aims to enhance the quality of financial statements (Elnahass et al., 2018). One of the agency theory implications is that managers improve firm performance, and achieve rewards by applying LLP in income smoothing (Elnahass et al., 2018). The use of reserves in Sharia and conventional banks is very different. The reserve policy on sharia banks is better than conventionals in that it considers not only actual, and also future losses (Othman & Mersni, 2014).

Earnings management is measured using two concepts, discretionary and non-discretionary accruals. The discretionary accrual is the recognition of profit or expense, which is a management choice. In contrast, non-discretionary accruals is the recognition of reasonable profit which affect the financial statements (Faradila & Cahyati, 2013). Several factors influence earnings management using LLP, such as Capital Adequacy Ratio (CAR), Earnings before Tax, and Loan Loss Provisions (EBTLLP), Non-Performing Loans (NPL), Change Loans (CLOANS), and Size.

CAR is defined as bank capital expressed as a percentage of the weighted risk. The minimum ratio guarantees banks to absorb the losses before experiencing financial difficulties (Mili, Sahut, Trimeche, & Teulon, 2017).

1 The two terms are similar in meaning. However, One of the practices of earnings management is the smoothing, which aims to reduce the composition of net income for each period. Earnings management is measured using two concepts, discretionary and non-discretionary accruals. The discretionary accrual is the recognition of profit or expense, which is a management choice.

2 One of the agency theory implications is that managers improve firm performance, and achieve rewards by applying LLP in income smoothing (Elnahass et al., 2018) The reserve policy on sharia banks is better than conventionals in that it considers not only actual, and also future losses (Othman & Mersni, 2014). In contrast, non-discretionary accruals is the recognition of reasonable profit which affect the financial statements (Faradila & Cahyati, 2013).

.

A high allowance when capital is low is consistent with a reduced capital acquisition cost that correlates with more exceptional LLP practices (Packer & Zhu, 2012). Furthermore, EBTLLP is a measure of the bankability to use assets in generating income before tax and LLP (Elnahass et al., 2018). Assets of good quality increase higher profitability. Therefore, it is imperative for banks to efficiently manage asset quality and other factors of profitability (Swamy, 2017).

Meanwhile, Non-Performing Loans (NPL) is the ratio of impaired to the total loans. Change Loans (CLOANS) transforms in the total loans from the current and the previous year (Elnahass et al., 2018). Variable NPL and CLOANS are used to measure the credit quality because it is more of risk than other types of assets (cash, reserves, bonds), therefore, high loans are associated with low credit quality (Packer & Zhu, 2012). Size is related to the company's internal control system which reduces the suspicion of earnings management. Large companies have more effective internal control systems and competent auditor teams than th smallers. This leads to the reliability of the public financial statements (Ali, Noor, Khurshid, & Mahmood, 2015).

Abdelsalam et al., (2016) and Lassoued et al., (2018) examined the banks in middle-east and north Africa countries, in which conventional-based manage earnings more than the sharia. This is because sharia banks tend to manage income by reporting earnings and discretionary accrual cases. The study of Caporale et al., (2018) showed that earnings management in Italian banks is counter-cyclical with non-discretionary components, while macroeconomic shocks play an important role. CKPN has less occurrence in the case of local banks, because their loans are more guaranteed, and supervisory activities strongly influence their behaviour.

The study of Shawtari et al., (2019) conducted in Indonesia, stated that earnings management at sharia-based banks is lower than conventionals, which is similar to the results of Othman & Mersni, (2014) study. Pinto & Ng Picoto, (2018) explained that managers use LLP to manage income and capital regulation. The key provisions of LLP are size and NPL, while Elnahass et al., (2018) showed the practice of earnings management through CKPN in conventional-based, especially in large banks that suffered losses. Conversely, sharia system tend not to use CKPN in earnings or capital management. The difference is due to the limited sharia banking business model, strict governance, and ethical orientation.

3 For example, data used in this study was obtained from the annual reports of Indonesia, Malaysia, and Brunei Darussalam Bank. The number of samples was 40 banks, consisting of 20 from conventional and 20 from sharia system, from 2014 to 2018. This study compares the variables of conventional and Sharia banking in Indonesia, Malaysia, and Brunei Darussalam, which included CAR for capital measurement, EBTLLP for assessing credit risks, and company's size for evaluating the firm magnitude either classified as large, medium, or small. Capital Adequacy Ratio (CAR) (Alhadab & Al-Own, 2019). Earnings Before Tax and Loan Loss Provisions (EBTLLP) (Elnahass et al., 2018), (Chan & Lin, 2017). Non-Performing Loans (NPL) (Fund, 2020). Change Loans (CLOANS) (Alhadab & Al-Own, 2019). Size (Kartikasari & Merianti, 2016), (Jaisinghani & Kanjilal, 2017) and (Mamipour & Sepahi, 2015).

3. Data and variables

The data used in this study was obtained from the annual reports of Indonesia, Malaysia, and Brunei Darussalam Bank. The number of samples was 40 banks, consisting of 20 from conventional and 20 from sharia system, from 2014 to 2018. This study compares the variables of conventional and Sharia banking in Indonesia, Malaysia, and Brunei Darussalam, which included CAR for capital measurement, EBTLLP for assessing credit risks, and company's size for evaluating the firm magnitude either classified as large, medium, or small.

Capital Adequacy Ratio (CAR)

CAR is the assessment of the modern banking system's safety. Banks are required to plan a certain amount from the capital to support the growth of productive assets that are in line with the their working plan (Alhadab & Al-Own, 2019). This ratio identifies bankability in providing reserve funds to minimize loss risks.

Earnings Before Tax and Loan Loss Provisions (EBTLLP)

EBTLLP is the capacity measurement in using its assets in generating earnings before its liabilities and CKPN (Elnahass et al., 2018), (Chan & Lin, 2017). This ratio is measured as the banks' earnings before the reserve's impairment loss on total bank assets.

Non-Performing Loans (NPL)

NPL is the measurement of impaired credits, which is the main reason for default in banks The high NPL should be balanced with the increased reserve fund (Fund, 2020). It is also defined as the inability of customers to pay part or all of their obligations to the bank.

Change Loans (CLOANS)

Change loans are the changes in the current year's credit value with the previous (Alhadab & Al-Own, 2019).

Size

The company's size is an embodiment of the total owned assets, which includes the capital, rights, and obligations (Kartikasari & Merianti, 2016), (Jaisinghani & Kanjilal, 2017) and (Mamipour & Sepahi, 2015). The firm or business size was based on several elements, one of which is the total assets.

Multiple Discriminant Analysis (MDA)

Multiple discriminant analysis have two main steps, the first step is the F-Test (Wilks Lambda) used to determine whether this model as a whole is significant or not. Second, assuming the F-Test shows significant value, then each independent variable is assessed for their differences. In the average group, this is used to classify the dependent variable. The discriminant equation is formulated as follows:

Where

L = linear combination of discriminating (independent) variable

b1 – bn = discriminant coefficient

c = constant value

X1 = capital adequacy ratio (CAR)

X2 = earning before tax and loan loss provisions (EBTLLP)

X3 = non-performing loans (NPL)

X4 = change loans

X5 = size

The Determinant of Cut-Off Value

Both groups observed in this study have several samples, therefore, the equation applied determines the cut-off point is as follows.

Where

ZCU = critical point, as a function of cut-off score

ZA and ZB = centroid number for group 1 and 2

NA and NB = number of group 1 and 2

The cut-off determination is based on the average value of the total Z-score from each bank, which is 0.0000. The standard applied to measure whether banks are classified as conventional or Sharia is as follows.

- When Z-score statistic < 0.000, the bank is classified as a sharia.

- When Z-score statistic > 0.000, the bank is classified as conventional.

5 There are numerous models for gauging earnings management, Multiple discriminant analysis have two main steps, the first step is the F-Test (Wilks Lambda) used to determine whether this model as a whole is significant or not. Second, assuming the F-Test shows significant value, then each independent variable is assessed for their differences. In the average group, this is used to classify the dependent variable

4. Empirical results

The descriptive analysis of Sharia and conventional banking was presented in Table 1 with the following variables, Capital Adequacy Ratio (CAR), Earning before Tax and Loan Loss Provisions (EBTLLP), Nonperforming Loans (NPL), and Company's Size.

First, the statistical range of 15.69% in the conventional and 151.92% in the sharia banking showed a significant difference in CAR. Similarly, the statistical range values differed significantly in EBTLLP, which was 4.51% in conventional and 13.45% in sharia banking. Furthermore, the statistical range of conventional (13.05%) and sharia banking (61.20%) also showed significant differences in CLOANS. An insignificant comparison between Sharia and conventional banking occurred in the NPL and firm size variables with a statistical comparison of 9.06%: 4.95% for NPL, and 6.29%: 5.82% for Company's Size, respectively. Based on these values, there were significant differences between Sharia and conventional banking in the five determinants of earnings management. This showed that sharia banking did not follow the business model of conventional system in earnings management practices.

Second, a discriminant analysis was conducted by identifying which variables were significant in distinguishing earnings management between Sharia and conventional banking. From the equality test, the variable values, namely CAR, EBTLLP, CLOANS, and Size were below 0.05. These test results showed that there were differences between the groups or determining variables. However, the NPL variable had significant value above 0.05, which means there was no difference between the groups, or the value of the two groups is relatively the same.

Third, the MDA model was used to determine the discriminant equation of the selected variables. The MDA model in the discriminant equation started with the variable that had the most significant F value. In the first stage, the calculated F Size value was 0.573. Then the NPL variable had a calculated F value of 0.471, CLOANS was 0.461, and EBTLLP was 0.451. Finally, determining the cut-off value was based on the average value of the Z-Score. For the Multiple Discriminant Analysis (MDA) model, the Z-Score of each bank was 0,000. When the Z-Score was < 0.000, it was categorized as sharia, and when the Z-Score was > 0.000, it was classed as conventional-based system.

Table 1. Statistical Descriptive

Variable	N	Min	Max	Mean		Std. Deviation
	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic
CAR	100	10.52%	26.21%	18.0035%	0.32691%	3.26912%
	100	11.15%	163.07%	21.6335%	1.71102%	17.11025%
EBT	100	0.30%	4.81%	2.4570%	0.12965%	1.29651%
LLP	100	-0.36%	13.08%	1.9395%	0.20215%	2.02150%
NPL	100	0.40%	9.46%	2.4524%	0.18672%	1.86721%
	100	0.02%	4.97%	2.0470%	0.15384%	1.53839%
CLOANS	100	0.23%	13.28%	4.6773%	0.28338%	2.83384%
	100	0.05%	61.26%	9.2239%	0.84000%	8.39995%
SIZE	100	7.7757	14.075	11.85359	.137108	1.3710764
	100	6.4953	12.325	9.598000	.125316	1.2531569

Source: the authors' calculations in Multiple Discriminant Analysis according to the statistical data

Normality Test

Table 2. One-Sample Kolmogorov-Smirnov Test

		Unstandardized Residual
N		200
Normal Parameters[a,b]	Mean	.0000000
	Std. Deviation	.33616765
Most	Absolute	.056

Extreme	Positive	.055
Differences	Negative	-.056
Test Statistic		.056
Asymp. Sig. (2-tailed)		.200[c,d]

Source: the authors' calculations in Multiple Discriminant Analysis according to the statistical data

The data shown in Table 2 was from the Kolmogorov-Smirnov normality test. The table showed that all independent variables had a significant value of 0.200, which was more than 0.05. Which means that the independent variable was distributed to meet the assumptions that was used for discriminant analysis.

Table 3. Box's M Test

Test Results		
Box's M		158.897
F	Approx.	15.544
	df1	10
	df2	187429.482
	Sig.	.000
Tests null hypothesis of equal population co-variance matrices.		

Source: the authors' calculations in Multiple Discriminant Analysis according to the statistical data

The box's M test showed that the F value was 15.544, and the significance was 0.000. This caused the co-variance matrix between the groups to violate the discriminant assumption, because the significance value was below 0.05. However, the analysis of discriminant functions remained strong even though the assumption of variance homogeneity did not correlate.

Table 4. Discriminant Analysis

Tests of Equality of Group Means

	Wilks' Lambda	F	df1	df2	Sig.
CAR	.979	4.342	1	198	.038
EBTLLP	.977	4.644	1	198	.032
NPL	.986	2.809	1	198	.095
CLOANS	.883	26.303	1	198	.000
SIZE	.573	147.458	1	198	.000

Source: the authors' calculations in Multiple Discriminant Analysis according to statistical data

From Table 4, the function of group centroid provided the information about average discriminant score. The discriminant score for conventional banks was 1.098, and -1.098 for Sharia, therefore, there was a stipulated cut-off value. Then the cut-off point of the discriminant function was calculated as follows:

Information :

ZCU = cut-off score

ZA and ZB = centroid values for group 1 and 2

NA dan NB = number of group 1 and 2

From the MDA model, the cut-off determination was based on the average value of the Z-Score from each bank (0.000). The standards used to assess whether the bank was categorized as a sharia or conventional bank were:

• When Z-Score was calculated as <0.000, the bank was classified as a sharia.

• When Z-Score was> 0.000, the bank was classed as a conventional.

Table 5. The determination of cut-off value

Functions at Group Centroids

Bank System	Function
	1
Conventional Bank	1.098
Sharia Bank	-1.098

Unstandardized canonical discriminant functions evaluated at group means

Source: the authors' calculations in Multiple Discriminant Analysis according to statistical data

Wilk's Lambda Test

Based on the Wilk's Lambda test in Table 6, the Size, NPL, CLOANS, and EBTLLP had a significance value of 0.000 less than 0.05. Therefore, all independent variables included in the MDA model had a significant effect.

Therefore, Size, NPL, CLOANS, and EBTLLP significantly affected earnings management in Sharia and conventional banking.

Canonical correlation was used to measure the closeness of the relationship between the discriminant scores. In this study, there were two groups.

Table 6. Wilk's Lambda

Number of Variables	Lambda	df1	df2	df3	Exact F Statistic	df1	df2	Sig.
1	.573	1	1	198	147.458	1	198.000	.000
2	.471	2	1	198	110.702	2	197.000	.000
3	.461	3	1	198	76.465	3	196.000	.000
4	.451	4	1	198	59.346	4	195.000	.000

Eigenvalue	% of Variance	Cumulative %	Canonical Correlation
1.217a	100.0	100.0	.741

Source: the authors' calculations in Multiple Discriminant Analysis according to statistical data

The results in Table 6 noted the CR value of 0.741. When squared (0.741) 2 = 0.549, it was found that 54.9% of variables explained the variation. Therefore, it was stated that the difference between Sharia and conventional banking groups was explained by the EBTLLP, NPL, CLOAN, and Size variables. The equation of Discriminant Analysis Functions unstandardized those formed from the results of the analysis as follows:

$$Z = (-9.419) + 0.117\ EBTLLP + 0.327\ NPL + (-0.038)\ CLOANS + 0.810\ SIZE$$

Accuracy of Classification Prediction

Based on the table below, the accuracy of the prediction was 89%. The accuracy of conventional banking was 91%, and 87% for sharia system. Misclassification in the conventional banking was 9% and 13% for sharia system. This was because the value of earnings management, which was initially classified as conventional banking and after being calculated turns out to be in the category of sharia system, and vice versa.

Table 7. Classification Results

	Banking System			Predicted Group Membership				Total
		Conventional		Sharia				
Original		Count	Conventional		91	9	100	
		Sharia	13	87	100			
	%	Conventional		91.0	9.0	100.0		
		Sharia	13.0	87.0	100.0			
Cross-validatedb			Count	Conventional		89	11	100
		Sharia	13	87	100			
	%	Conventional		89.0	11.0	100.0		
		Sharia	13.0	87.0	100.0			

Source: the authors' calculations in Multiple Discriminant Analysis according to statistical data

Based on the results shown In Table 7, the EBTLLP, NPL, CLOANS, and Size variables were used to determine earnings management in sharia and conventional banking. The EBTLLP, CLOANS, and Size variables had a higher value compared to sharia banking, making this variable to be used as a determinant in conventional banking earnings management. The CLOANS variable in Sharia banking was more significant than the conventional system. In the discriminant model, the CAR variable did not enter the model because it did not meet the requirements.

The results indicated that the average value of CARs in sharia was higher than conventional banking. This was in line with the research of Othman & Mersni, (2014) which stated that CAR was significantly higher in sharia than conventional banking. The CAR variable had a positive relationship with earnings management. Therefore, the higher the CAR value, the greater the manager performs earnings management, and vice versa. However, this variable was not included in the function equation, because it did not meet the requirements.

The findings showed that the average the value of EBTLLP had a significant difference between Sharia and conventional banking. The average value of EBTLLP in conventional was higher than sharia banking. This was in line with the research of Lassoued et al., (2018), which stated that sharia banking managed less income compared to conventional system. Dou et al., (2018), Ceccobelli & Giosi, (2019), and Bouvatier et al., (2014) showed significant results between EBTLLP and CKPN. In sharia banking, managers were not allowed to manipulate earnings, because it mislead users of financial statements. EBTLLP had a positive relationship with earnings management. The higher the profit generated, the greater the manager performs earnings management, and vice versa.

Based on the results, there was no significant difference between the NPLs in Sharia and conventional banking. Based on the descriptive analysis, the average value of NPL in conventional banking was higher than sharia system. This was in line with the research of Elnahass et al., (2018) and Othman & Mersni, (2014) stating that NPL have less significance in sharia banking. This variable has a positive relationship with earnings management. The higher the NPL value, the greater the manager preforms earnings management, and vice versa.

Based on the results, there was significant difference between the CLOANS in Sharia and conventional banking. Based on the descriptive analysis, the average value of CLOANS in sharia banking was higher than conventional system. This was in line with the research of Elnahass et al., (2018) srating that changes in loans were less significant in sharia banking. This was also strengthened by Quttainah et al., (2013), stating that CLOANS was significant for CKPN. This variable had a positive relationship with earnings management. The greater the value of CLOANS, the higher earnings management, and vice versa.

Based on the results, the Company's Size had a significant difference between both banking system. The descriptive analysis indicated that the average value of conventional banking Size was greater than that of the Sharia system. This was in line with the study of Elnahass et al., (2018), stating that earnings management was commonly used in conventional banking in large companies. Lassoued et al., (2018) and Ceccobelli & Giosi, (2019) showed significant positive results it. The research of Ahmed, Mohammed, & Adisa, (2014) showed that Sharia banking practice low management. Therefore, Size variable had a negative relationship with earnings management. The larger the Size of the company, the lower the profit management, and vice versa.

5. Concluding remarks

The data obtained from 200 banking entities were analyzed discriminately, and the findings showed that EBTLLP, NPL, CLOANS, and Size were different variables that determined the earnings management between conventional and Sharia banks. It was found that the EBTLLP, CLOANS, and Size showed significant differences, while the NPL did not. From the discriminant equation, the average ratio that was most dominant in predicting earnings management differences between the banking groups was the Size variable. The EBTLLP, NPL, and Size were mostly used in the determination of earnings management in conventional banks, while CLOANS was utilized in Sharia system. Overall, this study found that conventional banks dominanted the sharia system in practicing earnings management.

Conflicts of interest

All contributing authors declare no conflicts of interest.

References

Abdelsalam, O., Dimitropoulos, P., Elnahass, M., & Leventis, S. (2016). Earnings Management Behaviors Under Different Monitoring Mechanisms: The Case of Islamic and Conventional Banks. Journal of Economic Behavior and Organization, 132, 155– 173. https://doi.org/10.1016/j.jebo.2016.04.022.

Ahmed, A., Mohammed, A. Y., & Adisa, A. O. (2014). Loan Loss Provision and Earnings Management in Nigerian Deposit Money Banks. Mediterranean Journal of Social Sciences, 5(17), 49–58. https://doi.org/10.5901/mjss.2014.v5n17p49.

Alhadab, M., & Al-Own, B. (2019). Earnings Management And Equity Incentives: Evidence from the European Banking Industry. International Journal of Accounting and Information Management, 27(2), 244–261. https://doi.org/10.1108/IJAIM-08-2017-0094.

Ali, U., Noor, M., Khurshid, M. K., & Mahmood, A. (2015). Impact of Firm Size on Earnings Management: A Study of Textile Sector of Pakistan. SSRN Electronic Journal, 7(28), 47–56. https://doi.org/10.2139/ssrn.2698317.

Beck, T., Demirgüç-Kunt, A., & Merrouche, O. (2013). Islamic Vs. Conventional Banking: Business Model, Efficiency and Stability. Journal of Banking and Finance, 37(2), 433–447. https://doi.org/10.1016/j.jbankfin.2012.09.016.

Boulila Taktak, N., Ben Slama Zouari, S., & Boudriga, A. K. (2010). Do Islamic banks use loan loss provisions to smooth their results? Journal of Islamic Accounting and Business Research, 1(2), 114–127. https://doi.org/10.1108/17590811011086714.

Bouvatier, V., Lepetit, L., & Strobel, F. (2014). Bank Income Smoothing, Ownership Concentration and The Regulatory Environment. Journal of Banking and Finance, 41(1), 253–270. https://doi.org/10.1016/j.jbankfin.2013.12.001.

Caporale, G. M., Alessi, M., Di Colli, S., & Lopez, J. S. (2018). Loan Loss Provisions and Macroeconomic Shocks: Some Empirical Evidence for Italian Banks During The Crisis.Finance Research Letters, 25(October),239–243. https://doi.org/10.1016/j.frl.2017.10.031.

Chan, C. H., & Lin, M. H. (2017). Imputation tax system, dividend payout, and investor behavior: Evidence from the Taiwan stock exchange. Asia Pacific Management Review, 22(3), 146–158. https://doi.org/10.1016/j.apmrv.2016.12.002

Ceccobelli, G., & Giosi, A. (2019). Earnings Management Practices In The Banking Industry: The Role Of Bank Regulation And Supervision. 193–214. https://doi.org/10.22495/cpr19p10.

Cevik, S., & Charap, J. (2015). The Behavior of Conventional and Islamic Bank Deposit Returns in Malaysia and Turkey. International Journal of Economics and Financial Issues, 5(1), 111–124. https://doi.org/10.5089/9781455293704.001.

Chan, K., Li, F., & Lin, T. C. (2019). Earnings Management and Post-Split Drift. Journal of Banking and Finance, 101, 136–146. https://doi.org/10.1016/j.jbankfin.2019.02.004.

Curcio, D., & Hasan, I. (2015). Earnings and Capital Management and Signaling: The Use of Loan-Loss Provisions by European Banks. European Journal of Finance, 21(1), 26–50. https://doi.org/10.1080/1351847X.2012.762408.

Dou, Y., Ryan, S. G., & Zou, Y. (2018). The Effect of Credit Competition on Banks' Loan-Loss Provisions. Journal of Financial and Quantitative Analysis, 53(3), 1195– 1226. https://doi.org/10.1017/S0022109018000054.

Dyreng, S. D., Mayew, W. J., & Williams, C. D. (2012). Religious Social Norms and Corporate Financial Reporting. Journal of Business Finance and Accounting, 39(7–8), 845–875. https://doi.org/10.1111/j.1468-5957.2012.02295.x.

Elnahass, M., Izzeldin, M., & Abdelsalam, O. (2014). Loan Loss Provisions, Bank Valuations and Discretion: A Comparative Study Between Conventional and Islamic Banks. Journal of Economic Behavior and Organization, 103. https://doi.org/10.1016/j.jebo.2013.08.018.

Elnahass, M., Izzeldin, M., & Steele, G. (2016). The Expected Loan Loss Model and Earnings Management : Evidence from Contemporary Practices. Working Paper, 1–28.

Elnahass, M., Izzeldin, M., & Steele, G. (2018). Capital and Earnings Management: Evidence from Alternative Banking Business Models. International Journal of Accounting, 53(1), 20–32. https://doi.org/10.1016/j.intacc.2018.02.002.

Faradila, A., & Cahyati, A. (2013). Analisis Manajemen Laba Pada Perbankan Syariah.

None, 4(01), 57–74. https://doi.org/10.33558/jrak.v4i1.272.

Farook, S., Hassan, M. K., & Clinch, G. (2014). Islamic bank incentives and discretionary loan loss provisions. Pacific Basin Finance Journal, 28, 152–174. https://doi.org/10.1016/j.pacfin.2013.12.006

Funds, T. (2020). The Influence Of Third-Party Funds , Non-Performing Loans (Npl) On Credit Distribution With Profitability As. 2020(2), 40–50.

Garsva, G., Skuodas, S., & Rudzioniene, K. (2012). Earnings Management in European Banks: The Financial Crisis and Increased Incentives For Manipulation Through Loan Loss Provisions. Transformations in Business and Economics, 11(2 A), 504–526.

HT, H. A., & Rama, A. (2018). Indeks Kinerja Perbankan Syariah di Asia Tenggara Berdasarkan Konsep Maqâshid al-Syarî`ah. Madania: Jurnal Kajian Keislaman, 22(1), 33. https://doi.org/10.29300/madania.v22i1.782.

Jaisinghani, D., & Kanjilal, K. (2017). Non-linear dynamics of size, capital structure and profitability: Empirical evidence from Indian manufacturing sector. Asia Pacific Management Review, 22(3), 159–165. https://doi.org/10.1016/j.apmrv.2016.12.003

Jin, J. Y. (2013). Investor Attention and Earnings Management Around The World.

Accounting Perspectives, 12(2), 165–187. https://doi.org/10.1111/1911-3838.12013.

Kao, L., Chen, A., & Lu, C. S. (2018). Ex ante and ex post overvalued equities: The roles of corporate governance and product market competition. Asia Pacific Management Review, 23(3), 209–221. https://doi.org/10.1016/j.apmrv.2017.07.002

Kartikasari, D., & Merianti, M. (2016). The Effect of Leverage and Firm Size to Profitability of Public Manufacturing Companies in Indonesia. International Journal of Economics and Financial Issues, 6(2), 409–413.

Lassoued, N., Attia, M. B. R., & Sassi, H. (2018). Earnings Management in Islamic and Conventional Banks: Does Ownership Structure Matter?

Evidence from the MENA Region. Journal of International Accounting, Auditing and Taxation, 30(December 2017), 85–105. https://doi.org/10.1016/j.intaccaudtax.2017.12.003.

Lobo, G. J. (2017). Accounting Research in Banking – A review. China Journal of Accounting Research, 10(1), 1–7. https://doi.org/10.1016/j.cjar.2016.09.003.

Mamipour, S., & Sepahi, M. (2015). Analysis of the Behavior of Amateur and Professional Investors' Impact on the Formation of Bubbles in Tehran Stock Market. Iranian Economic Review, 19(3), 341–358. https://doi.org/10.22059/ier.2015.56855.

Mili, M., Sahut, J. M., Trimeche, H., & Teulon, F. (2017). Determinants of the Capital Adequacy Ratio of Foreign Banks' Subsidiaries: The Role of Interbank Market and Regulation. Research in International Business and Finance, 42, 442–453. https://doi.org/10.1016/j.ribaf.2016.02.002.

Mohd Isa, M. Y., Voon Choong, Y., Yong Gun Fie, D., & Abdul Rashid, M. Z. H. (2018). Determinants of Loan Loss Provisions of Commercial Banks in Malaysia. Journal of Financial Reporting and Accounting, 16(1), 24–48. https://doi.org/10.1108/JFRA-03- 2015-0044.

Mollah, S., & Zaman, M. (2015). Shari'ah Supervision, Corporate Governance and Performance: Conventional Vs. Islamic Banks. Journal of Banking and Finance, 58, 418– 435. https://doi.org/10.1016/j.jbankfin.2015.04.030.

Mozayani, A. H., & Parvizi, S. (2016). Exchange Rate Misalignment in Oil Exporting Countries (OPEC): Focusing on Iran. Iranian Economic Review, 20(2), 261–276. https://doi.org/10.22059/ier.2016.58802.

Muda, I., Maulana, W., Siregar, H. S., & Indra, N. (2018). The Analysis of Effects of Good Corporate Governance on Earnings Management in Indonesia With Panel Data Approach. Iranian Economic Review, 22(2), 599–625. https://doi.org/10.22059/ier.2018.66169.

Othman, H. Ben, & Mersni, H. (2014). The Use of Discretionary Loan Loss Provisions by Islamic Banks and Conventional Banks in the Middle East Region: A Comparative Study. Studies in Economics and Finance, 31(1), 106–128. https://doi.org/10.1108/SEF- 02-2013-0017.

Packer, F., & Zhu, H. (2012). Loan Loss Provisioning Practices of Asian Banks. SSRN Electronic Journal, (375). https://doi.org/10.2139/ssrn.2038215.

Pinto, I., & Ng Picoto, W. (2018). Earnings and Capital Management in European Banks Combining a Multivariate Regression With a Qualitative Comparative Analysis. Journal of Business Research, 89(June), 258–264. https://doi.org/10.1016/j.jbusres.2017.12.034.

Prima Sakti, M. R., & Mohamad, A. (2018). Efficiency, Stability and Asset Quality of Islamic Vis-À-Vis Conventional Banks: Evidence from Indonesia. Journal of Islamic Accounting and Business Research, 9(3), 378–400. https://doi.org/10.1108/JIABR-07- 2015-0031.

Quttainah, M. A., Song, L., & Wu, Q. (2013). Do islamic banks employ less earnings management? Journal of International Financial Management and Accounting, 24(3), 203–233. https://doi.org/10.1111/jifm.12011.

Rafay, A., Farid, S., Yasser, F., & Safdar, S. (2020). Social Collateral and Repayment Performance: Evidence from Islamic Micro Finance. Iranian Economic Review, 24(1), 41–74. https://doi.org/10.22059/ier.2020.74474.

Savitri, E., Andreas, A., Syahza, A., Gumanti, T. A., & Abdullah, N. H. N. (2020). Corporate governance mechanism and financial performance: Role of earnings management. Entrepreneurship and Sustainability Issues, 7(4), 3395–3409. https://doi.org/10.9770/jesi.2020.7.4(54)

Shu, P. G., Yeh, Y. H., Chiu, S. B., & Yang, Y. W. (2015). Board external connectedness and earnings management. Asia Pacific Management Review, 20(4), 265–274. https://doi.org/10.1016/j.apmrv.2015.03.003

Soedarmono, W., Pramono, S. E., & Tarazi, A. (2017). The Procyclicality of Loan Loss Provisions in Islamic Banks. Research in International Business and Finance, 39, 911– 919. https://doi.org/10.1016/j.ribaf.2016.05.003.

Suzuki, Y., Uddin, S. M. S., & Sigit, P. (2019). Do Islamic Banks Need to Earn Extra Profits?: A Comparative Analysis on Banking Sector Rent in Bangladesh and Indonesia. Journal of Islamic Accounting and Business Research, 10(3), 369–381. https://doi.org/10.1108/JIABR-01-2017-0003.

Shawtari, F. A., Ariff, M., & Abdul Razak, S. H. (2019). Efficiency and Bank Margins: a Comparative Analysis of Islamic and Conventional Banks in Yemen. Journal of Islamic Accounting and Business Research, 10(1), 50–72. https://doi.org/10.1108/JIABR-07- 2015-0033.

Swamy, V. (2017). Determinants of Bank Asset Quality and Profitability: An Empirical Assessment. Applied Economics Quarterly, 63(1), 97–135. https://doi.org/10.3790/aeq.63.1.97.

Wijayanti, R., Diyanty, V., & Laela, S. F. (2020). Education Strategy Misfit, Board Effectiveness and Indonesian Islamic Bank Performance. Journal of Islamic Accounting and Business Research, 11(3), 929–944. https://doi.org/10.1108/JIABR-04-2017-0052.

BAB III

THEORY PROSPECT

A. Teori Prospect

Diyakini bahwa efek bersih dari keuntungan dan kerugian yang terlibat dengan masing-masing pilihan digabungakn untuk menyajikan evaluasi keseluruhan terhadap pilihan yang diinginkan. Para ahli cenderung menggunakan 'utilitas' untuk menggambarkan kenikmatan dan berpendapat bahwa kita lebih suka contoh yang memaksimalkan utilitas kita.

Namun, penelitian telah menemukan bahwa kita tidak benar-benar memproses informasi dalam cara yang rasional. Kahneman dan Tversky (1979) mengemukakan teori prospek. Teori prospek berangkat dari analisis mengenai perilaku seseorang dalam pengambilan keputusan ekonomi di antara dua pilihan. Tidak seperti kebanyakan teori psikologi lainnya, karena dikembangkan bersama teori ekonomi, teori prospek memiliki dasar matematika yang kuat. Teori proskpek berfokus pada bagaimana keputusana nyata diambil.

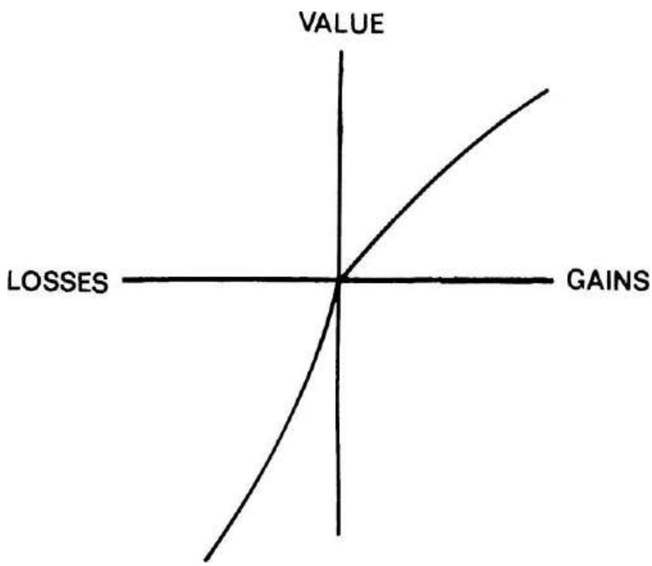
Teori prospek memiliki spesifikasi yaitu ekonomi berbasis perilaku yang menyatakan bahwa pelaku ekonomi tidaklah selamanya rasional. Dengan kata lain, dalam memandang pelaku ekonomi tidak hanya dilakukan pada sisi rasional atau tidak rasional saja melainkan pada aspek-aspek yang lebih luas. Ekonomi berbasis perilaku menekankan perilaku apa adanya dari pelaku ekonomi. Kahneman dan Tversky memulai penelitian terhadap perilaku manusia yang dianggap aneh dan kontradiktif dalam mengambil suatu keputusan dengan memberikan pilihan yang sama kepada dua subyek penelitian, dan kemudian dua subyek tersebut menunjukkan perilaku yang berbeda. Hal itu disebut Kahneman dan Tversky sebagai *risk-aversion* dan *risk-seeking behavior*.

Teori prospek menjelaskan bagaimana seseorang (investor) membuat keputusan dibawah kondisi resiko tertentu atau memilih diantara dua pilihan resiko dalam kondisi ketidakpastian. Ada beberapa aspek perilaku investor dalam memandang resiko yang dijelaskan dalam teori prospek, yaitu:

1) ***Loss aversion*** merupakan salah satu preferensi yang paling penting dalam teori keuangan keperilakuan. Aspek keperilakuan ini merupakan aspek yang membedakan dengan hipotesis pasar efisien. *loss aversion* menunjukkan keengganan investor untuk menderita kerugian. Seorang investor menunjukkan keengganan investor untuk menderita kerugian. Seorang investor cenderung menghindari kerugian dari pada memperoleh keuntungan.
2) ***Mental Accounting*** adalah kecenderungan orang untuk memisahkan uangnya ke dalam rekening berbeda berdasarkan berbagai kriteria subjektif, seperti berdasarkan sumber uang dan maksud dari setiap rekening. Menurut teori ini, individu menetapkan fungsi yang berbeda untuk setiap kelompok aset, yang sering memiliki pengaruh tidak rasional dan merugikan pada keputusan konsumsi dan perilaku lainnya.
3) ***Self-control***menjelaskan sejauh mana investor dapatmengendalikan dirinya. Aspek perilaku ini digunakan untuk menjelaskan mengapa investor terus menjadi orang yang mengalami kerugian. Aspek perilaku ini juga dapat diartikan bahawa investor suka berinvestasi pada efek dimana mereka memiliki kemampuan untuk mengontrol investasinya. Dengan alasan ini investor lebih memilih saham yang memberikan dividen dibandingkan capital gain.
4) ***Regret aversion*** adalah kecenderungan investor untuk menghindari beberapa perilaku yang mungkin menjadikan dirinya tidak nyaman sesudahnya, meskipun dia percaya bahwa perilaku tersebut adalah yang terbaik. Hal ini karena ketika investor membuat keputusan yang salah, mereka akan merasa sakit dan menyesal atas keputusan tersebut. Semakin keputusan yang diambilnya adalah keputusan yang tidak konvensional, akan semakin besar penyesalannya.

Dasar lain dari teori prospek adalah fungsi nilai. Fungsi nilai berbeda dari fungsi utilitas diharapkan teori utilitas karena titik referensi, yang ditentukan oleh kesan subjektif individu. Menurut teori utilitas yang diharapkan konvensional, fungsi utilitas cekung kebawah untuk semua tingkat kekayaan.

sebaliknya, menurut fungsi nilai kemiringan fungsi utilitas miringke atas untuk tingkat kekayaan di bawah titik referensi dan miring ke bawah untuk tingkat kekayaan setelah titik acuan. titik referensi ditentukan oleh masing-masing individu sebagai titik perbandingan, misalnya ukuran dari tingkat target kekayaan. untuk tingkat kekayaan di bawah referensi ini investor titik adalah pencari risiko, yaitu mereka siap untuk membuat taruhan berisiko agar tetap di atas target yang mereka sukai kekayaan. sedangkan, untuk tingkat kekayaan di atas titik acuan ini, fungsi nilai adalah miring ke bawah, sejalan dengan teori konvensional, dan investor di sini adalah menghindari resiko. Kahneman & Tversky (1974) menegaskan bahwa orang-orang pencari risiko kerugian.



Gambar 1 Kahnemann & Tvesky Fungsi Nilai

Teori prospek mengajukan beberapa prinsip dalam penerapannya. Prinsip-prinsip tersebut adalah:

1) Fungsi Nilai (*Value Function*)
   Teori prospek mendefinisikan nilai dalam kerangka kerjabipolar diantara perolehan (*gains*)dan kehilangan (*losses*).

Keduanya bergerak dari titik tengah yang merupakan referensi netral. Fungsi nilai bagi suatu perolehan (mendapatkan sesuatu) akan berbeda dengan kehilangan sesuatu. *Value* bagi suatu kehilangan dibobot lebih tinggi, sedangkan value bagi suatu perolehan dibobot lebih rendah. Contoh: pada uang satu juta rupiah. Kehilangan uang satu juta rupiah dirasakan lebih tinggi nilai kerugian bila dibandingkan dengan keuntungan ang dirasakan seseorang ketik memperoleh uang satu juta. Dengan kata lain, lebih tinggi kualitas kesedihan yang dirasakan seorang ketika kehilangan uang satu juta rupiah, dibandingkan kualitas kegembiraan yang dirasakan ketika mendapatkan uang satu juta. Jadi, antara keuntungan dan kerugian merupakan dua hal yang tidak simetris.

2) Pembingkaian (*framing*)
Teori prospek memprediksi bahwa prefensi (kecenderungan memilih) akan tergantung pada bagaimana suatu persoalan dibingkai atau di formulasikan.

3) Perhitungan psikologis (*psychological accounting*) *Psychological accounting* atau perhitungan mental ataupsikologis adalah orang yang membuat keputusan tidakhanya membingkai pilihan-pilihan yang ditawarkan, tetapijuga membingkai hasil serta akibat dari pilihan-pilihan itu.

4) Probabilitas (*Probability*)
Teori prospek perbandingan kecenderungan orang dalam membuat keputusan merupakan fungsi dari bobot keputusan (*decision weight*). Bobot keputusan ini tidak selalu dihubungkan denganbesar kecilnya peluang atau frekuensi kejadian.fenomena ini berlaku pada kejadian yang menimbulkan kerugian berskala besar. Seperti bencana alam,wabah penyakit, kelaparan dan bom nuklir.

5) Efek kepastian (*certainty effect*)
Teori prospek memprediksi bahwa pilihan yang dipastikan tanpa risiko sama sekali akan lebih disukai daripada pilihan yang masih mengandung risiko meski kemungkinannya sangat kecil. Sebab, orang-orang cenderung menghiangkan sama sekali adanya resiko (*eliminate*) dari pada hanya mengurangi (*reduce*). Tentunya setalah mempelajari suatu hal kita akan mendapatkan manfaat atas pelajaran tersebut. Begitu pula dengan perilaku keuangan apabila memahaminya secara benar. Terdapat manfaat yang dapat diperoleh dari memahami perilaku keuangan.

1) Untuk dunia akademik atau perkembangan dari ilmu ekonomi, kehadiran ekonomi berbasis perilaku serta perkembangan merupakan suatu terobosan penting. Dikatakan merupakan suatu

terobosan penting karena didalamnya terdapat ‘petunjuk’ bahwa selama ini ilmu ekonomi terkesan menyepelekan faktor-faktor psikologi. Selain itu, dengan memasukkan faktor-faktor yang lebih luas cakupannya akan sangat membantu dalam memahami perilaku pelaku ekonomi yang menyimpang. Yang mana hal ini membuka peluang untuk semakin banyaknya ditemukan pengetahuan baru yang kemudian akan memperkaya ilmu ekonomi.

Bagi pelaku ekonomi dalam melakukan kegiatan ekonominya. Kehadiran ekonomi berbasis perilaku dinilai dapat amat membantu untuk bagaimana pelaku ekonomi memahami perilakunya sendiri. Bagaimana pelaku ekonomi dapat memahami faktor-faktor seperti aspek kepribadian yang mencakup emosional, mood, suasana hati dan lainnya turut memberikan pengaruh terhadap perilaku yang menyimpang dari yang diharapkan. Alhasil, setiap orang terbantukan dalam mengendalikan diri asalkan ada niat yang kokoh untuk mereduksi penyimpangan perilaku tersebut.

B. Teori Auto Rejection

Hadi (2015:110) menyatakan bahwa Auto rejection adalah acuan harga yang digunakan untuk pembatasan harga penawaran tertinggi atau terendah dipasar. Menurut Bursa efek Indonesia (2017) Auto rejectionadalah penolakan secara otomatis oleh system di dalam transaksi saham elektronik yang dikenal dengan Jakarta Automated Trading System (JATS) Terhadap penawaran jual dan permintaan beli yang dimasukan ke dalam JATS sebagai akibat dilampauinya batasan harga yang ditetapkan oleh bursa efek. Dari pengertian diatas dapat disimpulkan bahwa Auto rejection adalah penolakan secara otomatis oleh JATS Terhadap penawaran jual dan permintaan beli di pasar modal sebagai akibat dilampauinya batasan harga yang ditetapkan bursa efek. Batasan auto rejection merupakan aturan yang di buat oleh Bursa Efek Indonesia yang memiliki peran sangat penting karena untuk memperlancar kegiatan transaksi yang terjadi di bursa efek supaya tidak merugikan salah satu pihak yang ikut dalam kegiatan transaksi dalam bursa efek. Kemudian, peran Batasan auto rejection juga supaya efektif, efisien, wajar, tidak melebihi atau mengurangi ketentuan yang sudah di tentukan dan berlaku di bursa efek. Menurut Bursa Efek Indonesia (BEI) Batasan auto rejection sudah beberapa kali dilakukan di Indonesia. Batasan auto rejection sebelumnya yaitu menggunakan batasan auto rejection asimetris dengan batas bawah 10% dikarenakan pada saat itu perekonomian di indonesia belum stabil dan untuk menjaga juga agar perdagangan dipasar saham.

Setelah satu tahun lebih menggunakan batas auto rejection asimetris, kemudian Bursa Efek Indonesia melakukan perubahan kembali terhadap Batas bawah yang disamakan dengan batas atas sesuai dengan kelompok masing-masing.Diikarenakan perekonomian Indonesiamulai stabil dan dinilai sudah bisa kembali menerapkan auto rejection simetris untuk menciptakan transaksi modal yang lancar.

Menurut Surat Keputusan Direksi Bursa Efek Indonesia Nomor Kep-00113/BEI/12-2016 Perihal Peraturan Nomor II-A tentang Perdagangan Efek Bersifat Ekuitas, bahwa Batasan auto rejection yang berlaku di Bursa Efek Indonesia pada saat ini adalah sebagai berikut:

1. Harga penawaran jual atau permintaan beli saham dimasukan ke JATS tersebut lebih kecil dari Rp 50

2. Harga penawaran jual atau permintaan beli yang dimasukan ke JATS lebih dari 35% di atas atau di bawah acuan harga saham dengan rentang harga Rp 50- Rp 200

3. Harga penawaran jual atau permintaan beli yang di masukkan ke JATS lebih dari 25% di atas atau di bawah acuan harga saham dengan rentang harga Rp 200- Rp 5000

4. Harga penawaran jual atau permintaan beli yang dimasukan ke JATS lebih dari 20% di atas atau di bawah acuan harga saham dengan rentang harga lebih dari Rp 5000 Kemudian acuan harga yang digunakan untuk pembatasan harga penawaran tertinggi atau terendah di pasar regular dan pasar tunai atas saham yang dimasukan ke JATS dalam ketentuan diatas ditetapkan berdasarkan pada: 1. Harga pembukaan di pasar reguler untuk perdagangan saham di pasar reguler dan pasar tunai; 2. Harga previous adalah harga pembukaan tidak terbentuk; 3. Harga teoritis hasil tindakan korporasi untuk saham perusahaan tercatat yang melakukan tindakan korporasi; atau 4. Harga perdana untuk saham perusahaan tercatat yang pertama kali diperdagangkan di bursa.

Contoh Jurnal :

Accurate Forecasting Volatility of Auto-Rejection Stock Prices During the Covid-19 Pandemic

Suripto[1*]

Abstract

The purpose of this study is to find an accurate forecasting model, especially an error rate of around 0, and, second, to examine how the automatic rejection system reacts to the stock price due to the pandemic. We use the statistical clustering method for the dataset in the form of daily observations, while the sample covers the period of cases before and after the COVID-19 pandemic from 02 January 2019 to 20 June 2020 at the Trinitan Minerals and Metal Company with shares. PURE code. The data used in the estimation are the opening price and closing price of returns, which are then processed using SAS analysis tools. In this article, we show you the most appropriate decision-making processes are those that are proven to be the most effective. Predicting future events based on a suitable time series model will help policymakers and strategists to make decisions and develop appropriate strategic plans regarding the stock market. Thus, 98% of the ARIMA model (1,1,1) is a forecasting model that can be applied to predict stock prices. The new approach of this article is an integrated autoregressive moving average approach used as an attempt to predict stock prices in a pandemic accurately.

Keywords: Price Limit, Auto-rejection, ARIMA, Covid-19, Forecasting

JEL Classification Code: E37, G17, Q47

1. Introduction

The movement of stock prices, which experienced a drastic decline, can indicate that investors are in a panic situation. This is due to the invalid and fully uncertain information that causes an abnormal stock price. These conditions can be overcome by the stock market authority by limiting the stock price (price limit) to bring it back to normal. Traits and Mohamad (2020) argued that stock price limitation will be effective when the stock market is in a bullish condition, whereas it is less effective when the market experiences a downward trend (bearish). Ma, Rao, and Sears (1989) examined the effect of price limits on return behavior and trading volume in the US futures market.

[1]First Author. Suripto, University of Lampung, Indonesia. Email: suriptob.1969@fisip.unila.ac.id

Some authors, including Ma et al. (1989) and Khodavandloo and Zakaria (2013), supported the existence of daily stock price limits by referring to the fact that this system can prevent a collapse in stock prices and provide opportunities for irrational investors to slow down the re-evaluation and to rationalize their decisions to invest. The existence of daily stock price limits can also reduce the level of price volatility by minimizing the over-reaction of investors toward the market. Proponents of the price limits system claimed that if this system were implemented in 1987, there might not be a capital market crisis in October 1987 (Abdelzaher & Elgiziry, 2017; Asuamah & Ohene-Manu, 2015; Hatta et al., 2018).

Several Asia-Pacific financial markets have imposed price caps to reduce excessive fluctuations. We examine stock price behavior following daily limit movements on the Shanghai Stock Exchange for 200 companies during the period 1997-2004. We find weak evidence for an overreaction in the Shanghai stock market based on price constraints. We conclude that investors do not overreact to limit activation events except in the case of a 1-day upper boundary move. We also conclude that the Shanghai Stock Exchange can be considered an efficient (semistrong) market.

Price limit research on the South Korean stock exchange shows that price limits can limit stock movements and support the information hypothesis and some are found consistent with the overreaction hypothesis (Junghoon, 2016); (Fama, 1989); (Fariska et al., 2021) . These findings indicate that the price limit is effective in limiting the volatility of stock prices, but it is also found that it is ineffective there is continued volatility. Further research by (Juan et al., 2017) analyzed the effectiveness of price limits in China for the 2007-2012 period, where there was high volatility, the findings indicated that stock market deregulation was needed. This finding indicates that the Chinese stock market is not in line with Fama (1989) which does not support a price limit. This finding is the same as the finding in the Malaysian stock market, where the price limit can reduce stock volatility when the stock price hits the upper limit. Touching the lower bound found mixed results. Conversely, when the stock market is in a crisis condition, the price limit will be insignificant, especially on lower price restrictions (Imtiaz & Azhar, 2020); (Purwono et al, 2018); (Ryu & Chae, 2021); (Arif & Hasan, 2021); (Rahmi, et al., 2016); (Zahra et al., 2021); (Ryu, 2021); (Jihadi et al., 2021). This finding supports the information hypothesis that price limit significantly reduces stock price volatility (Ji & Yoon, 2020); (Ryu & Chae, 2020).

The movement of stock prices reflects the level of risk for investors. Therefore, we need an appropriate forecasting design as a means of anticipation in reducing the level of risk. One forecasting solution that is widely used at stock prices is the (ARIMA) approach (M. Dritsaki & Dritsaki, 2020; Gontijo, et al., 2020; Azhar, et al., 2020; Gunarto, et.,al 2020; Alsaedi et al., 2019; Akhmetzhanov et al., 2018; C. Dritsaki, 2018; Mikhaylov, 2018; Jamalmanesh, et al., 2018). The ARIMA approach is a time series forecasting model that can be implemented to predict stock movements (Aktas et al., 2020; Nyangarika et al., 2019; Bakar & Rosbi, 2017). The present study contributes to the literature by, first, finding the best model of ARIMA to produce forecasting numbers, which further will be the basis for examining the relationship between price limits and fluctuations in stock prices. Second, the present study aims to examine how the auto-reject system reacts to stock prices due to the coronavirus disease 2019 (COVID-19) pandemic.

2. Literature Review

The study of volatility models is very essential for academics and practitioners in this decade (Handika & Chalid, 2018). Suspicious share price volatility requires a stock price restriction policy that has the objective to limit fluctuations in share prices. Regulators impose daily stock price limits to limit extreme daily stock price movements. Price limits are often used in the stock market to prevent fluctuations in stock prices that are too fast or too much (Li et al., 2014; Alomar, & Moll, 2018). Stock market regulators form a price limit as a tool that can limit stock price movements (Khodavandloo & Zakaria, 2013); (Pointer & Khoi, 2019); (Karbowski & Prokop, 2019); (Mihi-Ramírez et al., 2019); (Lee et al, 2018); (Laipaporn & Tongkumchum, 2018); (Laipaporn & Tongkumchum, 2020); (Kennedy & Nourzad, 2016); (Siddiqui, et al., 2016); (et al., 2019).

The price limit mechanism should influence stock movements. The movement of stocks during a pandemic tends to go out of control due to irrational market sentiment. This condition is almost the same as the 1987 American crisis where the Brady Report (1988) suggested a circuit breaker mechanism, such as a price limit mechanism, to prevent chaos in the market system. A price limit is a mechanism for limiting daily stock price movements so that the share price moves between the upper or lower limits on a trading day. Where the price limit aims to reduce excessive volatility due to information asymmetry. Overreaction by investors due to panic, a circuit breaker mechanism is needed. This provides an opportunity for investors to make rational decisions, which in turn will reduce the movement of stock volatility. Investors are allowed to think rationally so that the stock price will move towards its intrinsic price.

Fama (1989) argues that if the process of price formation on shares is interfered with, the volatility of the stock price will increase. The implication of a restricted price movement is a shift in volatility on the next trading day. The price limit is not able to limit the volatility of stock prices and will make more volatility occur in the days to come. The subsequent volatility in stock prices is in line with the volatility spillover hypothesis.

According to Fama (1989), the movement of a stock price touches the upper or lower limit. Price limit limits trading on that day. This is interference that limits the stock price to reach its equilibrium point. When the stock price has not reached the equilibrium point, the stock price will continue to move towards that point. If the price limit does not make the stock price reach equilibrium on that day, the stock price will still reach the equilibrium price the next day. The existence of stock price volatility on the next day is in line with the delayed price discovery hypothesis (Jo & Hong, 2016).

Fama (1989) states that this theory is the same when a price limit prevents trading on one trading day, it is less liquid so that the next trade increases significantly. This is due to an imbalance in the trading volume so that the volatility of the shares exceeds the predetermined share price so that the trading volume has increased significantly.

Several Asia-Pacific stock markets impose price limits to reduce excessive volatility. Research on the Shanghai Stock Exchange for the period 1997-2004 with 200 companies, found insignificant evidence that price limits can reduce volatility.

Furthermore, price limits are also intended to provide opportunities for investors to obtain good information so that they can make rational decisions in the capital market.

Daily stock price limits related to stock return volatility (Abdelzaher & Elgiziry, 2017; Sayed & Auret, 2018; Li et al., 2014; Upadhyaya et al, 2020; Thuy and Thuy, (2019); Soleymani et al, 2017; Siddiqui (2016); (Herwany et al., 2021) state that price limit regulations are not effective in dealing with volatility levels. The results of the present study (Zhang et al., 2016) also state that the regulation of price limits increases volatility after the stock touches the price limits. Khodavandloo and Zakaria (2013) found that stock volatility that touches price limits will experience volatility the next day.

Price restrictions do not affect price movements (Li et al., 2014); Chen et al. (2014), Abdelzaher and Elgiziry (2017); Danışoğlu and Güner (2018); Rillo (2018); Tao et al. (2017); (Kristiana et al., 2021); (Goh et al., 2021); (Abu-lila, 2021); (Purwono et al., 2018) and Aktas et al. (2020) did not agree with the price limit. They assumed that the price limits system causes an increase in high price volatility after the stock reaches the limit (volatility spillover hypothesis). The price limits system also claims that this system has influence or intervention in trading activities (trading interference hypothesis). The existence of a price limit system is also considered to delay reaching the equilibrium price in one or several days (delayed price discovery hypothesis). Those who do not support the system of price limits assumed that this system causes new problems and risks in investing higher.

3. Methodology

The empirical strategy we use in this article to analyze stock price movements that have experienced a very significant decline due to the 2019 coronavirus disease (COVID-19) pandemic consists of three basic steps:

3.1. The ARIMA Model

The study conducted by Alsaedi et al. (2019) led to the development of a new forecasting tool specifically known as the ARIMA forecasting model. The ARIMA model is generally formulated as ARIMA (p, d, q), in which p is the order of autoregressive (AR), d is the difference, and q is the order moving average (MA). The AR model illustrates that the dependent variable is influenced by the dependent variable in the previous period (time lag of the dependent variable as an independent variable). The MA model, which is an independent variable, is the residual value (error) in the previous period. The AR and MA models combine to produce the ARIMA model. It begins with forming stationary data. Generally, the form model AR (p) can be written in the following equation:

$$SPAR_t = \beta + \theta_1 SPAR_{t-1} + \theta_2 SPAR_{t-2} + \theta_3 SPAR_{t-3} + \cdots + \theta_p SPAR_{t-p} + \varepsilon_t \qquad (1)$$

MA(q) is presented as follows:

$$SPAR = \mu + \varepsilon - \lambda_1 \varepsilon_{t-1} + \lambda_2 \varepsilon_{t-2} + \lambda_3 \varepsilon_{t-3} + \lambda_q \varepsilon_{t-q}\,;\ \varepsilon_t \sim N\,(0, \theta^2) \qquad (2)$$

Statistical assumptions on time series data must meet various statistical assumptions in achieving the ARIMA model, and the most important starting step is data stationarity. This study uses ARIMA which aims to predict the past and present value of the dependent variable to produce accurate short-term forecasting.

3.2. Data Stationarity Test

Autoregressive model application has requirements that must be met, namely, the data used is stationary. Data are said to be stationary if the average value and variance of the data do not change systematically over time or, in other words, have a constant average value, variance, and covariance. Testing the stationarity of data can be done by looking at correlations (correlogram) through the autocorrelation function (ACF). Data series that have nonstationary properties are often also called unit root nonstationary time series (Tsay, 2005). Statistically, this ACF value should be located at −1 and 1. Data are said to be stationary if the ACF value at each lag is equal to 0, whereas nonstationary if the ACF value at each lag is not equal to 0 or is relatively high (Eliyawati, 2012); (Denkowska & Wanat, 2020).

Furthermore, the augmented Dickey-Fuller (ADF) test is also used in ensuring that the data series is stationary. The ADF test mathematical framework can be seen as follows (Brockwell & Davis, 2002; Tsay, 2005):

$$SPARt = \mu + \gamma_1 SPAR_{t-1} + \sum_{k-1}^{p-1} \gamma_k \, \Delta SPAR_{t-1} + \varepsilon_t \quad (3)$$

Where SPARt is time-series data from PURE shares that follow the AR (p) model with mean μ. The equation also forms γi as a parameter, and εt is white noise with mean 0 and variance, $\sigma\epsilon 2$. With certain considerations, the test was conducted with the condition that the statistical value τ is as follows (Virginia, et al., 2018):

$H_0 = \gamma_1 = 0$ (nonstationary PURE stock data)
$H_1 = \gamma_1 < 1$ (stationary PURE stock data)
ADF test:

$$\tau = \frac{\gamma i}{\hat{s}e\gamma i} \quad (4)$$

Under conditions where $\tau < -2.57$ or if $P < 0.05$, then H_0 will be rejected. In the end, if the PURE share data proves to be nonstationary, a statistical step in the form of differencing the data will be conducted.

3.3. Model Diagnosis Test

A model diagnostic test is conducted to determine whether the chosen model is good by looking at the results of the residual test. The residual test is done by looking at correlations (correlograms) both through the ACF and the partial ACF (PACF). If the ACF and PACF coefficients individually are not significant, the residuals obtained are random. To see whether the ACF and PACF coefficients are significant or not, it is seen through a statistical test developed by Ljung–Box or better known as the Ljung–Box (LB) statistical test. If the LB statistical value is smaller than the statistical critical value of the chi-squares distribution table, then the residual is random (white noise); hence, it can be said that the chosen model is good.

3.4. Empirical Results and Discussions

The present study comprises a dataset in the form of daily observation, whereas the sample covers the case period before and after the COVID-19 pandemic from January 02, 2019, to June 20, 2020, in the Trinitan Metals and Minerals Company with the share code PURE. The data used in the estimation are the opening price and the closing price of the return, which are then processed using the SAS analysis tool. In the ARIMA procedure, the first assumption that must be met is stationary data. The ADF unit root test will also be used to examine the time-series data stationarity. Plotting of daily PURE share price data results is presented in Figure 1.

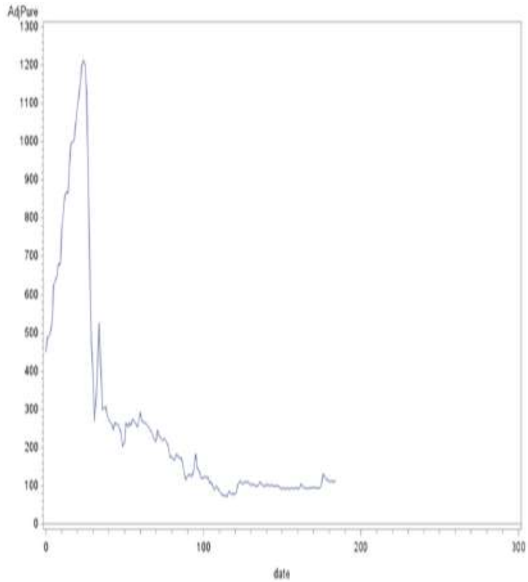


Figure 1. Present stationary data checks

We can quickly see the journey of PURE stock data plotting. Nonstationary data seen from visual charts with extreme volatility and sharp decreases. This condition requires the researcher to examine further so that ADF unit root tests are conducted, and the ADF test is produced in Table 1.

Table 1. Augmented Dickey-Fuller Unit Root Tests

Type	**Lags**	**Rho**	***Pr* < Rho**	**Tau**	***Pr* < Tau**	***F***	***Pr* > *F***
Zero Mean	**3**	−3.8642	0.1757	−1.5517	0.1135		
Single Mean	**3**	−6.2855	0.3204	−1.7577	0.4005	1.6338	0.6544
Trend	**3**	−14.0743	0.2072	−2.4638	0.3456	3.0509	0.5678

Based on the results of the above table, it is explained that if the *P*-value is >0.05, it gives a signal that the data used are not stationary. Furthermore, ACF and PACF charts can also be a reference to data stationarity. The results of statistical processing on the PURE stock data are shown in Figure 2:

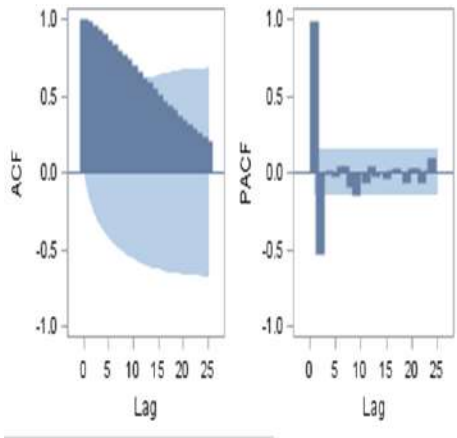


Figure 2. Presenting PACF and ACF Graphs

In Figure 2, PACF and ACF show a very slow decline and are also outside the area of confidence. It can also be concluded that the PURE stock data are not stationary. Statistically nonstationary data can be conditioned to be stationary in some ways, one of which is to data. Aims to reduce the distance of volatility between data. Because the data are not stationary, differencing treatment is conducted.

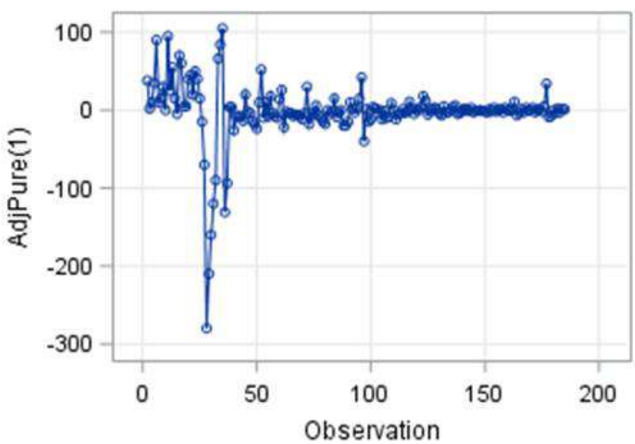


Figure 3. Data Differentiation Results

As shown in Figure 3, the average original data graph volatility has been between 0. This is a quick way to draw the initial assumption that the PURE stock data are stationary. To ensure that the statistics are needed, it is again seeing the ADF test on the data that has been conducted via differencing.

Table 1. Before Covid-19

Type	Lags	Rho	Pr < Rho	Tau	Pr < Tau	F	Pr > F
Zero Mean	**0**	-1,2880	0.0622	-6.82	0.1135		
	3	-3.8642	0.0622	-1.5517	0.1135		
Single Mean	**0**	-2,0951	0.0801	-1.7577	0.4005		
	3	-6.2855	0.3204	-6.47	0.4005	1.6338	0.6544
Trend	**0**	-4,6914	0.1384	-6.80	0.3456		
	3	-14.0743	0.2072	-2.4638	0.3456	3.0509	0.5678

The PURE stock data is not stationary because the ADF test value with a P value> 0.001 shown in Table 1. Shows that the value To verify this, we will check for white noise in the data. The white noise figure with the overall correlation value of the data moves away from 0 in contrast to the lower lag is shown in Table 3; the white noise hypothesis in the data is acceptable.

Table 2. Indigo ADF Test After Differencing

Type	Lags	Rho	*Pr* < Rho	Tau	*Pr* < Tau	*F*	*Pr* > *F*
Zero mean	**0**	−740.553	<0.0001	−6.82	<0.0001		
	1	−847.124	<0.0001	−6.48	<0.0001		
Single mean	**0**	−742.632	0.0013	−6.82	<0.0001	23.24	0.0010
	1	−850.388	0.0013	−6.47	<0.0001	0.89931	0.0010
Trend	**0**	−742.762	0.0005	−6.80	<0.0001	23.14	0.0010
	1	−850.534	0.0005	−6.46	<0.0001	0.89236	0.0010

ADF test values with *P* values of <0.001 are listed in Table 2. Therefore, the PURE stock data have been stationary using the differencing method. To verify this, we will examine the white noise in the data. The white noise numbers with the overall correlation value of the data close to 0 in line with the higher lag are displayed in Table 3; the hypothesis of the white noise in the data can be rejected.

Table 3. Autocorrelation Check for White Noise

To lag	**Chi-square**	**DF**	***Pr* > Chi Sq**	**Autocorrelations**					
6	90.03.00	6	<0.0001	0.4125	0.21319	0.08056	0.029	−0.085	−0.107
12	94.46.00	12	<0.0001	−0.035	0.099	0.092	0.050	0.009	−0.026
18	105.32.00	18	<0.0001	−0.048	−0.041	−0.127	−0.146	−0.106	−0.029
24	123.62	24	<0.0001	−0.070	−0.115	−0.064	−0.078	−0.168	−0.173

Further identifying the forecasting model with ARIMA can be done with a high level of confidence. We did a one-time statistical simulation for the PURE stock data and immediately obtained a good answer. As shown in Table 4, the estimated value of MA (1) is −0.09796, t-test = −0.79, with *P*-value = 0.4296 < 0.05, which means that this model is significant. Thus, the ARIMA model (1,1,1) was chosen with the following estimation models:

$$\boldsymbol{Pv_t = -1.11513 - 0.09796\, PL_{t-1} + 0.53176\, \alpha_{t-1} + \alpha_t}$$

Table 4. Conditional Least Squares Estimation

Parameter	**Estimate**	**Standard Error**	***t*-Value**	**Approx *Pr* > |*t*|**	**Lag**
MU	−1.11513	5.43435	−0.21	0.8376	0
MA1,1	−0.09796	0.12374	−0.79	0.4296	1
AR1,1	0.53176	0.10531	5.05	<0.0001	1

Furthermore, in the time series data, the estimation of the heteroscedasticity of the data is very common. In other studies, the ARCH effect is identified; if the hypothesis is accepted, then forecasting will be conducted via the GARCH method. As shown in Table 5, there are no significant ARCH effects until the seventh test order. Therefore, we decided on the best ARIMA model in forecasting the PURE stock data.

Table 5. ARCH Effect Identification

Tests for ARCH disturbances based on residuals				
Order	***Q***	***Pr* > *Q***	**LM**	***Pr* > LM**

1	1.8956	0.1686	1.6138	0.2040
2	2.9071	0.2337	2.2710	0.3213
3	5.6157	0.1319	4.1315	0.2476
4	6.2081	0.1841	4.3053	0.3663
5	18.1254	0.0028	12.8951	0.0244
6	18.5771	0.0049	12.8999	0.0447
7	21.0290	0.0037	13.9772	0.0516

As compared in Table 5, no ARCH values were found with a *P*-value of <0.0001, meaning that test orders 1 to 7 of the PURE stock data are non-heteroscedasticity data. Therefore, the ARIMA model (1,1,1) is further examined. The investigation starts by looking at the square value of 0.98 or 98%; this is a good initial signal. Furthermore, we can calculate the root-mean-square error, that is, 31.7, which is entered into the lower class. Confidence in the model can be evaluated via absolute error (MAE) and mean absolute percentage error (MAPE), which are in the low range of 16.6 and 6.3. Thus, the ARIMA model can be categorized as the best model for forecasting PAA shares.

Table 6. Statistics from the ARIMA the PURE Stock Data

Yule-Walker estimates			
SSE	181918.052	**DFE**	181
MSE	1005	**Root MSE**	31.70287
SBC	1824.20123	**AIC**	1811.31981
MAE	16.6324539	**AICC**	1811.54203
MAPE	6.31542481	**HQC**	1816.54034
Durbin–Watson	1.7421	**Transformed regression R^2**	0.0581
		Total R^2	0.9872

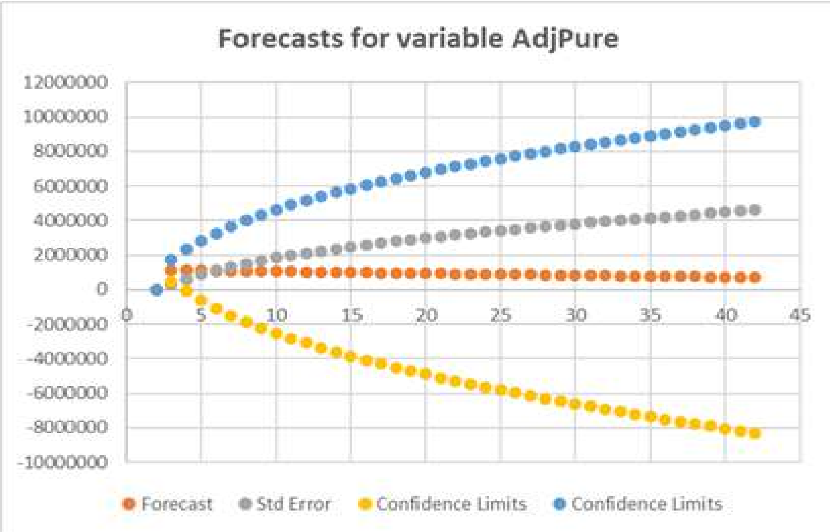


Figure 4. Forecasting of the PURE Stock Data

The examination has found good results, which are to be followed up by the forecasting of the PURE stock data with the best model. Forecasting provides an early opportunity for users and practitioners in determining economic steps. Forecasting of the PURE stock data using the ARIMA model (1,1,1) is shown in Figure 4. In statistical conditions with a longer period, it can be seen in Figure 4 that the confidence limit range is also widening. This is evidence that the length of the forecast timespan will also provide a higher bias. In line with the confidence limit, the error rate also shows an increase over time. The interesting part is the implication of the PURE stock data forecast, which tends to increase stability. We can quickly withdraw the auto-rejection conclusion applied to the PURE stock without disrupting its volatility. The level of market confidence in the PURE stock remains relatively good, so no selling action causes the stock price not to crawl up.

E. Conclusions

In this article, we use the ARIMA model to analyze, The impact of the COVID-19 pandemic might be unfavorable, especially on energy company shares. PURE is one of the energy companies whose shares dropped dramatically, so it was hit by an auto-rejection policy. Auto-rejection can have an adverse impact due to the market panic that cannot be muted; hence, the increase in stock prices after auto-rejection cannot be returned. The ARIMA model in the present study is the best model for forecasting PURE stock prices.

In the end, the most appropriate decision-making process is the one that proves to be the most effective. Predicting future events based on an appropriate time series model will help policymakers and strategists to make decisions and develop appropriate strategic plans regarding the stock market. Thus, 98% of ARIMA 68nglish68v (1,1,1) is a forecasting model that can be applied to predict stock prices. Thus, the auto-rejection policy at the Trinitan Metals and Minerals Company (PT.PURE) does not interfere with the volatility of the stock price.

References

Abdelzaher, M. A., & Elgiziry, K. (2017). The effect of daily stock price limits on the investment risk: evidence from the Egyptian stock market. Accounting and Finance Research, 6(4), 1. https://doi.org/10.5430/afr.v6n4p1

Abu-lila, Z. M. (2021). Determinants of Investment in the Jordanian Productive Sectors. 8(4), 635–641. https://doi.org/10.13106/jafeb.2021.vol8.no4.0635

Akhmetzhanov, B., Tazhibekova, K., Shametova, A., & Urazbekov, A. (2018). Expanded implementation of solar photovoltaics: forecasting and risk assessment. International Journal of Energy Economics and Policy, 8(5), 113–118.

Aktas, O. U., Kryzanowski, L., & Zhang, J. (2020). Volatility spillover around price limits in an emerging market. Finance Research Letters, (October 2019), 101610. https://doi.org/10.1016/j.frl.2020.101610

Alsaedi, Y., Tularam, G. A., & Wong, V. (2019). Application of autoregressive integrated moving average 68nglish68v for the forecasting of solar, wind, spot and options electricity prices: The Australian national electricity market. International Journal of Energy Economics and Policy, 9(4), 263–272. https://doi.org/10.32479/ijeep.7785

Arif, M. R., & Hasan, D. (2021). Relationship Between Innovation Activities and Business Performance : A Case Study in Indonesia *. 8(4), 307–315. https://doi.org/10.13106/jafeb.2021.vol8.no4.0307

Asuamah, S. Y., & Ohene-Manu, J. (2015). An econometric investigation of forecasting premium fuel. International Journal of Energy Economics and Policy, 5(3), 716–724.

Azhar, R., Kesumah, F. S. D., Ambya, Wisnu, F. K., & Russel, E. (2020). Application of short-term forecasting models for energy entity stock price: evidence from Indika Energi Tbk, Jakarta Islamic index. International Journal of Energy Economics and Policy, 10(1), 294–301. https://doi.org/10.32479/ijeep.8715

Bakar, N. A., & Rosbi, S. (2017). Autoregressive integrated moving average (ARIMA) model for forecasting cryptocurrency exchange rate in high volatility environment: a new insight of bitcoin transaction. International Journal of Advanced Engineering Research and Science, 4(11), 130–137. https://doi.org/10.22161/ijaers.4.11.20

Brockwell, P.J., & Davis, R.A. (2002). Introduction to time series and forecasting. New York: Springer-Verlag.
Danışoğlu, S., & Güner, Z. N. (2018). Do price limits help control stock price volatility? Annals of Operations Research, 260(1–2), 129–157. https://doi.org/10.1007/s10479-016-2317-y
Denkowska, A., & Wanat, S. (2020). Dependencies and systemic risk in the European insurance sector: New evidence based on copula-DCC-garch model and selected clustering methods. Entrepreneurial Business and Economics Review, 8(4), 7–27. https://doi.org/10.15678/EBER.2020.080401
Dritsaki, C. (2018). The performance of hybrid ARIMA-GARCH 69nglish69v and forecasting oil price. International Journal of Energy Economics and Policy, 8(3), 14–21.
Dritsaki, M., & Dritsaki, C. (2020). Forecasting European Union CO2 emissions using autoregressive integrated moving average-autoregressive conditional heteroscedasticity models. International Journal of Energy Economics and Policy, 10(4), 411–423. https://doi.org/10.32479/ijeep.9186
Fama, E.F. (1989). Agency Problems and Theory of the Firm. Journal of Political Economy.
Fariska, P., Nugraha, N., & Putera, I. (2021). Microblogging Sentiment Investor, Return and Volatility in the COVID-19 Era : Indonesian Stock Exchange. 8(3), 61–67. https://doi.org/10.13106/jafeb.2021.vol8.no3.0061
Goh, T. S., Henry, H., & Albert, A. (2021). Determinants and Prediction of the Stock Market during COVID-19: Evidence from Indonesia. Journal of Asian Finance, Economics and Business, 8(1), 001–006. https://doi.org/10.13106/jafeb.2021.vol8.no1.001
Gontijo, T. S., Rodrigues, A. D. C., De Muylder, C. F., la Falce, J. L., & Pereira, T. H. M. (2020). Analysis of olive oil market volatility using the arch and garch techniques. International Journal of Energy Economics and Policy, 10(3), 423–428. https://doi.org/10.32479/ijeep.9138
Gunarto, T., Azhar, R., Tresiana, N., Supriyanto, & Ahadiat, A. (2020). An accurate estimated model of volatility crude oil price. International Journal of Energy Economics and Policy, 10(5), 228–233. https://doi.org/10.32479/ijeep.9513
Gürtler, M., & Paulsen, T. (2018). Forecasting performance of time series models on electricity spot markets. International Journal of Energy Sector Management, 12(4), 617–640. https://doi.org/10.1108/IJESM-12-2017-0006
Handika, R., & Chalid, D. A. (2018). The predictive power of log-likelihood of GARCH volatility. Review of Accounting and Finance, 17(4), 482–497. https://doi.org/10.1108/RAF-01-2017-0006
Hatta, H. H. M., Daud, F. M., & Mohamad, N. (2018). An application of time series ARIMA forecasting model for predicting the ringgit Malaysia-dollar exchange rate. Journal of Data Analysis, 1(1), 42–48. https://doi.org/10.24815/jda.v1i1.11884

Herwany, A., Febrian, E., Anwar, M., & Gunardi, A. (2021). The Influence of the COVID-19 Pandemic on Stock Market Returns in Indonesia Stock Exchange. 8(3), 39–47. https://doi.org/10.13106/jafeb.2021.vol8.no3.0039

Imtiaz, S., & Azhar, M. (2020). Ex-post effects of circuit breakers in crisis and calm markets: Long horizon evidence from wide-band Malaysian price limits. Journal of Economic Studies, 47(2), 333–350. https://doi.org/10.1108/JES-06-2018-0226

Jamalmanesh, A., Mashhadi, M. K., Seifi, A., & Falahi, M. A. (2018). Prediction of hydropower energy price using the gómes-maravall seasonal model. International Journal of Energy Economics and Policy, 8(2), 81–88.

Jati, K., & Premaratne, G. (2017). Analysis of Staple Food Price Behaviour: Multivariate BEKK-GARCH Model. The Journal of Asian Finance, Economics and Business, 4(4), 27–37. https://doi.org/10.13106/jafeb.2017.vol4.no4.27

Ji, S. H., & Yoon, K. C. (2020). The effects of widening daily stock price limits on the relevance between audit quality and stock return. Journal of Asian Finance, Economics and Business, 7(4), 107–119. https://doi.org/10.13106/JAFEB.2020.VOL7.NO4.107

Jihadi, M., Vilantika, E., Hashemi, S. M., Arifin, Z., Bachtiar, Y., & Sholichah, F. (2021). The Effect of Liquidity, Leverage, and Profitability on Firm Value: Empirical Evidence from Indonesia. Journal of Asian Finance, Economics and Business, 8(3), 423–431. https://doi.org/10.13106/jafeb.2021.vol8.no3.0423

Jo, H. H., & Hong, H. (2016). Inform mation Ca ascade an nd Share e Market t Volatilit ty : A Chi inese Per 70nglish70ve e 2 . Information Cascade Model : How Does. 3(4), 17–24. https://doi.org/10.13106/j

Juan, T., Wu, Y., & Zhang, J. (2017). The performance of China's stock market price limits: noise mitigator or noise maker? China Finance Review International, 7(1), 85–97. https://doi.org/10.1108/CFRI-07-2016-0096

Junghoon, S. (2016). Widened Price-Limits and Efficiency of Price Discovery over a Trading Day. Journal of Derivatives and Quantitative Studies, 24(2), 245–267. https://doi.org/10.1108/JDQS-02-2016-B0003

Karbowski, A., & Prokop, J. (2019). The impact of vertical r&d cooperation on the market performance of firms. Entrepreneurial Business and Economics Review, 7(4), 73–89. https://doi.org/10.15678/EBER.2019.070405

Kennedy, K., & Nourzad, F. (2016). Exchange rate volatility and its effect on stock market volatility. International Journal of Human Capital in Urban Management, 1(1), 37-46. https://doi.org/10.7508/ijhcum.2016.01.005

Khodavandloo, M., & Zakaria, Z. (2013). The effects of price limits in an emerging market: evidence from the Bursa Malaysia. 114–117. https://doi.org/10.2991/iaw-sc.2013.24

Kristiana, Y., Pramono, R., & Brian, R. (2021). Adaptation Strategy of Tourism Industry Stakeholders During the COVID-19 Pandemic : A Case Study in Indonesia. 8(4), 213–223. https://doi.org/10.13106/jafeb.2021.vol8.no4.0213

Laipaporn, J., & Tongkumchum, P. (2018). The use of information criteria for selecting some knots in natural cubic spline volatility estimation. In Proceedings of International Conference of Applied Statistics 2018 (pp. 161-164). Bangkok: Faculty of Sciences and Technologies, Prince of Songkla University, Pattani campus.

Laipaporn, J., & Tongkumchum, P. (2020). The time-varying correlation estimator using the natural cubic spline volatility. Advances and Applications in Statistics, 62(1), 79-95. http://doi.org/10.17654/AS062010079

Lam, K. C., & Oshodi, O. S. (2016). Forecasting construction output: A comparison of artificial neural network and Box-Jenkins model. Engineering, Construction and Architectural Management, 23(3), 302–322. https://doi.org/10.1108/ECAM-05-2015-0080

Lee, C. L., Stevenson, S., & Lee, M. -L. (2018). Low-frequency volatility of real estate securities and macroeconomic risk. Accounting and Finance, 58(2018), 311-342. https://doi.org/10.1111/acfi.12288

Li, H., Zheng, D., & Chen, J. (2014). Effectiveness, cause, and impact of price limit-Evidence from China's cross-listed stocks. Journal of International Financial Markets, Institutions, and Money, 29(1), 217–241. https://doi.org/10.1016/j.intfin.2013.12.007

Ma, C. K., Rao, R. P., & Sears, R. S. (1989). Volatility, price resolution, and the effectiveness of price limits. Journal of Financial Services Research, 3(2–3), 165–199. https://doi.org/10.1007/BF00122800

Marín, J. B., Orozco, E. T., & Velilla, E. (2018). Forecasting electricity price in Colombia: A comparison between a neural network, ARMA process, and hybrid models. International Journal of Energy Economics and Policy, 8(3), 97–106.

Mihi-Ramírez, A., Arteaga-Ortíz, J., & Ojeda-González, S. (2019). The international movements of capital and labor: A study of foreign direct investment and migration flows. Entrepreneurial Business and Economics Review, 7(3), 143–160. https://doi.org/10.15678/EBER.2019.070308

Mikhaylov, A. Y. (2018). Volatility spillover effect between stock and exchange rate in oil-exporting countries. International Journal of Energy Economics and Policy, 8(3), 321–326.

Nyangarika, A., Mikhaylov, A., & Richter, U. H. (2019). Oil price factors: Forecasting on the base of the modified auto-regressive integrated moving average model. International Journal of Energy Economics and Policy, 9(1), 149–159. https://doi.org/10.32479/ijeep.6812

Perez-Mora, N., Alomar, M. L., & Martinez-Moll, V. (2018). Spanish energy market: overview towards price forecast. International Journal of Energy Economics and Policy, 8(3), 1–7.

Pointer, L. V., & Khoi, P. D. (2019). Predictors of return on assets and return on equity for banking and insurance companies on Vietnam stock exchange. Entrepreneurial Business and Economics Review, 7(4), 185–198. https://doi.org/10.15678/EBER.2019.070411

Purwono, R., Mucha, K., & Mubin, M. K. (2018). The dynamic of Indonesia's current account deficit: Analysis of the impact of exchange rate volatility. Journal of Asian Finance, Economics, and Business, 5(2), 25-33. https://doi.org/10.13106/jafeb.2018.vol5.no2.25

Rahmi, M., Azma, N., Muttaqin, A. A., Jazil, T., & Rahman, M. (2016). Risk Volatility Measurement: Evidence from Indonesian Stock Market. The Journal of Asian Finance, Economics and Business, 3(3), 57–65. https://doi.org/10.13106/jafeb.2016.vol3.no3.57.

Rathnayaka, R. M. K. T., & Seneviratna, D. M. K. N. (2019). Taylor series approximation and unbiased GM(1,1) based hybrid statistical approach for forecasting daily gold price demands. Grey Systems: Theory and Application, 9(1), 5–18. https://doi.org/10.1108/gs-08-2018-0032

Rillo, A. D. (2018). ASEAN financial integration: Opportunities, risks, and challenges. Public Policy Review, 14(5), 901-923. Retrieved November 1, 2020, from https://www.mof.go.jp/72nglish/pri/publication/pp_review/ppr14_05_04.pdf

Rusmita, S. A., Rani, L. N., Swastika, P., & Zulaikha, S. (2020). Capital Market Volatility MGARCH Analysis: Evidence from Southeast Asia. The

Journal of Asian Finance, Economics and Business, 7(11), 117–126. https://doi.org/10.13106/jafeb.2020.vol7.no11.117

Ryu, H.-Y., & Chae, S.-J. (2019). The working experience of internal control personnel and crash risk. Journal of Industrial Distribution & Business, 10(12), 35–42. https://doi.org/10.13106/ijidb.2019.vol10.no12.35

Ryu, H. (2021). The Effect of Business Strategy on Stock Price Crash Risk *. 12(3), 43–49.

Ryu, H., & Chae, S.-J. (2020). The Role of Accounting Professionals and Stock Price Delay. The Journal of Industrial Distribution & Business, 11(12), 39–45. https://doi.org/10.13106/jidb.2020.vol11.no12.39

Ryu, H., & Chae, S. (2021). The Effect of Managerial Ownership on Stock Price Crash Risk in Distribution and Service Industries *. 1, 27–35

Sayed, A., & Auret, C. (2018). The effectiveness of price limits in the South African white maize futures market. Investment Analysts Journal, 47(3), 193–208. https://doi.org/10.1080/10293523.2018.1475591

Siddiqui, M. A., & Erum, N. (2016). Modeling Effect of Exchange Rate Volatility on Growth of Trade Volume in Pakistan. The Journal of Asian Finance, Economics, and Business, 3(2), 33–39. https://doi.org/10.13106/jafeb.2016.vol3.no2.33

Sifat, I., & Mohamad, A. (2020). Ex-post effects of circuit breakers in crisis and calm markets: Long horizon evidence from wide-band Malaysian price limits. Journal of Economic Studies, 47(2), 333–350. https://doi.org/10.1108/JES-06-2018-0226

Soleymani, A., Chua, S. Y., & Hamat, A. C. (2017). Exchange rate volatility and ASEAN-4's trade flows: is there a third country effect? International

Economics and Economic Policy, 14, 91-117. https://doi.org/10.1007/s10368-015-0328-9 https://doi.org/10.1007/s10368-015-0328-9

Upadhyaya, K. P., Dhakal, D., & Mixon, F. G. (2020). Exchange rate volatility and exports: some new estimates from the ASEAN-5. Journal of Developing Areas, 54(1), 65-73. https://doi.org/10.1353/jda.2020.0004 https://doi.org/10.1353/jda.2020.0004

Tao, J., Yingying, W., & Jingyi, Z. (2017). The performance of China's stock market price limits: noise mitigator or noise maker? China Finance Review International, 7(1), 85–97. https://doi.org/10.1108/CFRI-07-2016-0096

Thuy, V. N., & Thuy, D. T. (2019). The impact of exchange rate volatility on exports in Vietnam: A bounds testing approach. Journal of Risk and Financial Management, 12(6), 1-14. https://doi.org/10.3390/jrfm12010006

Tsay, R.S. (2005), Analysis of financial time series. Hoboken, New Jersey: John Wiley & Sons, Inc.

Zahra, S. F., Murdayanti, Y., & Amal, M. I. (2021). Sharia Banking Stability Against Macroeconomic Shocks : A Comparative Analysis in the ASEAN Region *. 8(4), 151–159. https://doi.org/10.13106/jafeb.2021.vol8.no4.0151

Zhang, X., Peng, J., Zhu, T., Li, Y., & Xiong, X. (2016). Are price limits effective? An examination of an artificial stock market. PloS ONE, 11(8), 1–21. https://doi.org/10.1371/journal.pone.0160406

BAB IV

PERILAKU STOCK RETURN

A. Pengertian Stock Return

Stock Return merupakan hasil yang diperoleh dari investasi, sedangkan saham adalah tanda bukti kepemilikan dalam suatu perusahaan yang berbentuk Perseroan Terbatas (PT). Maka return saham merupakan pembayaran yang diterima karena hak kepemilikannya. Dengan kata lain, bisa disebut sebagai keuntungan berinvestasi atau tingkat pengembalian. Setiap investasi, baik jangka pendek maupun jangka panjang mempunyai tujuan utama mendapatkan keuntungan yang disebut return, baik secara langsung maupun tidak langsung. Dalam melakukan investasi, investor yang rasional akan mempertimbangkan dua hal, yaitu expected return (tingkat pengembalian yang diharapkan) dan risk (risiko) yang terkandung dalam alternatif investasi yang dilakukan. (Rika Verawati, 2014:23-24).

Menurut Brigham dan Houston (2006), return saham berbanding positif dengan risiko, artinya semakin besar risiko yang ditanggung oleh pemegang saham, maka keuntungan akan semakin besar pula, begitu juga sebaliknya. Komponen return terdiri dari dua jenis yaitu current income (pendapatan lancar), dan Capital Gain (keuntungan selisih harga). Current income merupakan keuntungan yang diperoleh melalui pembayaran yang bersifat periode seperti pembayaran bunga deposito, bunga obligasi, dividen dan sebagainya. Current income disebut sebagai pendapatan lancar, karena keuntungan yang diterima biasanya dalam bentuk kas, sehingga dapat diuangkan secara cepat, seperti bunga atau jasa giro, dan dividen tunai, juga dapat dalam bentuk setara kas seperti bonus atau dividen saham yaitu dividen yang dibayarkan dalam bentuk saham dan dapat dikonversikan menjadi uang kas. (Rika Verawati, 2014: 24-25).

B. Stock Return dalam Perilaku UKM

Hankinson (2000) dalam penelitiannya disebutkan bahwa salah satu kunci sukses strategi bisnis yang dijalankan suatu usaha kecil guna meningkatkan kinerjanya adalah dalam hubungannya dengan bank yang berkaitan dengan faktor permodalan (fasilitas kredit). Aspek permodalan dari perbankan kepada pengusaha kecil UKM yang merupakan salah satu kunci sukses pengembangan UKM menunjukkan pola hubungan yang saling menguntungkan antara pengusaha selaku debitur dengan bank selaku kreditur.

Pierre Bourdieu (1990), seorang intelektual dan sosiolog dari Perancis (1930-2000), berusaha membangun sebuah *general theory of* *practice*. Menurutnya, praktek sosial (*practise*, perilaku) bisa didefinisikan sebagai berikut:

PRACTICE = (Habitus x Capital) + Field

Formula tersebut menyiratkan bahwa, perilaku sosial seseorang ditentukan oleh Habitusnya, yang kemudian diperkuat oleh modal (*capital*) yang dia miliki, sesuai medan (*field*) yang ditempati. Menurutnya, habitus seseorang dibentuk oleh *personalhistory* orang tersebut dan pengalaman-pengalaman atau kejadian (struktur) dalam hidunya yang mempengaruhi bagaimana dia bertindak dan menempatkan diri. Medan (*field*) yang dimaksud Bourdieu, bukanlah medan yang statis dan tanpa perjuangan, melainkan sebuah medan yang dinamis. Medan atau ranah yang memiliki 'perjuangan' didalamnya, perjuangan untuk 'menang' dan menempati sebuah posisi, mendapatkan sebuah pengakuan.

Bourdieu mendefinisikan *capital* ke dalam 4 kategori: (1) material/ekonomi, (2) *cultural* (3) *social*, dan (4) *symbolic* (Purboyo et. al., 2012). Modal material adalah modal berupa uang, atau aset lain yang dapat ditukar dengan uang, karenanya disebut modal ekonomi. Modal cultural adalah modal yang bersifat pengalaman dan pengetahuan, baik yang diperolehsecara tactic maupun eksplisit. Modal social adalah modal yang dimiliki dalam bentuk jaringan atau hubungan-hubungan kerja, persahabatan yang telah terbina dan diperoleh pelaku sesama hidupnya. Modal yang terakhir yakni modal simbolik adalah modal berupa nama baik atau reputasi, yaitu kepercayaan dari orang lain yang telah diperoleh pelaku selama proses pekerjaan atau usahanya.

Menurut Bourdieu, modal-modal ini bisa saling ditukar. Dari keempat jenis modal ini, modal simbolik menempati posisi tertinggi, paling berpengaruh dan diakui. Oleh karenanya, setiap *partisipant* akan mencaristrategi dan berusaha berperilaku, untuk menambah akumulasi modal sebanyak-banyaknya, terutama modal simbolik (Purboyo et al., 2012).

Contoh Jurnal:

The Impact of Oil Prices and Stock Returns: A Study of Oil and Gas Mining Companies in Indonesia during the COVID 19 Crisis

Suripto[1]*, Supriyanto[2]

[1,2,3]Department of Business Administration, Faculty of Social and Political Science, Lampung University, Indonesia *Email: suriptob.1969@fisip.unila.ac.id, supriyanto.1989@fisip.unila.ac.id,

ABSTRACT

This study aims to analyze the determinants of stock return disclosure in oil and gas mining sector companies listed on the Indonesia Stock Exchange in 2019-2021 during the Covid 19 crisis. The study used the Eviews Program as data processing and the random effect regression model was chosen to examine the relationship between external and internal indicators as independent variables including Current Ratio (CR), debt to equity ratio (DER), total asset turnover (TATO), return on assets (ROA), oil price (WTI), an exchange rate (FOREX), institutional ownership (IO). The results showed that the current ratio, debt to equity ratio, and total asset turnover did not affect stock returns. Return on assets, exchange rates, and institutional ownership has a negative and significant effect on stock returns, while oil prices have a positive and significant effect on stock returns.

Keywords: Oil Price, Stock Return, Probability, Institutional Ownership, Covid-19
JEL Classifications: E22, E44, G11, O42, Q47

1. INTRODUCTION

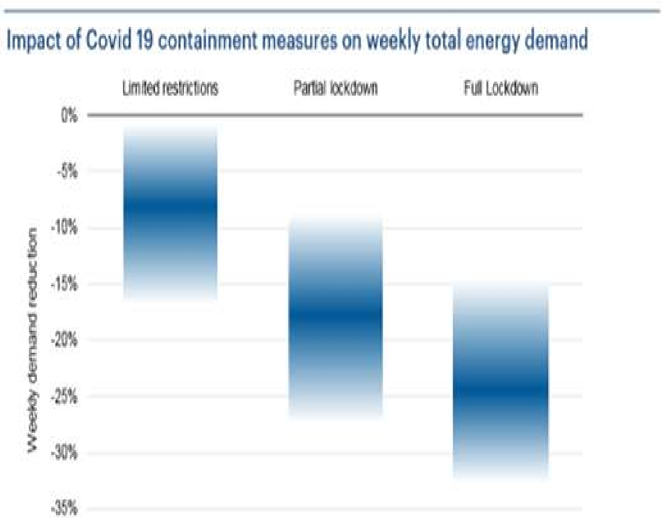
During the Covid-19 pandemic, the oil and gas mining sector index was corrected by 2,084,984 and became one of the pillars of the movement of the Jakarta Composite Index (JCI). The decline in share prices in the oil and gas mining sector is inseparable from the decline in coal and oil prices throughout 2021. This is due to an excess supply of coal and oil available in the global market. Besides, when viewed based on the reference price of oil which is the most widely used in the world, namely West Texas Intermediate (WTI) during December 2020, the reference price of oil has experienced a downward trend of around 30%. The factor of oversupply is the main cause, many world oil-producing countries have massively increased their production, such as the United States, Saudi Arabia, and Russia, which has not been followed by demand. Besides, other factors have caused the weakening of share prices in the oil and gas mining sector, namely the heated trade war between the United States and China, which caused a global economic slowdown that disrupted economic growth. Also, the trade war carries a downside risk, namely, when the global economy slows down, it will reduce the amount of energy demand.

As a result of the decline in share prices in the oil and gas mining sector, returns on mining stocks have also decreased (Endri et al. 2020). Figure 1 shows the data related to the average stock return. The results of the research by Endri et al. (2019) found that Return on Assets (ROA) has a significant effect on stock returns. This result contradicts the research of Bowens and Endri (2018) which states that return on assets (ROA) does not have a significant effect on stock returns. The results of the research by Endri et al. (2019) and Bustami and Heikal (2019) found that the debt-equity ratio (DER) affects stock returns. This result contradicts the results of the study by Baah et al. (2014) and Allozi and Obeidat (2016) who state that the debt-equity ratio (DER) does not affect stock returns. Murtadlo et al. (2017) found that total asset turnover (TATO) does not affect stock returns. This result contradicts the results of Bustami and Heikal's (2019) research which states that total asset turnover (TATO) affects stock returns. Fitriati et al. (2018) showed that the current ratio (CR) and institutional ownership (IO) have a significant negative effect on the stock return

The COVID-19 pandemic did not only affect the health sector, but it also eroded the global economy, including Indonesia (Baig, Butt, Haroon, & Rizvi, 2020), (Chen, Yang, & Lin, 2020), (Just & Echaust, 2020), (Ortmann, Pelster, & Wengerek, 2020), (Singh, 2020). It affected the exchange rate, as well as caused a decline in the Composite Stock Price Index (IHSG), which eventually went into freefall. Furthermore, everything was beyond predictions and difficult to control. Before the confirmation of the first phase of COVID-19 in the country, the IHSG was at the level of 6,244 (24 Jan), which was reduced to 5,942 (20 Feb) and 5,361 (2 March). On March 12, when the WHO declared COVID-19, a global pandemic, the IHSG fell to 4.2 percent or 4,937 during the Thursday session, a level that had not occurred in almost four years. Conversely, on March 13, stock trading was halted for the first time since 2008 due to the pandemic. (Planning et al., N.d.)

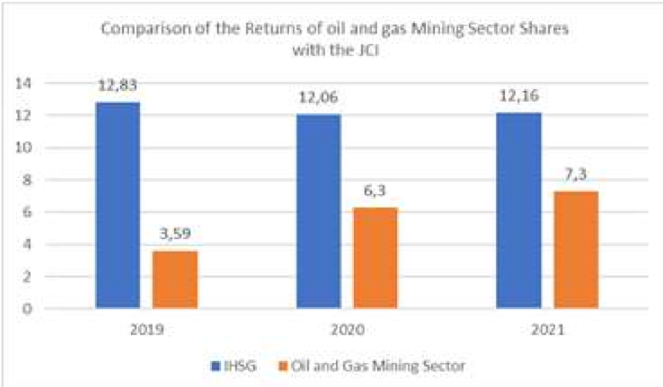
Also, all human activities were restricted to curb the spread of the virus. Several countries adopted partial and simultaneous restriction policies, which had an impact on energy demand.

Figure 1: Impact of COVID-19 on Energy Demand World



Countries with full lockdown policies experienced lesser energy demand than those with partial lockdown rules. In 2020, a 6% decline was predicted in the previous year. This is presumed as the worst condition 70 years after the second world war. Indonesia is one of the nations with limited restriction policies, which also impacted energy demand (Ibrahim, Myrna, Irawati, & Kristiadi, 2018).

Figure 2: Jakarta composite index performance and oil and gas mining sector stock return



Source: Indonesian stock exchange reprocessed

Internal factors such as current ratio (CR), debt to equity ratio (DER), and total asset turnover (TATO), return on assets (ROA), while external factors such as oil prices, exchange rates and share ownership.

2. LITERATURE REVIEW

2.1. Effect of CR on Stock Returns

CR shows the ability to meet the short-term obligations of a company because this ratio shows how far the demands of short-term creditors are fulfilled by assets that are estimated to be cash in the same period as the maturity of the debt. Hasanudin (2020) states that CR has a positive and significant effect on stock returns. With a positive coefficient, it means that the greater the short-term creditors are filled with assets, the higher the stock return will be. Meanwhile, Tri (2014) states that the current ratio (CR) does not affect stock returns. This shows that if the company is less able to fulfill its short-term obligations.

H1: CR affects stock returns.

2.2. Effect of DER on Stock Returns

The debt to equity ratio (DER) is the ratio used to assess debt to equity. Companies with a low debt to equity ratio will have a lower risk of loss when economic conditions are down, but when economic conditions improve, the opportunity to gain profits is low. Endri (2019) states that DER has a significant negative effect on stock returns. This shows that companies are more likely to use the allocation of funds from debt to maximize the company's wealth. Meanwhile, Benyamin and Endri (2019) state that individual DER has a negative and insignificant effect on stock returns.

H2: DER affects stock returns.

2.3. Effect of TATO on Stock Return

Total Assets Turnover is a ratio that shows the efficiency level of using the company's total assets in producing a certain sales volume. Midesia et al. (2016) stated that TATO affects the return of Islamic stocks. A high TATO value also shows that the company is more efficient in using its assets, especially to generate bigger sales, and has a positive effect on stock prices.
Meanwhile, the Suciati Study (2018) shows that TATO does not affect stock returns.

H3: TATO affects stock returns.

2.4. Effect of ROA on Stock Returns

Total ROA shows the company's financial performance in generating a net income from assets used for company operations. Endri (2018) states that ROAh has a positive and significant effect on stock returns. With a positive coefficient, it means that the greater the profitability (ROA), the higher the stock return will be. Meanwhile, Suciati (2018) states that profitability (ROA) does not affect stock returns. This shows that if the company is less effective in using its assets to generate profits, it will reduce investors' interest in buying company shares.

H4: ROA affects stock returns.

2.5. Effect of Oil Prices on Stock Returns

The price of WTI oil becomes the standard measure for oil trade in America. Diaz and de Gracia's research (2016) states that changes in linear oil price specifications have a significant positive effect on real stock returns of oil and gas companies in the short term and oil prices have a positive effect on short-term stock returns. Meanwhile, Masood et al. (2019), Gunarto et al. (2020) stated that the price of oil has no significant effect on the real stock market in all G7 countries

H5: Oil price affects stock returns.

2.6. Effect of Kurs on Stock Returns

Changes in real exchange rates reflect changes in competitiveness between Indonesia and its trading partners. Fatmawati et al. (2020) stated that the rupiah exchange rate against the USD had a significant positive effect on stock returns. Meanwhile, Suriani et al. (2015) show that there is no relationship between exchange rates and stock prices and the two variables are mutually independent.

H6: Kurs affect stock returns.

2.7. Effect of Institutional ownership on Stock Returns

Institutional ownership shows the percentage of shares owned by executives and directors. Share ownership is an important issue in agency theory since published by Jensen and Meckling (1976). The results of research by Rahayu and Faisal (2005) state that the greater the proportion of management ownership in a company, the management will try to be more active in fulfilling the interests of shareholders who are themselves. Management's opportunistic behavior increases the number of discretionary accruals which causes reported earnings to increase. In an efficient market, an increase in the amount of profit will be positively influenced by the market so that the company's stock market price will increase, which in turn increases the amount of return earned by shareholders. Meanwhile, Sudarman (2003) found that share ownership had no significant effect on firm value.

H7: Institutional ownership affects stock returns.

3. METHODOLOGY AND DATA

This research is quantitative. The population in this study were oil and gas mining companies listed on the Indonesia Stock Exchange (IDX) for the period 2019-2021 during the Covid-19 pandemic. The sampling method was purposive sampling. The sample criteria defined are:

1. Oil and gas mining companies listed on the Indonesia Stock Exchange and not delisted in the 2019-2021 period. 2. Public oil and gas mining companies that publish complete financial reports from 2019 to 2021 respectively. 3. Do not have outliers data. If the company has outlier data, the results will be biased. Based on these criteria, the number of samples that meet the criteria for this study are 10 companies from 15 oil and gas mining companies listed on the Indonesia Stock Exchange.

The purpose of this study was to analyze the effect of CR, DER, TATO, ROA, Oil Price, Exchange Rate, and institutional ownership on stock returns in the oil and gas mining sector. The research hypothesis formulation is based on supporting theories and proven through a series of statistical tests. The research conclusion was drawn based on the results of statistical testing. Secondary data processing methods that have been collected from various sources are carried out using several software, such as Microsoft Excel 2019 and EViews 10.0. (64 bit). Data processing activities use Microsoft Excel 2019 software related to table creation and analysis. While in panel data regression processing, the author uses the EViews 10.0 software (64 bit).

The research model used in this study are:

$$SR_{it} = \alpha + \beta_1 CR_{it} + \beta_2 DER_{it} + \beta_3 TATO_{it} + \beta_4 ROA_{it} + \beta_5 WTI_{it} + \beta_6 FOREX_{it} + \beta_7 IO_{it} + \varepsilon_{it}$$

i = 1,2,……, N; t = 1,2,……T

Which are:
SR = Stock Return, CR = Current ratio, DER = Debt to equity ratio, TATO = Total assets turnover, ROA = Return on assets WTI = Oil world texas index, FOREX = Exchange rate USD against the US dollar, IO = Institutional ownership, ε = Component error, β = Slope, α = Intercept, i = Company, t = Year, N = Number of observations, T = Number of times, N × T = Number of panel data.

4. RESULTS AND DISCUSSION

4.1. Data Analysis

Table 1 describes the statistical data descriptions of the research variables including the mean, median, maximum, minimum, and standard deviation. Standard deviation is a statistic that measures the distribution of a data set relative to its average, where the value for each variable is positive but has a significant difference. The largest standard deviation value is experienced by the Institutional Ownership (IO) variable, which is 130243.5, which means that the Institutional Ownership (IO) variable has a higher risk level than other variables. While the Current ratio variable has the lowest risk level, namely 375.4511. The dependent variable Stock Return has an average value of 40,70633 with a standard deviation of 160,6207. During the study period, return of shares with a minimum value of -452,9000 from PT. Medco Energi Internasional Tbk (MEDC) in 2019.

During the study period, stock returns with a minimum value of -452,9000 from PT. Medco Energi Internasional Tbk (MEDC) in 2019 and a maximum value of 646,0000 from PT. Super Energi Tbk (SURE) in 2019.

Table 1: Statistical Data description of research variables

Source: Processed data 2021

Panel data regression models to estimate the determinants of stock returns for oil and gas mining companies are based on three models, namely: common effect, fixed effect, and random effect. Panel data regression models were applied in the study for further analysis using paired tests for each model.

Based on the paired test results using the Chow test, the LM Breusch-Pagan (BP) test, and the Hausman test is shown in Table 2, the panel data regression method was chosen to estimate and analyze the determinants of stock returns for oil and gas mining companies. Listed on the Indonesia Stock Exchange during the 2019-2021 covid-19 pandemic is a random effect model.

Table 2: Conclusion of panel data regression model Testing

Method	Testing	Result
Chow-test	Common effect versus fixed effect	Common Effect
Lagrange multiplier-BP	Common effect versus random effect	Random Effect
Hausman test	Fixed effect versus random effect	Random Effect

4.2. Panel Data Regression

The panel data regression analysis model in this study used a random effect model. The selection of the random effect method as a data analysis method is based on the results of paired testing using the Chow test, the LM Breusch-Pagan (BP) test, and the Hausman test for the three random effect models chosen to be estimated and to analyze the determinants of stock returns of listed oil and gas mining companies. on the Indonesia Stock Exchange for the period 2019-2021 during the Covid-19 pandemic. Table 3 shows the results of panel data testing with the random effect model.

The estimation results of the random-effects model can be written in the following panel data regression equation:

SR = 97.33530 -0.038980*CR + 3.290000*DER -0.298103*$TATO$ + 0.096005*ROA -0.000679*WTI -0.017768*$FOREX$ + 0.000117*IO + [CX=R]

The coefficient of determination (R2) is a measure that shows how much the contribution of the independent variable to the dependent variable. The following are the results of the coefficient of determination in this study:

Table 3: Random effect testing results

Variable	Koefesien
C	97.33530
CR	-0.038980
DER	3.290000
TATO	-0.298103
ROA	0.096005
WTI	-0.000679
FOREX	-0.017768
IO	0.000117

Table 4: The coefficient of determination

Weighted Statistics			
R-squared	0.542331	Mean dependent var	36.19848
Adjusted R-squared	0.396709	S.D. dependent var	154.7919
S.E. of regression	120.2297	Sum squared resid	318013.9
F-statistic	3.724238	Durbin-Watson stat	1.955975
Prob(F-statistic)	0.008304		

Based on Table 4 and the model equation, it can be seen that the effect of Current Ratio (CR), debt to equity ratio (DER), total asset turnover (TATO), return on assets (ROA), oil price (WTI), an exchange rate (FOREX), institutional ownership (IO) of stock return (SR) of 0.175821 (Adjusted R-squared). = 0.396709). This means that the effect of the independent variable on the dependent variable is 39.67% and the rest is influenced by other variables not included in this study.

Measurement	SR	CR	DER	TATO	ROA	WTI	FOREX	IO
Mean	40.70633	580.5667	38535.69	300.7000	1219.634	35474.82	2544.000	56263.37
Median	7.000000	639.0000	18694.50	267.0000	1021.000	2132.000	354.0000	13864.50
Maximun	646.0000	1688.000	333438.0	924.0000	5458.000	480000.0	7181.000	440000.0
Minimun	-452.9000	7.000000	46.89000	7.000000	-154.1600	-10000.00	97.00000	4646.000
Standar Deviasi	160.6207	375.4511	67104.80	275.0994	1360.783	100137.1	3336.614	130243.5

4.3. Hypothesis Testing

Hypothesis testing aims to determine the effect of the independent variable on the dependent variable, we tested each random effect model regression coefficient for the determinant of stock returns for oil and gas mining companies using the t-test. The t-test was conducted to determine whether each of the independent variables used in this study partially affects the disclosure of stock returns of oil and gas mining companies as the dependent variable significantly with a confidence level of 95% or alpha of five percent ($\alpha = 0.05$). , or perhaps with a confidence level of 90% or alpha equal to ten percent ($\alpha = 0.10$).

Table 5: Hypothesis test results (t-test)

Variable	Std. Error	t-statistic	Prob.	Conclusion
CR	63.64934	1.529243	0.1405	Not Significant
DER	0.070935	-0.549513	0.5882	Not Significant

TATO	0.000375	0.087773	0.9309	Not Significant
ROA	0.099160	-3.006265	0.0065	Significant
WTI	0.022594	4.249166	0.0003	Significant
FOREX	0.000276	-2.459001	0.0223	Significant
IO	0.008940	-1.987508	0.0395	Significant

The results of partial statistical tests for each of the factors that affect the stock returns of oil and gas mining companies are shown in Table 5. For the effect of the variable return on assets (ROA), world oil prices (WTI), exchange rates (FOREX), and institutional ownership (IO) partially on stock returns that is significant will each be interpreted and compared with the research hypothesis.

From the results of the hypothesis testing above, it shows that return on assets (ROA), world oil prices (WTI), exchange rates (FOREX), and institutional ownership (IO) are variables that have a decrease in α value from a significant level of 0.05 and institutional ownership (IO) has an α value which is lower than the significant level of 0.10.

The empirical findings of this study are in line with the research hypothesis which states that the variables return on assets (ROA), world oil prices (WTI), exchange rates (FOREX), and institutional ownership (IO) affect the stock returns of mining companies listed on the Indonesia Stock Exchange period. 2019-2021 during the covid-19 pandemic. While the CR, DER, and TATO variables have a higher α value than the significance level of 0.05. The empirical findings of this study are not in line with the research hypothesis which states that CR, DER, and TATO affect the stock returns of oil and gas mining companies listed on the Indonesia Stock Exchange for the period 2019-2021 during the Covid-19 pandemic.

4.4. Discussion

Based on empirical findings, the CR variable has a positive effect on stock returns of oil and gas mining companies but it is not significant. This supports the signal theory, namely the ability to meet the short-term obligations of a company because this ratio shows how far the demands of short-term creditors are fulfilled by assets that are estimated to be cash in the same period as the maturity of the debt. The results of the study are not in line with

Hasanudin's research (2020) which states that CR has a positive and significant effect on stock returns. With a positive coefficient, it means that the greater the short-term creditors are filled with assets, the higher the stock return will be. Meanwhile, the results of this study are in line with Tri (2014) which states that the current ratio (CR) does not affect stock returns.

The results of the study stated that the debt to equity ratio The variable (DER) has a negative and insignificant effect on the return of shares of mining companies in Indonesia. It shows it the higher the DER level, the lower the share price. High debt composition compared to equity threatens instability in the company's financial condition. According to the pecking order, In theory, a company with minimal risk is a company with small debt. Companies with a low DER will have a lower risk of loss if economic conditions are declining, but when economic conditions increases, the chances of making a profit are low. Besides that, companies with high leverage ratios are at great risk of losses when economic conditions decline but have opportunities to get big profits when the economy improves. This result support the research of Benyamin and Endri (2019), Lee (2018), and Sugianto et al. (2020).

Based on empirical findings, it is known that the total asset turnover (TATO) variable has a positive and insignificant effect on the stock returns of oil and gas mining companies in Indonesia. These results are not in line with the research hypotheses previously made. The hypothesis states that total asset turnover (TATO) affects stock returns. This is in line with the theory that the greater the Total Asset Turnover (TATO), the more appropriate the use of these assets is. Total asset turnover (TATO) is one measure used to assess management efficiency in running its business. A high total asset turnover (TATO) indicates that company management can use all of its assets to benefit the company. These results support the research conducted by Huda et al. (2015), Bustami and Heikal (2019), and Piralanasih and Mustafa (2018).

Based on empirical findings, the ROA variable has a negative and significant effect on the stock returns of oil and gas mining companies. This supports the signal theory, namely information in the company regarding the rate of return on assets, whether the calculation of profitability or how much profit can be obtained from the assets issued, therefore if the profitability is large it will send a good signal to stakeholders. . The results of this study support research conducted by Nalurita (2015), Jasman and Kasran (2017), Sucianti (2018), and Sari and Endri (2019).

Based on the research results, it is known that the world oil price variable (WTI) has a positive and significant effect on the stock returns of oil and gas mining companies in Indonesia. This is because the increase in oil prices will certainly increase the opportunities for oil-producing companies to obtain higher revenues. Apart from oil-producing mining companies, the increase in oil prices causes the market to seek alternative energy to replace oil, for example, alternative energies such as coal also have the opportunity to gain higher profits. This is why the world oil price variable has a significant effect on mining companies in Indonesia. This result is supported by research by Ma et al (2019), Diaz and de Gracia (2016), Huang and Mollick (2020), Gunarto et al. (2020), and Wahyono et al. (2019).

Based on the research results, it is stated that the variable of the rupiah exchange rate has a negative and significant effect on stock returns of oil and gas mining companies in Indonesia. These results indicate that the weakening of the rupiah exchange rate has a positive impact on the return of shares of mining companies because most of the products produced by these mining companies are exported and sales transactions use foreign currency as a means of payment. Usually, an increase in the rupiah exchange rate is also followed by an increase in share prices, due to an increase in income or profit. This study is following the arbitrage pricing theory (APT) which states that security returns are not only influenced by market portfolios but are influenced by other sources of risk. namely the macroeconomic variable, in this case, the rupiah exchange rate. The results of this study are relevant to the research of Kumar (2013), Khan (2019), Assagaf et al. (2019), Wahyono et al. (2019), and Fatmawati et al. (2020).

Based on the research results, it is stated that the institutional ownership variable has a negative and significant effect on the stock returns of oil and gas mining companies in Indonesia. These results indicate that institutional ownership shows the percentage of shares owned by executives and directors. Share ownership is an important issue in agency theory since published by Jensen and Meckling (1976). The results of research by Rahayu and Faisal (2005) state that the greater the proportion of management ownership in a company, the management will try to be more active in fulfilling the interests of shareholders who are themselves.

5. CONCLUSIONS

The results showed that the variable current ratio (CR), debt to equity ratio (DER), and total asset turnover (TATO) did not affect stock returns of oil and gas mining companies listed on the Indonesia Stock Exchange for the period 2019-2021 during the Covid-Pandemic. 19. The variables Return on assets, exchange rates and institutional ownership have a negative and significant effect on stock returns. Meanwhile, the return on assets (ROA), world oil price (WTI), an exchange rate (FOREX) and institutional ownership (IO) variables affect the stock returns of mining companies listed on the Indonesia Stock Exchange for the period 2019-2021 during the Covid-19 pandemic.

Managerial suggestions or implications of the research results are associated with variables that have a significant effect. Investors and potential investors must pay attention to the variables that can affect the rate of return on shares. Because stock returns are used as a measure of company performance by investors to invest in companies in the capital market. Recommendations for this research can be developed by involving many internal factors, including return on equity, company size, public ownership, and external factors including the board of directors, interest rates, money supply, and inflation. To obtain better research results, it is recommended that further researchers be able to extend the period and other industrial sectors used in the research.

6. ACKNOWLEDGEMENT

The authors are grateful to the Ministry of Energy and Minerals and the Indonesia Stock Exchange for providing stock price data.

REFERENCES

Allozi, N.M., Obeidat, G.S. (2016), The relationship between the stock return and financial indicators (profitability, leverage): An empirical study on manufacturing companies listed in Amman stock exchange. Journal of Social Sciences, 5(3), 408-424.

Assagaf, A., Murwaningsari, E., Gunawan, J., Mayangsari, S. (2019), The effect of Macro-Economic variables on the stock return of companies that listed in the stock exchange: Empirical evidence from Indonesia. International Journal of Business and Management, 14(8), 108-116.

Baah, B.K., Tawiah, R., Opoku, F.E. (2014), Industry sector determinants of dividend policy and its effect on share prices in Ghana. International Journal of Economics Business and Finance, 2(5), 1-19.

Baig, A. S., Butt, H. A., Haroon, O., & Rizvi, S. A. R. (2020). Deaths, panic, lockdowns and US equity markets: The case of COVID-19 pandemic. Finance Research Letters, (July), 101701. https://doi.org/10.1016/j.frl.2020.101701

Benyamin, I.A., Endri, E. (2019), Determinants of stock returns of building construction companies listed on the Indonesia stock exchange period 2012-2016. Scholars Journal of Economics Business and Management, 6(1), 39-47.

Bowens, M.J.A., Endri E. (2018), Determinants of stock returns of telecommunications companies listed on the Indonesia stock exchange. Saudi Journal of Economics and Finance, 2(4), 194-203.

Bustami, F., Heikal, H. (2019), Determinants of return stock company real estate and property located in Indonesia stock exchange. International Journal of Economics and Financial Issues, 9(1), 79-86.

Chen, S., Yang, Y., & Lin, J. H. (2020). Capped borrower credit risk and insurer hedging during the COVID-19 outbreak. Finance Research Letters,36(September),101744. https://doi.org/10.1016/j.frl.2020.101744

Diaz, E.M., de Gracia, F.P. (2016), Oil price shocks and stock returns of oil and gas corporations. Finance Research Letters, 8(28), 1-6.

Endri, E. (2018), Factors determine stock return of livestock feed companies: Common effect model analysis. International Journal of New Technology and Research, 4(5), 106-113.

Endri, E., Abidin, Z., Simanjuntak, T.P., Nurhayati, I. (2020), Indonesian stock market volatility: GARCH model. Montenegrin Journal of Economics, 16(2), 7-17.

Endri, E., Dermawan, D., Abidin, Z., Riyanto, S. (2019), Effect of financial performance on stock return: Evidence from the food and beverages sector. International Journal of Innovation Creativity and Change, 9(10), 335-350.

Endri E. (2019), Determinant of firm's value: Evidence of manufacturing sectors listed in Indonesia shariah stock index. International Journal of Recent Technology and Engineering, 8(3), 3995-3999.

Fatmawati F, Tanjung, H., Endri E. (2020), Effect of market risk premium and exchange rate on the return of Jakarta Islamic index. Global Journal of Management and Business Research, 20(5), 1-11.

Gunarto, T., Azhar, R., Tresiana, N., Supriyanto, & Ahadiat, A. (2020). An accurate estimated model of volatility crude oil price. *International Journal of Energy Economics and Policy*, *10*(5), 228–233. https://doi.org/10.32479/ijeep.9513

Huang, W., Mollick, A.V. (2020), Tight oil, real WTI prices, and U.S. stock returns. Energy Economics, 85, 1-14.

Huda, G.N., Sinaga, B.M., Andati, T. (2015), The influence of corporate financial performance on share return. Indonesian Journal of Business and Entrepreneurship, 1(3), 117-185.

Ibrahim, M. A., Myrna, R., Irawati, I., & Kristiadi, J. B. (2018). Tax policy in Indonesian energy sectors: An overview of tax amnesty implementation. *International Journal of Energy Economics and Policy*, *8*(4), 234–236.

Jasman, J., Kasran, M. (2017), Profitability, earnings per share on stock return with size as moderation. Trikonomika, 16(2), 88-94.

Just, M., & Echaust, K. (2020). Stock market returns, volatility, correlation and liquidity during the COVID-19 crisis: Evidence from the Markov switching approach. *Finance Research Letters*, *37*(September), 101775. https://doi.org/10.1016/j.frl.2020.101775

Khan, M.K. (2019), Impact of exchange rate on stock returns in Shenzhen stock exchange. International Journal of Economics and Management, 1(2), 15-26.

Kumar, M. (2013), Returns and volatility spillover between stock prices and exchange rates: Empirical evidence from IBSA countries. International Journal of Emerging Markets, 8(2), 108-128.

Lee, R. (2018), Determinant factors of the stock return in manufacturing companies listed in the Indonesian stock exchange in the period of 2013-2015. Journal of Business Management and Entrepreneurship, 2(1), 97-103.

Ma, Y.R., Zhang, D., Ji, Q., Pan, J. (2019), Spillovers between oil and stock returns in the US energy sector: Does idiosyncratic information matter? Energy Economics, 81, 536-544.

Masood, O., Tvaronavičienė, M., Javaria, K. (2019), Impact of oil prices on stock return: Evidence from G7 countries. Insights In Regional Development, 1(2), 129-137.

Midesia, S., Basri, H., Majid, M.S.A. (2016), The effects of asset management and profitability on stock returns a comparative study between conventional and Islamic stock markets in Indonesia. Academic Journal of Economic Studies, 2(3), 44-54.

Murtadlo, A.A., Imam, Y., Wahono, B. (2014), Effect of capital structure, wealth structure and asset turnover on financial performance (case study in real estate companies listed on the IDX). JEMA, 12(1), 1-10. Nalurita, F. (2015), The effect of profitability ratio, solvability ratio, the market ratio on stock return. Business and Entrepreneurial Review,15(1), 73-94.

Ortmann, R., Pelster, M., & Wengerek, S. T. (2020). COVID-19 and investor behavior. *Finance Research Letters*, *37*(August), 101717. https://doi.org/10.1016/j.frl.2020.101717

Perencanaan, K., Nasional, P., & Indonesia, B. R. (2020). Dampak Covid-19 terhadap Pergerakan Nilai Tukar Rupiah dan Indeks Harga Saham Gabungan (IHSG). Jurnal Perencanaan Pembangunan: The Indonesian Journal of Development Planning, 4(2), 151–165. https://doi.org/10.36574/jpp.v4i2.114

Piralanasih, F., Mustafa, M. (2018), Analysis of fundamental factors' effect on the stock return of property: A case study of property, real estate, and building construction sector of companies listed on the Indonesia stock exchange in 2012-2016. Russian Journal of Agricultural and Socio-Economic Sciences, 5(77), 38-47.

Sari, F.N., Endri, E. (2019), Determinants of return on assets (ROA) on conventional banks listed on Indonesian stock exchange (IDX) period 2013-2017. IOSR Journal of Business and Management, 21(4), 52-62.

Singh, A. (2020). COVID-19 and safer investment bets. *Finance Research Letters*, *36*(August), 101729. https://doi.org/10.1016/j.frl.2020.101729

Suciati, N.H.D. (2018), The effect of financial ratio and firm size on stock return in property and real estate companies listed on the Indonesia stock exchange. The Indonesian Accounting Review, 8(1), 96-108. Sugianto, S., Oemar, F., Hakim, L., Endri, E. (2020), Determinants of firm value in the banking sector: Random-effects model. International Journal of Innovation, Creativity, and Change, 12(8), 208-218.

Suriani, S., Kumar, M.D., Jamil, F., Muneer, S. (2015), Impact of exchange rate on the stock market. International Journal of Economics and Financial Issues, 5(1S), 385-388.

Wahyono, T., Nugroho, L., Imron, M. (2019), Determinant factor of stock price in oil and gas sector (Indonesia stock exchange 2011-2016). Eurasian Journal of Business and Management, 7(2), 12-22.

BAB V

FINANCIAL PERILAKU

A. Pengertian Teori Financial

Teori Financial memiliki spesifikasi yaitu ekonomi berbasis perilaku yang menyatakan bahwa pelaku ekonomi tidaklah selamanya rasional. Dengan kata lain, dalam memandang pelaku ekonomi tidak hanya dilakukan pada sisi rasional atau tidak rasional saja melainkan pada aspek-aspek yang lebih luas. Ekonomi berbasis perilaku menekankan perilaku apa adanya dari pelaku ekonomi. Kahneman dan Tversky memulai penelitian terhadap perilaku manusia yang dianggap aneh dan kontradiktif dalam mengambil suatu keputusan dengan memberikan pilihan yang sama kepada dua subyek penelitian, dan kemudian dua subyek tersebut menunjukkan perilaku yang berbeda. Hal itu disebut Kahneman dan Tversky sebagai risk-aversion dan risk-seeking behavior.

Ada beberapa aspek perilaku investor dalam memandang resiko yang dijelaskan dalam teori prospek, yaitu:
1) Loss aversion merupakan salah satu preferensi yang paling penting dalam teori keuangan keperilakuan. Aspek keperilakuan ini merupakan aspek yang membedakan dengan hipotesis pasar efisien. loss aversion menunjukkan keengganan investor untuk menderita kerugian. Seorang investor menunjukkan keengganan investor untuk menderita kerugian. Seorang investor cenderung menghindari kerugian dari pada memperoleh keuntungan.
2) Mental Accounting adalah kecenderungan orang untuk memisahkan uangnya ke dalam rekening berbeda berdasarkan berbagai kriteria subjektif, seperti berdasarkan sumber uang dan maksud dari setiap rekening. Menurut teori ini, individu menetapkan fungsi yang berbeda untuk setiap kelompok aset, yang sering memiliki pengaruh tidak rasional dan merugikan pada keputusan konsumsi dan perilaku lainnya.
3) Self-control menjelaskan sejauh mana investor dapat mengendalikan dirinya. Aspek perilaku ini digunakan untuk menjelaskan mengapa investor terus menjadi orang yang mengalami kerugian. Aspek perilaku ini juga dapat diartikan bahawa investor suka berinvestasi pada efek dimana mereka memiliki kemampuan untuk mengontrol investasinya.

B. Model ARIMA dalam Teori Financial

ARIMA merupakan suatu teknik yang mengabaikan *independent variable* dalam melakukan peramalan. Model ini hanya menggunakan nilai-nilai sekarang dan masa lalu dari *dependent variable* untuk melakukan peramalan jangka pendek. Metode ini disebut juga dengan metode Box-Jenkins.

2. Petunjuk Operasional dalam Eviews

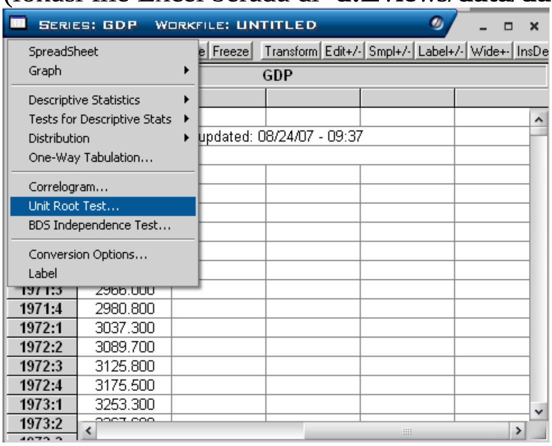
a. Uji Stasioneritas Data

Uji stasioneritas data digunakan untuk melihat apakah data mengandung akar unit atau tidak. Data *time series* dikatakan stasioner jika data tersebut tidak mengandung akar-akar unit (*unit root*) dengan kata *mean*, *variance*, dan *covariant* konstan sepanjang waktu. Pengujian akar-akar unit root dilakukan dengan *metode Augmented Dickey Fuller*(ADF), yaitu dengan membandingkan nilai $ADF_{statistik}$ dengan *Mackinnon critical value* 1%, 5%, dan 10%. Data dikatakan stasioner jika nilai $ADF_{statistik}$ lebih besar dari *Mackinnon critical value* 1%, 5%, dan 10% serta nilai probabilitasnya signifikan dibawah 10%. Jika $ADF_{statistik}$ lebih kecil dari *Mackinnon critical value* 1%, 5%, dan 10% serta nilai probabilitasnya diatas 10% (tidak signifikan) maka data dikatakan tidak stasioner.

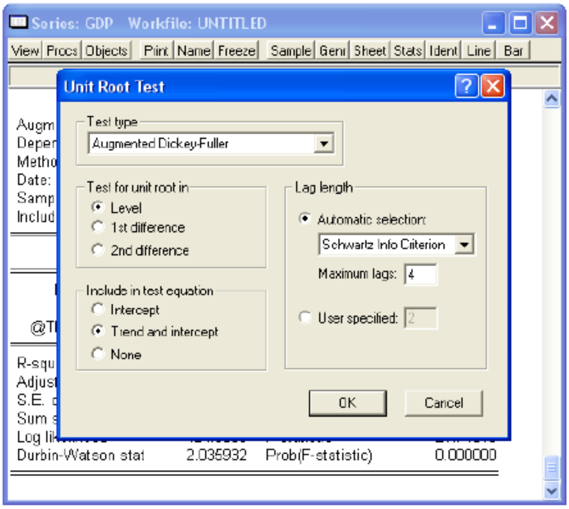
Lakukan prosedur berikut :

Klik Workfile – Klik variabel yang akan di uji – *View - Unit root test*

(lokasi file Excel berada di **d:Eviews/data/data2 ARIMA.xls)**



Lakukan pengujian pada tingkat **Level** dengan asumsi ***trend dan intercept* -OK**



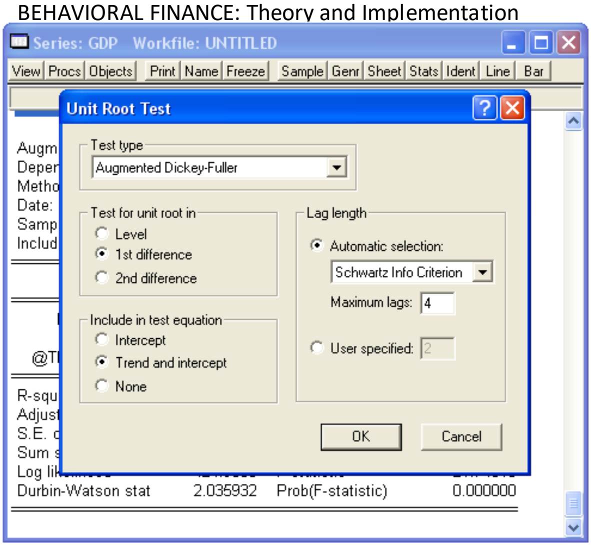
Augmented Dickey-Fuller Test Equation
Dependent Variable: D(GDP)
Method: Least Squares
Date: 10/22/07 Time: 20:59
Sample(adjusted): 1970:3 1991:4
Included observations: 86 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDP(-1)	-0.078661	0.035508	-2.215287	0.0295
D(GDP(-1))	0.355794	0.102691	3.464708	0.0008
C	234.9729	98.58764	2.383391	0.0195
@TREND(1970:1)	1.892199	0.879168	2.152260	0.0343

R-squared	0.152615	Mean dependent var	23.34535
Adjusted R-squared	0.121613	S.D. dependent var	35.93794
S.E. of regression	33.68187	Akaike info criterion	9.917191
Sum squared resid	93026.38	Schwarz criterion	10.03135
Log likelihood	-422.4392	F-statistic	4.922762
Durbin-Watson stat	2.085875	Prob(F-statistic)	0.003406

Dari hasil pengujian dapat dilihat nilai $ADF_{statistik}$ sebesar 2,215287 lebih kecil dari dengan probabilitas diatas 10%, yaitu 0,4749. Berarti data masih mengandung akar unit, dengan kata lain data tidak stasioner pada tingkat level. Lakukan kembali pengujian unit root pada tingkat *first difference*.

Klik *View* – *Unit root test* – Pilih *first difference* - *Intercept* – OK



Null Hypothesis: D(GDP) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic based on SIC, MAXLAG=4)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.588446	0.0000
Test critical values:	1% level	-4.068290	
	5% level	-3.462912	
	10% level	-3.157836	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(GDP,2)
Method: Least Squares
Date: 10/22/07 Time: 21:00
Sample(adjusted): 1970:3 1991:4
Included observations: 86 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(GDP(-1))	-0.682459	0.103584	-6.588446	0.0000
C	17.25493	7.965990	2.166074	0.0332
@TREND(1970:1)	-0.028246	0.149731	-0.188649	0.8508

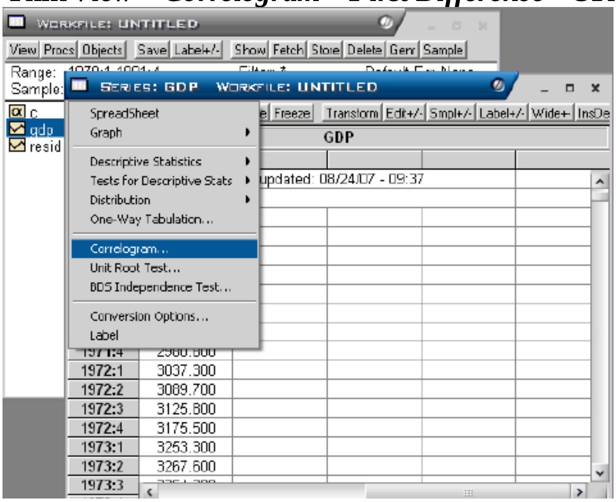
R-squared	0.343833	Mean dependent var	0.206977
Adjusted R-squared	0.328022	S.D. dependent var	42.04441
S.E. of regression	34.46559	Akaike info criterion	9.952061
Sum squared resid	98593.78	Schwarz criterion	10.03768
Log likelihood	-424.9386	F-statistic	21.74613
Durbin-Watson stat	2.035932	Prob(F-statistic)	0.000000

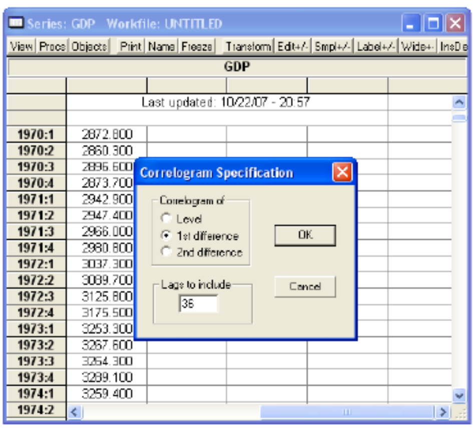
Dari pengujian yang kedua didapat bahwa nilai ADF$_{statistik}$ lebih besar dari *critical value* dan probabilitasnya signifikan pada tingkat keyakinan 1%. Hal ini berarti data telah stasioner pada *first difference*. Secara tidak langsung ordo integrasi telah ditemukan, yaitu d = 1. Berikutnya adalah penentuan ordo suku AR dan MA.

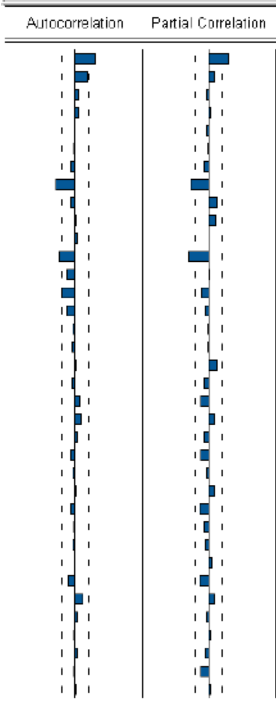
b. Penentuan Ordo AR – MA

Lakukan pengujian correlogram, dengan hasil derajat integrasi yang diperoleh dari uji unit root dan biarkan Eviews menentukan panjang lag maksimumnya. Lakukan prosedur berikut ini:

Klik *View – Correlogram – First Difference* - OK







	AC	PAC	Q-Stat	Prob
1	0.316	0.316	9.0136	0.003
2	0.186	0.095	12.165	0.002
3	0.049	-0.038	12.389	0.006
4	0.051	0.033	12.631	0.013
5	-0.007	-0.032	12.636	0.027
6	-0.019	-0.020	12.672	0.049
7	-0.073	-0.062	13.188	0.068
8	-0.289	-0.280	21.380	0.006
9	-0.067	0.128	21.820	0.009
10	0.019	0.100	21.855	0.016
11	0.037	-0.008	21.991	0.024
12	-0.239	-0.311	27.892	0.006
13	-0.117	0.011	29.314	0.006
14	-0.204	-0.114	33.712	0.002
15	-0.128	-0.051	35.474	0.002
16	-0.035	-0.021	35.610	0.003
17	-0.056	-0.019	35.956	0.005
18	0.009	0.122	35.965	0.007
19	-0.045	-0.071	36.195	0.010
20	0.066	-0.126	36.694	0.013
21	0.084	0.089	37.519	0.015
22	0.039	-0.060	37.696	0.020
23	-0.068	-0.121	38.259	0.024
24	-0.032	-0.041	38.384	0.032
25	0.013	0.092	38.406	0.042
26	-0.064	-0.143	38.932	0.049
27	-0.017	-0.081	38.970	0.064
28	-0.038	-0.051	39.156	0.078
29	0.005	0.056	39.160	0.099
30	-0.100	-0.141	40.516	0.095
31	0.129	0.091	42.803	0.077
32	0.026	-0.036	42.899	0.094
33	-0.017	0.034	42.939	0.115
34	0.037	-0.046	43.137	0.135
35	-0.011	-0.124	43.154	0.162
36	0.015	0.027	43.186	0.191

Cara melihat stasioner atau tidaknya model bisa di lihat dari nilai AC dan PAC dibandingkan dengan ± 1.96 ($\sqrt{1/n}$), atau sama dengan
±1.96($\sqrt{1/88}$) =
± 1.96 (0.1066)= -0.208 sd + 0.208
Jadi kalau AC dan PAC ada diantara -0.208 sd + 0.208 maka datanya stasioner namun jika diluar angka -0.208 sd + 0.208 maka tidak stasioner

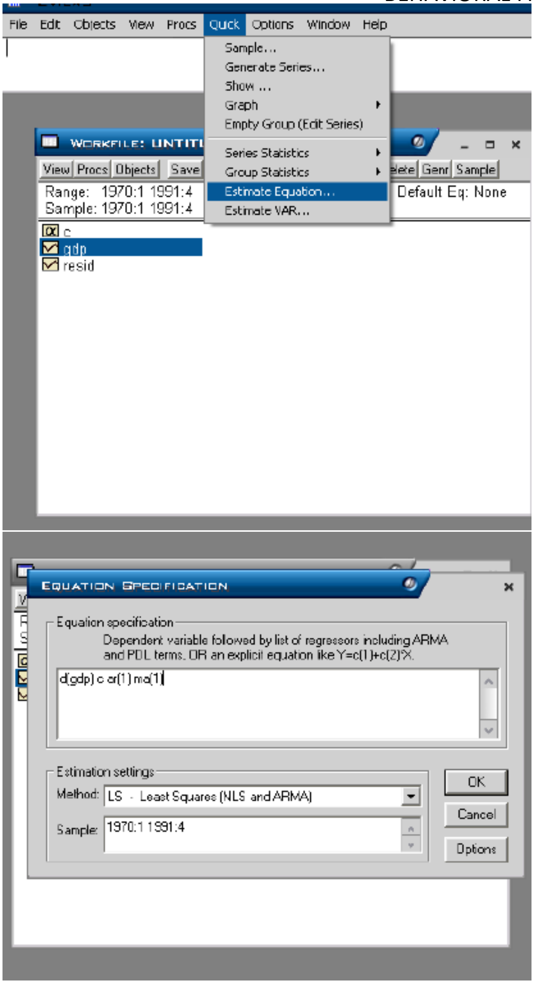
Tampak pada lag(1) AC dan PAC memiliki skor sebesar 0.316 yang berarti lebih besar dari 0.208 (0.316 > 0.208))maka datanya tidak stasioner pada lag (1,8, dan 12)

Dari grafik diatas terlihat bahwa terjadi pelanggaran garis batang AC pada lag 1, 8, dan 12, maka kita memiliki kandidat MA (1). Dari grafik batang PAC, terlihat kalau pelanggaran garis batas juga terjadi pada lag 1, maka diperoleh juga kandidat AR (1). 3 kandidat model yang akan digunakan adalah bentuk ARIMA (1,1,1); ARIMA (1,1,0) atau ARI (1) dan ARIMA (0,1,1) atau IMA (1). Selanjutnya adalah penentuan model terbaik.

c. Penentuan Model Terbaik.

Untuk model ARIMA (1,1,1) : **Klik *Quick* – *Estimate equation* – Ketik: d(gdp) c AR(1) MA(1) – OK**

Jangan lupa untuk memberi nama persamaan tersebut, **Klik Name – Arima – OK**



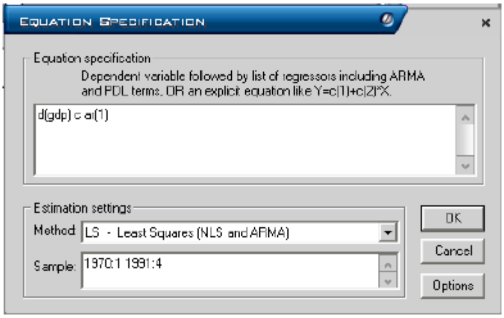
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	23.50643	5.942537	3.955622	0.0002
AR(1)	0.499690	0.275101	1.816384	0.0729
MA(1)	-0.201502	0.312614	-0.644572	0.5210

R-squared	0.105750	Mean dependent var	23.34535
Adjusted R-squared	0.084202	S.D. dependent var	35.93794
S.E. of regression	34.39166	Akaike info criterion	9.947766
Sum squared resid	98171.24	Schwarz criterion	10.03338
Log likelihood	-424.7539	F-statistic	4.907606
Durbin-Watson stat	1.994227	Prob(F-statistic)	0.009673

Inverted AR Roots	.50
Inverted MA Roots	.20

Hasil regresi pada model ARIMA (1,1,1) menunjukkan bahwa probabilitas MA(1) tidak signifikan, yaitu sebesar 0,5210, maka model ini dinyatakan

gugur.
Selanjutnya kita akan melihat model yang kedua yaitu model ARI(1) **Klik *Quick* – *Estimate equation* – ketik: d(gdp) c AR(1) – OK**. Kemudian namai persamaan tersebut, misal **ARI.** Begitu pula untuk model yang ketiga yaitu, IMA (1), **kembali Klik *Quick* – *Estimate equation* – ketik: d(gdp) c MA(1) - OK**



Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	23.44152	5.412216	4.331223	0.0000
AR(1)	0.317238	0.102975	3.080716	0.0028

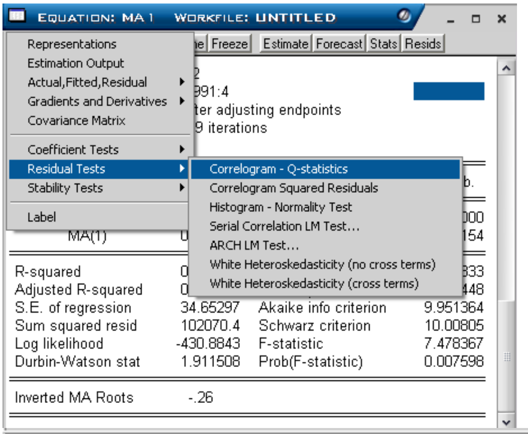
R-squared	0.101516	Mean dependent var	23.34535
Adjusted R-squared	0.090820	S.D. dependent var	35.93794
S.E. of regression	34.26717	Akaike info criterion	9.929234
Sum squared resid	98636.06	Schwarz criterion	9.986311
Log likelihood	-424.9570	F-statistic	9.490809
Durbin-Watson stat	2.034425	Prob(F-statistic)	0.002791
Inverted AR Roots	.32		

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	22.79699	4.666313	4.885441	0.0000
MA(1)	0.258497	0.104584	2.471667	0.0154

R-squared	0.080866	Mean dependent var	22.93333
Adjusted R-squared	0.070053	S.D. dependent var	35.93448
S.E. of regression	34.65297	Akaike info criterion	9.951364
Sum squared resid	102070.4	Schwarz criterion	10.00805
Log likelihood	-430.8843	F-statistic	7.478367
Durbin-Watson stat	1.911508	Prob(F-statistic)	0.007598
Inverted MA Roots	-.26		

Model ARI(1) dan IMA(1), memiliki nilai probabilitas yang signifikan, hal ini didukung pula oleh nilai │IRM│< 1. Maka pemilihan modeol terbaik akan dilanjutkan dengan pengujian autokorelasi.

Lakukan uji correlogram Q stat, **Klik *View – residual test – correlogram Q statistic - OK***



Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
		1	-0.022	-0.022	0.0422	
		2	0.082	0.081	0.6418	0.423
		3	-0.002	0.001	0.6423	0.725
		4	0.038	0.031	0.7741	0.856
		5	-0.017	-0.015	0.8002	0.938
		6	0.003	-0.003	0.8010	0.977
		7	0.032	0.035	0.9013	0.989
		8	-0.302	-0.305	9.7542	0.203
		9	0.015	0.003	9.7778	0.281
		10	0.042	0.100	9.9550	0.354
		11	0.141	0.153	11.951	0.288
		12	-0.277	-0.301	19.816	0.048
		13	0.004	-0.048	19.817	0.071
		14	-0.161	-0.124	22.557	0.047
		15	-0.094	-0.073	23.502	0.053
		16	0.023	-0.046	23.558	0.073
		17	-0.079	-0.085	24.246	0.084
		18	0.039	0.112	24.419	0.108
		19	-0.115	-0.011	25.911	0.102
		20	0.082	-0.134	26.683	0.112
		21	0.078	0.071	27.399	0.124
		22	0.044	-0.005	27.630	0.151
		23	-0.073	-0.074	28.263	0.167
		24	-0.030	-0.129	28.376	0.202
		25	0.048	0.090	28.662	0.233
		26	-0.074	-0.084	29.360	0.249
		27	0.023	-0.097	29.427	0.292
		28	-0.033	-0.080	29.567	0.334
		29	0.061	0.080	30.058	0.360
		30	-0.185	-0.180	34.679	0.215
		31	0.189	0.064	39.592	0.113
		32	0.024	-0.021	39.670	0.137
		33	-0.053	0.034	40.071	0.155
		34	0.062	-0.006	40.636	0.169
		35	-0.045	-0.108	40.942	0.192
		36	0.058	0.023	41.451	0.210

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
		1	0.038	0.038	0.1274	
		2	0.181	0.180	3.1103	0.078
		3	-0.006	-0.019	3.1140	0.211
		4	0.059	0.028	3.4372	0.329
		5	-0.015	-0.014	3.4588	0.484
		6	-0.016	-0.032	3.4830	0.626
		7	0.002	0.011	3.4834	0.746
		8	-0.296	-0.301	12.071	0.098
		9	0.006	0.030	12.075	0.148
		10	-0.007	0.108	12.079	0.209
		11	0.105	0.098	13.205	0.212
		12	-0.267	-0.304	20.569	0.038
		13	-0.011	-0.045	20.583	0.057
		14	-0.184	-0.094	24.156	0.030
		15	-0.089	-0.077	25.010	0.034
		16	0.002	-0.018	25.010	0.050
		17	-0.071	-0.055	25.571	0.060
		18	0.044	0.117	25.785	0.078
		19	-0.078	-0.001	26.469	0.090
		20	0.071	-0.157	27.059	0.103
		21	0.059	0.062	27.470	0.123
		22	0.043	-0.011	27.687	0.149
		23	-0.071	-0.108	28.304	0.166
		24	-0.026	-0.101	28.389	0.201
		25	0.039	0.105	28.576	0.236
		26	-0.080	-0.097	29.384	0.248
		27	0.015	-0.095	29.415	0.293
		28	-0.055	-0.089	29.816	0.322
		29	0.057	0.079	30.256	0.351
		30	-0.158	-0.145	33.636	0.253
		31	0.170	0.061	37.623	0.160
		32	-0.007	-0.021	37.630	0.192
		33	-0.030	0.023	37.760	0.223
		34	0.054	-0.003	38.189	0.245
		35	-0.042	-0.141	38.455	0.275
		36	0.060	0.019	38.995	0.295

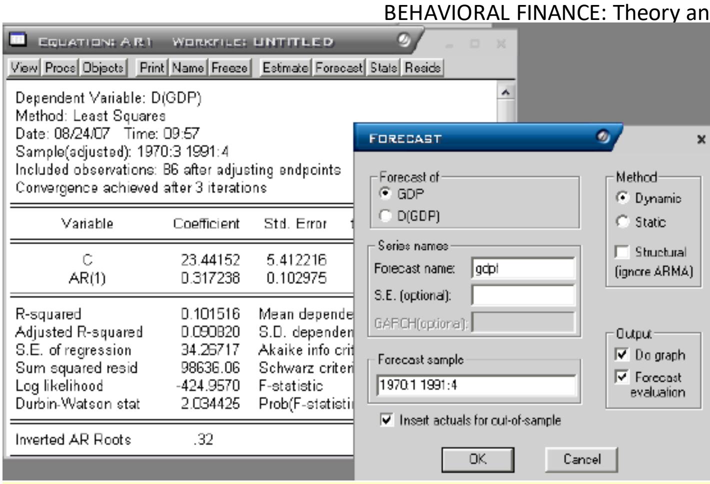
Correlogram AR

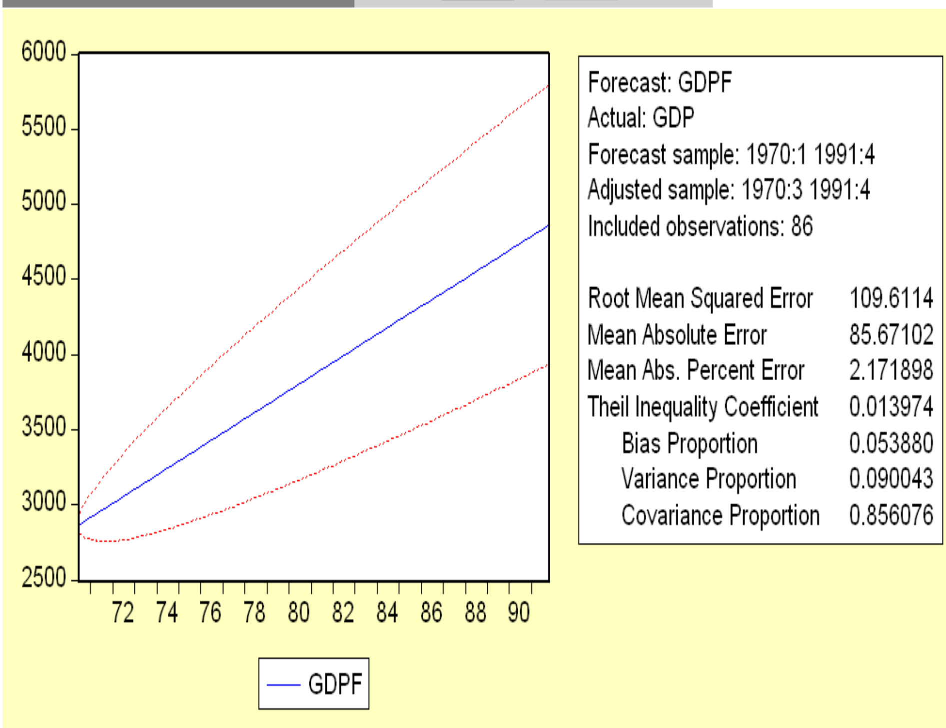
Ternyata kedua model berhasil menyelesikan permasalahan autokorelasi masing-masing, terlihat dari nilai Q-stat yang tidak signifikan di setiap lag. Maka langkah terakhir pemilihan model akan bergantung pada nilai SC yang lebih kecil. ARI (1) memiliki nilai SC sebesar 9.986, sementara IMA (1) sebesar 10.00805, maka model ARI(1)- lah yang terbaik.

Model	Adjusted R-square	AIC	SC
IMA (1)	0.070053	9.951364	10.00805
ARI (1)	0.09082	9.929234	9.986311
ARIMA (1,1,1)	0.084202	9.947766	10.03338

d. Peramalan

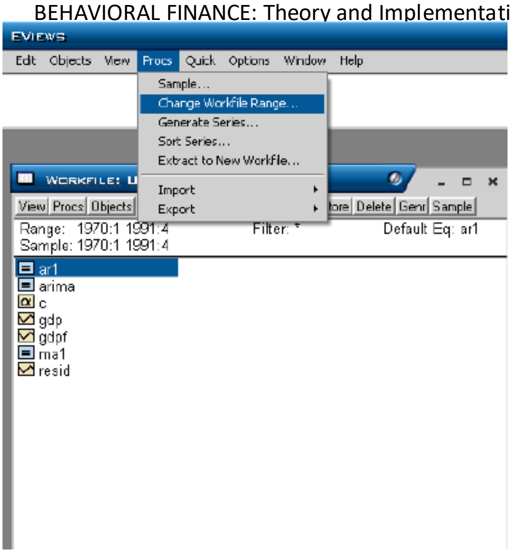
Dengan menggunakan model ARI(1), kita lakukan pengecekan kelayakan model bagi peramalan. Dalam hal ini data yang digunakan adalah data asli, yaitu GDP, karena data ini yang akan diramal. **Klik Forecast – pilih GDP - OK**

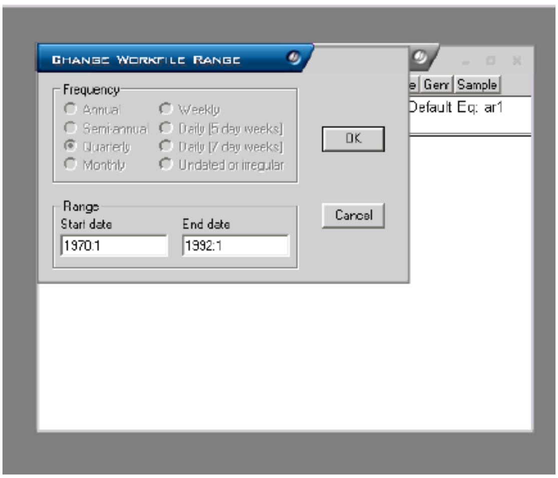




Terlihat bahwa nilai bias proportion sebesar 0.053880 (dibawah 0.2), sementara covariance proportion 0.856076 (hampir mendekati 1), maka model ini dapat meramal nilai GDP kedepan.
Bila mengasumsi model sudah benar, maka langkah selanjutnya adalah memperpanjang range data. Pada menu utama :

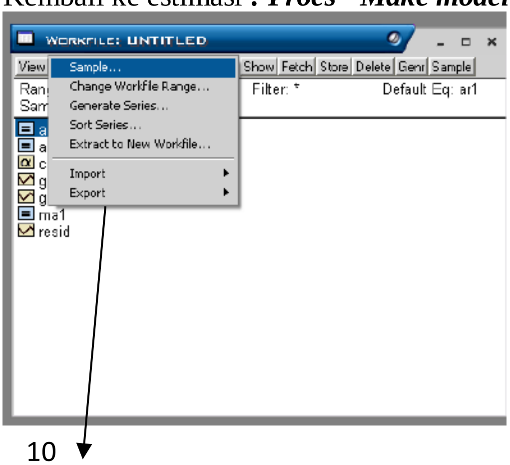
Klik *Procs – Change workfile range* (ubah End date menjadi 1992:1) – OK

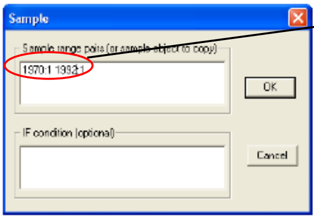




Ubah juga sample data : ***Procs – sample – ketik tahun yang akan diforcast***

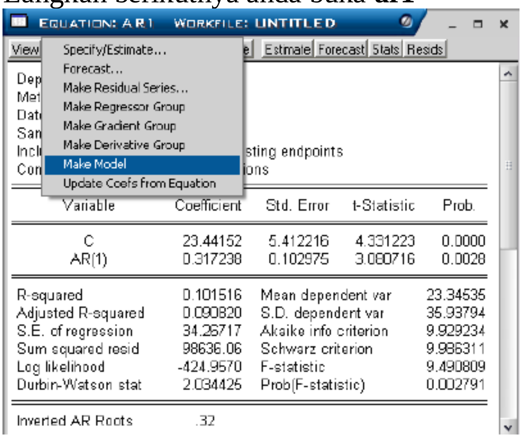
Kembali ke estimasi ***: Procs - Make model – Solve* – OK**



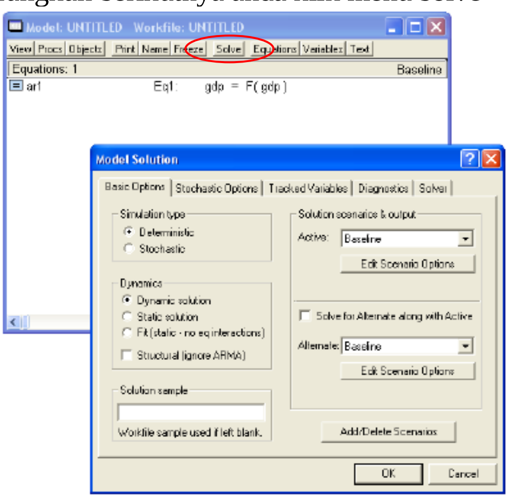


Jangan lupa diganti tahun estimasi yang diinginkan
Contoh :
1970:1 **1992:1**

Langkah berikutnya anda buka **ar1**



Langkah berikutnya anda klik menu **solve**



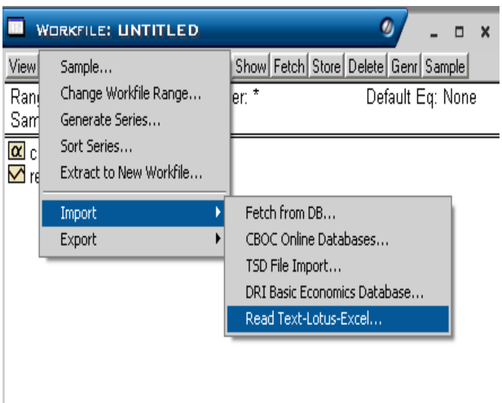
Sehingga akan terbentuk variabel forecast gdpf dengan tambahan nilai konsumsi 1992:1

1991:2	4865.329
1991:3	4888.771
1991:4	4912.212

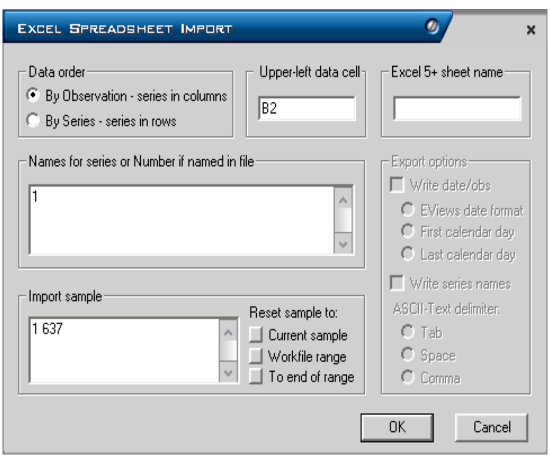
1992:1	4935.654

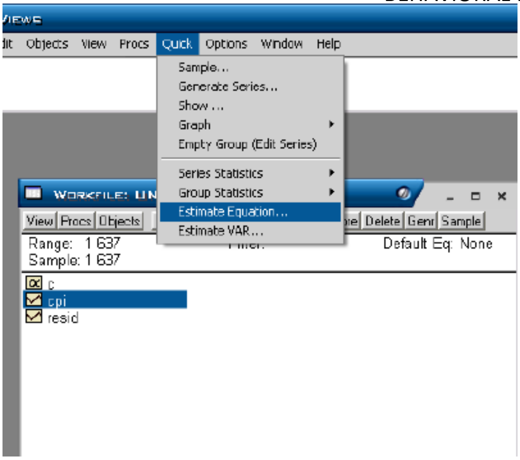
C. Model ARCH/GARCH dalam Behaviour Financial

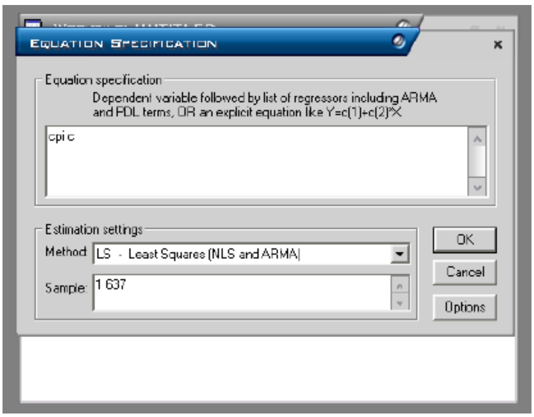
Data time series, terutama seperti data indeks saham, tingkat bunga, nilai tukar, dan inflasi, sering kali bervolatilitas. Implikasi data yang bervolatilitas adalah variance dari error tidak constant. Dengan kata lain mengalami heteroskedatisitas. Implikasi dari adanya heteroskedatisitas terhadap estimasi OLS tetap tidak bias, tetapi standart error dan interval keyakinan menjadi terlalu sempit sehingga dapat memberikan sense of precision yang salah.
Untuk menjawab pertanyaan-pertanyaan mengenai volatilitas, peralatan standar yang digunakan adalah model Autoregressive Conditional Heteroskedasticity Model (ARCH)/ Generalized Autoregressive Conditional Heteroskedasticity Model (GARCH). Model ini menganggap variance yang tidak constant (heteroskedatisitas) bukan suatu masalah, tetapi justru dapat digunakan untuk modeling dan peramalan.

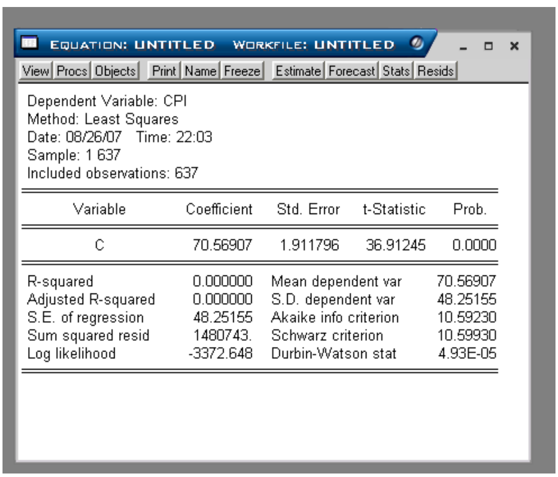


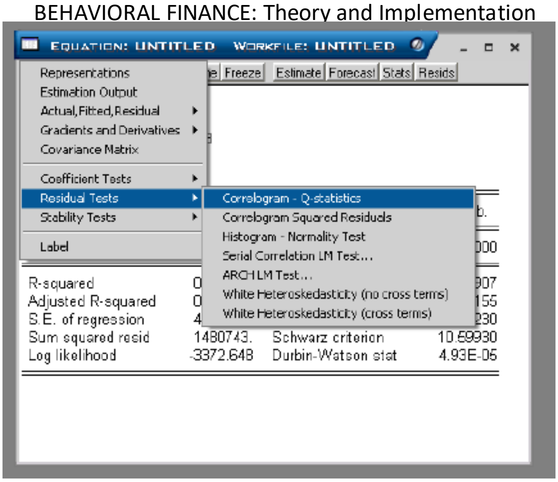
(lokasi file Excel berada di **d:Eviews/data/data3 ARCH.xls)**

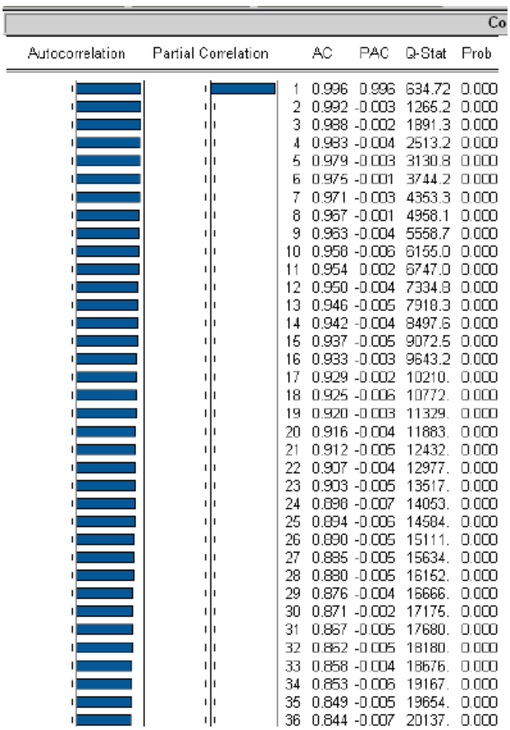



Objects View Procs Quick Options Window Help
Sample...
Generate Series...
Show...
Graph
Empty Group (Edit Series)
Series Statistics
Group Statistics
Estimate Equation...
Estimate VAR...
View Procs Objects
Delete Genr Sample
Range: 1 637
Sample: 1 637
Default Eq: None
c
cpi
resid

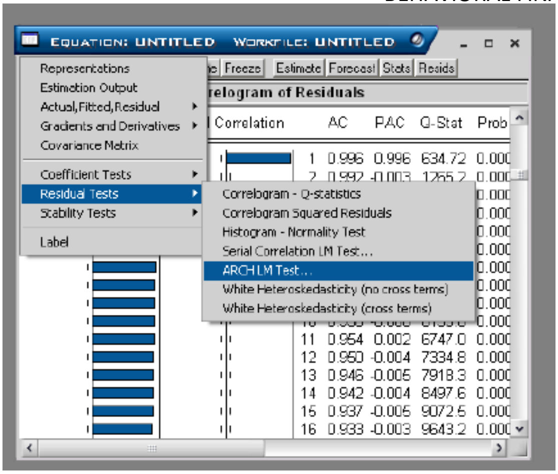

EQUATION SPECIFICATION
Equation specification
Dependent variable followed by list of regressors including ARMA and PDL terms, OR an explicit equation like Y=c(1)+c(2)*X
cpi c
Estimation settings
Method: LS - Least Squares (NLS and ARMA)
Sample: 1 637
OK
Cancel
Options


EQUATION: UNTITLED WORKFILE: UNTITLED
View Procs Objects Print Name Freeze Estimate Forecast Stats Resids
Dependent Variable: CPI
Method: Least Squares
Date: 08/26/07 Time: 22:03
Sample: 1 637
Included observations: 637
Variable Coefficient Std. Error t-Statistic Prob.
C 70.56907 1.911796 36.91245 0.0000
R-squared 0.000000 Mean dependent var 70.56907
Adjusted R-squared 0.000000 S.D. dependent var 48.25155
S.E. of regression 48.25155 Akaike info criterion 10.59230
Sum squared resid 1480743. Schwarz criterion 10.59930
Log likelihood -3372.648 Durbin-Watson stat 4.93E-05





Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
		1	0.996	0.996	634.72	0.000
		2	0.992	-0.003	1265.2	0.000
		3	0.988	-0.002	1891.3	0.000
		4	0.983	-0.004	2513.2	0.000
		5	0.979	-0.003	3130.8	0.000
		6	0.975	-0.001	3744.2	0.000
		7	0.971	-0.003	4353.3	0.000
		8	0.967	-0.001	4958.1	0.000
		9	0.963	-0.004	5558.7	0.000
		10	0.958	-0.006	6155.0	0.000
		11	0.954	0.002	6747.0	0.000
		12	0.950	-0.004	7334.8	0.000
		13	0.946	-0.005	7918.3	0.000
		14	0.942	-0.004	8497.6	0.000
		15	0.937	-0.005	9072.5	0.000
		16	0.933	-0.003	9643.2	0.000
		17	0.929	-0.002	10210.	0.000
		18	0.925	-0.006	10772.	0.000
		19	0.920	-0.003	11329.	0.000
		20	0.916	-0.004	11883.	0.000
		21	0.912	-0.005	12432.	0.000
		22	0.907	-0.004	12977.	0.000
		23	0.903	-0.005	13517.	0.000
		24	0.898	-0.007	14053.	0.000
		25	0.894	-0.006	14584.	0.000
		26	0.890	-0.005	15111.	0.000
		27	0.885	-0.005	15634.	0.000
		28	0.880	-0.005	16152.	0.000
		29	0.876	-0.004	16666.	0.000
		30	0.871	-0.002	17175.	0.000
		31	0.867	-0.005	17680.	0.000
		32	0.862	-0.005	18180.	0.000
		33	0.858	-0.004	18676.	0.000
		34	0.853	-0.006	19167.	0.000
		35	0.849	-0.005	19654.	0.000
		36	0.844	-0.007	20137.	0.000



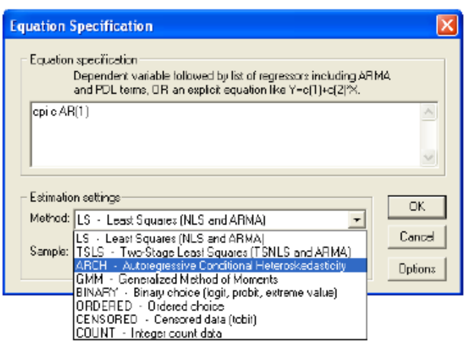
ARCH Test:

F-statistic	6235215.	Probability	0.000000
Obs*R-squared	635.9353	Probability	0.000000

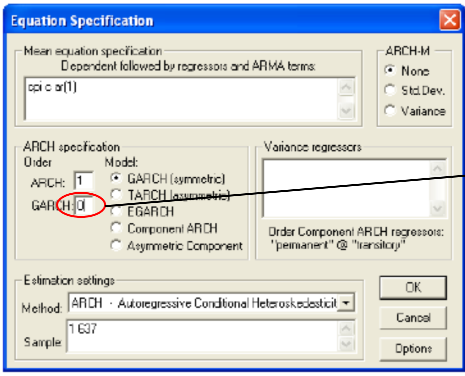
Tampak hasil pengujian dengan menggunakan ARCH LM Test menunjukkan hasil yang signifikan, oleh karena itu secara statistik kita menolak H nul (Ho) yang berarti varian residual tidak konstan atau dengan kata lain model yang digunakan mengandung unsur ARCH.

Model Estimasi ARCH

Untuk mengestimasi model ARCH dapat dilakukan dengan cara : **quick/estimate equation**



Kemudian pilih metode estimasinya dengan menggunakan ARCH, lalu klik metode tersebut sehingga aka muncul tampilan sebagai berikut :



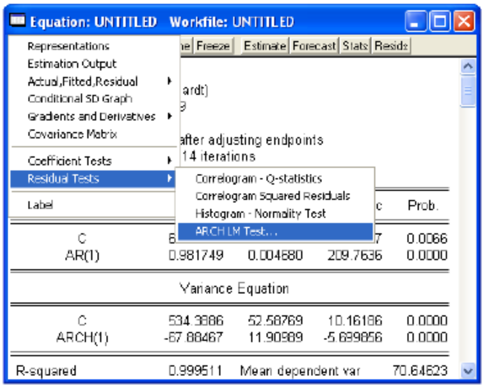
Pada tampilan ini kalau menghendaki model ARCH saja maka isi dengan (0) pada ARCH specification order.

Sehingga akan menghasilan model estimasi sebagai berikut :

Dependent Variable: CPI
Method: ML - ARCH (Marquardt)
Date: 10/25/07   Time: 12:29
Sample(adjusted): 2 637
Included observations: 636 after adjusting endpoints
Convergence achieved after 14 iterations
Variance backcast: ON

	Coefficient	Std. Error	z-Statistic	Prob.
C	66.22193	24.37509	2.716787	0.0066
AR(1)	0.981749	0.004680	209.7636	0.0000
		Variance Equation		
C	534.3886	52.58769	10.16186	0.0000
ARCH(1)	-67.88467	11.90989	-5.699856	0.0000
R-squared	0.999511	Mean dependent var		70.64623
Adjusted R-squared	0.999508	S.D. dependent var		48.25019
S.E. of regression	1.069711	Akaike info criterion		7.951147
Sum squared resid	723.1859	Schwarz criterion		7.979167
Log likelihood	-2524.465	F-statistic		430432.6
Durbin-Watson stat	0.029878	Prob(F-statistic)		0.000000
Inverted AR Roots	.98			

Tampak ARCH menunjukkan hasil yang signifikan berarti kesalahan prediksi (residual) CPI dipengaruhi oleh residual kuadrat periode sebelumnya ARCH(1).
Namun dengan memasukkan unsur persamaan ARCH ini, apakah kemudian model terbebas dari unsur ARCH? Lakukan pengujian dengan klik **View/Residual Test/ARCH LM Test.**



ARCH Test:

F-statistic	0.091028	Probability	0.762974
Obs*R-squared	0.091302	Probability	0.762528

Test Equation:
Dependent Variable: STD_RESID^2
Method: Least Squares
Date: 10/25/07 Time: 12:37
Sample(adjusted): 3 637
Included observations: 635 after adjusting endpoints

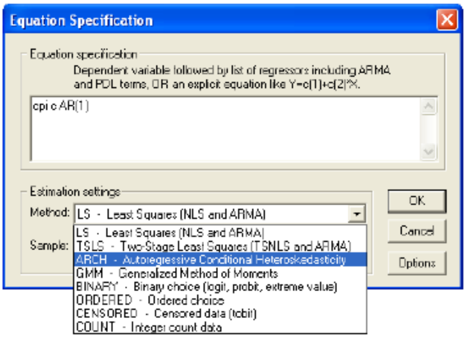
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.008176	0.004775	1.712304	0.0873
STD_RESID^2(-1)	0.011991	0.039745	0.301708	0.7630

R-squared	0.000144	Mean dependent var	0.008275
Adjusted R-squared	-0.001436	S.D. dependent var	0.119956
S.E. of regression	0.120042	Akaike info criterion	-1.398799
Sum squared resid	9.121638	Schwarz criterion	-1.384772
Log likelihood	446.1188	F-statistic	0.091028
Durbin-Watson stat	2.000168	Prob(F-statistic)	0.762974

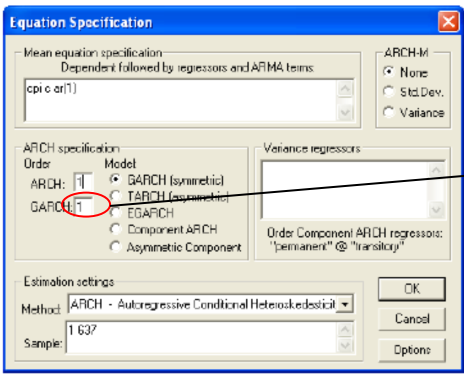
Tampak hasil perhitungan menunjukkan nilai prob sebesar 0.762528 (lebih besar dari 0.05), dengan demikian pada lag (1) secara statistik tidak signifikan sehingga kita menerima hipotesis nul (Ho) yang berarti varian residual konstan atau dengan kata lain model yang digunakan sudah tidak mengandung unsur ARCH.

Model Estimasi GARCH

Untuk mengestimasi model GARCH dapat dilakukan dengan cara : **quick/estimate equation**



Kemudian pilih metode estimasinya dengan menggunakan GARCH, lalu klik metode tersebut sehingga aka muncul tampilan sebagai berikut :



Pada tampilan ini kalau menghendaki model GARCH saja maka isi dengan (1) pada GARCH specification order.

Sehingga akan menghasilan model estimasi sebagai berikut :

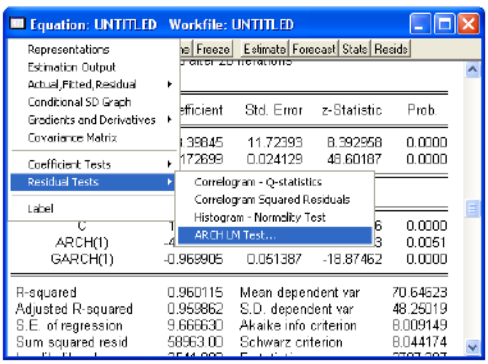
Dependent Variable: CPI
Method: ML - ARCH (Marquardt)
Date: 10/25/07 Time: 12:48
Sample(adjusted): 2 637
Included observations: 636 after adjusting endpoints
Failure to improve Likelihood after 26 iterations
Variance backcast: ON

	Coefficient	Std. Error	z-Statistic	Prob.
C	98.39845	11.72393	8.392958	0.0000
AR(1)	1.172699	0.024129	48.60187	0.0000
		Variance Equation		
C	1102.365	160.9089	6.850866	0.0000
ARCH(1)	-4.679865	1.669584	-2.803013	0.0051
GARCH(1)	-0.969905	0.051387	-18.87462	0.0000
R-squared	0.960115	Mean dependent var		70.64623
Adjusted R-squared	0.959862	S.D. dependent var		48.25019

S.E. of regression	9.666630	Akaike info criterion	8.009149
Sum squared resid	58963.00	Schwarz criterion	8.044174
Log likelihood	-2541.909	F-statistic	3797.387
Durbin-Watson stat	0.000473	Prob(F-statistic)	0.000000
Inverted AR Roots	1.17		
	Estimated AR process is nonstationary		

Tampak GARCH menunjukkan hasil yang signifikan berarti varian kesalahan prediksi (residual) CPI dipengaruhi oleh varian residual periode sebelumnya GARCH(1). Nilai ARCH juga menunjukkan hasil yang signifikan berarti varian kesalahan prediksi (residual) CPI dipengaruhi oleh varian residual kuadrat periode sebelumnya GARCH(1)

Namun dengan memasukkan unsur persamaan GARCH ini, apakah kemudian model terbebas dari unsur ARCH? Lakukan pengujian dengan klik View/Residual Test/ARCH LM Test



ARCH Test:

F-statistic	405.6918	Probability	0.000000
Obs*R-squared	248.0180	Probability	0.000000

Test Equation:
Dependent Variable: STD_RESID^2
Method: Least Squares
Date: 10/25/07 Time: 12:53
Sample(adjusted): 3 637
Included observations: 635 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.160692	0.018725	8.581812	0.0000
STD_RESID^2(-1)	0.618926	0.030728	20.14179	0.0000

R-squared	0.390580	Mean dependent var	0.425404
Adjusted R-squared	0.389617	S.D. dependent var	0.430193
S.E. of regression	0.336097	Akaike info criterion	0.660311
Sum squared resid	71.50446	Schwarz criterion	0.674338
Log likelihood	-207.6488	F-statistic	405.6918
Durbin-Watson stat	3.192647	Prob(F-statistic)	0.000000

Tampak hasil perhitungan menunjukkan nilai prob sebesar 0.000 (lebih kecil dari 0.05), dengan demikian pada lag (1) secara statistik signifikan sehingga kita menolak hipotesis nul (Ho) yang berarti varian residual tidak konstan atau dengan kata lain model yang digunakan sudah masih mengandung unsur ARCH.

D. Teori Volatility Spillovers

Spillover merupakan salah satu kategori dari Contagion yang diartikan dengan spillover yang tercipta dari interdependence diantara ekonomi-ekonomi dari berbagai negara secara berlebihan. Maksud dari interdepence disini adalah shock yang ditransfer antar negara-negara karena real link dan financial link. Spillover keuangan mengacu pada penyebaran gangguan pasar terutama pada sisi negatif dari satu negara ke negara yang lain, proses diamati melalui gerakan secara bersamaan dalam nilai tukar, harga saham, spread sovereign, dan arus modal. (Masson (1998), Wolf (1999), Forbes dan Rigobon (2000), Pritsker (2000) (Dornbusch, 2000)) Volatilitas adalah standar deviasi dari return yang ada berdasarkan variabel perunit dari waktu return yang terus meningkat pada umumnya volatilitas saham atau asset lainnya disebabkan oleh informasi baru dalam pasar.

Informasi baru tersebut yang menyebabkan orang untuk memperbaiki pendapat mereka mengenai nilai pada suau aset. Sehingga, terjadi perubahan dalam nilai pada aset dan hasil dari volatilitas. (Hull, 2015). Spillover Volatilitas Pasar Saham dapat dilihat dari volatilitas harga saham yang merupakan pengukuran statistik fluktuasi dari harga saham selama periode tertentu. Volatilitas harga saham yang tinggi menunjukan karakteristik penawaran dan permintaan saham yang tidak biasa di pasar saham. (Purbawati dan Dana,2016) Berdasarkan penelitian terdahulu, diketahui bahwa terdapat spillover volatilitas antar pasar saham satu negara dengan negara lainya seperti terjadinya adanya volatility spillover dua arah antara Indonesia dengan India dan terjadinya volatility spillover Indonesia dan China yang sifatnya searah. (Martin dan Yunita, 2010).

Contoh Jurnal :

Volatility Spillovers of Sharia Index during the Covid-19

Pandemic in ASEAN **Suripto[a,*]**suriptob.1969@fisip.unila.ac.id

[a] Department of Business Administration, Faculty of Social and

Political Science, University of Lampung Indonesia

Abstract

The rise in international financial integration is due to an increase in volatility spillovers. Therefore, it is extremely important to analyze the volatility spillovers for developing and developed countries using portfolio investment and risk management. This research investigates the Volatility Spillovers of Sharia Index on 6 ASEAN countries during the Covid-19 Pandemic using the EGARCH model. Data were obtained from 5 countries with significant volatility spillovers, namely Indonesia, Malaysia, Singapore, Thailand, and Vietnam, to determine the reciprocal relationship of the stock index in ASEAN as well as the direction of volatility movements. The result showed that this research is important for ASEAN investors except for the Philippines. Furthermore, this research has strong practical importance because the accurate prediction of the volatility spillovers in international equity markets is essential for reducing portfolio risk.

Keywords: ASEAN, Covid-19, EGARCH,

Volatility Spillovers.

JEL Classification Code: F00, E00, F30, F36

1. Introduction

A strong and efficient stock market in the long term conceptually refers to the anomaly that undermines the accuracy of the efficient market hypothesis. In practice, various forms of market anomalies undermine its accuracy, thereby, leading to inefficiency, such as herding behavior. Investors herd when they imitate the actions of others. This behavior occurs when there is a continuous interaction between rational investors, which prevents them from seeking information on market fundamentals, which is influenced by volatility spillovers (Fahdiansyah, 2016). According to Ady, Salim, & Susanto (2010), the higher the information imbalance among market players, the bigger the spread. Furthermore, the stronger the capital market's competition, the lower the selling price and the higher the buying price, thereby leading to a smaller spread. International finance integration has improved significantly over the past 30 years, thereby facilitating stronger cross-border mobility of capital and volatile spillovers (Billio et al., 2017). Dean et al. (2010) stated that increasing international financial integration led to a rise in the relationship between stock market returns and international market volatility. However, most influential studies tend to focus on developed economic contexts when the stock market is at a mature stage. The Volatility Spillovers of Sharia Index during the Covid-19 Pandemic in ASEAN seems relatively under-explored in the current literature.

During the Covid-19 pandemic, the Sharia principles were the basis for Muslim investor's behavior in the Islamic capital market (Sugianto et al., 2020). The Islamic economy's role in overcoming the economic crisis during the pandemic is one of the most important strategies for survival (Arfah et al., 2020). However, several stock indexes in the housing sector increased during this period, which means that several investment alternatives were developed during the pandemic (Levent & Beliz, 2020). Mahata et al. (2020)

stated that there are still stocks with large cash flow irrespective of the pandemic as an investment option. Therefore, this research aims to determine the Volatility Spillovers of Sharia Index during the Covid-19 Pandemic in ASEAN. This is the first research carried out to analyze the effect of the Volatility Spillovers of Sharia Index during the pandemic, which is different from previous studies that only analyzed non-Sharia Volatility Spillovers' effects in ASEAN.

Various literature studies focus on providing a deeper understanding of the stock market's volatility because it shows the risk and uncertainty of financial assets (Gunarto, 2020). Volatility Spillovers refer to volatile changes in one market that create a lagging impact on other stock markets' volatility (Milunovich & Thorp 2006). They are relevant for risk management, and, therefore, it is essential to explore the sources of volatility in financial markets around the world. Generally, the excessive financial and equity market volatilities are detrimental to the economic system function (Nikmanesh & Nor, forthcoming).

This research investigates the Volatility Spillovers of Sharia Index during the Covid-19 Pandemic in ASEAN. Furthermore, it controls the structural damage in the stock return series and focuses on the US market spillovers to the stock of ASEAN countries. The EGARCH approach was used to obtain daily frequency data set from March 2020 to December 31, 2020, during the Covid-19 Pandemic.

This research is motivated from several perspectives. The first is investigating volatility spillovers in emerging markets during the Covid-19 Pandemic. Due to the young nature of these markets, they are more vulnerable to even minor changes than the developed ones. Furthermore, this research is also motivated by the numerous literature pieces that do not convince the volatility spillovers during the pandemic. According to Carrieri et al. (2007), it is important to consider the volatility spillovers from different perspectives because previous research has shown that financial and macroeconomic developments and financial liberalization policies play an important role in integrating emerging markets.

Another important motivation associated with this research is the trend of increasing international financial integration of the Islamic index to 6 countries in ASEAN during the Covid-19 pandemic. For example, Batten et al. (2015) documented the important features of Asian stock markets and their relation to US stock markets. Miyakoshi (2003) stated that volatility is more influenced by the region's influential stock market (Japan) than the US. Meanwhile, John Wei et al. (1995) reported that the US stock market has more influence on Asian equity markets. Therefore, it is important to provide additional evidence to offer further insight into the volatility spillover puzzle between the US and other Asian stock markets.

In an influential study, Diebold & Yilmaz (2009) introduced different measures of return and volatility spillover. This research reports striking evidence of conflicting behavior in the dynamics of returns and volatility spillover. More specifically, the stock's return spillovers show a slowly increasing trend without bursts, while the volatility spillover shows no trend with clear bursts.

This study adds to the literature by providing an analysis of the impact of shocks originating from developed countries on developing ASEAN stock markets. This research advances previously published studies of volatility spillovers in several fields. Firstly, it focuses on the context of the ASEAN stock market, which is relatively poorly explored. Secondly, it is among the first studies to analyze volatility spillover effects with the ICSS algorithm used to identify extreme breaks in ASEAN stock markets (Inclan & Tiao 1994).

This research has strong practical relevance and policy implications that attract both policymakers and investors. Furthermore, it is important to analyze the volatility spillover for international investment and diversification. A clear understanding of the international volatility spillover is essential for financial supervisors to prevent domestic equity markets' excessiveness.

Section 2 of this research presents data and methods. Section 3 presents and discusses the results, while section 4 is the conclusion.

2. Data and methods

2.1. Data

This empirical analysis focuses on examining the sharia index of 6 countries in ASEAN during the Covid-19 pandemic in 2020. The data used to analyze the global financial crisis was obtained from March 2, 2020, to December 31, 2020. This study analyzes the Sharia Volatility Spillovers Index in six ASEAN countries during the Covid-19 Pandemic, namely Indonesia (Jakarta Islamic), the Philippines (FTWIPHLL), Malaysia (FBMKCI), Singapore (STI), Thailand (SET), and Vietnam (VN INDEX). Data were collected from the Bloomberg database.

2.2. Testing Stationary Data

Statistical tests were also performed to analyze stationary data, apart from plotting time-series graphs, using the Augmented Dicky Fuller test (ADF test). Some time-series data such as price are non-stationary because there is no fixed price level. This type of series is called a unit-root non-stationary time series because it is a stochastic process capable of causing problems in time series modeling (Tsay, 2005). The ADF test process is presented as follows (Brockwell and Davis, 2002; Tsay, 2005).

x1, x2 ... , xn are time-series data and {xt} follow the AR (p) model with mean μ. The mathematical expression of the model is presented in Equation (1).

$$Xt(\mu + \varphi 1Xt - 1) = \sum_{i=1}^{p-1} \varphi 1\Delta Xt - 1 + \varepsilon t \tag{1}$$

Where xt denotes the difference sequence, εt is white noise with mean 0 and the variance σ2 (ε t ~ WN (0, σ2)). The ADF test as a unit-root test was carried out by calculating the statistical value τ as follows:

Ho: ϕ 1 = 1 (non-stationary data).

Ho: ϕ 1 < 1 (stationary data). Statistics.

Statistical test (ADF test):

$$\tau = \frac{\varphi 1}{Se\ \varphi 1} \tag{2}$$

For the level of significance (α = 0.05), Ho is rejected if τ <−2.57 or if P <0.05 (Brockwell and Davis, 2002. p.195).

2.3. Checking for White Noise

Montgomery et al. (2008) stated that a time series is termed a white noise when it consists of uncorrelated observations (data) and has constant variance. Furthermore, when the observed time series is normally distributed, it is called Gaussian white noise. When the time series is termed a white noise, the distribution of the sample autocorrelation coefficient at lag k in a large sample is close to the normal distribution with a mean of 0 and a variance of 1 / T, where T is the number of observations (Montgomery et al., 2008; Brockwell and Davis, 2002; Pankratz, 1991). The expression is presented in Equation (3).

$$r \sim N(0,\tfrac{1}{T}$$

Based on Equation (3), it is possible to test the autocorrelation lag k Ho: ρ k = 0 against Ha: ρ k ≠ 0 using test statistics, as in Equation (4).

$$Z = \frac{rk}{\sqrt{1}/T} = rk\,\sqrt{T} \tag{4}$$

Ho is rejected if | Z | > Z $_{\alpha/2}$ is the top α / 2 percent of the standard or if P <0.05. The test statistic given by Equation (4) can be used to test ACF and PACF (Wei, 2006). Also, when the ACF slowly decays, the time series is indicated as non-stationary.

The procedure presented above is carried out one test at a time with the level of significance applied to the autocorrelation and considered individually. This study aims to evaluate a set of autocorrelations simultaneously when the time series is indicated as white noise. Therefore, this problem is solved using a statistical expression given by the Box-Pierce statistic (Box-Pierce, 1970), as shown in Equation (5).

$$Q_{BP} = T\sum_{k=1}^{K} r^2\mathrm{k} \tag{5}$$

It is distributed approximately as chi-squared with degrees of freedom K and under the null hypothesis that the time series is white noise (Montgomery et al., 2008). Ho is rejected if $Q_{BP} > X^2_{\alpha,K}$ and concludes that the time series is not white noise. It is also possible to use the p-value to reject Ho if P <0.05.

When the data is not stationary, the data differentiation and transformation processes are conducted.

2.4. Testing the ARCH Effect

This step is to estimate and examine parameters, diagnose and test residuals, and select the best model based on the criteria with the smallest value from AIC or SC. The residuals obtained from the best ARMA model are examined using the LM test to determine the ARCH effect. In the presence of an ARCH effect, the data is modeled using the ARCH or GARCH method. The sequence of the ARCH or GARCH model is found by plotting the square of the PACF residuals.

2.5. ARCH model

The ARCH/GARCH model is based on the assumption that the variance is not constant. According to Engle (2001), this assumption is called heteroscedasticity. It is associated with the basic idea of the least-squares model that assumes the expected values of all squared errors are the same at some point. The ARCH and GARCH models treat heteroscedasticity as a variant that needs to be modeled (Engle, 2001; Bollerslev, 1986). Furthermore, Engle (1982) introduced a conditional time-variance model with an autoregressive conditional heteroscedasticity (ARCH) model using lagged disturbances. Engle (2001) stated that ARCH is an autoregression function, which assumes that the variance is not constant over time and is affected by past data. The idea behind this model is to determine the relationship between current and previous random variables.

2.6. Generalized ARCH (GARCH) model

GARCH (Generalized Autoregressive Conditional Heteroscedastic) model is a general form of ARCH built to avoid high sequences. The GARCH model does not only examine the relationship between several residuals, it also depends on some past residuals (Eliyawati, 2014). GARCH was introduced by Bollerslev (1986), and the model with degrees p and q is defined as follows.

$$X_t|F_{t-1}|\sim N(0,\sigma^2{}_t) \tag{6}$$

The model allows conditional variants based on the previous lag, as shown in Equation (7).

$$\sigma^2{}_t = \omega + \sum_{i=1}^{q} \lambda_{i\varepsilon_{t-i}^2} + \sum_{j=1}^{p} \beta_{j\sigma_{t-j}^2} \tag{7}$$

Where the present value of the conditional variant is parameterized based on the q lag of the residual square and the p lag written as GARCH (p, q). Therefore, the varied conditional variance of the GARCH model is heteroscedastic with autoregression and MA (Wang, 2009). The GARCH model is written as in Equation (8).

$$X_t = \delta + \sum_{i=1}^{p} \emptyset_1 X_{t-i} - \sum_{i=1}^{q} \theta_1 \varepsilon_{t-i} + \varepsilon_t \tag{8}$$

$$\varepsilon_t \sim N(0, \sigma^2)$$

$$\sigma^2{}_t = \omega + \sum_{i=1}^{q} \lambda_{i\varepsilon_{t-i}^2} + \sum_{j=1}^{p} \beta_{j\sigma_{t-j}^2}$$

x_t is the equation of conditional mean (Bollerslev, 1986).

2.7 EGARCH model

This research makes use of the EGARCH model, also known as GARCH-BEKK model designed by Vo & Ellis (2018), to control the potential structural breaks in the volatility series. In particular, it uses the Iterative Cumulative Sum of Squares algorithm (ICSS) proposed by Inclán and Tiao (1994) to detect some lag dates in the Volatility Spillovers of Sharia Index in ASEAN during the Covid-19 Pandemic and also to examine its effects on other ASEAN stock markets. The original ICSS algorithm was widely applied in studies examining volatility spillovers. However, only a few studies used this approach to control structural damage from an EGARCH perspective. The ICSS algorithm needs the assumption of stationary unconditional variance over a period separated by a detected breakpoint. This is also used to estimate the effect of volatility in stock market returns. Several literature studies, such as Kim & Kon (1994), stated that Nelson's (1991) EGARCH model is the most appropriate specification for modeling stock index volatility. This was further confirmed in many subsequent studies, such as the research carried out by Krause & Tse (2013). After detecting all points of change in the volatility sequence, this research estimates the EGARCH model, which calculates change points for each series of ASEAN stock returns. All points of change are calculated via a set of dummy variables that are assigned a value of 1 for each point of change in variance and 0 when otherwise.

The reason for using the EGARCH (1,1) model rather than GARCH (1,1) is to loosen the non-negative constraints of the variance equation coefficient. More specifically, AR (1) -EGARCH (1,1) is adapted for the series of returns for each country in the data sample. In general, the mean and variance equations are represented as follows:

$$R_{it} = \alpha_{0i} + \alpha_{1i}R_{i,\, t-1} + \varepsilon_{it}\, ,\ \varepsilon_{it} \sim N\,(0, h_{it}); \tag{9}$$

$$h_{it} = \beta_{0i} + \sum\delta_{ji}\, Break_{ji} + \beta_{1i}h_{i,\, t-1} + \gamma\, \varepsilon 2 \tag{10}$$

where

Rit : The return of country i on day t

Hit : The variance of stock returns in country i on day t

Break : The dummy variable for the break point j of 1 during the period between the break point (j-1) to the break point j and 0 elsewhere.

To ensure resilience, the AR (1) -EGARCH (1,1) model is estimated without structural damage dummies. However, ASEAN stock market volatility is incorporated into the variance equation.

$$R_{it} = \alpha_{0i} + \alpha_{1i}R_{i,\, t-1} + \varepsilon_{it}\, ,\ \varepsilon_{it} \sim N\,(0, h_{it});\ h_{it} = \beta_{0i} + \theta_i USVolatility + \beta_{1i}h_{i,\, t-1} + \gamma\, \varepsilon 2 \tag{11}$$

where Volatility Spillovers is the variance of ASEAN stock returns and θi shows the effect of the stock return variance on country i.

3. Results

Table 1 shows descriptive statistics for stock market returns with positive mean returns values for all indices. Singapore stock market has the highest probability level of 0.588.

Table 1: Descriptive Statistics (in percentage)

Variable	Probability	Std. Dev.	Min	Max
R_Indonesia	0.000	0.064	2.352	2.907
R_Philippines	0.000	0.062	-0.257	0.278
R_Malaysia	0.000	0.036	0.659	0.893
R_Singapore	0.588	0.028	2.471	2.611
R_Thailand	0.369	0.027	2.031	2.155
R_Vietnam	0.000	0.062	2.699	3.052

The stock market daily average return in the sample is relatively large at 2.611, while the standard deviation is smaller at 0.028. Furthermore, the stock market of several emerging markets, such as, Thailand is second after Singapore, which has a high probability of 0.369 with a standard deviation of 0.027. Meanwhile, the other 4 countries are under Singapore and Thailand with a probability level of 0.000.

Table 2: Unit Root Test

Variable	Missing Points	Test statistics	ADF Phillip - Perron
R_Indonesia	9	-11,858 ***	0,000 ***
R_Philippines	6	-14,943 ***	0,000 ***
R_Malaysia	7	-5,413 ***	0,000 ***
R_Singapor	5	-2,068	0,258 ***

***, **, * respectively indicating a significance level of 1%, 5%, and 10%

The results of the stationarity test, which used the ADF and Phillip-Perron tests to determine the stationarity, are shown in Table 2. Both tests rejected the null hypothesis of non-stationary rates for all countries' stock returns, indicating a consistent conclusion that all stock returns are I (0).

Subsequently, white noise was performed, which is a statistical test of the estimation of the hypothesis that there is no autocorrelation from the series to a certain interval that is significantly different from zero. There is no information on the series for all logs. Autocorrelation was examined in six groups, as shown in Table 3, in which the white noise hypothesis was strongly received (P> 0.0001).

Table 3: White Noise Test

To Lag	P-Value	AC	Pac	Q-Stat	prob
1	<0,0001	0.298	0.298	17.902	0.000
2	<0,0001	0.232	0.157	28.836	0.000
3	<0,0001	0.449	0.387	70.038	0.000
4	<0,0001	0.290	0.100	87.334	0.000
5	<0,0001	0.257	0.098	100.94	0.000
6	<0,0001	0.241	-0.017	112.99	0.000
7	<0,0001	0.167	-0.050	118.78	0.000
8	<0,0001	0.188	0.005	126.17	0.000
9	<0,0001	0.076	-0.116	127.39	0.000
10	<0,0001	0.116	0.033	130.21	0.000
11	<0,0001	0.174	0.082	136.67	0.000
12	<0,0001	0.128	0.100	140.15	0.000
13	<0,0001	0.036	-0.064	140.44	0.000
14	<0,0001	0.053	-0.057	141.05	0.000
15	<0,0001	0.232	0.191	152.76	0.000
16	<0,0001	0.155	0.084	158.02	0.000
17	<0,0001	0.034	-0.047	158.29	0.000
18	<0,0001	0.239	0.119	170.88	0.000
19	<0,0001	0.120	-0.069	174.08	0.000
20	<0,0001	0.046	-0.058	174.55	0.000
21	<0,0001	0.167	0.003	180.84	0.000
22	<0,0001	0.128	0.019	184.52	0.000
23	<0,0001	0.120	0.048	187.81	0.000
24	<0,0001	-0.008	-0.146	187.83	0.000
25	<0,0001	0.005	-0.031	187.84	0.000
26	<0,0001	0.078	-0.046	189.23	0.000
27	<0,0001	0.051	0.071	189.84	0.000
28	<0,0001	-0.029	-0.015	190.04	0.000
29	<0,0001	0.047	0.082	190.56	0.000
30	<0,0001	0.006	-0.051	190.56	0.000
31	<0,0001	-0.020	-0.032	190.66	0.000
32	<0,0001	0.063	0.098	191.60	0.000
33	<0,0001	0.030	-0.074	191.82	0.000

34	<0,0001	0.058	0.059	192.65	0.000
35	<0,0001	0.007	-0.017	192.66	0.000
36	<0,0001	-0.000	-0.025	192.66	0.000

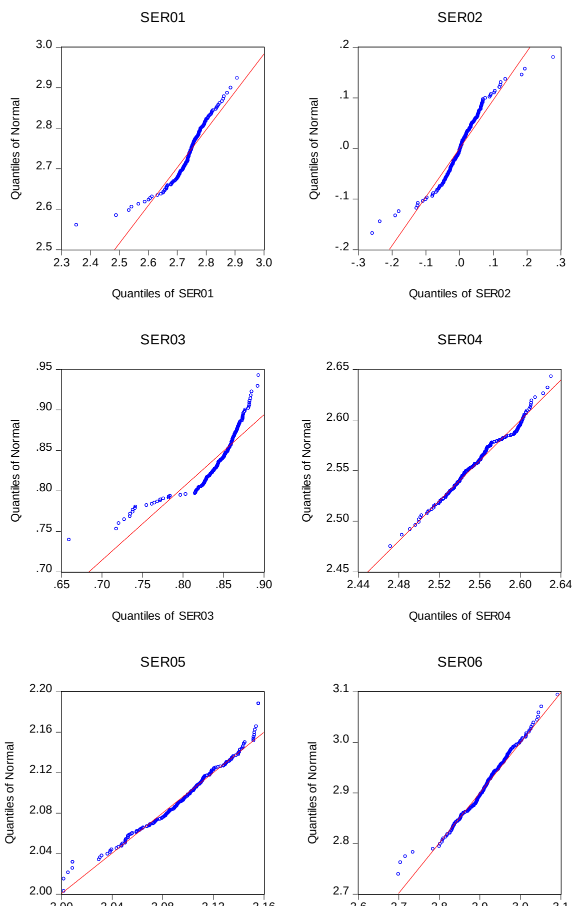
Furthermore, testing was carried out regarding the heteroscedasticity of the Sharia Index during the Covid-19 Pandemic in ASEAN using the heteroscedasticity test with ARCH, as shown in Table 4.

Table 4: Heteroscedasticity test

Heteroskedasticity Test: ARCH			
F-statistic	174.2866	Prob. F(1,196)	0.0000
Obs*R-squared	93.19469	Prob. Chi-Square(1)	0.0000

The heteroscedasticity test results with ARCH show that the p-value Obs * R-squared = 0.0000 <α, therefore, heteroscedasticity and modeling can be continued with EGARCH to create forecasting models. Table 4 shows a model from EGARCH.

Figure 1: Decrease of volatility spillovers in returns on Sharia Index stocks in ASEAN



SER01 : Indonesia
SER02 : Philippines
SER03 : Malaysia
SR04 : Singapore
SER05 : Thailand
SER06 : Vietnam

After applying white noise to identify sudden shifts in the volatility of the series of returns on Islamic stock indices in ASEAN, the EGARCH model (1,1) was estimated with and without dummy variables in order to analyze the overflow. The significance of the Break dummy variable in each EGARCH model allows estimating changes in the associated volatility and analyzes the abundance of volatility between ASEAN countries.

Table 5 shows the estimation results for the EGARCH model without considering structural damage.

Table 5: Results of the EGARC H model without considering structural damage

LOG(GARCH) = C(7) + C(8)*RESID(-1)/@SQRT(GARCH(-1)) + C(9) *LOG(GARCH(-1))

Variable	Coefficient	Std. Error	z-Statistic	Prob.
Indonesia	0.045508	0.005669	8.028236	0.0000
Philippines	-0.002412	0.006671	-0.361596	0.7177
Malaysia	-0.057870	0.013994	-4.135359	0.0000
Singapore	0.199745	0.018245	10.94819	0.0000
Thailand	0.161549	0.023083	6.998642	0.0000
Vietnam	0.027514	0.010517	2.616042	0.0089
Variance Equation				
C(7)	-0.517911	0.210506	-2.460316	0.0139
C(8)	-0.080755	0.028914	-2.792962	0.0052
C(9)	0.949578	0.022101	42.96543	0.0000

Mean dependent var	1.000000	S.D. dependent var	0.000000
S.E. of regression	0.012760	Akaike info criterion	-6.479688
Sum squared resid	0.031425	Schwarz criterion	-6.330744
Log likelihood	653.7289	Hannan-Quinn criter.	-6.419406
Durbin-Watson stat	0.124915		

The results in Table 5 show that the EGARCH Model indicates that Indonesia, Malaysia, Singapore, Thailand, and Vietnam have a probability of R = 0.000000 <α, therefore H0 is rejected, which means that there is spillover volatility. The results of the analysis with EGARCH still need to be re-evaluated by carrying out several tests, such as serial correlation, ARCH effect, and normality. In conclusion, the EGARCH model did not have an autocorrelation and ARCH effect, irrespective of whether the data were not normally distributed.

Table 6: Granger causality test results

Pairwise Granger Causality Tests
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
Philippines Does Not Granger Cause Indonesia	197	0.96975	0.3810
Indonesia Does Not Granger Cause Philippines		2.30871	0.1021
Malaysia Does Not Granger Cause Indonesia	197	2.81186	0.0626
Indonesia Does Not Granger Cause Malaysia		1.19861	0.3039
Singapore Does Not Granger Cause Indonesia	197	4.12609	0.0176
Indonesia Does Not Granger Cause Singapore		0.50001	0.6073
Thailand Does Not Granger Cause Indonesia	197	1.68209	0.1887
Indonesia Does Not Granger Cause Thailand		1.49094	0.2278
Vietnam Does Not Granger Cause Indonesia	197	2.57696	0.0786
Indonesia Does Not Granger Cause Vietnam		0.33952	0.7125
Malaysia Does Not Granger Cause Philippines	201	6.14871	0.0026
Philippines Does Not Granger Cause Malaysia		20.0764	1.E-08
Singapura Does Not Granger Cause	201	1.58846	0.2069

Philippines Philippines Does Not Granger Cause Singapura		7.50724	0.0007
Thailand Does Not Granger Cause Philippines	201	3.65236	0.0277
Philippines Does Not Granger Cause Thailand		3.84320	0.0231
Vietnam Does Not Granger Cause Philippines	201	4.52835	0.0120
Philippines Does Not Granger Cause Vietnam		0.55620	0.5743
Singapore Does Not Granger Cause Malaysia	202	0.81665	0.4434
Malaysia Does Not Granger Cause Singapore		0.14946	0.8613
Thailand Does Not Granger Cause Malaysia	205	0.19914	0.8196
Malaysia Does Not Granger Cause Thailand		3.02540	0.0508
Vietnam Does Not Granger Cause Malaysia	205	3.54464	0.0307
Malaysia Does Not Granger Cause Vietnam		8.58959	0.0003
Thailand Does Not Granger Cause Singapore	202	2.40613	0.0928
Singapore Does Not Granger Cause Thailand		0.21592	0.8060
Vietnam Does Not Granger Cause Singapore	202	3.66561	0.0273
Singapore Does Not Granger Cause Vietnam		2.68597	0.0707
Vietnam Does Not Granger Cause Thailand	213	4.69750	0.0101
Thailand Does Not Granger Cause Vietnam		0.76150	0.4683

In this study, the Granger causality test was carried out to determine whether the volatility spillover variable and the Sharia Index variable had a unidirectional, two-way, or no causality relationship using data from 1247 days of observation. Table 6 shows the results of the Granger causality test of return volatility spillover on the Sharia Index of 6 ASEAN countries.

4. Conclusion

Emerging markets provide the ideal setting for studying stock market volatility for several reasons. It is generally recognized that emerging markets are more volatile than developed equity markets. This volatile nature is exaggerated by the fact that emerging equity markets are small and heavily influenced by small innovations in developed markets. Therefore, this study investigates the Volatility Spillovers of Sharia Index during the Covid-19 Pandemic in ASEAN. Data on the Volatility Spillovers of Sharia Index data during the Covid-19 Pandemic in ASEAN were obtained from March 2 - December 31, 2020.

The results showed that there was a volatility spillover increase in the international financial integration of the Islamic index of 6 countries in ASEAN as indicated by the EGARCH method. Furthermore, the granger casualty test was carried out to determine the direction of volatility spillover, which was found to have no relationship in the stock markets of Indonesia, Malaysia, Singapore, Thailand, and Vietnam except for the Philippines and the Sharia Index during the Covid-19 Pandemic in ASEAN. Therefore, this indicates that shocks in the stock markets of Indonesia, Malaysia, Singapore, Thailand, and Vietnam, were not responsible for shocks in the Sharia Index during the Covid-19 Pandemic in ASEAN and vice versa. Globalization and financial liberalization facilitate the movement of capital across borders. This trend also encourages volatility spillover from mature to emerging markets. These findings are essential for investors in portfolio investment and risk management. It is also relevant for policymakers to embed the relevant framework for monitoring and controlling excessive volatility spillover.

Acknowledgments: The authors are grateful to Bloomberg and the Indonesia Stock Exchange for providing data on world stock prices.

References

Aggarwal, R., Inclan, C. & Leal, R. 1999, 'Volatilitas di pasar saham yang sedang berkembang', Jurnal Analisis Keuangan dan Kuantitatif, vol. 34, tidak. 1, hlm. 33-55.

Arfah, A., Olilingo, F. Z., Syaifuddin, S., Dahliah, D., Nurmiati, N., & Putra, A. H. P. K. (2020). Economics During Global Recession: Sharia-Economics as a Post COVID-19 Agenda. *Journal of Asian Finance, Economics and Business*, *7*(11), 1077–1085. https://doi.org/10.13106/jafeb.2020.vol7.no11.1077.

Batten, JA, Morgan, P. & Szilagyi, PG 2015, 'Integrasi pasar saham Asia yang bervariasi waktu',*Tinjauan Ekonomi Singapura*, vol. 60, tidak. 01, hlm.1550006-1--24.

Billio, M., Donadelli, M., Paradiso, A. & Riedel, M. 2017, 'Yang mengukur integrasi pasar?', *Jurnal Perbankan & Keuangan*, vol. 76, hlm. 150-74.

Carrieri, F., Errunza, V. & Hogan, K. 2007, 'Karakterisasi Integrasi Pasar Dunia melalui Waktu', Jurnal Analisis Keuangan dan Kuantitatif, vol. 42, tidak. 4, hlm.915-40.

Dekan, WG, Faff, RW & Loudon, GF 2010, 'Asimetri sebagai imbalan dan limpahan volatilitas antara pasar ekuitas dan obligasi di Australia', Pacific-Basin Finance Journal, vol. 18, tidak. 3, hlm. 272-89.

Diebold, FX & Yilmaz, K. 2009, 'Mengukur pengembalian aset keuangan dan limpahan volatilitas, dengan aplikasi untuk pasar ekuitas global', The Economic Journal, vol. 119, tidak. 534, hlm. 158- 71.

Gunarto, T., Azhar, R., Tresiana, N., Supriyanto, & Ahadiat, A. (2020). Accurate estimated model of volatility crude oil price. International Journal of Energy Economics and Policy, 10(5), 228–233. https://doi.org/10.32479/ijeep.9513.

Inclan, C. & Tiao, GC 1994, 'Penggunaan Jumlah Kumulatif Kuadrat untuk Deteksi Retrospektif Perubahan Varians', Jurnal Asosiasi Statistik Amerika, vol. 89, tidak. 427, hlm.913-23.

John Wei, KC, Liu, Y.-J., Yang, C.-C. & Chaung, G.-S. 1995, 'Volatilitas dan efek limpahan perubahan harga di pasar maju dan berkembang', Pacific-Basin Finance Journal, vol. 3, tidak. 1, hlm.113-36.

Kim, D. & Kon, SJ 1994, 'Model Alternatif untuk Heteroskedastisitas Bersyarat Pengembalian Saham', The Journal of Business, vol. 67, tidak. 4, hlm. 563-98.

Krause, T. & Tse, Y. 2013, 'Volatility and return spillovers in Canadian and US industry ETFs', *Ulasan Internasional Ekonomi & Keuangan*, vol. 25, hlm. 244-59.

Levent, S., & Beliz, O. (2020). Investing in gold or REIT index in Turkey: evidence from global financial crisis, 2018 Turkish currency crisis and COVID-19 crisis. In Journal of European Real Estate Research: Vol. ahead-of-print (Issue ahead-of-print). https://doi.org/10.1108/JERER-04-2020-0023.

Mahata, A., rai, A., Prakash, O., & Nurujjaman, M. (2020). Modeling and analysis of the effect of COVID-19 on the stock price: V and L-shape recovery. In *arXiv.org*. Cornell University Library, arXiv.org.

https://search.proquest.com/working-papers/modeling-analysis-effect-covid-19-on-stock-price/docview/2447129524/se-2?accountid=13771.
Milunovich, G. & Thorp, S. 2006, 'Menilai limpahan volatilitas', Jurnal Keuangan Global, vol. 17, tidak. 1, hlm. 1-22.

Miyakoshi, T. 2003, 'Spillovers of stock return volatility to Asian equity market from Japan and US', Journal of International Financial Markets, Institutions and Money, vol. 13, tidak. 4, hlm. 383-99.

Nelson, DB 1991, 'Heteroskedastisitas bersyarat dalam pengembalian aset: Pendekatan baru',*Econometrica: Jurnal Masyarakat Ekonometrika*, vol. 59, tidak. 2, hlm. 347-70.

Nikmanesh, L. & Nor, AHSM yang akan datang, 'Kausalitas-in-varians antara pasar saham dan variabel makroekonomi di singapore', The Singapore Economic Review, vol. 0, tidak. 0, hal. 1650036.

Sugianto, Marpaung, M., Mujiatun, S., Husein, I., & Silalahi, P. R. (2020). The behavior of muslim investors in investing in stocks on the Indonesia stock exchange during the COVID-19 pandemic. *Systematic Reviews in Pharmacy*, *11*(4), 745–752. https://doi.org/10.31838/srp.2020.4.10

Vo, XV & Ellis, C. 2018, 'Integrasi keuangan internasional: hubungan pengembalian saham dan transmisi volatilitas antara Vietnam dan negara-negara maju', Emerging Markets Review, vol. 36, tidak. September 2018, hlm.19-27.

Highlight

-We investigated Volatility Spillovers from the sharia index of 6 countries in ASEAN during the Covid-19 pandemic period March 2 - December 31, 2020.

-We used the EGARCH model coupled with White Noise to control the excessive volatility-suppressing effect

BAB VI

KESIMPULAN

Keuangan konvensional didasarkan pada teori-teori yang menggambarkan orang-orang untuk sebagian besar berperilaku secara logis dan rasional. Orang-orang mulai mempertanyakan sudut pandang ini karena telah ada anomali (penyimpangan), yang merupakan peristiwa keuangan konvensional yang memiliki waktu yang sulit untuk menjelaskan.

Tiga kontributor terbesar dalam psikolog adalah Daniel Kahneman dan Amos Tversky, dan ekonom Richard Thaler.

Konsep anchoring mengacu pada kecenderungan orang untuk melampirkan atau '*anchor*' pikiran ketitik acuan meskipun faktanya bahwa hal itu mungkin tidak memiliki relevansi yang logis untuk mengambil keputusan.

Akuntansi mental mengacu pada kecenderungan orang untuk membagi uang mereka kedalam rekening yang terpisah berdasarkan kriteria seperti sumber dana dan niat untuk apa uang itu digunakan nantinya. Selanjutnya, pentingnya dana di rekening masing-masing tersebut juga bervariasi tergantung padasumber uang dan niatnya.

Konfirmasi bias mengacu kepada bagaimana ornag cenderung lebih penuh perhatian terhadap informasi baru yang menegaskan pilihan terbentuk sebelumnya tentang suatu subjek. *Hindsight Bias* mewakili bagaimana orang-orang percaya bahwa setelah fakta, terjadi suatu peristiwa yang benar-benar jelas.

Gambler's Fallacy mengacu kepada interprestasi yang salah dari statistik dimana seseorang percaya bahwa terjadinya peristiwa independen acak entah bagaimana akan menyebabakanacara independen acak lain kurang mungkin untuk terjadi.

Perilaku kawanan mewakili preferensi bagi individu untuk meniru perilaku atau tindakan dari kelompok ukuran yang lebih besar. Terlalu percaya mengacu kepada kecenderungan investor untuk melebih-lebihkan kemampuannya dalam melakukanbeberapa tindakan. Berlebihan terjadi ketika salah satu bereaksi terhadap sebuah berita dengan cara yang lebih besar dari dampak sebenarnya berita tersebut.

Teori prospek mengacu kepada ide yang dibuat oleh Kahneman dan Tversky yang intinya menetapkan bahwa orang tidak menyandingkan tingkat yang sama kesenangan dan kesulitan untuk efek yang sama. Individu rata-rata cenderung lebih sensitif terhadap loss. Dalam arti bahwa ia akan merasa lebih sakit ketika ia menerima kerugian dibandingkan dengan jumlah kesenangan yang diterimanya dengan jumlah yang sama dengan kesulitan tersebut.

Event Study Theory merupakan penelitian yang mengamati dampak dari pengumuman informasi terhadap harga sekuritas. Penelitian event study umumnya berkaitan dengan seberapa cepat suatu informasi yang masuk ke pasar dapat tercermin pada harga saham. Studi peristiwa (event study) menggambarkan sebuah teknik riset keuangan empiris yang memungkinkan seorang pengamat menilai dampak dari suatu peristiwa terhadap harga saham perusahaan.

Teori keagenan (agency theory) yang menyatakan bahwa ”praktek earning management dipengaruhi oleh konflik antara kepentingan manajemen (agent) dan pemilik (principal) yang timbul karena setiap pihak berusaha untuk mencapai atau mempertimbangkan tingkat kemakmuran yang dikehendakinya”. Agency theory memiliki asumsi bahwa masing-masing individu semata-mata termotivasi oleh kepentingan dirinya sendiri sehingga menimbulkan konflik kepentingan antara principal dan agent. Pihak principal termotivasi mengadakan kontrak untuk menyejahterakan dirinya dengan profitabilitas yang selalu meningkat.

Teori Auto rejection adalah penolakan secara otomatis oleh JATS Terhadap penawaran jual dan permintaan beli di pasar modal sebagai akibat dilampauinya batasan harga yang ditetapkan bursa efek. Batasan auto rejection merupakan aturan yang di buat oleh Bursa Efek Indonesia yang memiliki peran sangat penting karena untuk memperlancar kegiatan transaksi yang terjadi di bursa efek supaya tidak merugikan salah satu pihak yang ikut dalam kegiatan transaksi dalam bursa efek.

Penganut teori perilaku telah memasuki model yang lebih compleks yang dapat memprediksikan masa depan daripada hanya menjelaskan dengan memanfaatkan masa lalu tentang apa yang dilakukan pasar di masa lalu. Pelajaran terpenting adalah bahwa teori ini tidak menjelaskan bagaimana orang lain bertransaksi di pasar melainkan teori ini mengatakan bahwa psikologi menyebabkan penyimpangan harga pasar dan nilai fundamental.

Teori perilaku keuangan tidak menawarkan keajaiban dalam investasi, tetapi dapat membantu para investor dalam melatih diri untuk mewaspadai perilaku mereka sendiri. Yang pada akhirnya akan dapat menghindari kesalahan yang dapat mengakibatkan mereka mengurangi kekayaan mereka.

DAFTAR PUSTAKA

Ackert, L. F. & Deaves, R. (2010). Behavioural Finance- Psychology, Decision-Making and Markets. South- Western CENGAGE Learning.

Baker, H. Kent and John R. Nofsinger (2010); Behavioral Finance: Investors, Corporations and Markets; John Wiley& Sons.

Barberis, N. and R. H. Thaler (2003); A Survey of Behavioral Finance; in G. M. Constantinides,

Barberis, N., Huang, M. & Santos, T. (2000). Prospect Theory and Aset Prices. Quarterly Journal of Economics 116 (1), 1-53.

Barradale, N. J. (2009). Social Incentives and Human Evolution. University of California, Berkeley, 1-39.

Bourdieu, Pierre. (1990). *The Logic of Practice*. California*:* Atanford University Press.

Elvin, Mike (2004); Financial Risk Taking: Introduction to the Psychology of Trading and Behavioural Finance; John Wiley & Sons.

Forbes, William (2009); Behavioural Finance; John Wiley & Sons Inc.

Godoi, C. K; Marcon, R. and Anielson B. Da Silva (2005); Loss Aversion: A Qualitative Study in Behavioural Finance; Managerial Finance, Vol. 31, No. 4; pp. 46 –56.

Goldberg, Joachim and Rudiger Von Nitzsch (2001); Behavioral Finance; John Wiley & Sons

Hankinson, Alan. (2000). "*The Key Factors in The Profiles of Small Firm Owner Managers That Influence Business Performance. The South Coast Small Firms Survey*, 1997- 2000". Industial and Commercial Training Vol.32 No.3.

http://nfaridaputri-fisip13.web.unair.ac.id/artikel_detail-119326 Prinsip%20Prinsip%20Ilmu%20Ekonomi%20(EKT205)-Teori%20Prospek:%20Keterkaitan%20Ekonomi%20dan %20Psikologi.html

http://novenrique.blogspot.co.id/2013/01/12-bias-kognitif-yang-membuat-anda.html

http://www.kompasiana.com/sina/gambler-fallacy-pada-investor_550eae61a33311b12dba8339

https://en.wikipedia.org/wiki/Herd_behavior https://gigihuzaman.wordpress.com/2011/07/23/definisi-the-winner%E2%80%99s-curse-kutukan-sang-pemenang/

https://www.sirusindo.com/index.php/8-utama/investasi/28-efek-januari-the-january-effect

Kahneman, Daniel and Amos Tversky (1979); Prospect Theory: An Analysis of Decision Under Risk; Econometrica, Vol. 47, No. 2; pp. 263 – 292.

Kahneman, Daniel and Amos Tversky (2000); Choices, Values and Frames; Cambrige UniversityPress.

Kahneman, Daniel; Slovic, Paul and Amos Tversky (1982); Judgment Under Uncertainty: Heuristics and Biases; Cambrige University Press.

Lim, Vivien K. G. & Thompson S.H. Teo. (1997). Sex, Money and Financial Hardship: An empirical study of attitudes towards money among undergraduates

M. Harris and R. Stulz; Handbook of the Economic of Finance; Elsevier

Odean, T. (1999); Do Investors Trade Too Much? American Economic Review, Vol. 89, No. 5, pp. 1279-1298.

Olsen, Robert A. (1998); Behavioral Finance and Its Implications for Stock-Price Volatility; Financial Analyst Journal, Vol. 54, No. 2; pp. 10 – 18

Perry, Vanessa G. and Marlene D. Morris (2005); Who is Control ? The Role of Self Perception, Knowledg, and Income in Explaining Consumer Financial Behaviour; Journal of Consumer Affairs; Vol. 29, No. 2; pp. 299 – 313.

Pompian, Michael M. (2006); Behavioral Finance and Wealth Management: How to Build Optimal Portofolios that Account for Investor Biases; John Wiley & Sons.

Pompian, Michael M. (2012); Behavioral Finance and Investor Types: Managing Behavior to Make Better Investment Decisions; John Wiley & Sons.

Purboyo, Arthur., Inge Barlian dan Elizabeth T. Manurung. (2012). *Pengaruh faktor-faktor kebiasaan (habitus), modal (capital) dan perubahan (changes) sebagai model perilaku keuangan untuk meningkatkan performa keuangan perempuan pelaku UMKM (suatu studi di UMKM binaan FE-UNPAR-Bandung dan Jakarta*. Bandung: Universitas Katolik Parahyangan: Lembaga Penelitian dan Pengabdian Masyarakat.

Schindler, Mark (2007); Rumors in Financial Markets: Insights into Behavioral Finance; John Wiley & Sons.

Shefrin, H. and M. Statman (1994); Behavioral Capital Asset Pricing Theory; Journal of Financial and Quantitative Analysis, Vol. 29, No. 3; pp. 323 –349.

Shefrin, Hersh (2005); A behavioral Approach to Asset Pricing; Elsevier Academic Press.

Shiller, R. (2005); Irrational Exuberance; Princenton University Press.

Statman, M.; Thorley, S. and K. Vorkink (2003); Investor Overconfidence and Trading Volume; Working Paper SSRN.

Statman, Meir (1995); Behavioral Finance versus Standard Finance; in Behavioral Finance and Decision Theory in Investment Management; ICFA Continuing Education, Association Investment Management and Research.

Suripto, S. (2021). Characteristics of banks as determinants of profit management for Islamic and conventional banks in ASEAN. Growing Science, 7, 1179–1188. https://doi.org/10.5267/j.ac.2021.2.020

Suripto, S. (2021). The Effect of the COVID-19 Pandemic on Stock Prices with the Event Window Approach : A Case Study of State Gas Companies , in the Energy Sector. International Journal of Energy Economics and Policy, 11(3), 155–162. https://www.econjournals.com/index.php/ijeep/article/view/10999/5799

Thaler, R. H. and H. M. Shefrin (1981); A Economic Theory of Self Control; Journal of Political Economy, Vol. 89, No. 1; pp. 392 – 406.

Thaler, Richard H. (1992); The Winner's Curse Paradoxes and Anomalies of Economic Life; Princenton University Press.

Thaler, Richard H. (1993); Advances in Behavioral Finance; Russell Sage Foundation

Thaler, Richard H. (2008); Mental Accounting and Consumer Choice; Marketing Science, Vol. 27, No. 1; pp. 15 -25.

Tvede, Lars (1999); The Psychology of Finance; John Wiley & Sons.

Tversky, A and Daniel Kahneman (1974); Judgment Under Uncertainty: Heuristics and Biases; Science, Vol. 185, No. 4157; pp. 1124 – 1131.

Tversky, A and Daniel Kahneman (1981); The Framing ofDecisions and the Psychology of Choice; Science, Vol. 211, No. 4481; pp. 453 – 458.

Tversky, A and Daniel Kahneman (1986); Rational Choice and Framing

Decisions; Jounal of Business, Vol. 59, No. 4; pp. 251 – 278.

Tversky, A and Daniel Kahneman (1992); Advances in Prospect Theory: Cumulative Presentation of Uncertainty; Journal of Risk and Uncertainty, Vol. 5; pp. 297 –323.

Ware, Jim (2001); The Psychology of Money: An Investment Manager's Guide to Beating the Market; John Wiley &Sons

Warneryd, Karl-Erik (2001); Stock-Market Psychology: How People Value and Trade Stocks; Edward Elgar.

Wernimont, P.F & Fitzpatrick S. (1972). *The meaning of money*. Journal of Applied Psychology. Vol.56, pp.218-226.

Zweig, Jason (2007); Your Money & Your Brain: How the New Science of Neuroeconomics can Help Make Your Rich; Simon & Schuster Paperback.

BIODATA PENULIS BUKU REFERENSI
"PERILAKU KEUANGAN *(BEHAVIOUR FINANCIAL*)"

Dr. Suripto, S.Sos. M.AB, lahir di Jember, yakin bahwa hidup pada hakekatnya adalah pengabdian. Profesi seseorang hanya salah satu bentuk nyata dari sebuah pengabdian. Semakin tinggi ilmu seseorang diharapkan akan lebih arif dan bijaksana dalam bertindak yang pada akhirnya akan mengantarkan sebagai Rahmatanlil'alamin. Setelah menyelesaikan Strata 1 di Universitas Jember , Fakultas Ilmu Sosial dan Ilmu Politik, Program Studi Ilmu Administrasi Bisnis Tahun 1993 mengikuti program Departemen Transmigrasi sebagai Tenaga Kerja Mandiri Profesional (TKPMP). Tahun 2002 melanjutkan Strata 2 di Pasca Sarjana Universitas Brawijaya Malang dengan predikat Cumlaude dengan minat Manajemen Keuangan. Tahun 2005 mendapat kesempatan untuk terus melanjutkan strata 3 pada Universitas yang sama dengan minat Manajemen Keuangan yang berbasis pasar modal pada Universitas yang sama dengan predikat Cumlaude dengan masa studi 2,7 tahun. Saat ini adalah dosen tetap Program Studi S1 Ilmu Administrasi Bisnis Fakultas Ilmu Sosial dan Ilmu Politik Universitas Lampung. Mengampu matakuliah Manajemen Keuangan, Akuntansi , Matematika Bisnis, Filsafat Ilmu dan Investasi Pasar Modal. Aktif Menulis artikel dan berbagai jurnal ilmiah tentang Keuangan dan Matematika.

Supriyanto,S.A.B.,M.Si. lahir di Teluk Betung Utara pada tanggal 19 September 1990, putra bungsu dari 5 (lima) bersaudara dari pasangan Bapak Tukirman dan Ibu Jaharah.Penulis menyelesaikan pendidikan di Sekolah Dasar Negeri 1 Gulak –Galik pada tahun 2001, Sekolah Lanjutan Tingkat Pertama (SLTP) Negeri 16 Bandar Lampung pada tahun 2004, dan Sekolah Menengah Umum (SMU) Negeri 1 Bandar Lampung pada tahun 2007. D3 Administrasi Perkantoran dan Sekretari Universitas Lampung pada tahun 2010. S1 Administrasi Bisnis Universitas Lampung pada tahun 2012 . S2 Magister Ilmu Administrasi Universitas Lampung pada tahun 2014. Saat ini adalah dosen tetap Program Studi S1 Ilmu Administrasi Bisnis Fakultas Ilmu Sosial dan Ilmu Politik Universitas Lampung. Mengampu matakuliah Matematika Bisnis , Akuntansi dan Statistika Bisnis. Aktif Menulis artikel dan berbagai jurnal ilmiah tentang Keuangan, dan Matematika.