T.C.

İSTANBUL COMMERCE UNIVERSITY

GRADUATE SCHOOL OF SOCIAL SCIENCES

DEPARTMENT OF ECONOMICS

MASTER OF SCIENCE

EFFECTS OF GOVERNMENT INTERVENTION ON THE ECONOMY

Master's Thesis

Yazid Suleiman

İSTANBUL, 2023

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ABSTRACT

Government intervention has become normalized in our contemporary times. Inflation-targeting have risen and given way to quantitative easing particularly after the COVID-19 pandemic in order to accelerate the pace of economic recovery. The main objective of this study is to investigate the effect of government intervention through stringency policies on stock market returns in Turkey from April to September 2020. To achieve this objective, the Nonlinear Autoregressive Distributed Lag (NARDL) model is applied with stock market returns as the dependent variable, interest rates (as proxy for monetary policy) and Oxford University's COVID-19 Government Stringency Index (as proxy for fiscal policy). The interest rate—a measurement of monetary policy is used in the model as a control variable. In support of the study's assumptions and existing literature, it is found that a positive shock in stringency policy increases stock market return and a positive shock in interest rates have a negative effect on stock market returns. The effect of a negative shock in both stringency policy and interest rates have no significant effect on stock market returns. The implication of these findings is that both monetary and fiscal policies during the COVID-19 pandemic have similar ripple effect on initial public offerings (IPO), investment funds, and other financial market sectors and securities.

Keywords: Pandemic; Monetary policy; Government intervention; Fiscal policy; Stock market returns; Interest rates; Nonlinear ARDL

ÖZET

Günümüzde devlet müdahalesi normalleşmiştir. Enflasyon hedeflemesi artmış ve özellikle Kovid-19 salgını sonrasında ekonomik toparlanmanın hızını artırmak amacıyla yerini parasal genişlemeye bırakmıştır. Bu çalışmanın temel amacı, Nisan-Eylül 2020 döneminde Türkiye'de hisse senedi getirileri üzerinde sıkı politikalar yoluyla hükümet müdahalesinin etkisini araştırmaktır. Bu amaca ulaşmak için, doğrusal olmayan otoregresif dağıtılmış gecikme (NARDL) modeli hisse senedi piyasası getirileri ile uygulanmıştır. bağımlı değişken, faiz oranları (para politikasının temsilcisi olarak) ve Oxford Üniversitesi'nin COVID-19 Hükümeti Sıkılık Endeksi (mali politikasının temsilcisi olarak). Faiz oranı – para politikasının bir ölçümü, modelde kontrol değişkeni olarak kullanılmıştır. Çalışmanın varsayımlarını ve mevcut literatürü destekler nitelikte, sıkılık politikasındaki pozitif şokun hisse senedi getirisini artırdığı, faiz oranlarındaki pozitif şokun ise hisse senedi getirilerini olumsuz etkilediği tespit edilmiştir. Hem sıkılaştırma politikası hem de faiz oranlarındaki negatif şokun etkisinin borsa getirileri üzerinde anlamlı bir etkisi bulunmamaktadır. Bu bulguların anlamı, COVID-19 salgını sırasında hem para hem de maliye politikalarının, halka arzlar (halka arzlar), yatırım fonları ve diğer finansal piyasa sektörleri ve menkul kıymetler üzerinde benzer dalgalanma etkisine sahip olduğudur.

Anahtar Kelimeler: Pandemi; Para politikası; Maliye politikası; Borsa getirileri; Faiz oranları;

DECLARATION

I, Yazid Suleiman, certify that,

• I am the sole author of this thesis and have fully acknowledged and documented in it all sources of ideas and phrases, including digital resources, created or published by another person or institution

• This thesis contains no material that has been submitted or approved for a diploma or degree in any other educational institution.

• This is an original copy of the thesis that was authorized by my advisor and thesis committee at Istanbul Commerce University, including final revisions required by them.

Yazid Suleiman

TABLES

FIGURES

ABBREVIATIONS

ADF	Augmented Dickey-Fuller
AIG	American International Group
ARM	Adjustable Rate Mortgage
AUM	Asset Under Management
BIST 100	Borsa Istanbul 100 Index
CRA	Community Reinvestment Act
CUSUM	Cumulative Sum
ECB	European Central Bank
EU	European Union
FDR	Franklin Deleanor Roosevelt
FOMC	Federal Open Market Committee
FX	Foreign Exchange
G7	Group of 7
IMF	International Monetary Fund
LBO	Leveraged Buy-Out
LIBOR	London Inter-Bank Offered Rate
LTCM	Long-Term Capital Management
M&A	Mergers & Acquisitions
NARDL	Nonlinear Autoregressive Distributed Lag
OMO	Open Market Operations
PP	Phlip-Peron
S&P 500	Standard &Poors 500 Index
TLREF	Turkish Overnight Repo Rate
UK	United Kingdom
US	United States
VAR	Vector Autoregression
VIX	Volatility Index

TABLE OF CONTENTS

1. INTRODUCTION

1.1 Background to the Study

The expectation that it is a government's responsibility to intervene in cases of economic downturn has been a part of economic thought throughout history. Different flavors and severity levels exist within the paradigm of government intervention – from mild interest rate cuts to direct state welfare handouts and outright socialism. Contemporary government intervention model was borne in 1913 with the creation of the Federal Reserve System. The creation of the Federal Reserve formalized government intervention by institutionalizing:

1 – Market stability as a function of the government and

2 – Channels of intervention via Monetary and Fiscal Policy.

The Federal Reserve System and its operational procedures have now been replicated in almost every country. The system revolves around the Monetary Policy Committee meeting every quarter or more frequently in emergency situations to set the Policy Rate. The Policy Rate is the interest rate at which banks borrow from the Central Bank. This rate affects the ability of banks to lend to consumers and businesses, and hence demand and supply in the real economy.

Although different Central Banks adopt different policy standards for measuring the health of the economy and grounds for intervention, all Central Banks aim at regulating inflation, staving off unemployment and ensuring price stability. The mechanisms relied upon by central banks to regulate the economy are interest rates and Open Market Operations (OMO). The effectiveness and usability of these mechanisms have decreased substantially due to excessive deployment by governments and central banks. This will be further discussed in Chapter 2 of this work.

The worldwide adoption of the Federal Reserve System's framework of Central Banking has had serious consequences for economies. To begin with, the somewhat universal adoption of the policy framework caused a convergence amongst world economies, both within the financial system and the real economy. This convergence restructured the entire global economy by creating new channels of transmission of

market and price information, which unified the global economy into a single market with products and services moving from one end of the globe to another seamlessly. These channels also became channels of risk transmission and groupthink; and the objectivity and effectiveness ofCentral Bank decisions by making themreactionary to each other's decisions.

The convergence of Central Banking structure and policy across the world also greatly increased the risk, frequency and magnitude of financial crises. The channels of transmission discussed above, whose effects are magnified by information technology and financial engineering, encourageever higher risk taking in financial markets by creating multiple windows of arbitrage and speculation.

2.LITERATURE REVIEW

2.1 History of Financial Crises

2.1.1 Post-Great Depression

Following the great depression and the subsequent structural changes to the US financial system including the Glass-Steagal Act (see (Crawford, 2011), (Wilmarth Jr., 2020), (Cyree, 2000), (Russell, 2014) and (Rahman, 2012), financial activity was brought back to moderate levels. However, the policies adopted by FDR, although credited with 'reflating' the economy, sowed the seeds of destruction that exacerbates the habit of monetary intervention being pushed by mainstream economists of the day such as Keynes.The policies of FDR introduced direct government welfare as a mainstream fiscal and economic policy instrument. Welfare spending by the treasury department became the second arm of government intervention, supplementing monetary intervention by the Fed.

The severe structural dislocations and misallocation of resources that will ensue from welfare spending by the government, especially coupled with monetary intervention, was masked by the existence of the gold standard and America's rise to superpower status after the Second World War. America's role as the manufacturing hub of the world and holding much of the global gold reserves eased the introduction of the New Deal(Eggerston, 2006)(Kennedy, 2009). Today, the Social Security system that has spread to other major economies has become a major source of dislocation in these economies.

2.1.2 Bretton Woods

The Bretton Woods Agreement (Iwge, 2018)(Bordo & Eichgreen, 1993)(Eighengreen, 1993)signed in 1944 in Bretton Woods, New Hampshire, restructured the global financial system by pegging all currencies to the US Dollar and the US Dollar to gold at $35 per ounce. This framework made a global free-floating fiat currency regime an inevitability due to the difference between the production and consumption capacity of the member countries. That is, growth rates, inflation and unemployment will create a conflict of interest between the members.

Another destructive consequence is the introduction of direct central bank intervention into foreign exchange markets in order to keep favorable parity against the US Dollar. The introduction of this maneuver eventually led to the breakdown of Bretton Woods. Eventually, conflict of interest arose when US trade deficit undermined the value of the Dollar while Japan and Germany, who have favorable balance of payments, declined to appreciate the Yen and Deutsch Mark to support the Dollar. This pushed the US to abandon the Bretton Woods system and allow the Dollar to float against other currencies. This brought the entire world into 100% fiat currency regime – that is no currency is backed by any specie. Efforts to revive the Bretton Woods under the auspice of the Smithsonian Agreement failed and the 'managed float regime' took hold. This institutionalized government and central bank intervention into foreign exchange markets in order to prop up the value of their respective currencies and maintain a favorable exchange rate that aids economic growth.

2.1.3 Post Bretton Woods

1970s – Stagnationdue to Misfit between Flexibility and Expansion Potential of Free Floating FXRegime and Tight Regulatory Structures

Following the breakdown of the Bretton Woods framework, a policy and regulatory crisis ensued. The rigid structure of Bretton Woods was supported by tight regulations and practices, especially in the financial markets. However, the breakdown of Bretton Woods and decoupling of the US Dollar from Gold let loose tides of expansion both in the corporate world and financial markets. This tide was generated by a flood of financial capital (or gun powder to borrow market lingo) held back by archaic regulations. The flood gates eventually broke in the early 1980s. In the US alone, 6,347 mergers and acquisitions including assets worth over $123 Billion occurred between 1980 and 1987. This period also witnessed the rise of financial engineering, financial derivative instruments, junk bonds and LBOs. The crisis was the incompatibility of free mobile capital and rigid and restrictive policies and regulations, which led to economic and financial stagnation due to the fact that pursuing profit is more restricted than ever. However, the dam was about to burst.

1980s – Reagan and Thatcher Free Market; Rise of M&A, Junk Bonds and LBOs

The wave of merger and acquisitions that swept the globe in the 1980s permanently changed the landscape of financial markets and the world economy. The rigid regulatory and policy regime of the late 1970s, which clashed with the free floating monetary regime, was dismantled in a wholesale fashion by the administrations of Ronald Reagan in the US and Margaret Thatcher in Britain. This led to the rise of entirely new segments in the financial markets, which brought in almost unlimited funding for corporations and triggered the wave of mergers and acquisitions that ensued. Of special note in the brand new segments of financial products and services are Leveraged Buy-Outs (notably the $25 Billion LBO of RJR Nabisco), Junk Bonds (personified by Michael Milken and Drexel Burnham), and Private Equity/LBO driven financiers (notably Carl Icahn and Henry Kravis).

1990s – Resetof 80s Excesses, Asian Financial Crisis, Rise of Hedge Funds and LTCM

The excesses of the 1980s came to a shocking halt in 1990 with the arrest of Michael Milken and Ivan Boesky for financial improprieties in the Junk Bond market, and the subsequent bankruptcy of Drexel Burnham, home of the Junk Bonds. Despite a respite in the financial markets however, the world came first-to-first with one of the damning risks of central bank intervention: free floating fiat currencies and capital flight.

Mexico, one of US's top trading partners had issued a Peso-denominated short-term bond to be repaid in US Dollars. This attracted a flood of investors, hoping to profit from both interest payments on the bond and any appreciation in Dollar-Peso exchange rate. However, the assassination of a candidate in the Mexican presidential elections, Luis DonaldoColosio, threw the economy into chaos by increasing the risk premium on Mexican assets. The Mexican Central Bank issued Dollar-denominated debt to buy Pesos to support the currency. This resulted in a trade deficit due to the now strong Peso. This led to increased speculation on the Peso, causing massive speculative trades on the Peso and the Mexican Central Bank to spend even more of its foreign exchange reserve to defend the Peso. However, this was not to last.

With depleted foreign exchange reserves, the Mexican Central Bank had no choice but to devalue the Peso and raise interest rates on December 24 1994. The Peso was allowed to float freely two days later (without a peg or central bank support). A $50 Billion bailout was organized for Mexico, led by the USA, G7 and IMF. (Lustig, 1995)

The Mexican Peso Crisis of 1994 put on full display the new regime that is reigning supreme across the world.

Three factors stand out as characteristic of the new financial regime:

1. Limits of interest rate and OMO as tools for central bank and government intervention into the economy.
2. Power of Hedge Funds and speculative capital
3. Destructive and contagious nature of crises in the new regime

These factors characterized the Asian Financial Crises later in the decade in July 1997. The background to the AFC was eerily similar to the Mexican Peso Crisis: Thailand floated its currency, the Thai Baht, due to foreign reserve shortage and inability to continue supporting Baht-Dollar peg. However, as global financial markets grow ever more interconnected, growth in hedge fund industry coupled with fast-trading computer system led to the spread of the crisis from Thailand like a wildfire.The countries hardest hit by the full-blown crisis that followed were Thailand, Indonesia and South Korea; followed by Hong Kong, Laos, Malaysia and the Philippines. Other East Asian economies were affected but to a lesser degree. Indonesia was forced to widen the trading band for its currency, the Rupiah, inviting even more speculative attacks on the flailing currency. Indonesia will not emerge from the crisis until May 1998 after the resignation of the country's president, Suharto.South Korea, whose major corporations (the *chaebols*) were pursuing aggressive expansion in order to compete globally, had its banking sector hanging by a thread due large non-performing loans.Malaysia deployed strict capital controls that angered the markets.(Goldstein, 1995)

As we have seen above, the severity and frequency of crises involving sovereign nations increased significantly. And as we shall see, the rise and integration of computer engineering with financial engineering and free flowing capital around the globe makes central banking and government intervention tools more blunt, dangerous and risky.

2000s – Dot Com Bubble, Channeling of Excess Liquidity into Housing Bubble and Rise of Financial Derivatives

A personification of the above combo: high-tech, financial engineering, mobile capital and government intervention is Long-Term Capital Management (LTCM). With $126

Billion in Assets-Under-Management (AUM), LTCM was the epitome of the modern hedge fund – high tech, highly speculative and spectacularly aggressive. LTCM's main trading strategy was Convergence Trading, defined as highly leveraged trades utilizing complex quantitative models to arbitrage across countries and asset classes. LTCM sought to take advantage of deviations across asset prices in different countries and also arbitrage differences created by central bank OMOs.As inspiring as LTCM's success was, the collapse of LTCM wasmore telling for the financial regime it represents: the modern financial system. Although LTCM earned spectacular returns over its short life span – 21%, 43%, 41% in its first, second and third year respectively, it suffered losses of over $4 Billion in the first half of 1998. The decision by the Russian government to devalue its currency, the Ruble, and default on its bond, triggered the collapse of LTCM under heavy leverage and speculative trades. Again, this is a prime example of the new normal of tight interconnectedness between government and central bank intervention and the capital markets on a global scale. Under the supervision of the Federal Reserve, the world's top banks organized a $3.6 Billion private sector bail out for LTCM, which was formally dissolved in 2000. The most important lesson from the LTCM quagmire was moral hazard and the realization that these financial behemoths that anchor the global economy are exposed to one another's losses, as counterparties, and these exposures could grow to monumental proportions where even governments and central banks cannot bail them out.This episode will be replayed in the 2008 Global Financial Crisis, as we shall see in subsequent chapters.(Dungeya, Fry, Gonz·lez-Hermosillo, & Martin, 2007)

The excessive capital accumulated in the hands of financial institutions and investors, as exemplified in the LTCM case,exacerbated the problem of government intervention by increasing the severity and frequency of crisis. This risk is buried within the capital markets, masked as trading - high-speed pursuit of profit has blown open the fracture lines of the new financial regime (policy arbitrage). Massive capital pools can be moved overseas in split seconds, bankrupting countries and unleashing contagious financial tsunamis. The high mobility of capital essentially neutralizes the effects of central bank and government intervention tools. However, the carrot to staying in the country is the other central bank tool: credit expansion and OMOs, with which central banks can

incentivize corporations and financial institutions not to move.(Dungeya, Fry, Gonz·lez-Hermosillo, & Martin, 2007)

A hedge fund or bank could move billions in the blink of an air, blowing massive holes in assets, companies and countries. This high speed pursuit of profits also leads to bubbles. Moving capital from one asset class to another, in such an interconnected world, leads to asset bubbles. In 2001, after the LTCM debacle, these investable capital were moved into technology startups in Silicon Valley.Startup companies with income or customers, not even a product, were valued at billions of US Dollars. The crash of WorldCom and NorthPoint Communications marked the height of the bubble.

The housing bubble that led to the 2008 Global Financial Crisis signifies how capital moves from one asset to another in search of profit. Given that conventional wisdom in intervention-driven economy is bail outs, interest rate cuts and a flood of credit after each bubble has burst; it is no surprise that after each bubble even more idle capital is floating around looking for the next asset to inflate. However, apart from asset bubbles, sovereign debt bubbles can also arise, as we are seeing at the moment.

2.1.4 2008 Great Recession

After the Dot Com bubble burst in 2001, central banks, led by the US Federal Reserve, lowered interest rates to encourage the issuance of new credit by banks and financial institutions to ailing investors and corporations who stand to lose their investments in the startup companies. The 9/11 attacks also eased this process and further exacerbated it by enabling the extension of the low interest rates and cheap credit to airlines, insurance companies and the entertainment industry.

This intervention significantly increased the risk and potential of a financial crisis of monumental proportions by increasing the quantity of investable capital within the markets. Given that the number of purchasable products are limited, the choice is either inflation or bubble. The markets chose the latter. The investable pool of capital went into housing markets around the world and their financial derivatives.This unsustainable boom went on for half a decade, every year growing.

In 2007, signs of cracks began to appear on this bubble.Full interest rate charges on Adjustable Rate Mortgages (ARMs) made in the early to mid-2000s had were to begin

kicking in in the first quarter of 2008. Although the Fed, the Treasury and all financial institutions warehousing these loans or holding enormous quantities of derivatives based on these instruments were well aware of this, ignorance took over. Interest rates on new home loans were reduced from 6.22% to 5.76%, which had no effect whatsoever on ARMs.

In January 2008 home foreclosures rose 57% year-on-year, only to reach the catastrophic level of 97% in December 2008. Housing inventories doubled and home sales crashed to a 10-year.An objective assessment of these few statistics: sharply rising costs, excess inventory and crashing sales indicate excessive inventory.

However, in comes central bank and government intervention to once again prevent necessary market correction from occurring – pushing farther into the future. The US government increased the limits for government-supported enterprises Fannie Mae and Freddie Mac to further repurchase jumbo home loan portfolios while the Federal Reserve, counting on falling oil price and not bullish on inflation:

1. Pumped $100 Billion into the economy via repo and Term Auction Facilities,
2. Lent $200 Billion worth of securities to bailout bond dealers holding the housing derivative instruments,
3. Guaranteed the liabilities of Bear Stearns for a pending takeover by JP Morgan,
4. And lowered interest rates to 2%.

Almost all major economies followed in the footsteps of the US Federal Government and The Federal Reserve System: injecting money and credit into the economy and cutting interest rates although remaining more confident.

As will be discussed below, this only served to exacerbate the problem due to the fact that maladjustments caused by prior interventions (Dot Com bubble) were not allowed to be correct by market forces. Instead, further credit and money was inject into the very same zombie firms and investment endeavors that were weighing down the economy and distorting markets. These corporations and investments had to be purged from the economy and markets, and injecting more credit and money to protect them only served

to push counterparty risks higher and almost breaking the commercial paper market around the world.

By September 2008, the effects poisoned pill that was the earlier intervention was spreading through the economy. The US Treasury nationalized Fannie Mae and Freddie Mac and Lehman Brothers declared Chapter 11 Bankruptcy. The earlier intervention by the Fed and the Federal Government perpetuated the dangerous risk taking model that was precipitating the crisis. After the bailout of Bear Stearns and its takeover by JP Morgan, there was an atmosphere of invincibility amongst both individual traders and major financial institutions. Instead of allowing the excess risk to be washed from the market system (detoxify), the intervention only assured greater severity and longer correction that was to befall the markets a few months later. The day after Lehman Bankruptcy, the Federal Reserve System purchasedAIG for $85 Billion. The failure of AIG was cause by the mountain of risk insured by the AIG Financial Portfolio Desk based in London. Similar bailouts were occurring in the UK, France and Germany

The failure of Lehman Brothers and the bailout of AIG was the last straw. Investors fled mutual funds, withdrawing a total of $172 Billion in a day. The US Treasury had to cough up $700 Billion to bailout the banks and the Federal Reserve System initiated a $1.7 Trillion credit facility.In addition, the Fed also executed a $540 Billion bailout of mutual funds.

A concerted effort by the US, UK, EU, Canada, Switzerland and Sweden – cutting their interest rates by 50bps - to lower the LIBOR (London Interbank Overnight rate), cut the cost of bank borrowing. Another round of coordinated action between the US, UK, EU and Japan brought about further injection of credit and money into the economy: $1.8 Trillion by the EU, 526 Billion by the UK and unlimited lending by the Bank of Japan.

2.1.5 Post 2008 Great Recession: *Greece and Eurozone crisis*

By 2010 it was widely believed that the financial crisis of 2008 is a thing of the past. However, the massive injections of cash through 2010 and even beyond that especially by the European Central Bank (ECB) is only accumulating deep systemic risk within the Eurozone.

The wide economic and financial disparities between the members of the Eurozone proved to be a key source of vulnerability. The southern members such as Spain,

Portugal, Italy and Greece have different approaches to economic and financial planning as opposed to the Northern members such as Germany - the keystone of the Eurozone itself.

Germany and other northern members maintain strong production structure and national income. The German economy, built on the framework set forth in 1954 by Economy Minister Ludwig Earhart is based on high productivity, exports and savings rate. This offered huge advantages to Germany as a country: strong currency, high foreign reserves and excellent credit. This turned Germany into the anchor of the European continental economic and financial system. Successive European federalist and supranational plans hinged on Germany as the anchor - the EU and Eurozone inclusive.

At the Eurozone level, Germany, alongside France, served as the cornerstone upon which the currency will be hinged. The currency will then be used by all Eurozone members - banking on the currency's strength and credit backed by French and German involvement. The ECB, based in Frankfurt, will serve as the central bank in charge of the Euros administration and as the super central bank for EU Eurozone members. This duty of course involves lending and intervention.

The southern members of the Eurozone, specifically Portugal, Spain, Italy and Greece were on the reverse side of the French and German economic and financial position. Italy and Greece did not meet the financial and fiscal conditions of membership set forth in the Maastricht Treaty but were admitted anyway. There were no penalties for violating these conditions as well. This created an enormous chasm within the Eurozone between Northern (productive economies) and the Southern (less productive economies).

The Eurozone system morphed into a system where the credit of the Northern economies is used to finance debt for the Southern economies. The buildup of massive debt began in the mid-2000s, just a few years after the roll out of the Euro. The crisis of 2008 gave the ECB the opening to open the flood gates of intervention pumping hundreds of billions into mainly the southern economies. However, given the structural weaknesses in these economies, a crisis made of this intervention is not far off as it came to pass in 2012. Although the crisis of 2008 did affect the northern economies as well, they had the productive capacity and export power to absorb the shock. The

southern economies do not have the structural capacity or power to absorb such a shock and the injection of more credit by ECB only exacerbated this problem.

All of the southern (Spain, Italy, Portugal) and Ireland ran into sovereign debt crises triggered by Greece defaulting on its debt in 2009-2010. Subsequent austerity measures imposed by the troika (ECB, IMF, European Commission). This plunged the countries into political and social crises in addition to the economic and financial meltdowns. High unemployment, low tax revenue and high cost of debt service led to the obliteration of their economies which are still limping 8 years later.

The key takeaway from the European Debt crisis is the creation of the ECB, the Euro and the interventions they engineered. These interventions eventually led to structural dislocations in continental Europe between the northern and southern states. As will be discussed in a subsequent chapter, interventions cause misallocation and structural dislocations in the production structure.

2.1.6 Expansions of Central Bank Balance Sheets

Prior to the 2008 financial crisis, interest rates were the main intervention instrument of choice for central banks and governments. However, the abuse of the interest rate mechanism rendered them completely ineffective in 2008. This led to central banks directly expanding their balance sheets by buying up devalued subprime bonds and related derivatives. Also, governments bailed out corporations by directly buying stakes, often significant. The need for governments and central banks to directly take on financial assets themselves indicates the severity of the crisis and the neutering of interest rate as an effective policy tool. Interventions distort market signals and lead to the complete breakdown of market signals and mechanisms.

Fed Balance Sheet

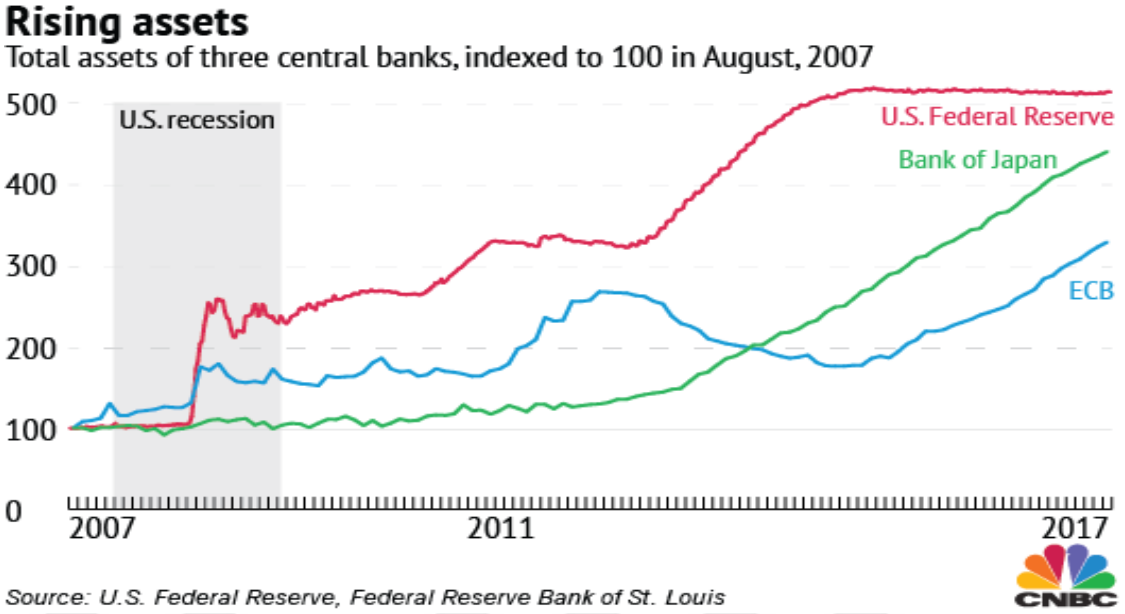


Figure 1 – Federal Reserve Balance Sheet

With central bank balance sheets overextended, treasury departments drowning in debt, interest rates below zero; an incurable inflation and unemployment phase is being ushered in.

2.2 Structure of the Business Cycle

2.2.1 Production Structure

So, how do interventions cause these devastating consequences on the economy? Interventions primarily cause damage by causing misallocations and malinvestments. The larger and more frequent the interventions, the greater the misallocations and malinvestments. The longer governments and central banks intervene to postpone the inevitable correction to the production structure, the more violent the correction - often in the form of economic and financial crises.

The production structure represents how value is created within an economy. It represents the stages of value-addition in the economy from raw material to finished good. Advanced economies have more 'roundabout' production structure – representing the use of more advanced technology.

Low Order and High Order Goods

The structure of production is divided into three stages: Low-Order, Intermediate and High Order goods.

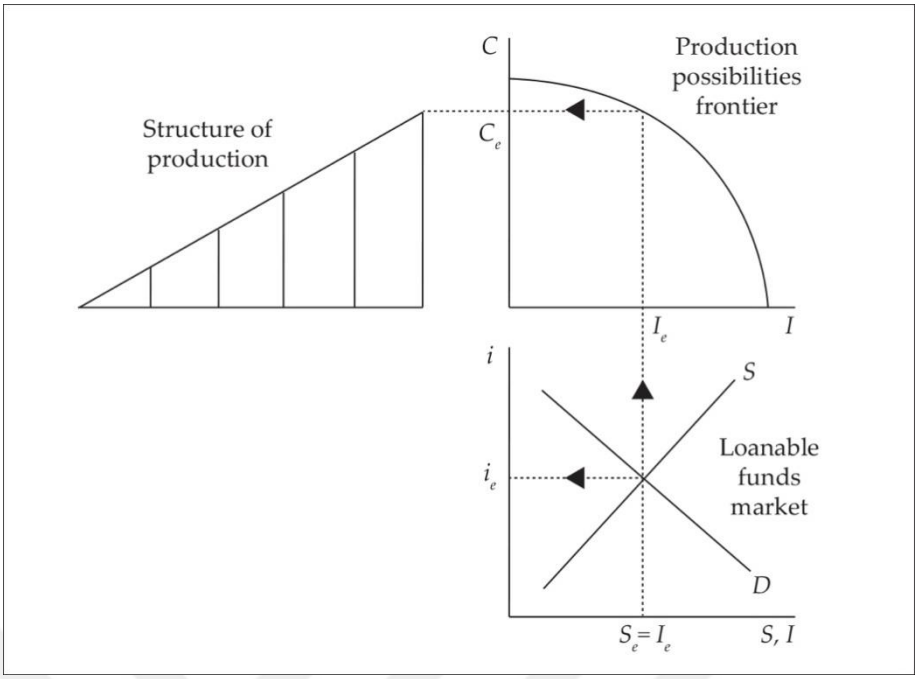


Figure 2 – Structure of Production

Source: The Quarterly Journal of Austrian Economics, Renaud FillieuleThe Macroeconomic Models of the Austrian School: A History and Comparative Analysis

Low order goods represent goods at the beginning of the production process. Generally, these are unprocessed raw materials such as coal, crude oil, agricultural products and so on. Goods in this category contain little end use value to final consumers. As a result, these goods are employed in the production of goods up the production chain. However, these goods can serve both as input for other goods or final products for consumption. For example, goods such as crude oil must be processed along different lines to produce different final products. But goods such as agricultural products, say orange, can be consumed directly or used as input for many different products.

Intermediate goods are goods in the middle of the production process i.e. goods that have been processed from low order in order to serve as input to higher order goods. Intermediate goods narrow down the

Higher order goods are goods that are at the end of the production cycle. For example, cars. Higher order goods are the most valuable within the production structure. They are the result of successive value additions in the production process. At each prior stage, the good is enhanced in some way to serve its intended end-use.

Investment from Savings – Time/Liquidity Preference

What drives the structure of production? What determines the shape of the production structure? Investments.

Investment precedes production. Production precedes consumption. This is in line with Says Law: Supply (production) creates its own demand (consumption). To illustrate the validity of this sequence, let's imagine an individual called Murat, stranded alone on a Pacific island. Every day he catches 5 fishes that sustain him for that day. In order to increase his productivity, say increase his catch from 5 to 10 fishes a day, he must create a fishing net. In order to create the fishing net, he must go 5 days without fishing. But to do that he must save enough fish (25) to sustain him while he creates the net. That means, he must invest (time and labor) before producing in the first step (5 fishes). In order to increase his production to 25 fishes, he must invest further time, labor and resource (fish he saved).In modern industrial societies, this cycle is illustrated by entrepreneurs who save capital, invest time and resourcefulness into innovating a product or service before selling it. Then and only then, do they earn the benefit of *consuming* the profits earned.

In free market societies, investments must come from savings – either individuals/companies save their own capital to invest or borrow the savings of others to invest. Saving denotes time and liquidity preference relating to consumption.

Time preference refers to the choice between either spending ones capital immediately (or in the short term); or saving it to spend later (longer term). Time preference affects market by increasing or decreasing demand for products. Short term time preference increases demand and drives employment and production. However, this also leads to low quantity of savings available for lending to investors. As a result, interest rates rise and investment projects are stalled.

Murray N Rothbard shows that in general individuals prefer current consumption to future consumption. The intertemporal relationship between current and future consumption determines the pure rate of interest in society. This rate affects not only the financial markets but also rates of production. That is, preference between current or future consumption determines the demand for products and therefore production in the

economy. This also links into long-run rates of profit in both the financial and production markets.

Philip A. Trostel and Grant A. Taylor in their work 'An Econometric Theory of Time Preference'(Trostel & Taylor)concluded that the cause of discount is due to the fact that marginal consumption in the future is expected to be less than current consumption. They used PSID consumption data to test their hypothesis.

Liquidity preference refers to the choice between holding liquid capital or saving it to liquidate later in the future. Liquidity preference is not driven by consumption like time preference but rather it is driven by returns available in the market. If returns (indicated by short term interest rates) are relatively high presently, this indicates a need for funds. The high returns incentivizes savings in the short term. If however interest rates are low, longer term savings (low liquidity) is incentivized as longer term interest rates are generally higher due to the long time frame. In summary, if short term interest rates are higher than long term interest rates, individuals prefer liquidity (short term investments). If long term interest rates are higher, individuals prefer long term (illiquid investments).

Both time and liquidity preference determine the production structure by determining the quantity of funds available for lending to investors.Higher order goods require the heaviest and longer term investments, followed by intermediate order goods and lastly the lower order goods. Investments in higher order goods are mainly infrastructural in nature and require large upfront financing. Example, mining and oil exploration, oil rigs, mining trucks and steel plants. These are multiyear projects that generally require external financing from financial institutions and money markets.

2.2.2 Cyclicality in the Business Cycle

The natural swings between saving and consumption by individuals create a mild cycle of investment and consumption within the economy. When individuals save, investments rise, particularly in the high order goods industries which require heavy investments. This lowers consumption and demand in the lower order goods industries and shifts demand for labor to the higher order industries. This is the first swing. The counter swing is when savers, now with their gains from accrued interest, move to spend it on new products created on the back of the prior investments made in the high

order goods that trickled down through intermediate goods industries and eventually the lower order goods (consumables) industries. This is ordinary business fluctuation - a result of normal changes in the taste and interests of market participants.

Business cycles on the other hand, presents deeper and more structural tremors that sometimes become wild financial and economic crises. The business cycle can be described as business fluctuation on steroids. What the steroids that turn mild, normal business processes into dangerous crises that often threaten the entire economic structure? The steroids in this case are government/central bank intervention.

Government and central bank intervention to inject new money and credit into the economy for various faux reasons extrapolate and magnify these benign business fluctuations and engender new forms of systemic risks in the economy.These risks arise from the distortion of key market signals ad mechanisms, most importantly prices and interest rates.

Injecting new credit and money into the economy in order to save a few corporations or industries distort the signal in the market by indicating that consumers are saving more than consuming when this is not the case. This leads to the false expectations of consumer time and liquidity preferences and encourages heavy investments in the higher order goods industries. Given that these investments require a long time to come to fruition and begin churning out returns, when the injection of new credit and money halts, the projects become wasteful. This is one aspect. The other aspect is injection of new credit and money pushes interest rates lower and therefore pushes lending to zombie corporations and ill-thought out projects. These zombie corporations, under normal market conditions, will face bankruptcy and reorganization while only solid projects will be financed by investors and savers. Since the government and central banks cannot continue to inject new credit and money non-stop perpetually, whenever the injection is halted even temporarily, a spiral of failures, bankruptcies and abandoned projects ensues.

However, unlike a key difference exists here. In normal business fluctuations, the market disciplines hubris projects and poorly run corporations by starving them of investments – responsible savers and investors do not invest in poorly run companies or badly thought out projects. Thus, the depth of the misallocation and malinvestment is

limited in a free market and corrections are smooth and short-lived. When governments and central banks intervene, they distort market signals and stopping the market mechanism resolving the misallocations and malinvestment ensuing. Even worse, by injecting new credit and money to save these corporations and projects, the intervention is pouring fuel on the fire by suffocating well run corporations and well thought out projects of investments and resources.

By saving poorly run corporations and badly thought out projects, governments and central banks suffocate the good ones. Bad money drives out good money from the market.

Murray N Rothbard related that business cycles and fluctuations are not the same. Fluctuations, which are minor, temporary changes that come with daily economic activities, are generally independent of (only maybe tangentially related to) government interventions. However, business cycles are an expected feature that is guaranteed to follow government intervention(Rothbard, 2004).

Mises' theory shows that depressions are corrections that follow malinvestments. These malinvestments are fueled by intervention into the production cycle via monetary and/or fiscal policy. These interventions incentivize zombie corporations and like-malinvestments which inevitably leads to inflation and economic bubbles.(MISES, A Treatise on Human Action, (1998 [1949]))(MISES, The Theory of Money and Credit., (1953 [1912])).

2.3 Government Intervention in the Business Cycle

2.3.1 Forms of Central Bank and Government Intervention into the Economy

We have seen from numerous illustrations above of government intervention into the economy. In this section, we will delineate various forms of government intervention into the economy.

From a historical perspective, some of which were analyzed above, forms and tools of government intervention into the economy have transmogrified over time as tools become dull and ineffective in delivering the governments desired response. The transformation of central bank and government intervention forms, tools and mechanism is due to the fact that the more governments and central banks intervene into the economy with any particular tool, the more severe the next intervention is required

to be in order to be as effective as it was in the previous intervention. We will illustrate with the favorite intervention tool, interest rates.

When governments and central banks began using interest rates as a tool to move the market either way, they damaged the market signaling characteristic of interest rates. With each intervention, the damage gets more severe. This continues until interest rates are completely detached from market reality (for instance the current negative interest rate environment). Each intervention using interest rates distort the market and subsequent interventions must be deeper in order to cause similar levels of impact. The power of interest rates as an intervention tool has been neutered. Beginning during the Great Depression, interest rate became the tool of choice, as stated above. However, following the New Deal and stagflation of the 1970s, interest rates became dormant due to the steady nature of markets owing to the pseudo-Gold Standard of Bretton Woods.

When the dam broke on financial regulation in the 1980s, market volatility reached historic levels that only rose higher to-date. This volatility created even greater impetus for government intervention into the economy. The use of interest rates became even more prevalent under the volatile market environment.

By the mid-2000s and the subsequent financial crisis in 2008, the effectiveness of interest rates have been dulled significantly and the 'normal' rate levels dropped to the 5-6% range. After the crisis, interest rates as intervention tools became obliterated as tools on intervention. 'Normal' rate levels dropped to 2% and governments and central banks sought for a new intervention tool. This led to the collaboration between central banks and treasury departments and the growth of Quantitative Easing Programs as tools of choice for intervention.

Following the 2008 financial crisis, interest rates remain below 3% and multiple QE programs, running into trillions of dollars have been created. Some of the QE programs entail monthly purchases of tens of billions of dollars' worth of securities to support market prices, which are disconnected from market reality.

2.3.2 MonetaryPolicy

Monetary policy as a primary form of central bank and government intervention has undergone immense changes from 1913 to the present. The introduction of interest rate

manipulation by central banks and governments kick started an avalanche in the economy through the financial system. Monetary policy refers to anti-free market actions that central banks take in order to manipulate the economy one way or another.

Historically, interest rate management and Open Market Operations (OMO) were the basic mechanisms of implementing monetary policy. However, due to excessive use of these mechanisms and market participants adapting, these instruments now seem futile. By excessively cutting interest rates and injecting credit through OMO, central banks and governments have now been cornered in an impossible position. The newly created trillions force central banks to keep interest rates ever lower as even a moderate increase in interest rates will kick the domino on defaults and inflation.

2.3.3 FiscalPolicy

Fiscal policy has now become the regular instrument of intervention by central banks and governments, particularly after the 2008 financial crisis. As the effectiveness of interest rates decline substantially, central banks and government treasuries are teaming up to print more money to complement the now weak interest rate tool. This has led to the creation of ever more state welfare programs that are used as avenues of pushing more money into the economy to complement central bank efforts.

Fiscal policy before 2008 were aimed at social programs to help the needy in society. These include welfare payments and affordable housing. However, after the 2008 financial crisis, especially after the US Treasury took a $10 Billion-$20 Billion stake in the US's largest banks and outright took over AIG, the aims of fiscal policy changed from social programs to monetary policy. Fiscal and monetary policy implementation now occur tacitly between central banks and treasury departments.

2.3.4 Channels of Transmission of Monetary and Fiscal Intervention

The primary channels of transmission of monetary and fiscal policies are prices and interest rates. Central banks take the interest rate arm while governments, acting through the treasury department, take the prices arm. Central banks, by raising or lowering the interest rates, inject new credit (money) into the economy. Governments, by giving massive handouts to people, is having a direct impact on demand and prices of products. This is because with fiscal policy through government, there is no trickle down. The new money goes straight to the end of the line, consumers. And given that it

is most likely that interest rates are down (hence the unorthodox intervention), consumers are not induced to save and therefore spend and spend.

3. RESEARCH METHODOLOGY

3.1 Introduction

The coronavirus pandemic which began in 2020, again opened the floodgates on intervention. The social suffering caused by the pandemic gave governments a chance to fully turn on the intervention tap and inject money. In fact, some politicians like New York's Alexander Ocasio-Cortez are calling on people to never return to work but rather stay home, forever. Interventions during the pandemic took the classical route we described above: monetary and fiscal. In Europe and the West, monetary policy by central banks slashed interest rates to near zero levels in the name of providing credit to support the financial markets and banks. The fiscal policy was aimed at providing government cash to individuals and corporations. Entire sectors, such entertainment, hotels and airlines were bailed out due to the lockdowns.

An important study related to stock market returns and covid-19 intervention is Onali's work: 'Covid-19 and stock market volatility' (Onali, 2020). Onali's work studies stock market volatility relative to stock market indices – VIX(Whaley, 2009)(Bekaert & Hoerova, 2013), S&P 500 and the Dow Jones Industrial Average. Onali's dataset consists of stock market returns from 08 April 2019 to 09 April 2020. The dataset before the pandemic was used as buffer as the pandemic did not gather enough steam to make a difference until early March 2020 (giving just a month of data between March-April 202). The dataset for (Onali, 2020) COVID deaths consist of countries with over 1000 daily deaths at the time - China, France, Iran, Italy, Spain, and the UK. Onali findings were as follows: 'VAR(Luetkepohl, 2011), (Haslbeck, Bringmann, & Waldrop, 2021)models suggest that the number of reported deaths in Italy and France have a negative impact on stock market returns, and a positive impact on the VIX returns. Finally, Markov-Switching models suggest that at the end of February 2020 the magnitude of the negative impact of the VIX on stock market returns increased threefold.' (Onali, 2020)

Numerous other studies have been conducted to study the correlation between COVID deaths and stock market movements. Onali emphasized the following literature particularly (Gormsen & Koijen, 2020), who found that at the beginning of the pandemic economic packages and relief stimulus programs announced by the US Government failed to shift the downward trend in short-term economic expectations and volatility measured by the VIX Index;(Yilmazkuday, 2020) work and(Baker, et al.,

2020) who used textual analysis to measure sentiments, market volatility and the number of deaths from the novel COVID. We contend that the result found in (Onali, 2020), that rising COVID deaths had an impact on stock markets, was an aberrant result due to the timing of the study. In April 2020, most governments were in disarray. Social and economic lives were thrown into chaos as a result of uncertainty about governments' ability to control the pandemic. Over subsequent weeks, governments got their acts together and engaged the pandemic in a planned manner – rolling out interventions, lockdowns and welfare handouts to citizens. This was an especially positive development for the stock market given that the markets are more prone to volatilities in times of uncertainty.

3.2 Data Description

In this study, we aim to expand on Onali's work by using the period of April-September 2020, in the middle of the pandemic, to model the relationship between stock market returns and intervention (in this case via both fiscal and monetary policy).

For the purpose of our study, we employ three variables: stock market returns, interest rates (which serve as a proxy for monetary policy) and the Oxford University Government Stringency Index(Hale, et al., 2021) (which serves as a proxy for government intervention programs during the COVID-19 pandemic which encompasses lockdowns, transfer payments to citizens, social interventions for the sick and elderly and economic support programs to prop-up businesses (especially SMEs). We take the natural logarithms of stock market close since it is not expressed in percentage. However, since TLREF and Stringency index are in percentage already, we make use of them directly. Table 1 presents the variables in the model for this study, their measurements and sources.

Table 1: Regression variables

VARIABLE	MEASUREMENT	SOURCE
Stock Market Return (SMC)	BIST 100 Index	Borsa Istanbul
Interest Rates (ITR)	TLREF (%)	Borsa Istanbul
Stringency (STR)	Government Stringency Index (%)	Oxford University

3.3 Model Specifications

In order to study both the long- and short-term effects of interest rates and governments stringency (specifically in Turkey), we applied the nonlinear ARDL model. This is due to the fact that one of the variables (STR) was exhibiting asymmetry. It is more appropriate to employ the nonlinear ARDL model if at least one of the variables is statistically asymmetrical.

The functional relationship between the variables is as follows:

$$\ln SMC_t = \zeta_0 + \beta_1 ITR + \beta_2 STR + \varepsilon_t \qquad (3.1)$$

The NARDL model has significant advantages over other modelling techniques such as the error correction model (ECM), the threshold ECM, the Markov-switching ECM, and the Smooth Transition ECM in modelling joint asymmetries and co-integration. The model allows for the joint investigation of short- and long-run response of stock market returns to changes in interest rate and stringency. The NARDL model also exposes hidden co-integration among the variables. The independent variables, interest and stringency, are decomposed into their respective positive and negative partial sums (i.e. positive and negative shocks) by the NARDL model in the following functional form:

$$x_t^+ = \sum_{i=1}^{t} x_i^+ = \sum_{i=1}^{t} Max(\Delta x_i, 0)$$

and

$$x_t^- = \sum_{i=1}^{t} x_i^- = \sum_{i=1}^{t} Max(\Delta x_i, 0) \qquad (3.2)$$

The first difference of the variables are denoted by Δ, x_t^+ and x_t^- are the partial sums of the positive (or increases) and negative (or decreases) in interest rates and stringency. The nonlinear ARDL model for this study can therefore be expressed as:

$$\Delta \ln SMC_t = \zeta_0 + \beta_1 \ln SMC_{t-1} + \beta_2^{+'} ITR_{t-1}^+ + \beta_3^{-'} ITR_{t-1}^- + \beta_4^{+'} STR_{t-1}^+ + \beta_5^{-'} STR_{t-1}^-$$
$$+ \sum_{i=0}^{p-1} \omega_{6,i}^{+'} \Delta \ln SMC_{t-i}^+ + \sum_{i=0}^{q-1} \omega_{7,i}^{+'} \Delta ITR_{t-i}^+ + \sum_{i=0}^{q-1} \omega_{8,i}^{-'} \Delta ITR_{t-i}^- + \sum_{i=0}^{q-1} \omega_{9,i}^{+'} \Delta STR_{t-i}^+ + \sum_{i=0}^{q-1} \omega_{10,i}^{-'} \Delta STR_{t-i}^- + \varepsilon_t$$
(3.4)

The definition of the variables stays the same. Here, *p* and *q* denotes the lag order of the variables respectively, hence we have nonlinear ARDL model of the order (*p, q's*) for this study.

For the positive shock (X^+) and negative shock (X^-), the cumulative dynamic multiplier effects on stock market returns are measured as follows:

$$m_h^+ = \sum_{j=0}^{h} \frac{\partial \ln SMC_{t+j}}{\partial x_t^+} \text{ and } m_h^- = \sum_{j=0}^{h} \frac{\partial \ln SMC_{t+j}}{\partial x_t^-} \text{ where } h = 0, 1, 2, \ldots \qquad (3.5)$$

Therefore as $h \to \infty$, $m_h^+ \to L_X^+$ and $m_h^- \to L_X^-$ (here L_X^+ and L_X^- represent the disaggregated asymmetric long-run positive and negative partial sums of the independent variables interest rates and stringency).Additionally, in order to avoid model misspecification, we test the symmetry by applying the (Brock, Dechert, & Scheinkman, 1987) test. Over the long- and short-run, the test detects asymmetry in the variables by discriminating over time. We use the WALD test to further check for symmetry, where the null hypothesis is $L_X^+ = L_X^-$ and the standard WALD test is used to measure symmetry over the short-run. The null hypothesis for this test is as follows: $\sum_{i=0}^{q-1} \omega_{t-i}^{+'} = \sum_{i=0}^{q-1} \omega_{t-i}^{-'}$.

4. EMPIRICAL RESULTS AND DISCUSSION

4.1. Descriptive Statistics

Table 2 below shows descriptive statistics of the variables. The variables lnSMC and ITR show relatively low levels of deviation with negligible negative skewness while ITR shows high deviation witha slight positive skew. All three variables show negligible excess kurtosis which indicates stability and low tendency for extreme outcomes. The Jacque-Bera test of normality corroborates these results given thetest statistics significantly exceed the critical values and therefore rejection of the default null hypothesis.

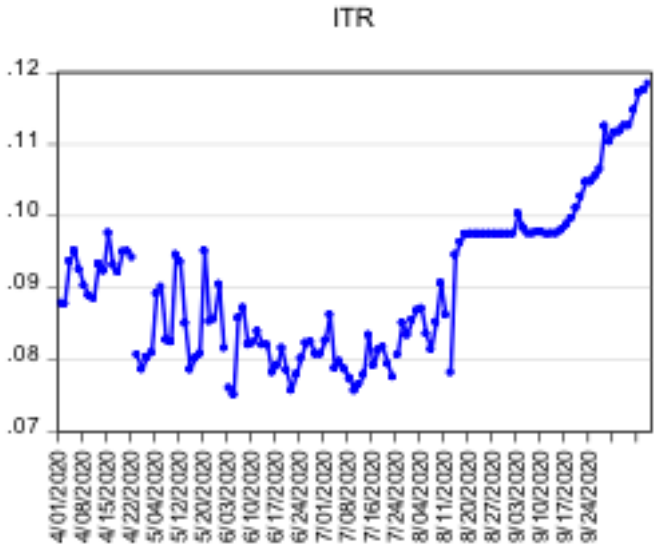
Table 2: Descriptive statistics of variables

VARIABLE	lnSMC	ITR	STR
Mean	6.981364	0.090375	0.614890
Median	6.999568	0.088464	0.638900
Maximum	7.086462	0.118413	0.759300
Minimum	6.792176	0.075000	0.231500
Std. Dev.	0.071184	0.010667	0.133769
Skewness	-0.695748	0.691934	-0.636099
Kurtosis	2.768609	2.779773	2.711287
Jarque-Bera	10.19774	10.06339	8.721958
Probability	0.006104	0.006528	0.012766
Sum	858.7078	11.11614	75.63150
Sum Sq. Dev.	0.618192	0.013882	2.183085
Observations	123	123	123

4.2 Time Series Plots of Variables

Figure 3 below show the time series plots of the variables in order to visually detect heteroscedasticity (Harvey, 1976), drifts(Entorf, 1997), seasonality(Plosser, 1978)(Lovell, 1963), structural breaks(Casini & Perron, 2018)(Perron, 2005) and/or trends(Frisch & Waugh, 1933). These abnormalities introduce distortions into regression models in the form of biased estimates of intercepts and coefficients; and invalid test statistics. The times series plots show the trend in the three variables: lnSMC, ITR and STR. The plots show outline of the relationship between the variables. As can be observed, lnSMC has a positive relationship with STR while it has a negative relationship with ITR. We can see that as interest rates drop from April 2020 to mid-August 2020, stock market returns rose along with stringency. This was the period when

the pandemic was setting in and government policies were enacted with full force. Conversely, from mid-August 2020, as interest rates began to rise, stock market returns dropped along with stringency as government began to relax some of the pandemic restrictions.



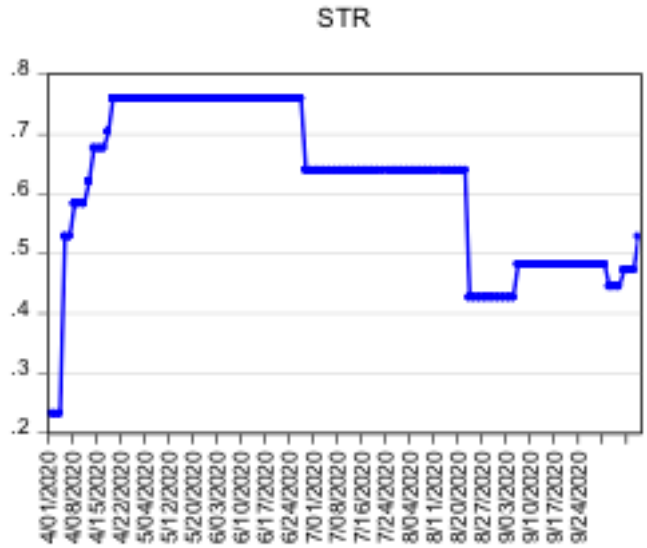


Figure 3: Times series plot of lnSMC, ITR and STR

Table 3: Long- and Short-run Symmetry Test results

Variable	Long-run Asymmetry (W_{LR})		Short-run Asymmetry (W_{SR})	
	F-Statistic	P-value	F-Statistic	P-value
STR_t	5.8317***	0.000	0.5316	0.472
ITR_t	4.944**	0.028	2.878*	0.093

4.3 Nonlinearity Test Results

To determine the suitability of the model that would be employed in this study, the long-run and short-run asymmetry tests are conducted as suggested by (Shin, Yu, & Greenwood-Nimmo, 2014) . In this instance, we take the application of the NARDL from the approach of (Rafindadi & Usman, 2020). As reported in Table 3, the null hypothesis of symmetry relationship is rejected for both stringency and interest rate in the long run, while in the short run, the null hypothesis of symmetry can only be rejected in the case of interest rate. These results imply that the variables employed in this study are found to be asymmetric

Theoretically, interest rates have an inverse relationship with stock market returns due to the following:

(i) A rise in interest rates lowers the intrinsic value of stocks (either measured via the Dividend Discount Model(Farrell Jr., 1985) or Discounted Cash Flows(Jennergren, 2011)(Lundholm & O'Keefe, 2010)) by increasing the discount rate.

(ii) On a macroeconomic level, a rise in interest rates lures investors away from the equity market towards the fixed income (bonds) markets due to the better risk-return profile.

Government Stringency is generally associated with a contractionary fiscal policy. However, the form of contractionary fiscal policy during the COVID-19 pandemic was novel in both its scope and application. The fiscal policy regime during the pandemic took the form of contradictory policy objectives: restricting social movements and interactions to curb the spread of the virus; while maintaining the demand and employment levels in the economy to avoid a complete crash. The application of these policies involved lockdowns for extended periods (including business closures) while government transfer payments to businesses (to encourage employers not lay off workers) and citizens (for sustenance in the face of a halted economy).

The flood of the money directly into the hands of the households (who are off work with few avenues to spend the money outside major retailers and ecommerce giants) and firms (who are closed, under pressure to keep staff on the payroll, and few, if any exploitable, investment opportunities) channeled the transfer payments into the financial markets to chase after profits.

Table 4: Unit Root Test results

UNIT ROOT TEST TABLE (PP)				
At Level				
Variable		**lnSMC**	**ITR**	**STR**
With Constant	t-Statistic	-2.468*	-0.5227	-2.9272**
	Prob.	***0.0865***	***0.8818***	***0.0452***
With Constant & Trend	t-Statistic	-2.1549*	-1.8040	-5.6033***
	Prob.	***0.5099***	***0.6970***	***0.0000***
Without Constant & Trend	t-Statistic	1.6321*	1.2684	0.0463

	Prob.	***0.9747***	***0.9476***	***0.6957***
At First Difference				
Variable		**d(lnSMC)**	**d(ITR)**	**d(STR)**
With Constant	t-Statistic	-10.8690***	-13.9599***	-10.6777***
	Prob.	***0.0000***	***0.0000***	***0.0000***
With Constant & Trend	t-Statistic	-11.0210***	-23.4078***	-10.9697***
	Prob.	***0.0000***	***0.0000***	***0.0000***
Without Constant & Trend	t-Statistic	-10.6657***	-13.5142***	-10.6753***
	Prob.	***0.0000***	***0.0000***	***0.0000***

UNIT ROOT TEST TABLE (ADF)

At Level

Variable		**lnSMC**	**ITR**	**STR**
With Constant	t-Statistic	-2.6268*	-0.1188	-2.8901**
	Prob.	***0.0904***	***0.9440***	***0.0494***
With Constant & Trend	t-Statistic	-2.1602	-1.4562	-5.1981***
	Prob.	***0.5070***	***0.8390***	***0.0002***
Without Constant & Trend	t-Statistic	1.6610	0.8702	0.1113
	Prob.	***0.9762***	***0.8960***	***0.7160***
At First Difference				
Variable		**d(lnSMC)**	**d(ITR)**	**d(STR)**
With Constant	t-Statistic	-10.8635***	-11.3056***	-10.6179***
	Prob.	***0.0000***	***0.0000***	***0.0000***
With Constant & Trend	t-Statistic	-11.0198***	-9.7646***	-10.9522***
	Prob.	***0.0000***	***0.0000***	***0.0000***
Without Constant & Trend	t-Statistic	-10.6657***	-11.2813***	-10.6172***
	Prob.	***0.0000***	***0.0000***	***0.0000***

Notes: * Significant at the 10% level; ** Significant at the 5% level and *** Significant at the 1% level

4.4 Unit Root Test Results

Having conducted linearity and symmetry tests for the variables used, we must check the unit root or stationarity properties of the variables. For the purposes of this study, we used the Augmented Dickey Fuller (ADF) and the Phillip-Perrons (PP) non-stationarity tests. The results are shown in Table 4 above. As the results show, lnSMCand ITR variables are stationary at first difference, i.e. *I(1)* while STR is stationary at levels. This implies that the variables used in this study have mixed order of integration.

Given that the variables employed in this study are integrated of mixed orders, we proceed by checking the long-run relationship among the variables. To do this, (Shin, Yu, & Greenwood-Nimmo, 2014)suggested bounds testing cointegration approach within the framework of nonlinearity. The results of cointegration as shown in Table 5, suggest that both the F-statistic and t-statistic are greater than their critical values. This means that there is a cointegration among the variables employed in this study.

Table 5: NARDL estimates

Dependent Variable: $\Delta lnSMC$			
	Long-run Coefficients		
Variable	**Coefficient**	**Standard Error**	**P-value**
$lnSMC_{t-1}$	0.9083***	0.0380	0.0000
STR_t^+	0.1237*	0.0652	0.0605
STR_{t-1}^+	-0.1070**	0.0462	0.0224
STR_t^-	0.0365	0.0258	0.1602
ITR_t^+	-0.8059*	0.4375	0.0681
ITR_{t-1}^+	-0.3388	0.5829	0.5623
ITR_{t-2}^+	1.1675**	0.4641	0.0133
ITR_t^-	-0.1246	0.2514	0.6211
Constant	0.6264**	0.2600	0.0177
	Short-run Coefficients		
ΔSTR_t^+	0.1237***	0.0391	0.0020
ΔITR_t^+	-0.8059*	0.4075	0.0505
ΔITR_{t-1}^+	-1.1675**	0.4164	0.0060
ECM_{t-1}	-0.0917***	0.0225	0.0001
F_{PSS}	4.978***		
t_{BDM}	-4.853***		
Diagnostic Tests	**Statistic**	**p-value**	
χ^2_{SC}	0.3536	[0.7029]	
χ^2_{H}	0.4163	[0.5201]	

χ^2_{FF}	0.1517	[0.8797]
χ^2_N	23.922	[0.0000]

Notes:Selected model is ARDL (1, 1, 0, 2, 0). ***,**, and * denote significance levels at 1%, 5% and 10%. χ^2_{SC}, χ^2_H, χ^2_{FF} and χ^2_N represent LM tests for serial correlation, heteroscedasticity via ARCH, functional form of Ramsey's RESET test and normality test, respectively.

4.5 NARDL Results

The results of our regression is shown in Table 5 above. Here we would like to note the advantage of using the nonlinear ARDL, which decomposes the variables into the relevant positive and negative partial sums at multiple lags. The nonlinear ARDL is useful irrespective of whether the underlying variables co-integrated, *I(0)* or *I(1)*.

Over the long-run, we can observe that the independent variable with the most significance is the dependent variables first lag, $lnSMC_{t-1}$, indicating that over the long-term stock market returns under the conditions of the pandemic economy highly correlate with returns from previous periods. Over the short-run, however, the first lag of $lnSMC_{t-1}$ plays no role at all on the current expected returns of the market. This may indicate significant volatility in the market, which is plausible given the upheaval which occurred the pandemic. The empirical results show that a 1% positive change in $lnSMC_{t-1}$ results in 0.9083% in stock market returns.

We can also observe that the stringency variable, STR, only affects stock market returns via positive shocks at current and first lags. This shows that:

(i) the injection of cash by government significantly affects markets,

(ii) given the permanent nature of the direct transfer payments during the pandemic, the withdrawal of the stringency (negative shock) will be immaterial to market returns. This maybe can be explained in two ways: one, the transfer payments have already been invested in the market and faces low probability of withdrawal specifically due to reduction in stringency. Two, a negative shock of stringency is immaterial to the market as such an event will only signal a return to normal market dynamics and therefore not necessarily a shock to the system (as the pandemic market conditions *are* the abnormalities (read *shock*) in the market,

(iii) stringency also affects markets from period to period. This is plausible given that investments in previous periods affect market sentiment, momentum and

numerous other systematic processes inherent in financial markets in general, and specifically to the stock markets.

(iv) However, the positive partial of stringency at lag one, STR_{t-1}^{+}, has a negative impact on market returns. A 1% positive shock in STR_{t-1}^{+} cause a -0.1070% change in stock market returns. We assert, given the general volatility of the pandemic period and the significant impact of government decisions on lockdowns and so on (stringency in general), investors tend to negatively price in the previous periods stringency into the current periods expected market return. That is, whatever government policy was put into play in the previous period is likely to be reversed or doubled down on, either way a serious disruption to the current period.

In the case of interest rates, we observe the effect of the *impact lag* over the long-term. *Impact lag* is the period between interest rate policy decisions and the full impact of these decisions on the economy. Monetary policy decisions at the central bank level takes a longer transmission chain (a waterfall, so to speak) than fiscal policy decisions made by governments. Economic support programs by governments, such as those employed during the pandemic, are usually direct-to-end user type. Governments provide avenues where households and businesses can apply and receive these benefits without an intermediary. However, in the case of monetary policy, the decisions are transmitted via a chain of intermediaries (commercial lenders, insurance companies, pension funds, mutual funds) which may dampen the desired effect of the decision. Additionally, these chains add costs in terms of time, intermediary spreads, transaction costs and possibly taxes.

Empirically, over the long term only ITR_{t}^{+} and ITR_{t-2}^{+} are statistically significant. A 1% positive shock in ITR_{t}^{+} causes a -0.8059% change in stock market returns while a 1% positive shock in ITR_{t-2}^{+} causes a 1.1675% change in stock market returns.

The short-run form of the regression equation indicated again that only the positive partial sums affect stock market returns. Here again, the results concur with our initial assumptions that stringency has a positive correlation with stock market returns while interest rates have a negative correlation. In case of stringency, only the current period contributes to the predictor power of the model – at current lag a 1% positive shock in

stringency causes a 0.1237% change in stock market returns. In the case of interest rates both the current period and previous lag have significance. At current lag, ΔITR_t^+, a 1% change causes a -0.8059% change in stock market returns while at one period lag, ΔITR_{t-1}^+, a 1% change causes a -1.1675% change in stock market returns. Given that this is a short-run model, it follows that short term interest rates are related intertemporally as they serve as the key parameter for many economic processes.

Two other important observations can be drawn from the NARDL results:

(a) The regression output support our beginning assumptions on the relationship between stock market returns, interest rates and government stringency during the pandemic; and

(b) Additionally, there was a considerable jump in the number of active retail investors on the Borsa Istanbul and the number of IPOs. This, although tangential, is also evidence of a push into the stock markets by investors.

Table 6: Borsa Istanbul retail investors and IPO data

Year	Number of IPOs	Number of Retail Investors
2019	6	~1.205.000
2020	8	1.988.640 (+65%)
2021	52	2.002.873 (+39%)
2022	44	~3.780.000 (+38%)
2023	54	~7.644.000 (+102%)

Furthermore, the estimate of error correction model (ECM) is 0.0917, which is statistically significant. This estimate suggests that whenever there is a short term disequilibrium in the system, the speed of adjustment back to the equilibrium of stock market returns is roughly about 9.17% every day through changes in stringency and interest rate. Additionally, some diagnostic tests are conducted to check the fitness and stability of the NARDL model employed in this study. We conducted diagnostic tests for serial correlation, heteroscedasticity, functionary form of the model. The results show that there is no serial correlation and conditional heteroscedasticity. Also, the functional form of the model is correctly specified while the normality distribution of the error term is rejected.

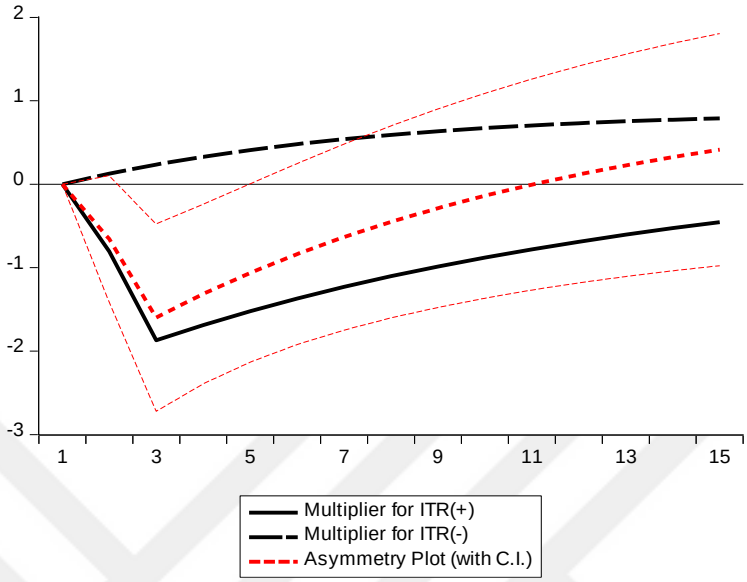


Figure 4: Multiplier Graph for ITR

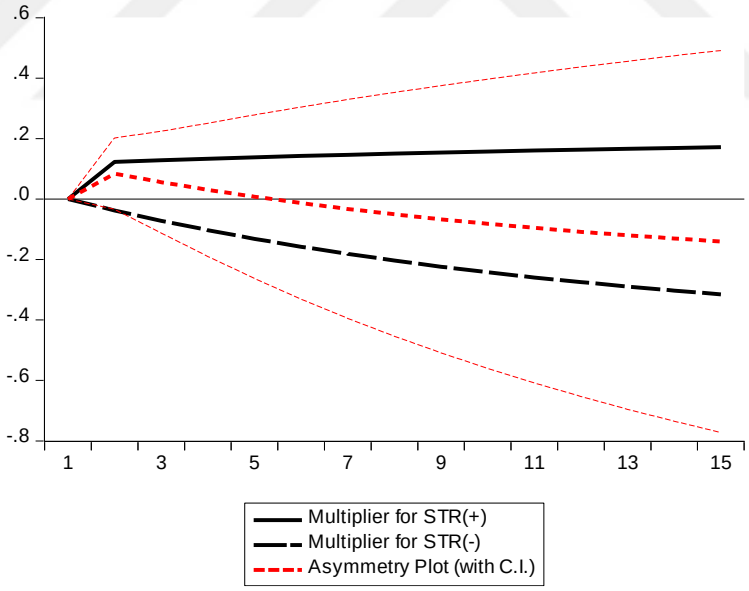


Figure 5: Multiplier Graph for STR

4.6 Multiplier Effect Graphs of Variables

Statistical multiplier graphs (shown for the relevant variables in Figure 4 and 5 above), along with an asymmetry plot featuring a confidence interval, provides a comprehensive understanding of the multiplier effect in various economic scenarios. The multiplier graph visually represents the successive rounds of spending and income generation

resulting from an initial economic stimulus or shock (in this instance interest rates and government stringency during the pandemic). The asymmetry plot, complemented by confidence intervals, goes a step further by capturing the potential nonlinear and asymmetric responses in the multiplier process. The confidence interval aids in assessing the uncertainty associated with the asymmetry, offering a range within which the asymmetry is likely to fall.

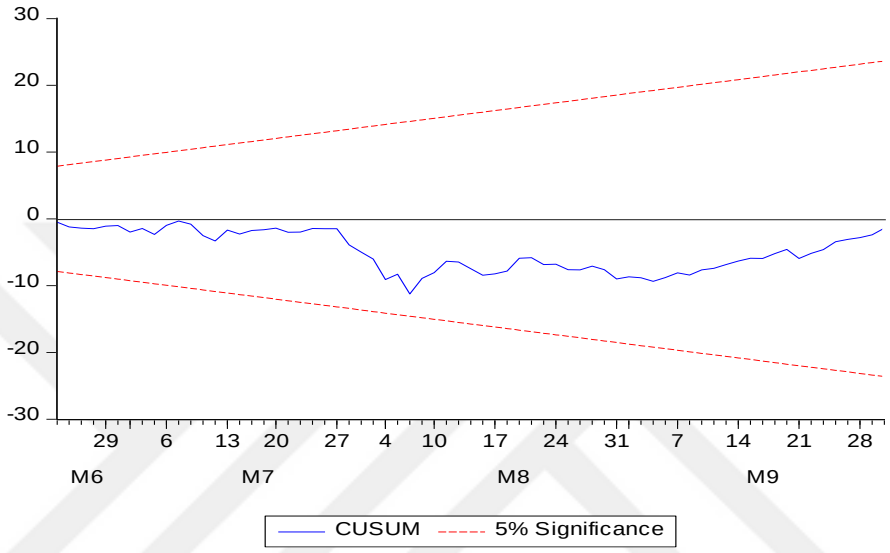


Figure 6: ITR CUSUM at 5% Significance

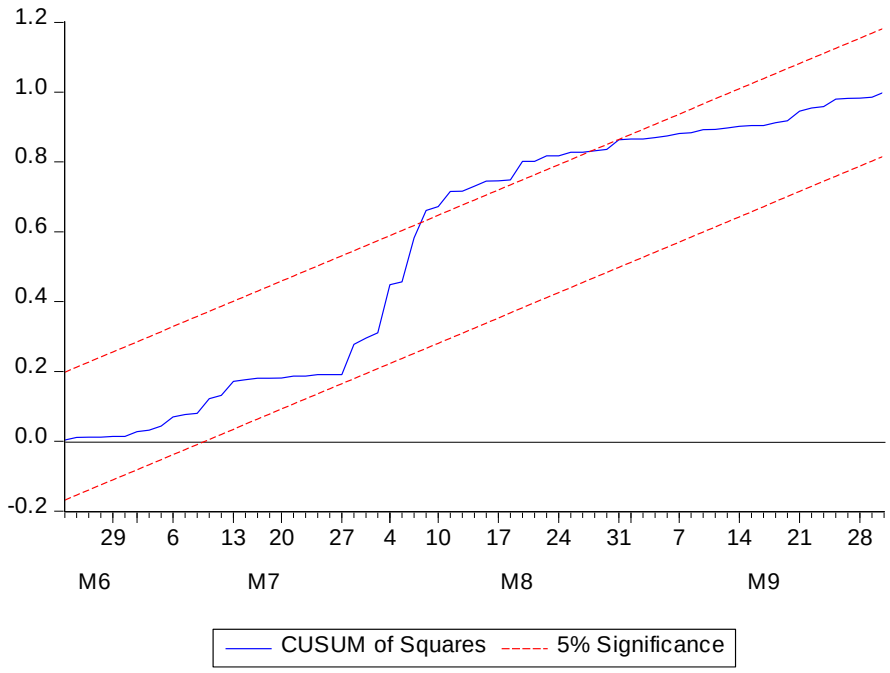


Figure 7: STR CUSUM at 5% Significance

4.7 CUSUM and CUSUM Squares Tests

A Cumulative Sum (CUSUM) graph is an important statistical analysis tool for detecting shifts or trends in a dataset over time. The CUSUM graph visually represents the cumulative sum of deviations from a specified reference value, generally highlighting changes in the underlying process. When applied to economic processes, the CUSUM graph enables the identification of shifts or deviations that may not be immediately apparent in raw data. Peaks or troughs in the CUSUM graph indicate significant deviations from the expected pattern, helping identify when a process undergoes a systematic change. The slope and direction of the CUSUM curve provide insights into the magnitude and direction of the observed shifts, aiding in the detection and diagnosis of changes in the data-generating process.

The CUSUM graph for the ITR variable is within bounds while the CUSUM graph for the STR variable is slightly out of bounds on the upper range. This is due to the fact that the STR variable has a very wide range and standard deviation.

5.CONCLUSION AND POLICY RECOMMENDATIONS

5.1 Conclusion

In this work, we sought to study the effects of government intervention during the tumultuous COVID-19 pandemic. Our aim was to examine the effects of the novel form of self-contradicting policies enacted during the period. We used stock market returns (measured by the BIST 100 Index) as proxy for the state of the economy, interest rates (measured by the TLREF) as proxy for monetary policy and government stringency during pandemic (measured by Oxford University's Government Stringency Index) as proxy for fiscal policy.

Our initial statistical tests indicate the all three variables are approximately normal as shown by the standard deviation, skewness and kurtosis. This was further confirmed by the Jarque-Bera test of normality as well. A test of symmetry indicated one of the variables, stringency, was highly asymmetric, thereby allowing for the use of the nonlinear autoregressive distributed lag (NARDL) model. Further, Philip-Peron (PP) test of stationarity showed that the three variables were not stationary at *I(0)*, but all three were stationary at *I(1)*. These results were confirmed by the Augmented Dickey-Fuller (ADF) test. As such, the regression was modeled as an *I(1)* NARDL.

In the final results, we were able to confirm our initial assumptions that, within the economic dynamic of the COVID-19 pandemic era, stringency is positively related to stock market returns while interest rates, abiding by existing theory, is negatively related. Given the use of NARDL model, we were able to discern that, in general, only the positive shock of both stringency and interest rates affect stock market returns.

5.2 Policy Recommendations

Although government intervention during the pandemic somewhat plausible given the circumstances, policymakers should beware of the following:

Inflation: although transfer payments were somewhat justified due to the dire circumstances of the pandemic, limitations must be placed on these as the economy opens up and the economy normalizes. Lack of doing so may lead to a surge in inflation given that the payments justified during the pandemic lockdowns is now going to cause excessive cash in the economy, driving up inflation.

Tax: In addition to scaling the transfer payments as mentioned above, tax rates should be increased in order to 1) furnish the government with funds and 2) pull some money out of the economy as it opens back up in order to rein in inflation.

Displacement: In addition to the inflation and tax issues discussed above, the government also runs the risk of the transfer payments displacing actual, productive economic investments and spending.

REFERENCES

Baker, S. R., Bloom, N., Davis, S. J., Kost, K., Sammon, M., & Viratyosi, T. (2020). The unprecedented stock marketreaction to covid-19. *White paper - Becker Friedman Institute for economics at UChicago* .

Bekaert, G., & Hoerova, M. (2013). *THE VIX, THE VARIANCE PREMIUM AND STOCK MARKET VOLATILITY.* NATIONAL BUREAU OF ECONOMIC RESEARCH.

Block, W., & Barnett, W. (2004). The Dynamics of Intervention: Regulation and Redistribution in the Mixed Economy. *Austrian Economics, Praxeology and Intervention*, 87-104.

Bollerslev T. (1986). Generalized autoregressive conditional heteroskedasticity. *JOurnal Econometrics*, 307-327.

Bordo, M. D., & Eichgreen, B. (1993). *A Restrospective on Bretton Woods.* National Bureau of Economic Research.

Brock, W. A., Dechert, W. D., & Scheinkman, J. A. (1987). A Test for Independence Based On the Correlation Dimension. *Department of Economics, University ofWisconsin at Madison, University of Houston, and University of Chicago*.

Brown, B. (2018). Manipulation of Long-Term Interest Rates. B. Brown içinde, *The Case Against 2 Per Cent Inflation* (s. 43-54). Palgrave Macmillan.

Carden, W. (2004). Intervention Begets Intervention. *Mises Wire*.

Casanova, L. (2006). The great circle of intervention. *Mises Wire*.

Casini, A., & Perron, P. (2018). *Structural Breaks in Time Series.* Boston University.

Cochran, J. P. (2001). The Hangover Theory? *Mises Daily*.

Crawford, C. (2011). The Repeal Of The Glass- Steagall Act And The Current Financial Crisis. *Journal of Business & Economics Research*.

Cyree, K. B. (2000). The erosion of the Glass–Steagall Act: Winners and losers in the banking industry. *Journal of Economics and Business*, 343-363.

Dungeya, M., Fry, R., Gonz·lez-Hermosillo, B., & Martin, V. L. (2007). Contagion in global equity markets in 1998: the., (s. 1-31).

Eggerston, G. B. (2006). *Was the New Deal contractionary?* New York: Federal Reserve Bank of New York.

Eighengreen, B. (1993). *Three Perspectives on the Bretton Woods System.* National Bureau of Economic Research.

Entorf, H. (1997). Random walks with drifts: Nonsense regression and spurious fixed-effect estimation. *Journal of Econometrics*, 287-296.

Ewerhart, C., Cassola, N., Ejerskov, S., & Valla, N. (2004). *SPORADIC MANIPULATION IN MONEY MARKETS WITH CENTRAL BANK STANDING FACILITIES.* European Central Bank.

Farrell Jr., J. L. (1985). The Dividend Discount Model: A Primer. *Fninancial Analysts journal*, 16-25.

Frisch, R., & Waugh, F. V. (1933). Partial Time Regressions as Compared with Individual Trends. *Econometrica*, 387-401.

Goldstein, M. (1995). *The Asian Financial Crisis.* Insitute for International Economics.

Gormsen, N. J., & Koijen, R. S. (2020). Coronavirus: Impact on stock prices and growth expectations. *SSRN Electronic Journal*.

Haaker, A. (2013). To manipulate or not to manipulate – A short comment on the game of interest rate manipulation. *International Journal of Economics, Finance and Management Sciences* , 21-24.

Hale, T., Angrist, N., Goldszmidt, R., Kira, B., Petherick, A., Phillips, T., . . . Tatlow, H. (2021). A global panel database of pandemic policies (Oxford COVID-19 Government Response Tracker). *Nature Human Behaviour*.

Hall, R. E., & Reis, R. (2017). *ACHIEVING PRICE STABILITY BY MANIPULATING THE CENTRAL BANK'S PAYMENT ON RESERVES.* Cambridge: NATIONAL BUREAU OF ECONOMIC RESEARCH.

Harvey, A. C. (1976). 'Estimating regression models with multiplicative heteroscedasticity. *Econometrica*, 461-465.

Haslbeck, J. M., Bringmann, L. F., & Waldrop, L. J. (2021). A Tutorial on Estimating Time-Varying Vector Autoregressive Models. *Multivariate Behavioral Research*, 120-149.

Hunter, B. (2018). How the Housing Crisis Vindicated the AustrianSchool of Economics. *Foundation for Economic Education*.

Iwge, I. O. (2018). History of the International Economy: The Bretton Woods System and its Impact. *Athens Journal of Law*, 105-126.

Jennergren, L. P. (2011). *A Tutorial on the Discounted Cash Flow Model for Valuation of Companies.* SSE/EFI Working Paper Series.

Judge, G., Griffiths, W., Hill, R., Lutkepohl, H., & Lee, T.-C. (1985). *The Theory and Practice of Econometrics.* Wiley.

Kennedy, D. M. (2009). What the New Deal Did. *Political Science Quarterly*, 251-268.

Krugman, P. (1998, December 4). *The Hangover Theory: Are recessions the inevitable payback for good times?* Slate: http://qed.econ.queensu.ca/pub/students/phds/rouillard/econ222/winter2011/news/krugman_hangover.pdf adresinden alındı

Lovell, M. C. (1963). *Seasonal Adjustment of Economic Time Series and Multiple Regression.* Cowles Foundation.

Luetkepohl, H. (2011). *Vector Autoregressive Models.* European University INstitute, Florence.

Lundholm, R., & O'Keefe, T. (2010). Reconciling Value Estimates from the Discounted Cash Flow Model and the Residual Income Model. *Contemporary Accounting Research*.

Lustig, N. (1995). *The Mexican Peso Crisis:*. Brookings Institution.

MISES, L. v. ((1953 [1912])). *The Theory of Money and Credit.* Yale University Press.

MISES, L. v. ((1998 [1949])). *A Treatise on Human Action.* Mises Institute.

Onali, E. (2020). *Covid-19 and stock market volatility.*

Paresh, K. N., Neluka, D., & Wang, H. (2020). Japanese currency and stock market—What happened during the COVID-19 pandemic? *Economic Analysis and Policy*, 191-198.

Perron, P. (2005). *Dealing with Structural Breaks.* Boston University.

Plosser, C. I. (1978). A Time Series Analysis of Seasonality in Econometric Models. A. Zellner içinde, *Seasonal Analysis of Economic Time Series* (s. 365-408). National Bureau of Economic Research.

Polleit, T. (2007). Manipulating the Interest Rate: a Recipe for Disaster. *Mises Wire*.

Rafindadi, A., & Usman, O. (2020). Toward sustainable electricity consumption in Brazil. *Journal of Environmental Planning and Management*, 905-929.

Rahman, K. S. (2012). *Democracy and Productivity: The Glass-Steagall Act and the Shifting Discourse of Financial Regulation.* New York: Brooklyn Law School.

Rothbard, M. N. (2004). Why the Business Cycle Happens. *Mises Institute*.

Russell, E. D. (2014). Lessons from the Glass-Steagall Act. G. A. Epstein, T. Schlesinger, & M. Vernengo içinde, *Banking Monetary Policy and the Political Economy of Financial regulation* (s. 100-122).

Shin, Y., Yu, B., & Greenwood-Nimmo, M. (2014). Modelling Asymmetric Cointegration and Dynamic Multipliers in a Nonlinear ARDL Framework. *Festschrift in Honor of Peter Schmidt*, 281-314.

T., B., & J., W. (1992). Quasi-maximum likelihood estimation and inference in dynamic models with time-varying covariances. *Economic Review*, 143-172.

Tahoun, A., & Van Lent, L. (2019). The Personal Wealth Interests of Politicians and Government Intervention in the Economy. *Review of Finance*, 37-74.

Trostel, P. A., & Taylor, G. A. (tarih yok). *An Econometric Theory of Time Preference.*

Whaley, R. E. (2009). Understanding the VIX. *Journal of Portfolio Management*.

What is Linear Regression? (2021, 01 26). StatisticsSolutions: https://www.statisticssolutions.com/what-is-linear-regression/ adresinden alındı

Wilmarth Jr., A. E. (2020). *Taming the Megabanks: Why We Need a New Glass-Steagall Act.* The FinReg Blog.

Yilmazkuday, H. (2020). Covid-19 effects on the s&p 500 index. *SSRN Electronic Journal*.