



**HOW DOES INFLATION VULNERABILITY
INFLUENCE WORLD ECONOMIES?:
CONSTRUCTING A MULTIDIMENSIONAL INDEX**

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ABSTRACT

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Master Program in Financial Economics

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Defined as the general increase in the price of goods and services, inflation has serious adverse impacts on world economies. It is seen that inflation is one the biggest threats against economic growth and welfare. Considering the importance of inflation on world economies, this study aims to construct a composite and multidimensional vulnerability index, namely the Inflation Vulnerability Index, to measure the sample countries' level of risks to experience high inflation. To this end, the index is

constructed upon five variables that have a high influence on inflation. These variables include unemployment rate, deposit interest rate, GDP per capita growth rate, exchange growth rate, and gasoline prices growth rate. The constructed index covers the time period between 2006 and 2016. Considering the data limitations, a total of 77 countries representing different geographical regions and economy profiles are included in the index. To analyze the results of the Inflation Vulnerability Index, three major categories consisting of high, medium and low vulnerable countries are created. Accordingly, the findings of the study reveal that most of the sample countries have intermediary scores regarding inflation vulnerability. Due to financial and political events occurred between related years, both advanced and developing countries like South Africa, Turkey, Brazil are among the least vulnerable countries while China, Thailand and Singapore are among the most vulnerable countries, which means they are more likely to experience risks for high inflation. Moreover, the study provides certain policy recommendations for countries encountering high inflation.

Keywords: Inflation, Vulnerability, Composite Index, Inflation Vulnerability Index

ÖZET

ENFLASYONA KIRILGANLIK DÜNYA EKONOMİLERİNİ NASIL ETKİLER?: ÇOK BOYUTLU BİR ENDEKS

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Mal ve hizmet fiyatlarındaki genel artış olarak tanımlanan enflasyonun dünya ekonomileri üzerinde ciddi olumsuz etkileri bulunmaktadır. Enflasyonun ekonomik büyüme ve refah açısından en büyük tehditlerden biri olduğu görülmektedir. Enflasyonun dünya ekonomileri üzerindeki önemi göz önüne alındığında, bu çalışma, örnek ülkelerin yüksek enflasyona maruz kalma risklerini ölçmek için bileşik ve çok boyutlu bir kırılma endeksi, yani Enflasyon Kırılma Endeksi oluşturmayı amaçlamaktadır. Bu amaçla endeks, enflasyon üzerinde yüksek etkiye sahip beş değişken üzerine inşa edilmiştir. Bu değişkenler arasında işsizlik oranı, mevduat faiz oranı, kişi başına düşen GSYH'deki büyüme oranı, döviz kuru büyüme oranı ve benzin

fiyatlarındaki büyüme oranı yer almaktadır. Oluşturulan endeks, 2006 ile 2016 arasındaki dönemi kapsamaktadır. Veri kısıtları göz önüne alındığında, farklı coğrafi bölgeleri ve ekonomi profillerini temsil eden toplam 77 ülke endekse dahil edilmiştir. Enflasyon Kırılganlık Endeksinin sonuçlarını analiz etmek için yüksek, orta ve düşük kırılganlık oranlarına sahip ülkelerden oluşan üç ana kategori oluşturulmuştur. Buna göre, çalışmanın bulguları, örnek ülkelerin çoğunun enflasyon kırılganlığı konusunda orta seviyede puanlara sahip olduğunu ortaya koymaktadır. İlgili yıllar arasında gerçekleşen ekonomik ve politik gelişmelerden dolayı Güney Afrika, Türkiye ve Brezilya gibi gelişmiş ve gelişmekte olan ülkeler düşük kırılganlığa sahipken, Çin, Tayland ve Singapur gibi ülkeler ise yüksek kırılganlığa sahip ülkeler arasındadır. Bu da söz konusu ülkelerin yüksek enflasyon ile karşılaşma riskinin fazla olduğu anlamına gelmektedir. Ayrıca, çalışma yüksek enflasyonla karşılaşan ülkeler için belirli politika önerileri sunmaktadır.

Anahtar Kelimeler: Enflasyon, Kırılganlık, Birleşik Endeks, Enflasyon Kırılganlık Endeksi



To my beloved family and my dearest Berfu

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CHAPTER 1: INTRODUCTION

While the ongoing slowdown in global growth continued simultaneously in developed and developing countries in the last quarter of 2019, the uncertainties regarding global economic policies have remained important, although they have decreased to some extent recently. Positive developments towards resolving the trade disputes between the USA and China, decreasing uncertainties regarding the Brexit process and support of global monetary policies for economic growth have positively affected the expectations regarding global economic activity. However, the fact that geopolitical tensions originating from the Middle East and North Africa intensified in January, social protests in some developing countries, drought in the southern hemisphere and the pandemic recently started in China and rapidly expanded to the world created risks on global economic activity (Bernanke et al., 2001). Accordingly, while the growth outlook in developed countries is expected to turn positive in the coming period, country-specific vulnerabilities continue to pose downside risks to the growth outlook in the developing countries.

Risks related to global inflation are balanced. Decreasing uncertainties regarding global economy are likely to increase global headline inflation through commodity prices and core inflation through growth. The tightening in the labor markets of the US and Eurozone is regarded as an upside risk on core inflation (Boussard, 1984). However, the fact that the global uncertainties still remain at high levels and the re-intensification of geopolitical tensions keeps downside risks on global economic activity alive. Although geopolitical developments increase the volatility in oil prices, the forecasts regarding oil production point to the existence of risks in both directions.

There are several risks that trigger high inflation. These include the volatilities in country's risk premium depending on the global and geopolitical developments, the fact that medium-term inflation expectations remain above the inflation target, risks regarding the Monetary and fiscal policy coordination, risks related with credit market, uncertainties in the global trade and growth outlook, uncertainties regarding the capital flows for developing economies, and volatilities in crude oil and import prices (Artis and, Kontolemis, 1998; Frisch, 1977). Crude oil prices have recently followed a volatile course due to geopolitical developments and pandemic. The sliding scale system implementation in fuel products alleviated the reflections of the oil price

increases on inflation. Moreover, the weak course of global economic activity limits the upward trend in commodity prices. The course of crude oil and other commodity prices in the coming period is likely continue depending on the global growth outlook, news flows on pandemic and geopolitical developments. Therefore, volatility in commodity prices keeps both downside and upside risks on inflation alive (Lanzafame, 2016).

Headline inflation rates in the last quarter of 2019 increased in developed and developing countries due to the rise in crude oil prices (Kim, and Yim, 2020). In this period, the weak course of demand has stabilized the upward pressures on prices due to supply constraints and geopolitical problems, while crude oil prices have increased due to the escalation of tensions between Iran and the US in early January (Ishida, and Matsuzaki, 2020). Moreover, the epidemic that started in China in the same period caused a decrease in oil prices, creating concerns about oil demand.

Despite the weakening in the global growth outlook, the headline inflation rates in the last quarter of 2019 increased in developed and developing countries compared to the previous quarter with the impacts of rise in crude oil prices (Nasir, Huynh, and Vo, 2020). Figure 1 shows this increase. In the same period, while the core inflation rate tends to increase for developed countries, it decreased in developing economies. Figure 2 illustrates these tendencies.

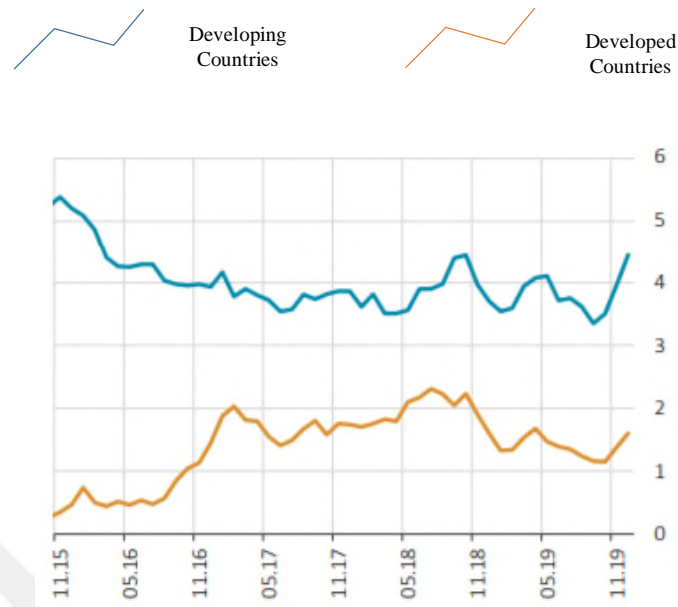


Figure 1. Consumer Price Inflation in Developed and Developing Countries (%) (Source: Bloomberg, 2020)

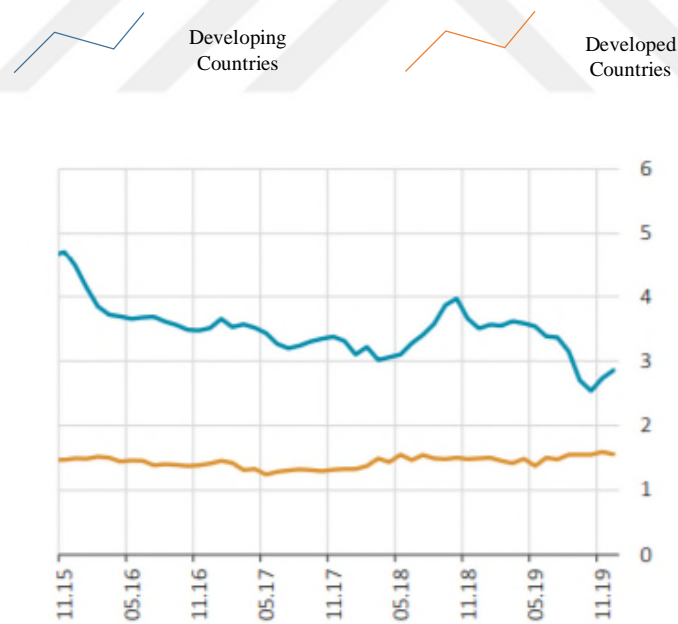


Figure 2. Core Inflation in Developed and Developing Countries (%) (Source: Bloomberg, 2020)

Figure 3 provides a different scheme to illustrate the world inflation rates in 2020. It uses a map where the inflation rates are ranged between 0% and more than 25%. In this sense, the countries that have the highest inflation rates are colored with dark

orange while the countries that have the lowest level of inflation rates are colored with dark green. On the other hand, the countries that do not have any statistical information regarding inflation rates are colored with grey. Accordingly, it is seen that countries such as Iran, Sudan, Yemen, Venezuela, Suriname and Zimbabwe have the highest inflation rates in the world with a rate of more than 25%. These countries are followed by Turkey, Libya, Angola, Congo, Uzbekistan and Pakistan whose inflation rates range between 10% and 25%. On the contrary, countries such as Spain, Portugal, Thailand have the negative values for inflation rates. Similarly, the low inflation rates belong to Scandinavian countries such as Norway, Sweden and Finland whose economies are highly developed and other European Union countries as well as the US and Canada.

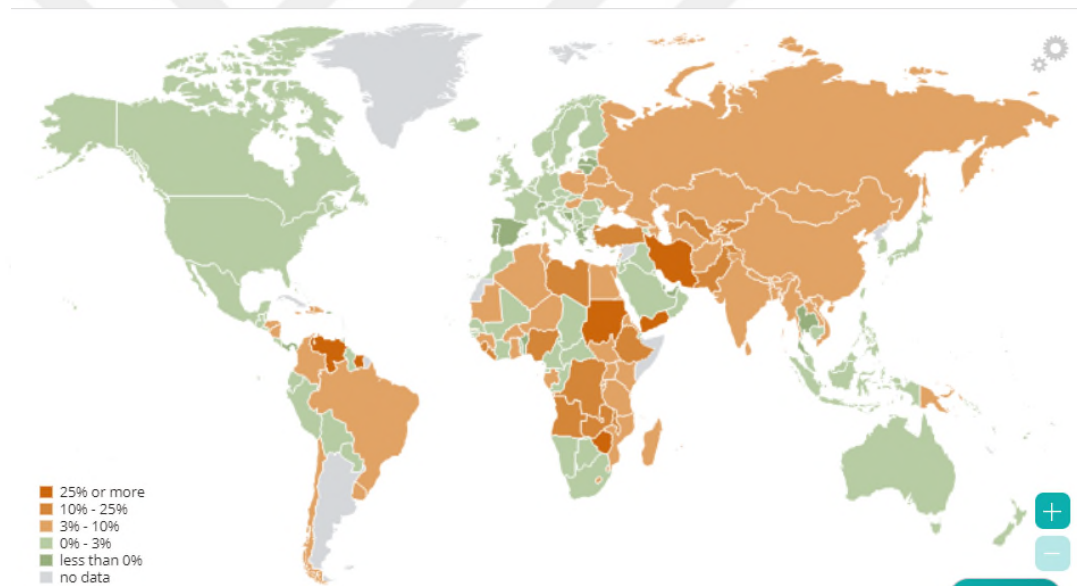


Figure 3. Inflation Rate, Average Consumer Prices in 2020 (Source: International Monetary Fund, 2020)

Considering the change of the inflation rates over a time period between 2000 and 2020 in different geographical regions, the following graph might be created, as illustrated in Figure 4. The statistical data on the graph is taken from International Monetary Fund's statistics on inflation rates over average consumer prices. Accordingly, it is seen that Western European countries have the lowest levels of inflation rates in recent years. On the other hand, particular regions have volatilities regarding the inflation rates. For example, Central Asian and Caucasian countries have changing inflation rates from one period to another. While the value of the inflation

rate in Central Asian and Caucasian countries was 40 in 2001 this value suddenly decreased to 8,1 in 2004, and its fluctuations continued in the upcoming years. Similarly, North African countries and Middle Eastern countries also experience fluctuations regarding inflation rates in certain time periods. On the contrary, European countries in general encounter relatively stable inflation rates during the time period between 2000 and 2020.



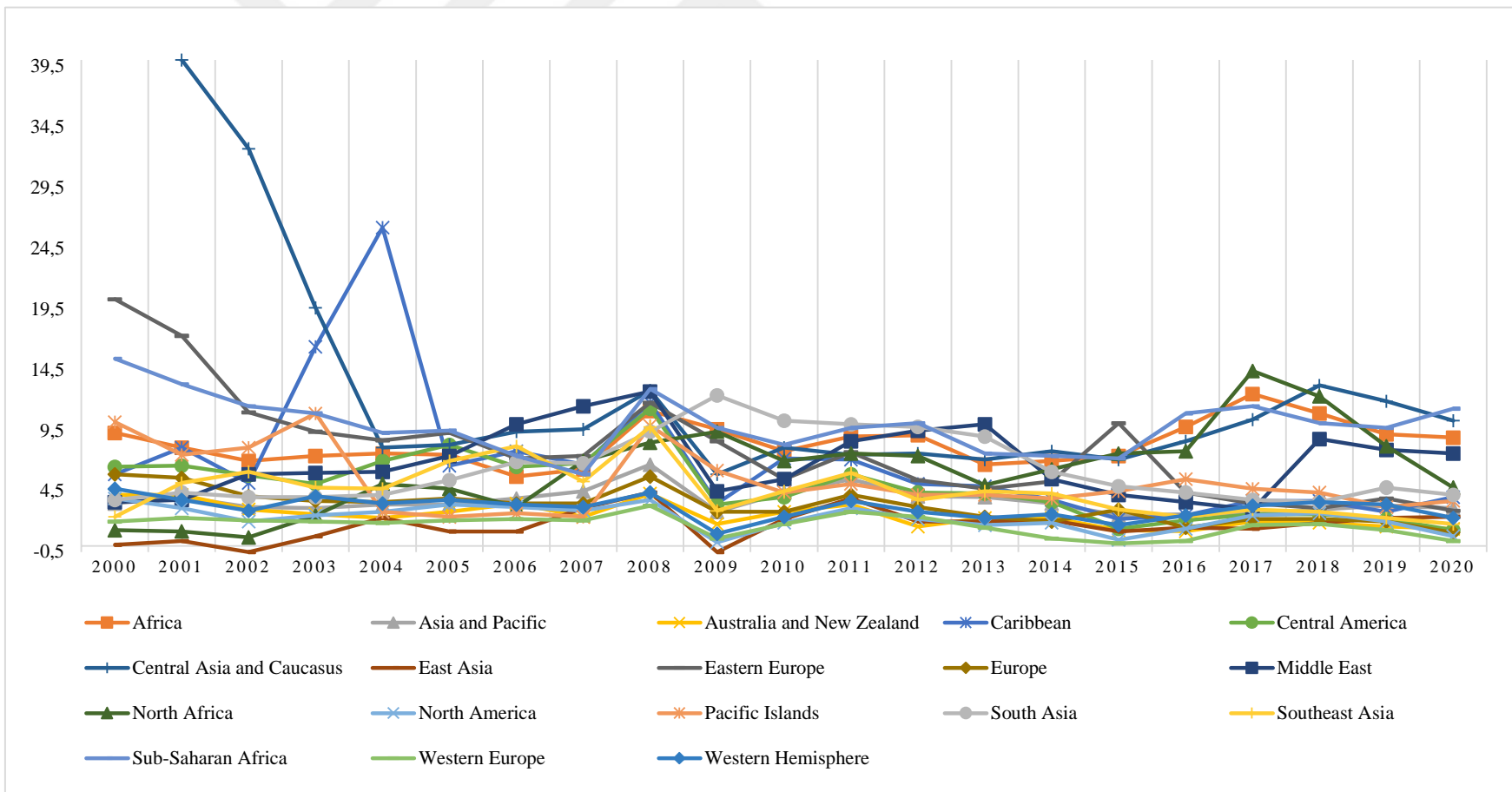


Figure 4. Regional Inflation Rates between 2000 and 2020

The growing literature concerning inflation tries to explain how inflation economically influence world countries. Accordingly, inflation is defined as an overall increase in prices of goods and services used frequently in daily life. However, prices of goods and services may increase or decrease over time. Inflation is not only an increase in the price of a particular good or service, but also a continuous increase in the general level of prices. Depending on the large impact of inflation on economic prosperity, the scholars in the literature tend to conduct scientific studies related to inflation. Although the inflation literature has been quite mature in terms of theoretical and empirical studies, there exists a gap in the literature due to the lack of a systematic index to measure and analyze the vulnerability to inflation of multiple countries. Therefore, this study will aim to fill the gap in the literature, designing a multi-dimensional and composite inflation vulnerability index.

Within the framework of the research, this thesis aims to answer the following research questions:

1. What is the possibility of designing an Inflation Vulnerability Index?
2. Why do we need an Inflation Vulnerability Index?
3. What are the fundamental variables that can be utilized to design an Inflation Vulnerability Index?
4. How can the inflation vulnerability of the sample countries be interpreted on the basis of the designed Inflation Vulnerability Index?
5. What are the policy implications and recommendations for the sample countries that have high levels of inflation vulnerability?

The results of the study show that countries including Mexico, Malaysia, Switzerland, Nicaragua, Philippines, and Japan are among the most vulnerable countries to inflation while South Africa, Armenia, North Macedonia, Turkey, and Brazil are among the least vulnerable countries. The standard error of the average scores of vulnerabilities is also low, meaning that the scores are mostly circling around the mean of averages. These results help the community understand which countries are most vulnerable and why, as well as which countries are the least vulnerable and why, with some policy implications and recommendations, also which indicators are among the most effective. Additionally, how a vulnerability index is constructed and how to apply it to the field of economics can be seen and experienced through.

In terms of its structure, the thesis includes five chapters. Accordingly, **Chapter 1** is the introduction section of the thesis, and it provides a general view regarding the inflation trends in the world definition of inflation and inflation literature. Moreover, the chapter introduces the research questions.

Chapter 2 reveals a comprehensive literature review of the thesis, regarding inflation literature. This section consists of several steps. First, the chapter provides a definition for inflation and types of inflation as well as different theories explaining inflation. Second, it summarizes the variables influencing inflation, illustrating a detailed table.

Chapter 3 introduces the selected variables to construct the Inflation Vulnerability Index and reveals the methodology of the thesis. Moreover, the sample countries whose inflation vulnerability is analyzed are introduced in this chapter. In addition, the formulation that is used to construct the index and the relationship between each variable and inflation are provided.

The findings of the thesis are evaluated and interpreted in **Chapter 4**. In accordance, the sample countries are categorized among themselves and their vulnerability to inflation is compared.

Finally, **Chapter 5** concludes the thesis. In this chapter, a final assessment is completed on Inflation Vulnerability Index. Furthermore, this section offers policy recommendations for sample countries that have high levels of inflation vulnerability in order to stabilize their national economies. Besides, the chapter provides some suggestions for further research.

CHAPTER 2: LITERATURE REVIEW

This chapter of the thesis presents a comprehensive review regarding the literature on inflation and theoretical background. To this end, the operational phases of the literature review are two-fold. In the first phase, a definition of inflation from different sources as well as the conditions leading to inflation are provided. Moreover, it is clearly identified how inflation is measured. In the second phase, the literature is systematically reviewed to identify the variables and indicators of inflation.

The literature review has been completed on the basis of a comprehensive research conducted in multiple scientific databases including Web of Science, ScienceDirect, ResearchGate, and Google Scholar. The key words to conduct the literature review consist of “inflation”, “inflation variables”, “inflation indicators”, “inflation expectations”, “inflation targeting”, “interest rate”, “inflation hedging”, “rapid inflation”, “inflation variability”, “financial development”, “economic growth”, “monetary policy”, “monetary inflation”, “financial inflation”, “demand-pull inflation”, and “cost-push inflation”.

In the initial screening, around 750 sources on inflation-related issues were identified. Following the initial screening, the extent of the research was narrowed to focus on a particular aspect. To this end, the most relevant 250 sources that provide a discussion regarding which variables influence inflation and what kind of a relationship there is between related indicators and inflation were selected. Accordingly, 110 most frequently cited sources on inflation variables; consequently, the literature review was built on this 110 sources. Figure 5 illustrates the phases of literature review in detail.

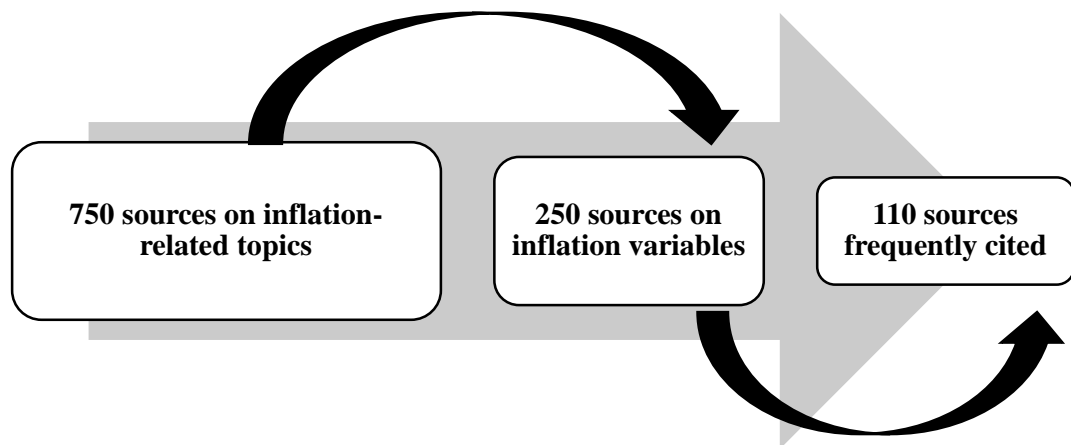


Figure 5. Analytical Approach for Literature Review

Among 110 sources that were frequently cited, the variables that have an influence on inflation were reviewed again. In this phase, while reviewing the literature, the sources were filtered according to publication year. This time, the review gave 30 different articles published between the years of 1995 and 2020. Among these, most of the sources were published after 2000. However, only 5 articles were published before 2000. The criteria to focus on these articles were based on the fact that these were the most up-to-date studies and they had a high number of citations. Particularly, the most recent studies were of great importance in order to identify the variables to construct an inflation index as the variables discussed in these studies give an idea about the recent factors affecting inflation.

The following sections present the outputs of the literature review that has been systematically conducted in two stages. The first part of the literature review aims to define inflation, explain the different types of inflation, make a reference to the theories explaining the drivers of inflation, and show the relationship between vulnerability and inflation. The second part of the literature review introduces the variables of inflation in detail, shedding light on the existing studies in the inflation literature.

2.1. Definition of Inflation

Multiple studies in the literature provide definitions regarding inflation. The literature reveals that inflation has been clearly defined in a common way. Accordingly, inflation is defined as an overall increase in prices of goods and services used frequently in daily

life (Frisch, 1977; Boussard, 1984; Cachanosky, 2009). However, prices of goods and services may increase or decrease over time. Inflation is not only an increase in the price of a particular good or service, but also a continuous increase in the general level of prices (Nasir, Huynh, and Vo, 2020). In other words, the constant increase in the prices of some goods or the increase in the price of all goods once is not defined as inflation. For example, the monthly inflation rate of 1 percent indicates that the general level of prices in that month increased by 1 percent compared to the previous month. The annual inflation rate of 30 percent means that the prices increased by an average of 30 percent compared to the previous year (Kim, and Yim, 2020). High inflation reduces the purchasing power and also makes it difficult to understand the price changes (Bernanke et al., 2001). Therefore, a decline in inflation does not necessarily means that prices will fall and the purchasing power and income level will rise. Instead, a decline in inflation implies that the prices will increase to a smaller extent and the purchasing power will decrease more slowly, resulting economic stability and prosperity.

2.2. Types of Inflation

Inflation might be categorized under particular major domains according to the rate of price increase, including creeping inflation, walking inflation, running inflation, galloping inflation, and hyperinflation, as depicted in Figure 6.

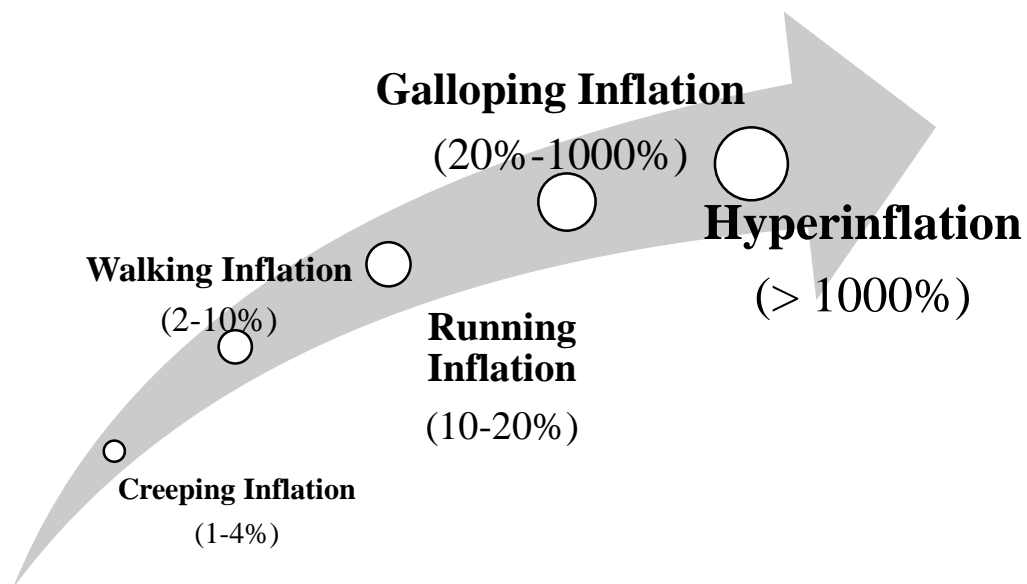


Figure 6. Types of Inflation

2.2.1. Creeping inflation

Creeping inflation occurs when the rate of inflation tends to slowly increase over time. In case the prices rise by 3% or less in a year, it means the relevant country is likely to experience creeping inflation (Bates, and Gabor, 1986). Several economists accept creeping inflation as one of the major economic problems experienced in modern economics (Holzman, 1959). Scholars argue that although creeping inflation might not be recognized at first glance, it might cause severe problems in time if the creeping rate of inflation continues (Reuten, 2003; Bates, and Gabor, 1986).

Federal Reserve explains that when prices increase by 2% or less, the country benefits from economic growth. This kind of mild inflation creates an expectation on consumers that prices will continue to increase, resulting in a sharp increase in demand (Forbes, Hjortsoe, and Nenova, 2015). Therefore, consumers will have a tendency to purchase goods or benefit from services immediately to avoid higher future prices. This is the manner how mild inflation triggers economic expansion. Accordingly, the Fed sets 2% as its target inflation rate.

2.2.2. Walking inflation

Walking inflation, also referred to as moderate inflation, means the inflation rate is less than 10%. Namely, it is experienced when inflation rate is between 3-10% in a year (Ishida, and Matsuzaki, 2020). When the inflation rate exceeds 4%, Central Banks will be alarmed. The scholars imply that this type of inflation is quite harmful to the economy since it revives economic growth at an extreme speed (Long et al., 2018). This is likely to create a condition in which consumers start to buy more than they need, just to overcome tomorrow's much higher prices. Under these conditions, suppliers cannot provide enough good and services to meet increasing demand. Consequently, a sharp increase in the prices of common goods and services is seen in a way that most people cannot afford to purchase.

2.2.3. Running inflation

Running inflation is a type of inflation that increases at an important rate. Usually defined as a rate between 10% and 20% in a year, running inflation creates serious costs on a country's economy and starts to easily creep higher (Lee, 2013). Running inflation is an indicator for the need to implement strong monetary and fiscal measures

(Mishkin, 2000). Otherwise, the impacts of inflation may further alleviate, resulting in a more serious situation called as hyperinflation.

2.2.4. Galloping inflation

The inflation rate between 20% and 1000% is identified as galloping inflation. Galloping inflation means that money starts to lose its value to such an unprecedented rate that business and employee income do not deal with increasing costs and prices (Chu et al., 2019). Moreover, this situation discourages the foreign investors to invest in a country where galloping inflation is experienced. In this situation, inflation becomes a severe problem and challenging to control. Consequently, the economy of the relevant country is likely to become unstable and government officials lose their credibility and reliability (Williams, 2014).

2.2.5. Hyperinflation

Extreme form of inflation is identified as hyperinflation which means rate of inflation exceeds 1000%. Hyperinflation generally implies extremely fast price changes at such a sudden time that it becomes an ordinary occurrence when money rapidly loses its value (Morgan, 2009). In other words, the market prices skyrocket more than 50% monthly.

In the history, hyperinflation was experienced rarely. In fact, the hyperinflation was mostly experienced only when governments printed money to pay for wars (Mishkin, and Savastano, 2001). There are a few prominent examples of hyperinflation in the history. For instance, the most prominent example of hyperinflation is the incident in Germany in the early 1920s. During this period, inflation rate in Germany was around 30.000% in a year. Moreover, the hyperinflation in Zimbabwe in the 2000s provides another extreme example. The statistical information reveals that the price increase per month in Zimbabwe reached around 79.600.000.000% in 2008. Similarly, Venezuela also experienced severe hyperinflation in the 2010s when the country faced with a prompt economic rout.

2.3. Theories Explaining the Drivers of Inflation

There exist particular reasons leading to inflation. Demand-pull inflation, cost-push inflation, and price expectations of future inflation are regarded as fundamental

sources of inflation (Alpanda, and Honig, 2014; Lanzafame, 2016). These sources of inflation are explained by several influential theories in economics and finance. Keynesian economics and monetarist economics provide a framework for the conditions leading to inflation. Figure 7 summarizes the theories explaining the major factors driving inflation.

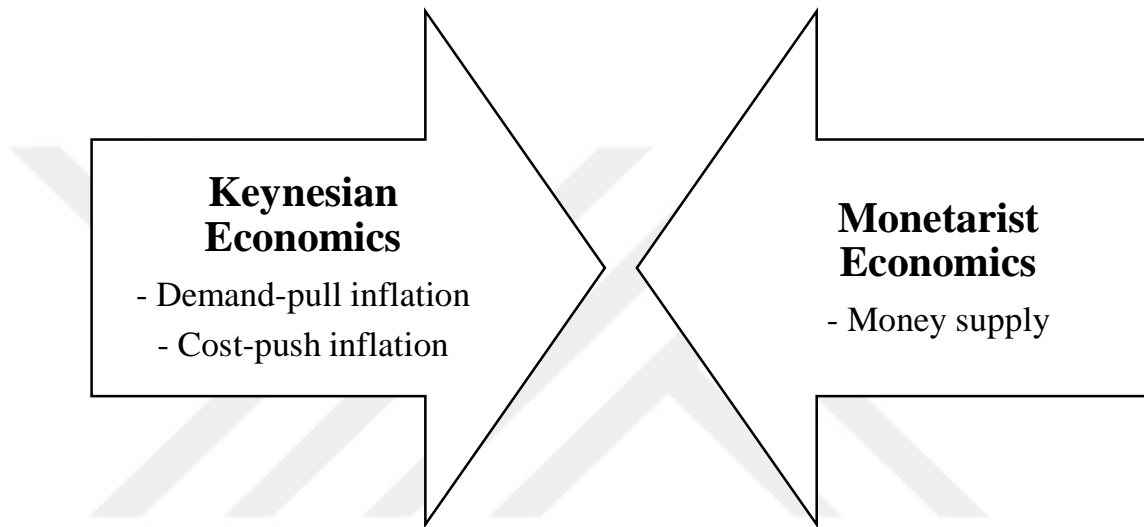


Figure 7. Theories Explaining Causes of Inflation

2.3.1. Keynesian Economics

Originating from British economist John Maynard Keynes, the Keynesian theory argues that economic development is mostly based on aggregate demand. The scholars support Keynesian economics emphasize that government intervention in economics via fiscal and monetary policy is vital for successful economic outputs including rising levels of employment and reducing the instability of the business cycle (Obstfeld, 2014; Balima, Combes, and Minea, 2017). According to Keynesian theory, particular economic pressures such as increasing costs of production as well as rising aggregate demand are the root causes of inflation. Furthermore, Keynesian economics model categorize causes of inflation into two major areas; namely, demand-pull inflation and cost-push inflation (Artis, and Kontolemis, 1998).

Demand-pull inflation generally occurs when the rise in money supply causes an increase in the level of consumption, as depicted in Figure 8. The theory on demand-

pull inflation implies that in case aggregate demand exceeds aggregate supply, prices will increase, resulting in inflation (Mehra, and Herrington, 2008). This mostly stems from the fact that total supply in an economy does not satisfy total demand. The amount of money spent by the consumers affects inflation. The increase in the price of a good requires consumers to spend more money on the same commodity (Minella et al., 2003). This is only possible if the consumers either save less or increase their level of income. If level of income and spending increases with prices, inflation will also increase since consumers' demand for goods and services increases when they have more money, and they can spend more for the goods they want to buy (Lu et al., 2017). While the increase in the amount of money that consumers have and rise of money supply via printing unbacked money increases the demand for consumption, the rise in the level of production at the same rate is not an easy and quick process. In order to meet the increasing demand with the increase in money supply, companies tend to increase their capacities at the first stage; for this purpose, hiring extra workers, working overtime, and buying new machines increase the costs of these companies (Cerisola, and Gelos, 2009).

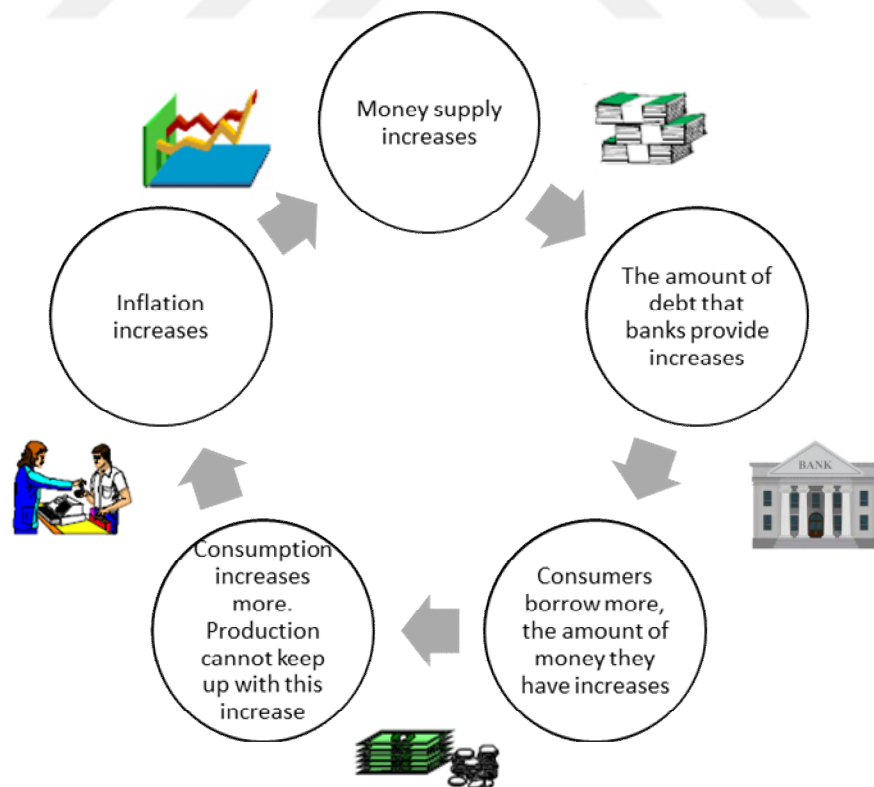


Figure 8. Demand-pull Inflation Model

If firms increase their prices to cover the rising cost, they cause inflation. With the increase in the money supply, the economy started to recover with decreasing unemployment and increasing profits; however, these positive effects will soon be replaced by increasing inflation and its adverse impacts (Morgan, and Patomaki, 2017).

Not only demand but also supply affects inflation. Cost-push inflation results from an overall increase in the costs of the factors of production, namely capital, land, labor, and entrepreneurship that are key aspects to produce goods and services. Figure 9 presents the cycle in cost-push inflation model.

The increase in the cost of these factors means that producers who are willing to maintain their profit margins have to escalate the price of their goods and services. An economy-wide level increase in the production costs results in a rise of consumer prices in the overall economy (Broadbent, 2017) Consequently, the consumer prices are raised by production costs. The increase in prices as a result of the increase in the cost of all kinds of materials and labor used in production creates inflation. This ultimately leads to continuous increases in worker wages, tax burden of firms, and production costs of increases in raw material prices (Nasir, and Simpson, 2018).

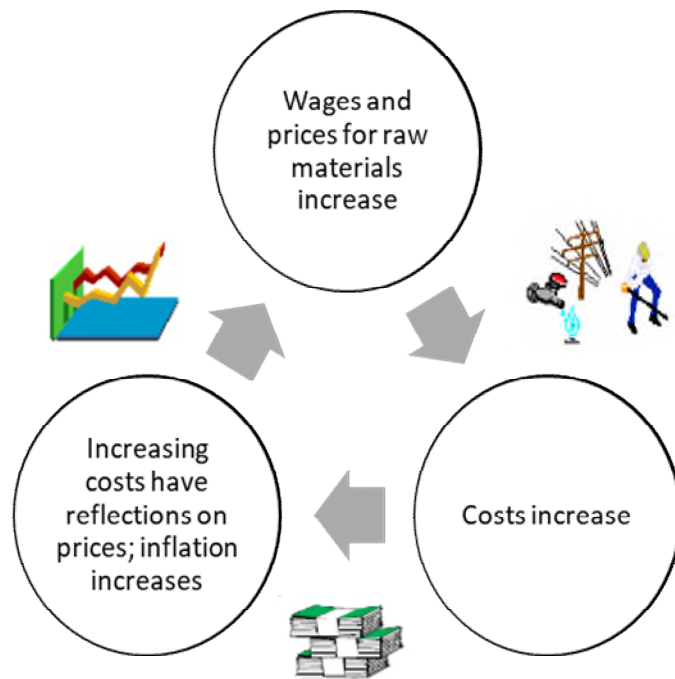


Figure 9. Cost-push Inflation Model

2.3.2. Monetarist Economics

American economist Milton Friedman is mostly known with Monetarism. The role of money is the central idea of Monetarism. It addresses how the changes in money create economic effects. In this sense, Monetarist economics argues that money supply is the key driver of economic growth (Amadeo, 2020). Accordingly, an increase in the money supply causes rising demand, more production and more job opportunities. However, according to Monetarists such growth is not permanent; instead, it leads to inflation in the long run. The mentality in this theory is that when demand exceeds supply, the prices will continually increase.

As far as the operation mechanism of the monetarist economics is considered, it is seen that the interest rates decrease as the money supply increases. This mostly stems from the fact that banks have more to lend and they are more prone to lower rates. This triggers consumers to borrow more money to purchase estates and goods. On the contrary, a decrease in the money supply further increases interest rates and makes the loaning costlier. These incidents are the major reasons for slow economic growth, which increases vulnerability to inflation.

2.4. Relationship between Vulnerability and Inflation

Vulnerability is simply defined as a degree to which the focused system does not have any sufficient conditions to deal with the relevant negative case or event (Jahan, 2017). The concept of vulnerability was firstly introduced by Hyman Minsky (1975), and it has been mostly utilized by post-Keynesian economists to measure financial fragility (Karwowski, Shabani, and Stockhammer, 2019). By definition Minsky (1975) defines vulnerability the “debt relative to income”. In the formula, the debt is considered over the current income. As a result, a rise in the interest rates or a decrease in asset prices are likely to trigger high levels of debt to income rates or “towards insolvency” (Karwowski, Shabani, and Stockhammer, 2019).

Vulnerability to inflation shows to what extent a country has a risk to face with inflation. If vulnerability is high in that country, it increases the possibility to experience high inflation, which all can lead to hyperinflation eventually. The vulnerability to inflation can cause a decrease in purchasing power, weaken exchange rate value of the country, reduce employment etc. Beirne (2009) argues that exchange

rate movements, productivity growth, government consumption expenditure, capital growth, the current account balance, and reforms on price liberalization have strong effects on inflation. Therefore, a sharp increase or decrease in these factors is likely to affect a country's vulnerability to inflation.

The literature reveals several examples of vulnerability indices. Iacoviello, and Navarro (2019) make an analysis over the impact of increasing interest rates in the USA on economic activity. The study uses a panel study approach over 50 advanced and emerging economies. The vulnerability index in the study is constructed upon particular variables such as "current account, foreign reserves, inflation, and external debt". Methodologically, the study applies an equally-weighted average of these selected variables. Accordingly, the study shows the implications of the constructed vulnerability index revealing that the sample countries' financial fragility increases when their GDP decreases more rapidly as a consequence of monetary tightening of the USA (Iacoviello, and Navarro, 2019). Moreover, it has been argued that the rapid changes in consumer price index, the current account deficit explained in terms of the share of GDP, and external debt are the variables that influence the vulnerability index. Another study conducted by Claessens et al. (2010) uses similar indicators to design a vulnerability index and argues that a large current account deficit is possibly to exacerbate the negative influences of the crisis and increase vulnerability. Likewise, Santacreu (2015) argues that foreign reserves and external debt are the factors that increase external vulnerability of the countries. These variables are of significance in terms of the sensitivity of an economy towards negative economic and financial shocks.

Vulnerability is also considered by other scholars, Adrian, Boyarchenko, and Giannone (2019). In this sense, Adrian, Boyarchenko, and Giannone (2019) analyze financial vulnerability on the basis of leverage and maturity transformation in the financial sector. The study concludes that the financial sector is negatively affected by unanticipated productivity and credit demand shocks, which causes depression and high vulnerability for economic and financial crises. Similarly, Yadav, Goyari, and Mishra (2018) put forward that financial openness and trade openness are the significant components of an integrated economy and financial stability. The study methodologically applies GMM-system approach and creates a vulnerability index. The study reveals that depending on these indicators, integrated economies are less

vulnerable to external shocks (Yadav, Goyari, and Mishra, 2018).

The existing studies in the literature show that vulnerability is a significant concept in economics and finance. There are numerous studies focusing on vulnerability to different economic and financial incidents. Accordingly, these studies either construct vulnerability indices from scratch or utilize the existing vulnerability indices to test their hypothesis and reach generalizable outcomes. However, the lack of a systematic index to measure inflation vulnerability constitutes a gap in the literature. This gap is worth studying as the constructed index will contribute to evaluate the sample countries profile in terms their proclivity for inflation and recommend policy suggestions to overcome inflation.

2.5. Inflation Variables

The systematically reviewed literature reveals 30 most recent and highly cited studies from inflation literature. Accordingly, a total of 26 variables were observed to influence inflation. Table 1 summarized the inflation variables, and shows which articles have utilized these variables before. These variables are listed as follows: Exchange rate, Oil prices, Unemployment rate, Liquidity, Interest rates, Real GDP, Industrial production, Producer Price Index (PPI), Export of goods, Import of goods, Money supply, GDP gap, Private consumption, Import prices, Harmonized Index of Consumer Prices (HICP), Consumer Price Index (CPI), Wholesale prices, Gold prices, Commodity prices, Currency growth, Real output growth , Output gap, Size of the price changes, Stock prices, Government expenditure, and Exchange rate pass through.

Table 1. Inflation Variables Used in Most Recent Studies

# of Articles	Authors and Publication Year	Exchange Rate	Gasoline Prices	Unemployment Rate	Liquidity	Interest Rates	Real GDP	Industrial Production	PPI	Export of Goods	Import of Goods	Money Supply	GDP Gap	Private Consumption	Import Prices	HICP	CPI	Wholesale Prices	Gold Prices	Commodity Prices	Currency Growth	Real Output Growth	Output Gap	Size of the Price Changes	Stock Prices	Government Expenditure	Exchange Rate Pass Through
1	Boroumand et al. (2019)	X	X																						X		
2	Khezri et al. (2017)		X	X	X	X	X																				
3	Sharma (2019)	X				X		X	X	X	X	X															
4	Andıç, and Ögünç (2015)	X						X	X				X	X	X												
5	Álvarez, and Sánchez (2018)															X	X										
6	Saatçioğlu, and Korap (2006)	X				X												X									
7	Mahdavi, and Zhou (1997)																X		X	X							
8	Lucey et al. (2017)											X							X								
9	Makin et al. (2017)		X			X															X						
10	Assenmacher et al. (2007)																				X	X	X				
11	Apaitan et al. (2020)						X										X							X			
12	Moser et al. (2007)			X	X			X																			
13	Ball, and Mazumder (2011)			X																							
14	Hossain (2005)											X															

Table 1 (cont'd)

# of Articles	Authors and Publication Year	Exchange Rate	Oil Prices	Unemployment Rate	Liquidity	Interest Rates	Real GDP	Industrial Production	PPI	Export of Goods	Import of Goods	Money Supply	GDP Gap	Private Consumption	Import Prices	HICP	CPI	Wholesale Prices	Gold Prices	Commodity Prices	Currency Growth	Real Output Growth	Output Gap	Size of the Price Changes	Stock Prices	Government Expenditure	Exchange Rate Pass Through
15	Ramakrishnan, and Vamvakidis (2002)	X																			X						
16	Mahdavi, and Zhou (1997)																X		X	X							
17	David et al. (2000)			X			X		X								X		X								
18	Stock, and Watson (1999)			X		X														X							
19	Leigh, and Rossi (2002)	X				X	X	X									X	X		X							
20	Banerjee, and Marcellino (2005)	X				X	X																		X		
21	Banerjee et al. (2005)						X													X		X			X		
22	Goodhart, and Hofmann (2002)	X				X																X					
23	Barr, and Campbell (1997)					X																					
24	Mandalinci (2017)	X	X	X		X		X				X													X		
25	Berg, and Henzel (2014)		X	X			X			X	X					X											
26	Öğünç et al. (2013)	X				X											X						X				
27	Wimanda et al. (2011)	X					X										X										X

Table 1 (cont'd)

# of Articles	Authors and Publication Year	Exchange Rate	Oil Prices	Unemployment Rate	Liquidity	Interest Rates	Real GDP	Industrial Production	PPI	Export of Goods	Import of Goods	Money Supply	GDP Gap	Private Consumption	Import Prices	HICP	CPI	Wholesale Prices	Gold Prices	Commodity Prices	Currency Growth	Real Output Growth	Output Gap	Size of the Price Changes	Stock Prices	Government Expenditure	Exchange Rate Pass Through
28	Garner (1995)																		X								
29	Danlami et al. (2020)	X																									X
30	Ha et al. (2020)																										X

Boroumand et al. (2019) makes an analysis over the impacts of “global oil price shock, euro/dollar exchange rate shock and global inflation shock”. Accordingly, the study aims to determine the monetary policy rule to increase the level of macroeconomic fluctuations and provide an opportunity for keeping inflation at a low level. The study uses DSGE model with a Keynesian approach for Iran’s economy. The indicators used are oil prices and exchange rates in order to determine their effects on macroeconomic variables such as inflation. The analysis covers a time period between 1990 and 2014. Consequently, the main findings of this paper show that from the first quarter of the year 1990 to the quarter of 2014, the core inflation rule was the best monetary rule for stability in both macro variables and inflation.

Khezri et al. (2019) conduct a study regarding inflation forecasting. They argue that key factors such as oil prices, unemployment rate, liquidity, interest rates, and real GDP are influential on inflation. The study uses quarterly data, referring to 1988-2012, using nonlinear dynamic models as well as TVP-DMA and TVP-DMS models to see the effects of variables that have an impact on inflation in order to forecast it. It is also shown in the paper that unemployment rate has a reverse relation to inflation according to Philips-Curve; however, for the other variables, such as interest rates, liquidity, real GDP and oil prices, this relationship is direct. The problem of other researches was that their prediction of inflation was not persistent; therefore, this paper was conducted and the main result was that dynamic models act more accurate in inflation forecasting in Iran.

Sharma (2019) mentions macroeconomic variables that are influential over Indonesia’s inflation rate. The study applies a comparative analysis to understand and identify the key variables that are significant to forecast the inflation rate. These variables include exchange rate, interest rates, industrial production, Producer Price Index, export of goods, import of goods and money supply. The time span taken for indicators are between 1967 and 2018. The main result is that %73 of the indicators are significant. The author accepts that up-to-date datasets are valuable, and one of the major problems of former studies is that they utilized old datasets. Another problem seems like all other research studying Indonesia’s inflation prediction could not conduct a robustness tests to validate their results. Therefore, Sharma (2019) tries to come up with a solution and that constitutes the main goal of this research.

Andıç, and Ögünç (2015) mention forecasting features of several inflation variables.

This paper tries to formulate a methodology to choose variables that can help in forecasting, and the main focus is the leading indicators of inflation in Turkey. The authors use pseudo out-of-sample approach to determine leading indicators out of 112 in total. The results show that the best leading indicators are economic activity variables. These are exchange rates, industrial production, Producer Price Index, GDP gap, private consumption and import prices. The time period used in the analysis covers the years between 2003 and 2014.

Another similar study was conducted by Álvarez, and Sánchez (2018). They make an analysis over the main reasons and determinants of inflation in Spain. The authors use Harmonized Index of Consumer Prices (HICP) to measure inflation. They also mention Consumer Price Index (CPI) as another indicator for calculating inflation; however, they do not include CPI in their analysis due to the former studies. This is mostly because of the fact that CPI is analyzed often while other factors are not involved in the analysis. In the literature review, it can be seen that nearly all European countries' central banks publish HICP data more than CPI data. In terms of methodology, the time span for the data that is being used in this article is between 1995 and 2018. The results of this paper indicate that CPI gives much more detailed information on inflation than HICP.

The studies focusing on inflation variables are not only limited with foreign authors and publishers. Turkish scholars also conduct similar studies. For example, Saatçioğlu, and Korap (2006) try to find the indicators of Turkish Inflation. They use an empirical study in order to make their analysis. The data was mainly about consumer price changes, GDP and inflation of previous years. The authors used root test using variation (VAR) and logarithm (log) as well as Granger Casualty / Block Exogeneity Wald Test. The data they were using was in between 1990 and 2004. In the end, it was found that cost push factors such as wage interest rates, exchange rates, wholesale prices and exchange rate pass through are the main reasons and determinants of inflation in Turkey.

Mahdavi, and Zhou (1997) conduct a research to find out whether commodity prices and gold have any impact on inflation and whether or not these variables have significance on economy. They also try to improve inflation forecast with these findings with the error correction models. They use an empirical methodology applying statistics derived from tests like ADF Tests and PP Tests to delve into the

inflation determinants and forecasting. The data they collected reflected the years between 1970 and 1994. They that gold and commodity prices do have impact; however, their significance is overrated.

Lucey et al. (2017) aim to find the relationship between price of gold and inflation. They use formal test for time variation as their method. There are three countries that they conducted their research on; these are USA, UK and Japan. The monthly dataset they used were from 1974 to 2014. It contained the gold prices from many resources such as Bank of England, Bank of Japan, Bureau of Labor Statistics and so forth. The conclusion remarks reveal nearly the same results in three countries and it was found that gold is an indicator for inflation and also a hedge strategy, but if inflation continues to rise, then gold will no longer be a hedge opportunity anymore.

Makin et al. (2017) consider the data consisting of money supply growth and interest rates between 1970 and 2015 in Australia. It is mentioned that as well as money supply and money growth, oil prices and interest rates have also a relationship with inflation. The methodology used in this paper is “The Lucas smoothing approach” and “structural breaks and co-integration analysis”. The conclusion implies main findings; excess currency growth is the main determinant of Australian economy.

Assenmacher et al. (2008) conduct a study on monetary policies and inflation in Japan as well as their relationship. They used an empirical model of inflation, regression, Philip Curve, Granger Causality and utilized a dataset between 1970 and 2005. The data contains log difference of CPI, gross domestic expenditure, interest rates and so forth. The findings included as follows; money growth and inflation are correlated while output growth has an inverse relationship with inflation.

Apaitan et al. (2019) focus on inflation dynamics in Thailand. They performed a dynamic factor analyses for this research. The main goal was to achieve analyzing inflation and its dynamics while looking at it from another perspective, which is disaggregated price data. The main findings based on their analysis using the price changes in the years between 2005-2015 while mainly focusing on the year 2011. The authors also used many other analysis methods such as regression to indicate the close relationship and correlation between price changes, and they tried to show them all with related graphs. The final findings told us that small or large price changes as inflation increases and decreases proposes that a good model of price adjustments can

hedge firms and country from facing different harms like costs or economic shocks.

Moser et al. (2007) uses factor models to forecast Austrian inflation including VAR and ARIMA models in order to find most accurate model to forecast inflation. The authors tried to resolve the issue on forecasting by implementing particular analysis such as logarithm, VAR and ARIMA. As known from previous papers and inflation literature, inflation is commonly addressed with HICP or CPI. Therefore, in this paper, HICP was tried to be forecasted. The results show that aggregation of sub-indices is pretty important and makes the forecast accurate when it comes to calculating HICP.

Ball, and Mazumder (2011) focus on inflation elements in USA from 1960 to 2010. The authors try to answer the research question identified as did inflation fall since 2010 according to Philips curve estimates. As it is mentioned, Ball, and Mazumder (2011) start with Philips Curve with a time varying slope to analyze the data and finalize with robustness test. Finally, it can be seen from the paper that there is clarity on that Philips Curve changed since 1990 and inflation became fixed, also a simple Philips Curve's estimation is accurate in the current state.

Hossain (2005) took the annual data of CPI, money growth and economic growth from 1952 to 2002 in order to find inflationary statistics in Indonesia. He performed co-integration and error correction model (ECM) and found that between money, output, prices and exchange rate, there are strong correlation in terms of interpreting inflation. The conclusion remarks were mainly on the relationship of money, CPI, exchange rate and inflation stating that there is a correlation between them, and such relationship is proven by the ECM.

Ramakrishnan, and Vamvakidis (2002) aims to create a consistent inflation-forecasting model that is necessary for a proper monetary policy. The paper focuses on the relationship between the domestic and international transmission effects and inflation. Authors' case selection is Indonesia. Accordingly, the study proposes the driving variable for inflation. The results show that exchange rate and currency growth are the variable that have an influence on inflation in Indonesia.

David, Chaudhry, and Koch (2000) study on the relationship between prospective gold and silver prices and inflation. The study applies an intraday data and reveals significant variables that affect inflation. Accordingly, unemployment rate, real GDP, Producer Price Index, Consumer Price Index, and Gold Prices have a direct influence

on inflation. Moreover, in parallel with inflation, unemployment rate also affects gold and silver prices, whereas the Gross Domestic Product and Producer Price Index have important impacts only on gold prices.

Another significant study conducted in inflation literature belongs to Stock and Watson (1999). In accordance, the study analyzes the inflation forecasts in the USA within a 12-month-period. In its methodology, the study applies unemployment rate Phillips curve. The study argues that unemployment rate Phillips curve is more successful to for inflation forecasting compared to other macroeconomic variables such as interest rates, money and commodity prices. Furthermore, the study proposes that commodity prices are also influential in forecasting inflation.

Leigh, and Rossi (2002) focus on Turkey as the case of their study. The authors make an analysis regarding the linkage between inflation and growth. The paper aims to identify the factors that are leading to high inflation levels in Turkey. These influential factors are listed as exchange rate, interest rates, real GDP, industrial production, Consumer Price Index, wholesale prices, and commodity prices. The findings of the study reveal that the individual indicators are uneven to forecast the inflation. Second, if these uneven forecasts are combined in a proper manner, a reliable forecasting can be achieved by an autoregressive model.

Banerjee, and Marcellino (2005) make an assessment for forecasting inflation over three alternative approaches, namely “the use of an automated model selection procedure, the adoption of a factor model, and the adoption of single-indicator-based forecast pooling”. The assessment consists of several indicators that have a relationship with inflation. These indicators include exchange rate, interest rate, real GDP and stock prices. The case selectin of the study is the USA. The results of the study are utilized for policymaking. In terms of methodology, the study applies recursive and rolling estimation models.

Banerjee, Marcellino, and Masten (2005) study the determinant of “Euro-area inflation and GDP growth”. The study uses several databases such as European Central Bank's (ECB) Euro-area-wide model database as well as similar variables for the US. Utilizing autoregressive models, the authors make a comparison regarding inflation forecasting. Moreover, the study follows a three-level research framework. In the first level of the analysis, the indicators for inflation are determined. These include real

GDP, commodity prices, output gap and government expenditures. In the second level, these indicators were modeled to forecast the future values of the indicators. Finally, the sensitivity analysis is conducted regarding these indicators.

Goodhart, and Hofmann (2002) conduct a study on G7 countries in terms of their future inflation and demand conditions. Moreover, the study also proposes that the exchange rate and property and share prices are also effective in inflation. The authors give an example over UK to show the relationship between monetary policy, inflation and output gap variability. Consequently, the study offers a Financial Conditions Index (FCI) through “short-term real interest rate, the real exchange rate, real property and real share prices”. The designed FCI is also observed to be a predictor of prospective CPI inflation.

Barr, and Campbell (1997) provide estimations for “future real interest rates and inflation rates”. The paper considers UK via its “nominal and index-linked bonds”. The authors suppose that the inflation parameters are likely to be determined via these “nominal and index-linked bonds”. Accordingly, it is emphasized that interest rates are the most influential parameter of inflation.

Mandalinci (2017) forecasts the performance of several models for inflation, and the analysis is based on three key dimensions including “time, emerging markets and models”. The variables included in inflation forecasting are exchange rate, oil prices, unemployment rate, interest rates, industrial production, money supply, and stock prices. The results of the study show that different models give separate forecasting models depending on the time period and countries.

Berg, and Henzel (2014) uses Bayesian vector autoregressive (BVAR) model to make an analysis on HICP inflation and GDP growth. In the analysis, authors use several parameters, such as oil prices, unemployment rate, real GDP, export of goods, import of goods, and HICP. Utilizing calibration tests, the study reveals that BVAR produces the most rational forecast for HICP. However, the same thing does not apply to GDP growth.

Öğünç et al. (2013) give short term estimations for Turkey’s inflation. The study covers a large number of econometric models such as “univariate models, decomposition-based approaches, a Phillips curve motivated time varying parameter model, a suite of VAR and Bayesian VAR models and dynamic factor models”. The

study uses inflation variables such as exchange rate, interest rates, Consumer Price Index, and output gap. Based on these variables, the study concludes that forecast combination results in a decrease of forecast error.

Wimanda, Turner, and Hall (2011) make a comparison between “backward-looking and forward-looking expectations” of inflation in Indonesian economy. The study uses GMM estimator model as the methodology and covers a data from 1980 to 2008. The variables used in the model are exchange rate, real GDP, Consumer Price Index, and exchange rate pass through. Consequently, the study proposes that a “gradualist monetary policy” is regarded as more influential to alleviate the fluctuations of inflation.

Garner (1995) argues that there are several approaches to forecast the inflation. In this sense, the study uses “standard economic theory”. Accordingly, the leading indicator to inflation is mentioned as gold prices. A similar study was also conducted by Danlami, Hassan, and Hidhiir (2020) assess the impact of exchange rate pass through on inflation. Methodologically, the study uses Autoregressive Distributed Lag (ARDL) and Non-linear ARDL (NARDL) models on a dataset from 1980 to 2016. The results of the study imply that exchange rate fluctuations cause inflation, and the stabilization of these fluctuations are essential to fight with inflation. The impact of exchange rate pass through is also analyzed by Ha, Stocker, and Yilmazkuday (2020). The authors put forward that exchange rate pass-through should be examined as well as currency movements and country characteristics for combatting inflation.

CHAPTER 3: DATA AND METHODOLOGICAL FRAMEWORK

3.1. Data Selection

The variable and data selection to construct the Inflation Vulnerability Index is based on the comprehensive literature review conducted in Chapter 2 of this thesis. In this sense, Table 1 provided in Chapter 2 inspires to select the most relevant variables that could measure the vulnerability to inflation. Accordingly, the variables that have been most frequently mentioned in inflation literature are selected as the inputs for the index. These variables include unemployment rate, deposit interest rate, GDP per capita growth rate, exchange growth rate, and gasoline prices growth rate. Each variable has either a positive or negative relationship with inflation. In other words, they have direct impacts on the increase or decrease of inflation. The following sections identify the reasons to focus on the selected variables and explain the rationale behind the increase or decrease of inflation with the impacts of these variables.

3.1.1. Unemployment Rate

Unemployment rate has been selected as a variable of the Inflation Vulnerability Index as it explains the demand side of the equation. The Philips Curve clearly explains the relationship between unemployment rate and inflation. In this regard, it is seen that there is an inverse relationship between unemployment rate and inflation (Khezri et al., 2019). This means when unemployment decreases, inflation increases. The rationale behind this relationship can be identified in a way that during high unemployment period, more people look for job opportunities in the market. This means that the number of available jobs is less than the number of people that wants to find a job (Moser et al., 2007). This results in excessive labour supply compared to labour demand. Under these conditions, employers do not tend to pay higher wages for the employees since there are so many alternatives in the market (Ball, and Mazumder, 2011). That is the major reason why wage inflation is prone to be low when the unemployment rate is high.

The coin has another side. When the unemployment rate is low, employers provide more job opportunities for the employees. This means labour demand is more than labour supply (David et al., 2000). Under these circumstances, employers want to attract the job seekers and they could pay higher wages. This directly increases the inflation.

Philips curve provides a similar explanation to this. Accordingly, higher labour demand implies less people that want to find a job (Stock, and Watson, 1999). On the quite contrary, employers do not accept lower wages when the labour demand is low. Consequently, the decrease in wage rates become highly slow. As the inflation tends to rapidly rise, workers are more likely to supply their labour force due to high wages. This directly decreases the unemployment rate (Berg, and Hanzel, 2014).

3.1.2. Deposit Interest Rate

The deposit interest rate is defined as the interest rate that the financial institutions pay to the deposit account holders. Certificates of deposit, saving accounts, and self-directed deposit retirement accounts are among the deposit accounts. Selecting deposit interest rate as one of the variables of the Inflation Vulnerability Index stems from the fact that it explains the policy perspective. To calculate the inflation vulnerability more effectively, the datasets published by Central Banks that are specific to countries could be useful and more suitable. However, due to data limitations, there is not any large and consolidated dataset published by Central Banks similar to World Bank's data. Therefore, the deposit interest is decided to be taken as an indicator since it closely follows the data published by Central Banks.

The inflation theories explain that the relationship between deposit interest rates and inflation is inverse. This means while deposit interest rates are increasing, inflation tends to decrease (Sharma, 2009). The explanation behind this situation is that people are more prone to borrow money when the interest rates are decreasing. As a result, people start to hold more money to spend for goods and services, which leads economy to rapidly grow, causing an increase in inflation (Makin et al., 2017). On the other hand, when the interest rates are increasing, people want to save more due to the fact that the returns from savings are rising as well. Consequently, in accordance with less amount of disposable income, the economic growth becomes slow and inflation tends to reduce (Leigh, and Rossi, 2002). The banking system and money quantity better explains this rationale behind the relationship between interest rate and inflation.

Interest rate is seen as the price of money loan. Lower levels of interest rates push consumers to loan more from banks, resulting in excessive money supply in the market (Banerjee, and Marcellino, 2005; Mandalinci, 2017). That is the reason, in fact, how excessive money supply increases inflation in an economy.

3.1.3. GDP per Capita Growth Rate

High GDP per capita growth rate implies high economic growth. GDP per capita growth rate has been deliberately selected as a variable to the Inflation Vulnerability Index since it explains demand, similar to unemployment rate. The literature shows that a rise in GDP per capita growth rate triggers high levels of inflation. This mostly stems from the fact that consumers are more prone to spend their money during high inflation periods as they believe that their money will lose its value in the near future (Banerjee et al., 2005; Goodhart, and Hofmann, 2002). This situation results in high price increases and inflation in the short run.

Higher GDP per capita growth rate is associated with high levels of production and economic growth. Firstly, high production levels cause the unemployment rate to decrease and demand to increase (Wimanda et al., 2011). Low unemployment rates are one of the major reasons of increased wages, and increasing wages ultimately result in high demand on the grounds that people spend more money for goods and services (Banerjee, and Marcellino, 2005). That is in fact the key rationale behind why high GDP per capita is associated with higher levels of inflation.

3.1.4. Exchange Growth Rate

The relationship between exchange rate and inflation is seen as positive. This means when the exchange rate increases, inflation increases as well. Exchange rate is defined as the value of a currency against the other currencies. In this sense, when the exchange rate increases, namely the depreciation occurs, inflation increases as the currency is likely to buy less foreign exchange, which means imports become more expensive (Boroumand et al., 2019; Sharma, 2019; Andiç, and Ögünç, 2015). On the contrary, any possible appreciation of the exchange rate can cause decreasing inflation. This is caused by less expensive prices for imported goods (Saatçioğlu, and Korap, 2006).

There are certain arguments explaining why depreciation in the exchange rate, namely the increase in exchange rate, can result in inflation. When the ability of any currency to purchase foreign exchange decreases, the depreciation occurs. Consequently, imported goods become more expensive while price of exported goods starts to reduce (Ramakrishnan, and Vamvakidis, 2002). Moreover, the depreciation causes the domestic demand to rise rapidly. Under these conditions, demand for imported goods increases as their prices are likely to be higher (Leigh, and Rossi, 2002). These high

prices are the fundamental reason of consumer preference for domestic goods (Wimanda et al., 2011). This is the key motivation behind demand-pull inflation.

To better identify and analyse the inflation vulnerability, the growth in the exchange rate gives better results in terms of observing the change between the years. Furthermore, the exchange growth rate has been selected as an indicator since it explains the costs. Therefore, the growth in exchange rate has been calculated and taken as a variable of the constructed Inflation Vulnerability Index.

3.1.5. Gasoline Prices Growth Rate

The causal relationship between gasoline prices and inflation implies a positive impact, which means the inflation increases when the gasoline prices are rising, or vice versa (Khezri et al., 2019). It has been decided as a variable of the Inflation Vulnerability Index as it explains the cost-related dimensions. The gasoline prices include the state subsidies and taxes. In fact, gasoline prices do not have any direct impact on inflation since the taxes on fuel products are high (Özata, 2019). In times of economic recession and high unemployment, governments can reduce the taxes on fuel and prevent the reflection of the increase in gasoline prices on domestic inflation. Nevertheless, it is seen that the countries that have high gasoline prices have high inflation levels. To eliminate this problem, the growth rate in gasoline prices was calculated in this thesis to better reflect the change between the years.

One of the most striking examples of the relationship between gasoline prices and inflation is the time period in the 1970s because of oil crisis. As the oil is a key component of an economy, mostly in terms of transportation, petrochemicals and electricity generation, the potential price increases in gasoline result in an increase of the cost of final products (Makin et al., 2017). The impacts of gasoline prices and inflation were observed more clearly during Gulf War and the 1990s (Mandalinci, 2017). During this time period, the crude oil prices more than doubled, and price for overall goods and services rapidly increased to a great extent (Berg, and Henzel, 2014). At the end, the general price increase in the market triggered higher inflation.

3.2. Methodological Framework

Previously, many scholars have already analyzed the indicators that have an influence on inflation. Furthermore, they looked the relationship between inflation vulnerability

and income or wealth (i.e. Hurd, and Shoven, 1985). However, any study has not yet put these indicators into a composite index to measure inflation vulnerability. Therefore, constructing an inflation vulnerability index is worth studying to analyze the sample countries' inflation profile from a multidimensional perspective.

The vulnerability index is simply defined as a measurement calculated over the degree to what extent a particular population is likely to encounter a damage or risk. The index is constructed upon various numeric indicators. In an index, the numerical result calculated over particular formulas shows the degree a country might experience hazard. To construct the index, firstly the individual measures are created, and then an average or cumulative score is obtained through operating the results of the individual measures in a composite and combined formula.

On the basis of this information, this thesis constructs a multidimensional vulnerability index for inflation. The index is regarded as multidimensional as it covers five different variables. Moreover, it is built upon a systematic and quantitative model. The variables to construct the Inflation Vulnerability Index include unemployment rate, deposit interest rate, GDP per capita growth rate, exchange growth rate, and gasoline prices growth rate.

The Inflation Vulnerability Index is constructed upon a certain quantitative model that was firstly used by Gnansounou (2008) to reveal and quantify energy vulnerability on the basis of energy supply and demand balance, adopting a similar methodology through multiple indicators for analysis. Following Gnansounou's study in 2008, Cabalu (2010) adapted the same methodology to study gas supply security, and constructed a multi-dimensional gas supply security index. These studies construct their indices according to the selected variables. Therefore, this thesis applies a similar method and utilizes different variables. Finally, a more recent study conducted by Biresselioglu et al. (2019) implemented the same methodology and designed a resource curse vulnerability index. The index covers nine different variables and shows to what extent the selected countries are open to hazards in terms of resource curse.

There are alternative methods to measure the vulnerability. For example, the vulnerability of the European energy systems was a focus of a research conducted by Costantini et al., (2017). In this sense, the study utilizes Shannon-Wiener diversity

index based on multiple indicators. The study uses “subjective weights” to create a composite and multidimensional index. On the other hand, another study Gupta (2008) implements principal component analysis (PCA) over eigenvalues to make a prediction on the weights of principal components. Principal Component Analysis is an exploratory data analysis method to design predictive models. In PCA, there are principal components that are linearly uncorrelated variables. The results of the PCA are in the form of component scores. Similar to the Inflation Vulnerability Index designed in this thesis, the values are scaled and normalized in PCA before performing the analysis.

In the literature, vulnerability and PCA are used together by certain studies. For example, Uddin et al. (2019) make an analysis on the climate vulnerability using PCA. To characterize and evaluate the risks regarding climate change, principal components are calculated to illuminate the economic, social and environmental vulnerabilities. Therefore, PCA approaches are useful for vulnerability mapping to detect the high vulnerabilities. Similar to the vulnerability indices designed Gnansounou (2008), and Cabalu (2010), the vulnerability assessment completed through PCA in the research by Uddin et al. (2019) has multiple indicators that are normalized between 0 and 1. The formula to scale the values is also the same, calculating the difference between maximum and minimum values. Another study conducted by Abson, Dougill, and Stringer (2012) also apply PCA for socio-ecological vulnerability in Southern Africa. In the study, the scores of principal components are associated with the “multiple variables of vulnerability”.

As could be clearly understood from these examples, PCA method is a frequently used statistical tool to analyze the vulnerability. However, the difference of PCA from the Vulnerability Index Model introduced by Gnansounou (2008), and Cabalu (2010) stems from that PCA might be questionable in certain aspects. In PCA method, the weight of a principal component is regarded as high with respect to its impact on the total variability. This creates a question regarding the objectivity of the weights of each principal component. In other words, it is not certain whether the weights are based on subjective or objective perceptions. Therefore, to eliminate this problem, Gnansounou (2008) uses both PCA and the Energy Vulnerability Index Model together to justify and verify the results of these two methods. Consequently, the results of the study show that both indices designed with PCA and the Energy Vulnerability Index Model

support each other, which means they give the exactly same results. This proves that the Vulnerability Index Model proposed by Gnansounou (2008) is a reliable method to assess the vulnerability patterns. Therefore, this study applies the same method to inflation vulnerability rather than PCA. As PCA is the most frequently used method for vulnerability assessment, it is interesting and useful to focus on an alternative model that could give the same results. Moreover, this thesis tries to show to what extent the Energy Vulnerability Index Model could be adapted into different fields and disciplines.

The Inflation Vulnerability Index constructed in this thesis consists of five variables. These variables are determined according to the literature review provided in Chapter 2. The relevant references for these variables are also shown in both Chapter 2 and Chapter 3. The rationale to select these variables is based on the fact that these variables are the most frequently mentioned indicators of inflation. However, the difference of this study is that the Inflation Vulnerability Index will be the unique study that combines these variables under a single model in the inflation literature. The constructed Inflation Vulnerability Index helps us to analyze the sample countries' inflation profile under systematic categories.

To create a homogenized data, all variables are taken from World Bank's datasets. This has a particular importance as it is quite difficult to combine different data taken from different datasets in a common way. Therefore, World Bank's data helps to a great extent as they share the same structural forms.

The vulnerability index models used by Gnansounou (2008), and Cabalu (2010) firstly applied a scaling and normalization on the related variables and secondly used a root mean square to calculate the relative values for each variable and construct the index. The reason to apply scaling is that each variable has different units to measure them, and it is quite problematic to cover all these different units under a single umbrella. Therefore, scaling method enables to reach a common denominator. At the end of the scaling, a relative indicator is obtained. Firstly, as proposed by the sample studies (Gnansounou, 2008; Cabalu, 2010), the variables are scaled between 0 and 1 to eliminate the possibility that each variable has different units. The scaling also provides an opportunity to make a cross-comparison between multiple selected variables. The country that has the best performance regarding inflation will have a

score of 1 while the country that has the worst situation will have a score of 0.

To scale the variables, there exist two different formulas. In the formulas, ε represents the value of the relative indicator, and V is the abbreviation for “variable”. The first equation is used to scale the variables that have a positive relationship with inflation; i.e. When variable A increases, inflation increases.

$$\varepsilon_{1C} = \frac{V_{1C} - \text{MIN}(V_1)}{\text{MAX}(V_1) - \text{MIN}(V_1)} \quad (3.2.1)$$

In the equation, ε_{1C} is the relative scaled indicator; V_{1C} represents the real value of the selected country in the dataset; $\text{MIN}(V_1)$ is the minimum value of the dataset; $\text{MAX}(V_1)$ is the maximum value of the dataset.

The second equation is used to scale the variables that have a negative relationship with inflation; i.e. When variable A increases, inflation decreases.

$$\varepsilon_{2C} = \frac{\text{MAX}(V_2) - V_{2C}}{\text{MAX}(V_2) - \text{MIN}(V_2)} \quad (3.2.2)$$

In the equation, ε_{2C} is the relative scaled indicator; V_{2C} represents the real value of the selected country in the dataset; $\text{MIN}(V_2)$ is the minimum value of the dataset; $\text{MAX}(V_2)$ is the maximum value of the dataset.

To construct the Inflation Index and process the scaled variables, a further calculation is used. The following equation calculates the root mean square of the relative indicators. Firstly, the square of each relative indicator is calculated. Secondly, the sum of the squared indicators is calculated and then divided by the number of the variables, which is five.

$$\text{Inflation Index} = \sqrt{\frac{\sum_{i=1}^5 \varepsilon_{ic}^2}{5}} \quad (3.2.3)$$

The time period that the index covers is determined according to the availability of the years in the relevant datasets. When the relevant datasets are examined, it is seen that some information is lacking for certain years in the datasets. For example, the time period before 2000 is lacking in some variables’ datasets. As a result, the time period between 2006 and 2016 is utilized to construct the index. These are the years that are commonly available for all variables and selected countries. Moreover, the countries that do not have any statistical information regarding the related data are eliminated

due to data limitations. It is seen that; the focused information and data is not available for particular countries. Therefore, the lacking information is eliminated from the index. At the end, the list of sample countries is reached in this method. The highest variation among the sample countries has been tried to obtain. Consequently, there exist 77 countries from different geographical regions and economic profiles in the index. This number has emerged as the maximum number because of abovementioned limitations in the datasets. The sample countries are listed as follows in alphabetical order.

Sample countries:

- Angola
- Albania
- Armenia
- Australia
- Azerbaijan
- Benin
- Burkina Faso
- Bangladesh
- Bulgaria
- Bosnia and Herzegovina
- Belarus
- Brazil
- Brunei Darussalam
- Botswana
- Canada
- Switzerland
- Chile
- China
- Cote d'Ivoire
- Cameroon
- Congo, Rep.
- Colombia
- Czech Republic
- Dominican Republic
- Algeria
- Egypt, Arab Rep.
- Ghana
- Guinea
- Guatemala
- Hong Kong SAR, China
- Honduras
- Hungary
- Indonesia
- Israel
- Jamaica
- Japan
- Kenya
- Kyrgyz Republic
- Cambodia
- Korea, Rep.
- Kuwait
- Sri Lanka
- Morocco
- Madagascar
- Mexico
- North Macedonia
- Mali
- Myanmar
- Montenegro
- Mongolia
- Mozambique
- Mauritania
- Malaysia
- Namibia
- Niger
- Nigeria
- Nicaragua
- New Zealand
- Oman
- Pakistan
- Peru
- Philippines

- Paraguay
- Romania
- Russian Federation
- Senegal
- Singapore
- Chad
- Togo
- Thailand
- Tajikistan
- Turkey
- Tanzania
- Ukraine
- Uruguay
- Vietnam
- South Africa

3.2.1. Unemployment Rate

The data for unemployment rate is collected from World Bank’s unemployment dataset labelled as “Unemployment, total (% of total labour force)”.

There is a negative relationship between unemployment rate and inflation, which means when unemployment rate decreases, inflation tends to increase. Therefore, the equation to calculate the relative indicator for unemployment rate is following:

$$\varepsilon_{1C} = \frac{\text{MAX}(V_1) - V_{1C}}{\text{MAX}(V_1) - \text{MIN}(V_1)} \quad (3.2.1.1)$$

3.2.2. Deposit Interest Rate

The data for interest rate is taken from World Bank’s dataset, titled as “Deposit interest rate (%)”.

There exists a negative relationship between deposit interest rate and inflation, which means as deposit interest rate increases, inflation decreases. Consequently, the equation to calculate the relative indicator for interest rate is as follows:

$$\varepsilon_{2C} = \frac{\text{MAX}(V_2) - V_{2C}}{\text{MAX}(V_2) - \text{MIN}(V_2)} \quad (3.2.2.1)$$

3.2.3. GDP per Capita Growth Rate

The data for GDP per capita growth rate is obtained from World Bank’s data.

The growth rate for GDP per capita has been calculated manually, taking the difference between the later and the previous value and dividing it with the previous value. The relationship between GDP per capita growth rate and inflation is positive. Accordingly, one-unit increase in GDP per capita growth rate means a similar increase in inflation. For this reason, the equation to calculate the relative indicator for GDP

per capita is as follows:

$$\varepsilon_{3C} = \frac{V_{3C} - \text{MIN}(V_3)}{\text{MAX}(V_3) - \text{MIN}(V_3)} \quad (3.2.3.1)$$

3.2.4. Exchange Growth Rate

The data for exchange rate is collected from World Bank.

There is a positive relationship between exchange rate and inflation, meaning that when the exchange growth rate increases, inflation decreases. Accordingly, the equation to calculate the relative indicator for exchange rate is following:

$$\varepsilon_{4C} = \frac{V_{4C} - \text{MIN}(V_4)}{\text{MAX}(V_4) - \text{MIN}(V_4)} \quad (3.2.4.1)$$

3.2.5. Gasoline Prices Growth Rate

The data regarding gasoline prices growth rate is collected from World Bank's dataset.

The relationship between gasoline prices growth rate and inflation is positive, which means when the gasoline prices growth rate increases, inflation increases as well. This takes us the following equation:

$$\varepsilon_{5C} = \frac{V_{5C} - \text{MIN}(V_5)}{\text{MAX}(V_5) - \text{MIN}(V_5)} \quad (3.2.5.1)$$

CHAPTER 4: FINDINGS AND ANALYSIS

After calculating the relative indicators and operating these indicators into the vulnerability root mean square formula, the Inflation Vulnerability Index is created. The scores range between 0 and 1 for every year on a country basis. The range tells us that the closer the score is to “0”, the countries are less vulnerable to inflation and the closer the score is to “1”, the countries are more vulnerable to inflation. The results of the empirical study are also evaluated and justified with the fundamental reasons, leading to low or high vulnerability levels. In this respect, Table 2 shows the results of the Inflation Vulnerability Index. With the results, I investigated the reasons behind fluctuations and also the most vulnerable and least vulnerable countries. The analysis showed that the index is justifying itself, and it remains consistent with the incidents experienced in that particular year. This is showed and explained with some sample countries from both vulnerable and non-vulnerable side.

Table 2. Inflation Vulnerability Index Scores

Country Name	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Angola	0,57377	0,64000	0,67745	0,57550	0,60076	0,52109	0,62877	0,56677	0,59122	0,63950	0,65385
Albania	0,45975	0,50921	0,59421	0,56213	0,58628	0,56726	0,59331	0,45400	0,52080	0,58577	0,60267
Armenia	0,53342	0,58791	0,60815	0,39381	0,46098	0,48570	0,58230	0,39535	0,42707	0,41050	0,32462
Australia	0,55923	0,57331	0,60102	0,72101	0,68340	0,59849	0,64078	0,56214	0,57498	0,62457	0,62110
Azerbaijan	0,63287	0,78948	0,71935	0,58107	0,54123	0,48271	0,54460	0,60565	0,61024	0,54223	0,62396
Benin	0,54422	0,63390	0,65079	0,58670	0,60395	0,59468	0,64333	0,56423	0,58477	0,57579	0,56733
Burkina Faso	0,51655	0,59334	0,61855	0,55936	0,62035	0,54001	0,58281	0,51137	0,51578	0,55862	0,55498
Bangladesh	0,57247	0,72336	0,71069	0,58346	0,60493	0,58853	0,61964	0,53345	0,60488	0,64401	0,65500
Bulgaria	0,54851	0,63496	0,69280	0,55698	0,61165	0,58356	0,59234	0,49731	0,56480	0,67920	0,68099
Bosnia and Herzegovina	0,43025	0,46660	0,52489	0,50172	0,56289	0,51353	0,52506	0,47018	0,49421	0,58159	0,56024
Belarus	0,51428	0,75456	0,80095	0,58609	0,61284	0,65160	0,43486	0,44465	0,51389	0,49353	0,46645
Brazil	0,42019	0,49242	0,53515	0,53642	0,59125	0,47055	0,51671	0,50831	0,45974	0,46680	0,37876
Brunei Darussalam	0,59339	0,65748	0,64910	0,62476	0,63963	0,65759	0,65648	0,56888	0,57662	0,61658	0,60747
Botswana	0,43836	0,62002	0,61504	0,40144	0,54152	0,59638	0,62877	0,62979	0,51978	0,47176	0,54241
Canada	0,57881	0,63427	0,62608	0,69691	0,71412	0,64728	0,65407	0,58814	0,61807	0,63179	0,62796
Switzerland	0,54355	0,68605	0,64170	0,67528	0,70412	0,67768	0,68716	0,61168	0,63419	0,66302	0,67833
Chile	0,51437	0,59361	0,54325	0,62920	0,69019	0,60414	0,64130	0,54984	0,57371	0,59729	0,56345
China	0,62022	0,74247	0,78630	0,72189	0,73008	0,71134	0,75235	0,65026	0,70096	0,73139	0,72358
Cote d'Ivoire	0,49470	0,55413	0,56302	0,57485	0,59082	0,45478	0,62494	0,58370	0,64483	0,67538	0,61464
Cameroon	0,56520	0,60910	0,61874	0,62863	0,65105	0,59322	0,61852	0,60451	0,65850	0,68137	0,65665
Congo, Rep.	0,44769	0,47400	0,50522	0,65468	0,69495	0,51759	0,55702	0,51490	0,60648	0,59045	0,53690
Colombia	0,49100	0,49926	0,51009	0,57174	0,61466	0,55798	0,55199	0,54910	0,57254	0,60265	0,50553
Czech Republic	0,58829	0,63444	0,64220	0,64138	0,68061	0,64198	0,64285	0,56678	0,63210	0,71628	0,67502
Dominican Republic	0,51794	0,63522	0,59204	0,56776	0,68145	0,61322	0,63109	0,53756	0,61213	0,62855	0,59336

Table 2 (cont'd)

Country Name	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Algeria	0,52764	0,59304	0,59279	0,60779	0,60971	0,56431	0,57318	0,54067	0,56540	0,63820	0,63894
Egypt, Arab Rep.	0,48411	0,72002	0,71030	0,55623	0,56397	0,47022	0,47600	0,61270	0,60950	0,49912	0,51208
Ghana	0,53677	0,63356	0,69582	0,60149	0,54818	0,64658	0,64303	0,52695	0,63647	0,51005	0,52313
Guinea	0,60950	0,51577	0,63958	0,46650	0,62309	0,64651	0,64347	0,45787	0,49929	0,57443	0,71172
Guatemala	0,57126	0,69027	0,64318	0,60361	0,61278	0,64158	0,66384	0,56112	0,59370	0,63448	0,60235
Hong Kong SAR, China	0,58591	0,71439	0,70820	0,64168	0,71510	0,70932	0,69969	0,64544	0,66424	0,69646	0,70624
Honduras	0,50720	0,62863	0,57690	0,54159	0,59995	0,59562	0,62989	0,47929	0,48737	0,55152	0,54181
Hungary	0,51764	0,50784	0,53002	0,53084	0,60303	0,54303	0,54423	0,51393	0,63429	0,68186	0,66942
Indonesia	0,49871	0,58821	0,60895	0,64927	0,66087	0,52710	0,57434	0,73107	0,72393	0,59899	0,58352
Israel	0,52048	0,56938	0,56958	0,65194	0,67533	0,61969	0,63204	0,58825	0,62037	0,65237	0,67846
Jamaica	0,46053	0,61792	0,52547	0,52577	0,54456	0,58022	0,58693	0,48103	0,47934	0,55066	0,56952
Japan	0,61824	0,75145	0,68676	0,62889	0,68740	0,69830	0,72035	0,66413	0,62691	0,68052	0,67303
Kenya	0,56428	0,62642	0,64199	0,62607	0,67983	0,61890	0,57081	0,54189	0,56096	0,60961	0,59793
Kyrgyz Republic	0,56874	0,65768	0,72171	0,63935	0,63129	0,62084	0,59754	0,66868	0,60198	0,61317	0,60256
Cambodia	0,64226	0,71745	0,71336	0,68862	0,74271	0,73068	0,76585	0,69334	0,73311	0,74246	0,72604
Korea, Rep.	0,56645	0,63821	0,73388	0,64943	0,64818	0,65220	0,67906	0,60061	0,62203	0,66959	0,67271
Kuwait	0,57496	0,65878	0,62621	0,59853	0,62571	0,65497	0,65514	0,58469	0,58907	0,75344	0,76792
Sri Lanka	0,52664	0,78704	0,70126	0,53892	0,60797	0,63110	0,70294	0,50717	0,59163	0,62876	0,58850
Morocco	0,53070	0,58043	0,61701	0,59743	0,60117	0,61070	0,62070	0,53522	0,53009	0,60272	0,53961
Madagascar	0,45714	0,54909	0,61562	0,50559	0,54916	0,52174	0,57899	0,51435	0,53160	0,55463	0,56364
Mexico	0,58715	0,67606	0,64770	0,63729	0,66482	0,65331	0,67190	0,60400	0,65989	0,67768	0,67595
North Macedonia	0,38572	0,44805	0,47711	0,45154	0,52531	0,46408	0,49304	0,41538	0,47915	0,55626	0,52343
Mali	0,44812	0,49797	0,52512	0,53216	0,56865	0,49891	0,52212	0,46882	0,57950	0,58537	0,54794
Myanmar	0,70029	0,60991	0,65612	0,79139	0,76633	0,65298	0,86327	0,78812	0,71246	0,68396	0,61927

Table 2 (cont'd)

Country Name	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Montenegro	0,42859	0,48500	0,56994	0,49826	0,58984	0,54009	0,52798	0,47886	0,49747	0,59246	0,52132
Mongolia	0,45751	0,68188	0,71901	0,51459	0,49699	0,68903	0,72345	0,62560	0,60083	0,50482	0,45281
Mozambique	0,54025	0,70887	0,67377	0,59178	0,68637	0,65779	0,69145	0,55747	0,60089	0,61792	0,66556
Mauritania	0,51428	0,64049	0,60834	0,48155	0,49710	0,55777	0,63014	0,52628	0,53433	0,57325	0,50200
Malaysia	0,59682	0,63944	0,65376	0,63490	0,67958	0,64614	0,68035	0,62286	0,68651	0,67677	0,64491
Namibia	0,42757	0,56085	0,57614	0,48936	0,54138	0,54014	0,58772	0,51529	0,52008	0,51495	0,40712
Niger	0,53220	0,56389	0,59843	0,58289	0,65551	0,57386	0,68667	0,56377	0,60457	0,62545	0,62190
Nigeria	0,50648	0,61336	0,59626	0,61834	0,60021	0,70018	0,67809	0,54847	0,54908	0,55816	0,54917
Nicaragua	0,54872	0,73003	0,67131	0,54524	0,66900	0,66599	0,71598	0,62746	0,66277	0,68440	0,68705
New Zealand	0,55277	0,56307	0,62271	0,64070	0,61086	0,61974	0,64642	0,55090	0,57923	0,62902	0,62087
Oman	0,56191	0,65927	0,66599	0,60462	0,59958	0,58310	0,63568	0,56316	0,57989	0,72479	0,72736
Pakistan	0,62243	0,67589	0,70141	0,62168	0,60874	0,66235	0,67907	0,55458	0,57521	0,62640	0,63791
Peru	0,56068	0,65759	0,70593	0,61007	0,69016	0,66981	0,70879	0,62401	0,59686	0,63619	0,60881
Philippines	0,55985	0,63942	0,66208	0,65104	0,67647	0,65810	0,71831	0,64396	0,68171	0,71431	0,72638
Paraguay	0,53485	0,60974	0,68003	0,65330	0,73483	0,69187	0,68829	0,63308	0,60524	0,62601	0,61559
Romania	0,54673	0,54811	0,70274	0,54544	0,58946	0,58344	0,63060	0,55495	0,61370	0,67404	0,68927
Russian Federation	0,56192	0,63539	0,65292	0,52644	0,56904	0,62939	0,65950	0,52918	0,54020	0,58589	0,54062
Senegal	0,45875	0,51370	0,52121	0,51274	0,55122	0,48524	0,56229	0,45514	0,55203	0,59324	0,55461
Singapore	0,61244	0,69462	0,67191	0,67014	0,81121	0,71281	0,71689	0,64350	0,66570	0,68474	0,68537
Chad	0,58327	0,61953	0,63055	0,65742	0,75063	0,57517	0,64978	0,60876	0,66265	0,65976	0,61396
Togo	0,51468	0,54138	0,55523	0,63310	0,66471	0,57171	0,62020	0,57209	0,61107	0,62900	0,58758
Thailand	0,59273	0,68109	0,70355	0,75496	0,80030	0,66889	0,75378	0,63014	0,63989	0,69778	0,69008
Tajikistan	0,44037	0,64292	0,62146	0,55690	0,54504	0,63981	0,66763	0,50421	0,54629	0,58723	0,60939
Turkey	0,40736	0,42924	0,44136	0,46627	0,56575	0,54283	0,49628	0,48759	0,45582	0,52147	0,44201

Table 2 (cont'd)

Country Name	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Tanzania	0,56316	0,63461	0,61167	0,61836	0,64619	0,61710	0,59111	0,54011	0,58484	0,60847	0,58891
Ukraine	0,52341	0,63764	0,60491	0,59363	0,56295	0,64156	0,58608	0,42993	0,58314	0,57298	0,50347
Uruguay	0,54355	0,63391	0,64075	0,64491	0,66279	0,67611	0,68911	0,56795	0,58657	0,56263	0,56898
Vietnam	0,55956	0,68885	0,64668	0,63700	0,65867	0,64594	0,68329	0,58408	0,64732	0,69668	0,66773
South Africa	0,36960	0,53960	0,57440	0,43867	0,48638	0,48239	0,50927	0,43051	0,39324	0,43459	0,40616

The average scores of the index are tabled from the highest value to the lowest, and divided to three vulnerability sections in Table 3:

Table 3. Average Inflation Vulnerability Scores (Highest to lowest)

High		
Country Name	Average	St. Dev.
Cambodia	0,72	0,03
China	0,72	0,04
Myanmar	0,71	0,08
Thailand	0,69	0,06
Singapore	0,69	0,05
Hong Kong SAR, China	0,68	0,04
Japan	0,68	0,04
Philippines	0,67	0,04
Nicaragua	0,66	0,06
Switzerland	0,65	0,04
Malaysia	0,65	0,03
Mexico	0,65	0,03
Korea, Rep.	0,65	0,04
Vietnam	0,65	0,04
Kuwait	0,64	0,06
Paraguay	0,64	0,05
Peru	0,64	0,05
Czech Republic	0,64	0,04
Medium		
Country Name	Average	St. Dev.
Canada	0,64	0,04
Chad	0,64	0,05
Mozambique	0,64	0,05
Pakistan	0,63	0,04
Kyrgyz Republic	0,63	0,04
Oman	0,63	0,06
Cameroon	0,63	0,03
Brunei Darussalam	0,62	0,03
Bangladesh	0,62	0,05
Guatemala	0,62	0,04
Sri Lanka	0,62	0,08
Israel	0,62	0,05
Uruguay	0,62	0,05
Australia	0,61	0,05
Indonesia	0,61	0,07
Romania	0,61	0,06
Azerbaijan	0,61	0,08
Angola	0,61	0,04

Table 3 (cont'd)

Country Name	Average	St. Dev.
Bulgaria	0,60	0,06
Kenya	0,60	0,04
New Zealand	0,60	0,03
Dominican Republic	0,60	0,04
Niger	0,60	0,04
Tanzania	0,60	0,03
Benin	0,60	0,03
Nigeria	0,59	0,06
Ghana	0,59	0,06
Togo	0,59	0,04
Chile	0,59	0,05
Mongolia	0,59	0,10
Algeria	0,59	0,03
Russian Federation	0,58	0,05
Guinea	0,58	0,08
Cote d'Ivoire	0,58	0,06
Morocco	0,58	0,04
Tajikistan	0,58	0,06
Hungary	0,57	0,06
Belarus	0,57	0,12
Ukraine	0,57	0,06
Egypt, Arab Rep.	0,56	0,09
Burkina Faso	0,56	0,04
Honduras	0,56	0,05
Congo, Rep.	0,55	0,07
Mauritania	0,55	0,05
Low		
Country Name	Average	St. Dev.
Albania	0,55	0,05
Colombia	0,55	0,04
Botswana	0,55	0,08
Madagascar	0,54	0,04
Jamaica	0,54	0,05
Mali	0,52	0,04
Senegal	0,52	0,04
Montenegro	0,52	0,05
Namibia	0,52	0,05
Bosnia and Herzegovina	0,51	0,04
Brazil	0,49	0,06
Turkey	0,48	0,05
North Macedonia	0,47	0,05
Armenia	0,47	0,09
South Africa	0,46	0,06

In Table 3, Cambodia has the highest score, meaning that it is the most vulnerable country among others, and South Africa has the lowest score meaning that it is the least vulnerable country to inflation among those 77 countries according to five indicators selected. As it can be clearly seen in the index, countries such as South Africa, Armenia, North Macedonia, Turkey and Brazil are among the least vulnerable countries while Cambodia, China, Myanmar, Thailand and Singapore are among the most vulnerable countries. Below, you can see randomly picked countries from both sides to assess the vulnerability situation.

South Africa is the first country we encounter in the low vulnerability section as it has the lowest value. It is the second largest economy in Africa. It is also a hub for manufacturing as the most industrialized economy of the continent. As for income groups, South Africa is in the upper-middle income category. Besides, having a strong banking system has a strong positive effect on the economy as well as the inflation rate which is mostly low between 2006 and 2016.

Armenia is the second country in the low vulnerability list. Even if its economy is not that much advanced, and the country is in lower-middle-income category, foreign direct investment and price stability save Armenia from depreciation. Particularly, its close ties with Russia confirms Armenia's position. Inflation rates are also low.

Turkey here is an extraordinary example. The positive sides ensure Turkey's position just like Armenia, but the inflation rates indicate another story. Turkey is among the developed countries and has the 13th largest nominal GDP according to World Economic Outlook Database. Its agriculture products, textiles, motor vehicles, transportation equipment, construction materials are in the lead compared to many other strong economies but still, its inflation rates are high. The reasons behind this high inflation are excessive current deficit, foreign currency debt and governance issues like government's unorthodox ideas about interest rate policy which affects inflation greatly. As Turkey's vulnerability scores are low but inflation rates are high, the abovementioned reasons seem the main reasons of the problem. If more indicators in econometric terms as well as governance indicators are taken into consideration, the index may score Turkey differently. Moreover, it is worth mentioning that in this thesis, only 77 countries can be calculated due to data limitations. Therefore, when more countries are taken into calculation such as the US, European countries and

others, as well as considering more indicators, it is not wrong to assume that Turkey will probably be in the middle vulnerability section, or even close to high vulnerability section, since its vulnerability score is 0,48. It is not somewhere between 0,20 and 0,30. It still indicates a high vulnerability; however, in real terms, its vulnerability is low when compared between 77 countries. The same case also applies for Brazil.

After analyzing low vulnerability scores, the countries with high vulnerability rate might also be focused on. At this point, the first country we encounter is Cambodia. While Cambodia has experienced a rapid increase in its economy, the income per capita is still low. Before 2000s, the inflation rate was high due to planned economy system of the government. After it faced with a change into market-driven economy, inflation rates lowered, and economy recovered but the vulnerability didn't change. This is also the outcome of the regional economic crisis, civil unrest and political infighting between the years 1998-1999. There is another crisis called global crisis in 2008-2009, which nearly all countries suffered from. Lastly, weak economies that have inadequate basic infrastructure, unadvanced technology and poverty are the reasons that lead to high inflation vulnerability. All these reasons put a light to the vulnerability situation.

China is another extraordinary example like Turkey and Brazil. It is well known that China is in top three economy compared to world. It has a strong banking system, private sector and natural resources. Its trade partners and trade volume is also high but when a deep-dive is performed, between the years 2006-2016, high inflation rates can be seen. The high inflation rate in 2008 in China is also approved by BBC and government as the highest inflation since 1997. Following the consistent rise in the inflation rates caused by global economic crisis, severe winter storms disrupting the food economy and food shortages, increase in the food prices, supplies running short and a rise in the price of fuel concerned the government to a great extent. This concern also reached to the highest levels of the government to a degree that they had to publish the following statement on the official website of the government on 9 January 2008: "The Chinese government decided on Wednesday to take further measures to stabilize market prices and increase the severity of punishment for those guilty of driving up prices through hoarding and cheating (Chinese Government's Official Web Portal, 2008). All these reasons and high inflation rates in those years caused a high inflation vulnerability score in the index.

Myanmar (also known as Burma) is the last country that will be analyzed in the high vulnerable section and it also is a simple case. Its economy is not advanced and faces with many downsides like corruption, illegal drug trade, low technological advancements and wars with small ethnic groups. The vulnerability score is not a surprise after all these events.

Table 3 also shows the grouping of all countries based on their vulnerability average scores. A threshold is calculated with a simple formula:

$$\epsilon_C = \frac{\text{MAX}(V_c) - \text{MIN}(V_c) + 0,01}{\# \text{ of Threshold Sections}} \quad (4.1)$$

In this thesis, the threshold groups were selected as low, medium and, high. That is why the # of threshold sections part in the formula is 3.

The standard deviations also indicate the maximum and minimum range that the averages can move between. Nearly all countries have really low dispersion. Some are marked like Belarus and Mongolia. This high standard error scores indicate that there is a greater variability concerning their indicator data following the relative indicators. In short, the RI values of these countries vary in a wide range and this tells us about their volatile market and economy since there is no stable or close scores between relative scores of indicators.

With this section of the thesis, both low and highly vulnerable countries to inflation are analyzed systematically, and it is proven that the countries' current situations justify their scores. It is also vital to see the reasons behind the serious fluctuations that countries have over the years. Figure 10, 11 and 12 below show the volatility of inflation vulnerability for all countries divided into three threshold sections in more detail.

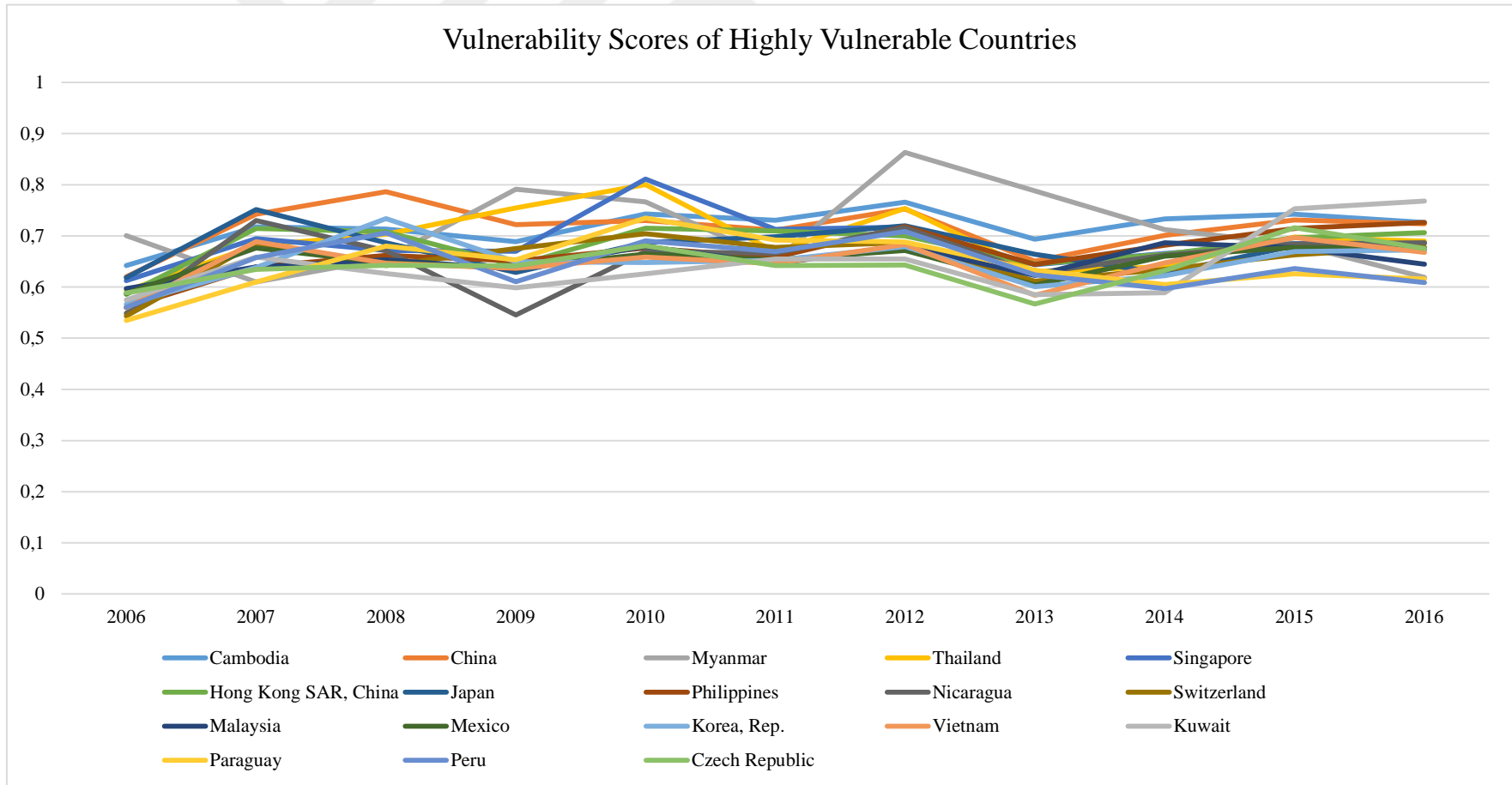


Figure 10. Fluctuations in Inflation Vulnerability Index for Highly Vulnerable Countries

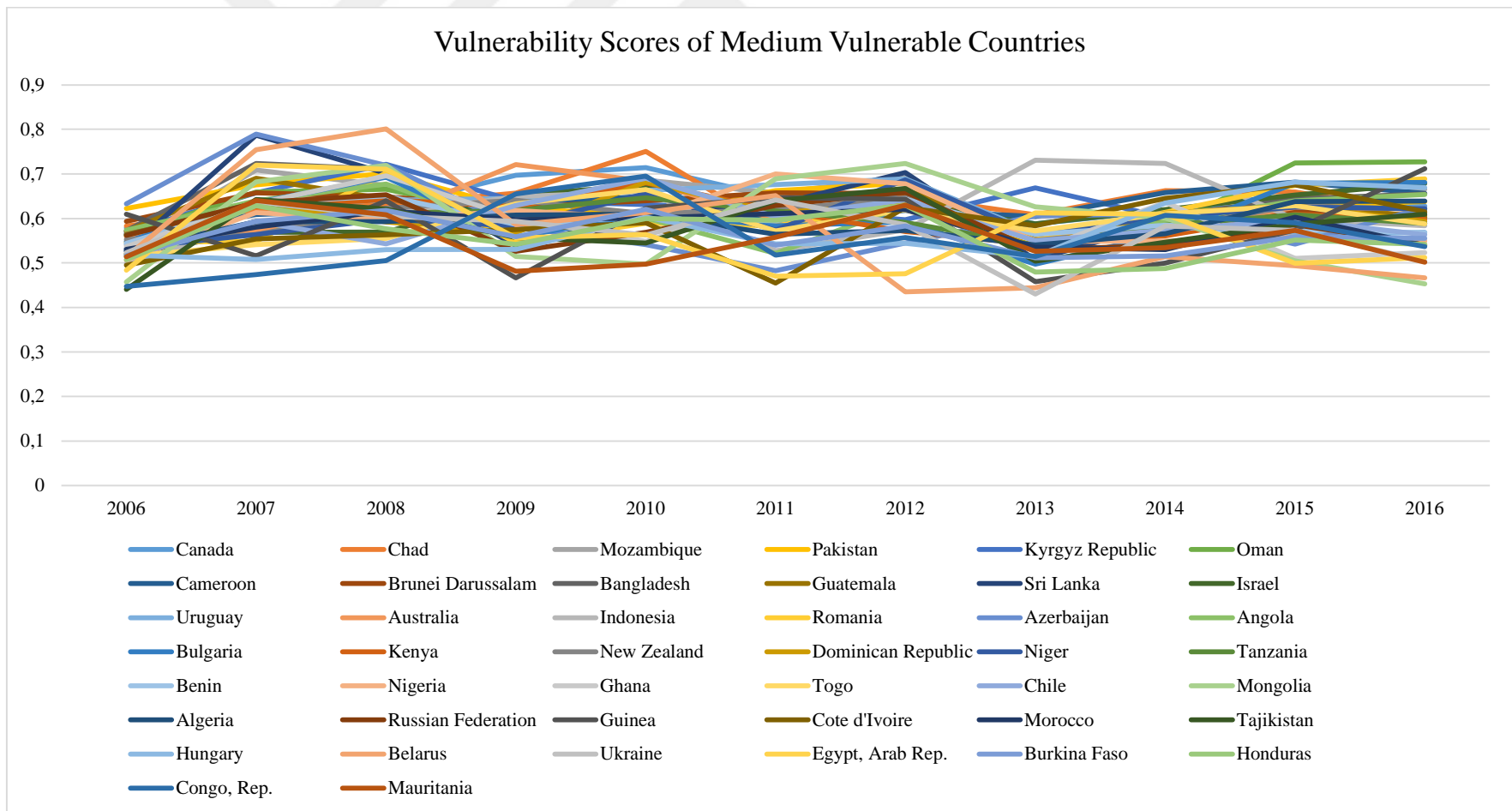


Figure 11. Fluctuations in Inflation Vulnerability Index for Medium Vulnerable Countries

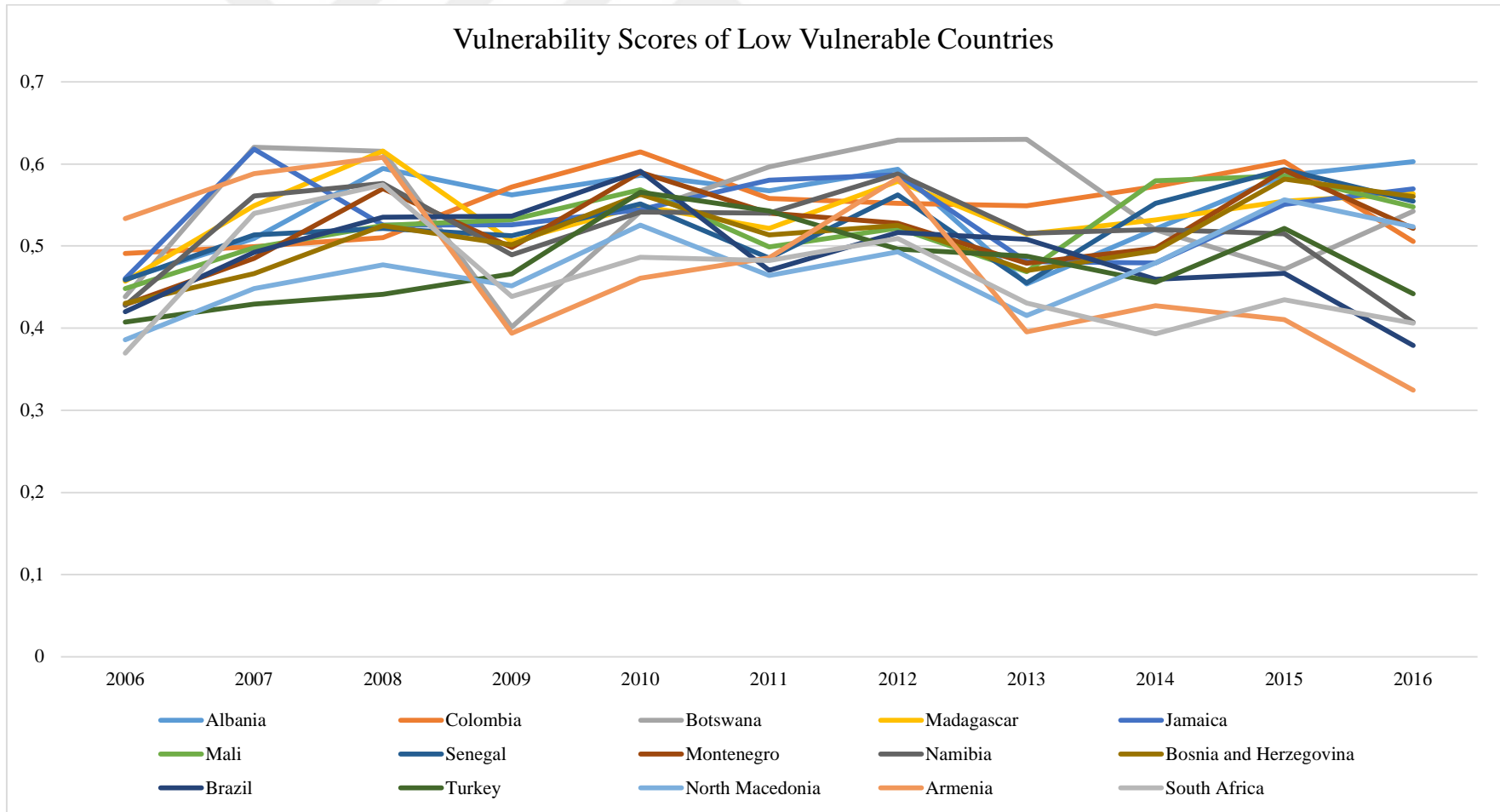


Figure 12. Fluctuations in Inflation Vulnerability Index for Low Vulnerable Countries

The Inflation Vulnerability Index results also provide implications regarding the inflation profile of certain countries that are the members of international organizations. In this sense, it is possible to analyze these countries, grouping them under different categories such as OECD (Organization of Economic Cooperation and Development) countries, OPEC (Organization of Petroleum Exporting Countries), G20 countries which are the largest economies of the world, and G7 countries which constitute the 64% of the global wealth.

When the OECD countries are analyzed together, it is seen that Japan (0,68), Switzerland (0,65) and Mexico (0,65) are the OECD member countries that have the highest inflation vulnerability scores according to their averages. This probably stems from the fact that these countries have political and governance issues as well as problems in other economic indicators. On the contrary, particular OECD member countries such as Turkey (0,47) and Colombia (0,54) have the lowest vulnerability scores due to their powerful peculiarities. Other OECD member countries included in the index such as Israel, Australia, and New Zealand have intermediate vulnerability scores.

The same categorization applies to OPEC countries as well, and with a rate of %46, these countries are included in the dataset. OPEC countries are particularly analyzed in a separate framework as these countries are correlated with gasoline prices as one of the variables of the Inflation Vulnerability Index. Among OPEC countries, Algeria, Kuwait and Nigeria are involved in the index. Accordingly, Kuwait (0,65) is the country that has the highest vulnerability score, which means Kuwait, even it is a strong economy, had its downsides in terms of inflation between 2006-2016 due to economic crisis and shortage of demand in oil which is the main natural resource of Kuwait. After 2016, the economy grew on a large and fast scale, and inflation decreased to the point of 0.5 recently. On the other hand, the inflation vulnerability scores of Algeria and Nigeria are 0,59 and 0,60, respectively.

G20 countries are the most representative group in the index as 58% of these countries are included. Among these countries, China (0,72), Japan (0,68) and Mexico (0,66) are the most vulnerable countries while South Africa (0,46), Turkey (0,47) and Brazil (0,49) are the least vulnerable countries. Other countries are Russian Federation (0,58), Indonesia (0,61), Australia (0,61), Canada (0,64) and Republic of Korea (0,65).

In Figure 10, 11 and 12, the first thing to notice is the biggest fluctuation between 2007 and 2010. It is possible to see a depreciation between 2008-2009 and a rise after 2010 as it indicates a recovery. The inflation rates were also raised and lowered between those years. The fluctuation is well known due to all world nations' suffering because of the infamous economic crisis in those years called "the great recession". The International Monetary Fund (IMF) came to conclusion that it was the biggest and most severe crisis of all. Starting with "housing bubbles" which is a decrease in house prices overall in the United States, the subprime mortgage crisis followed. Later on, the banks being unable to provide sufficient support, bankruptcy of Lehman Brothers and so on, the world found itself in an unavoidable crisis. With all these events, many countries became more and more vulnerable to inflation, and many of them were facing serious consequences. The graph shows exact results of these event in the massive fluctuation between related years, meaning that scores are doing what they are made to do.

Starting from Figure 13 to Figure 21, the graphs illustrate the rate of vulnerability's relative indicators, and to point out its limits, the cases of six countries are selected as same as before and shown in pentagon graphs in order to explain the importance of relative indicators as an addition to economic analysis of those countries. The first three countries are the different cases of least vulnerable countries and the second three are the different cases of most vulnerable countries. These figures show the weights that indicators have in natural. In other words, they show the contributions of the relative indicators to the index. Without selecting any weight from a subjective perspective, the formula and the relative indicators are determining their own scores and showing us the real weights that the indicators have in real time. With these scores, it is possible to assume that higher the score, higher the impact on vulnerability scores.

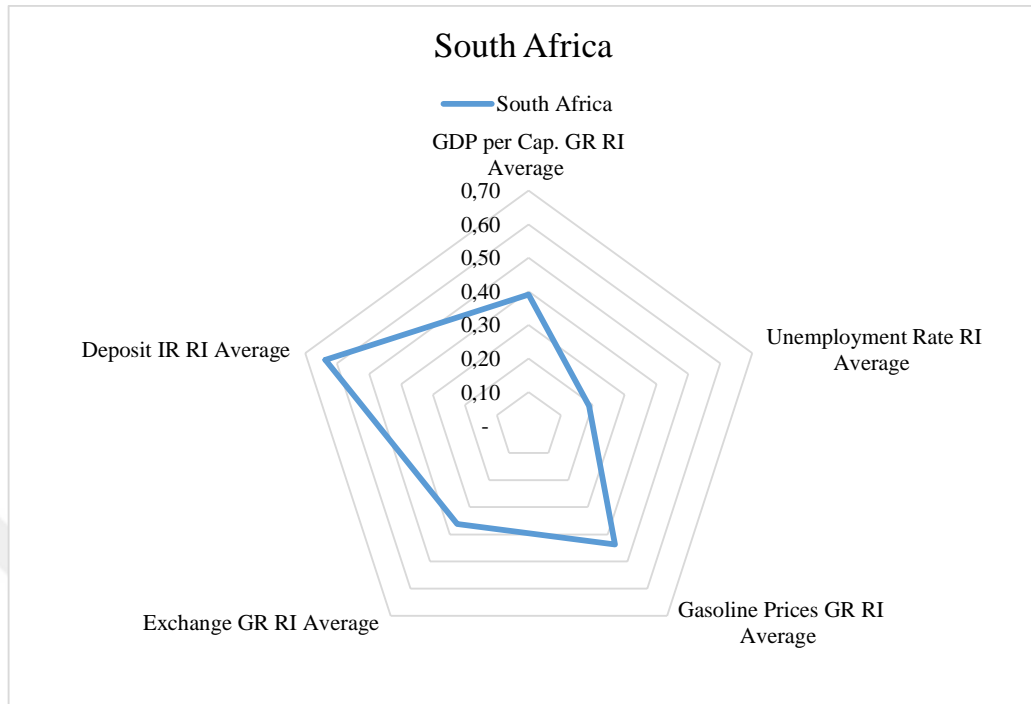


Figure 13. Relative Indicator Scores of South Africa

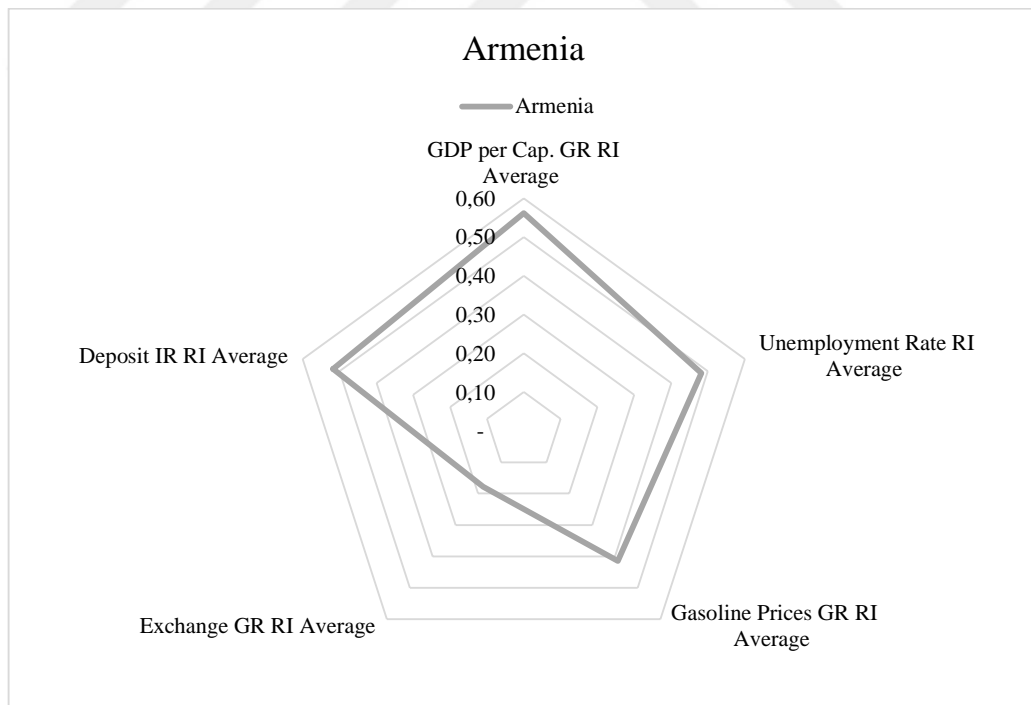


Figure 14. Relative Indicator Scores of Armenia

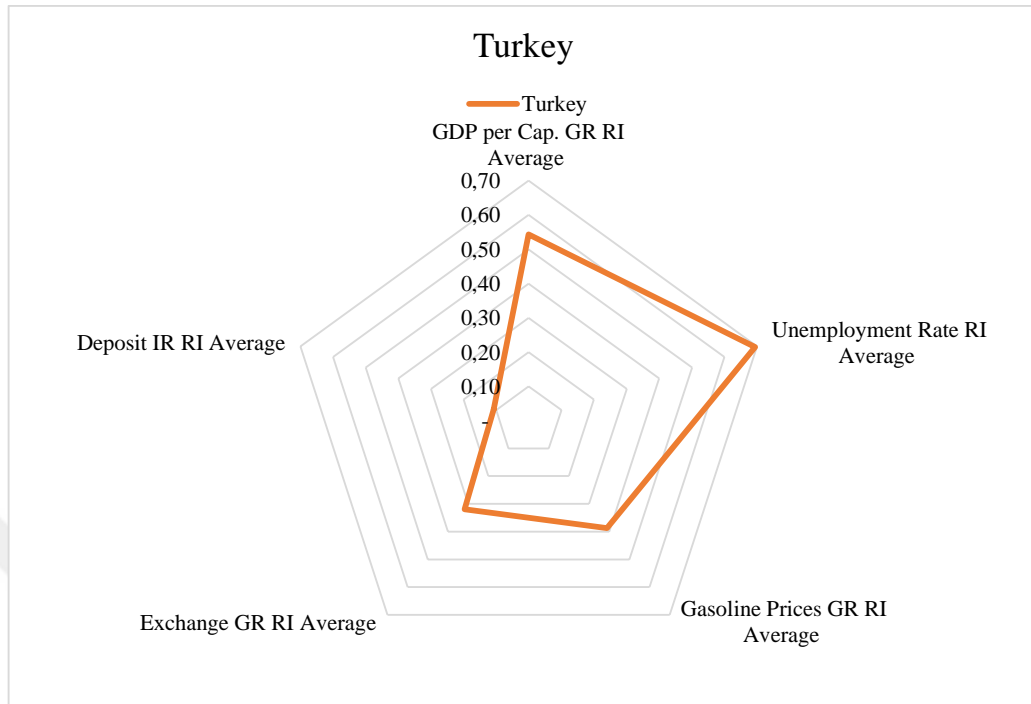


Figure 15. Relative Indicator Scores of Turkey

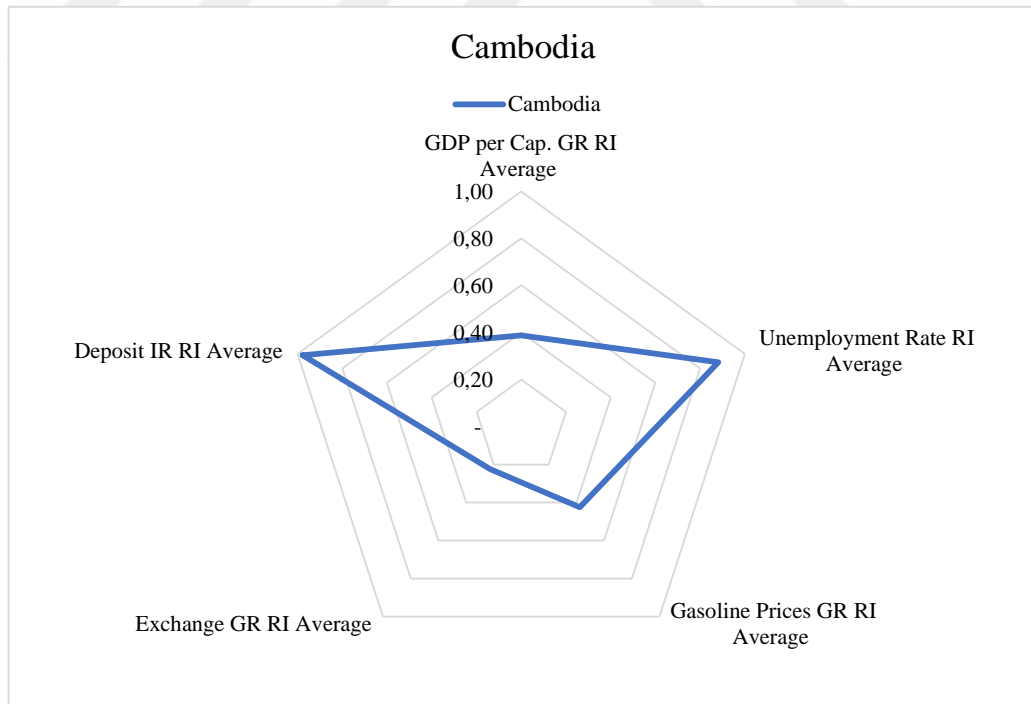


Figure 16. Relative Indicator Scores of Cambodia

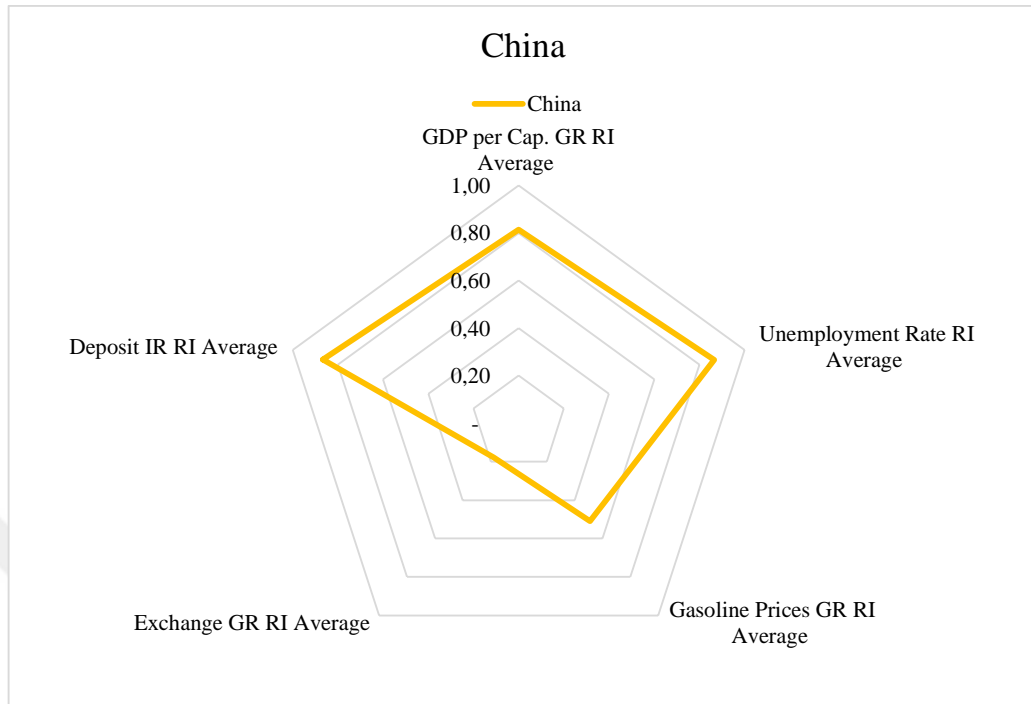


Figure 17. Relative Indicator Scores of China

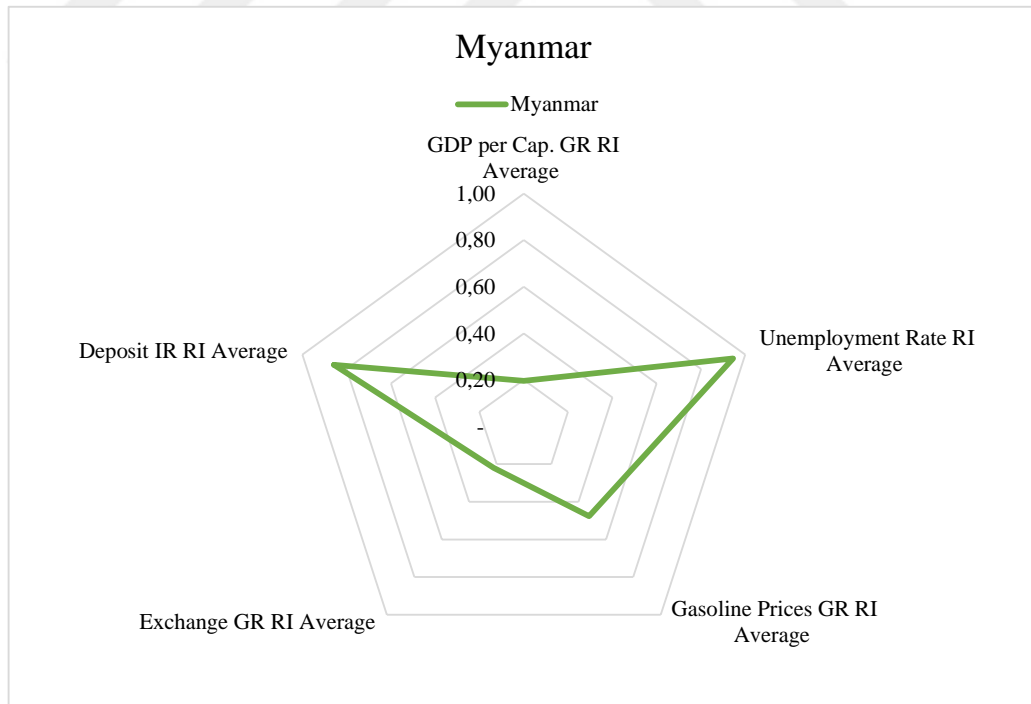


Figure 18. Relative Indicator Scores of Myanmar

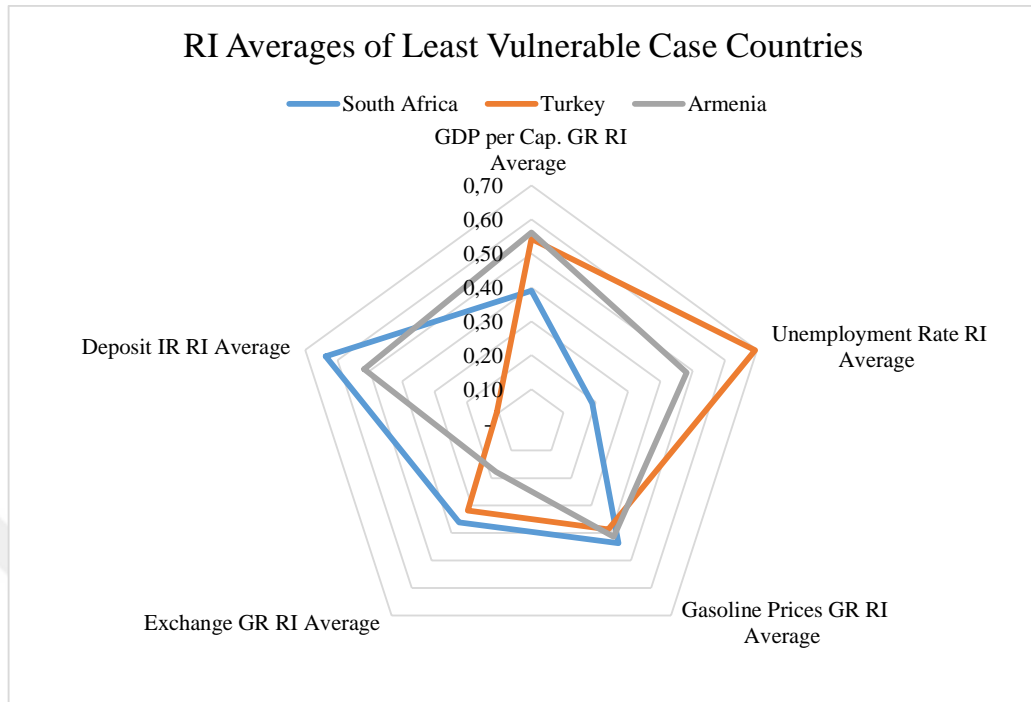


Figure 19. Relative Indicator Scores of Least Vulnerable 3 Countries

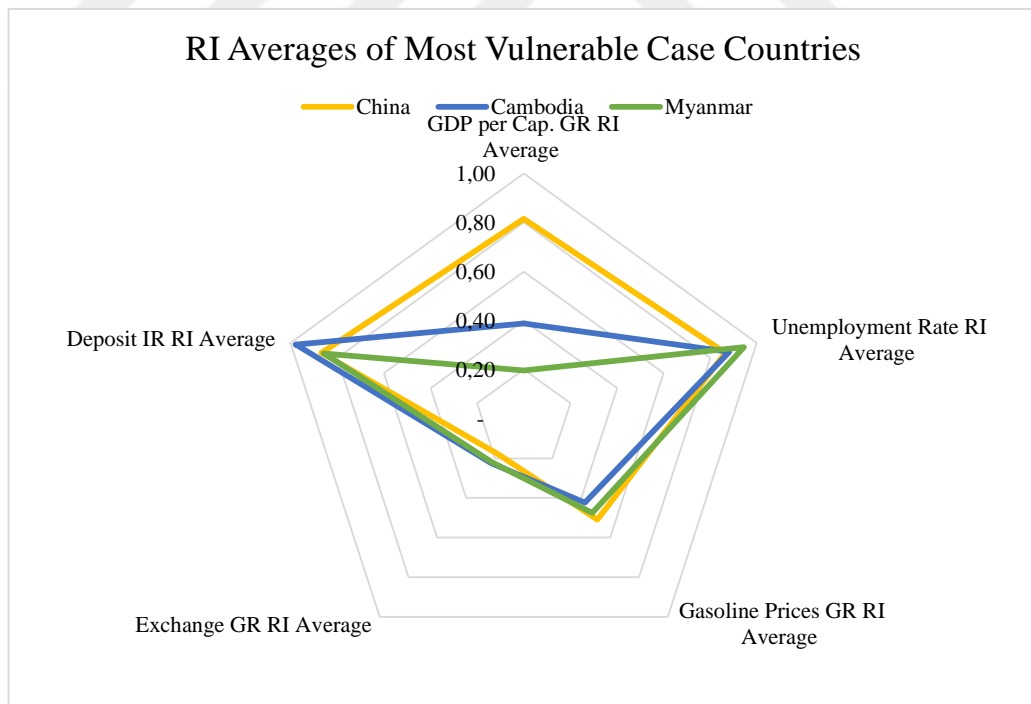


Figure 20. Relative Indicator Scores of Most Vulnerable 3 Countries

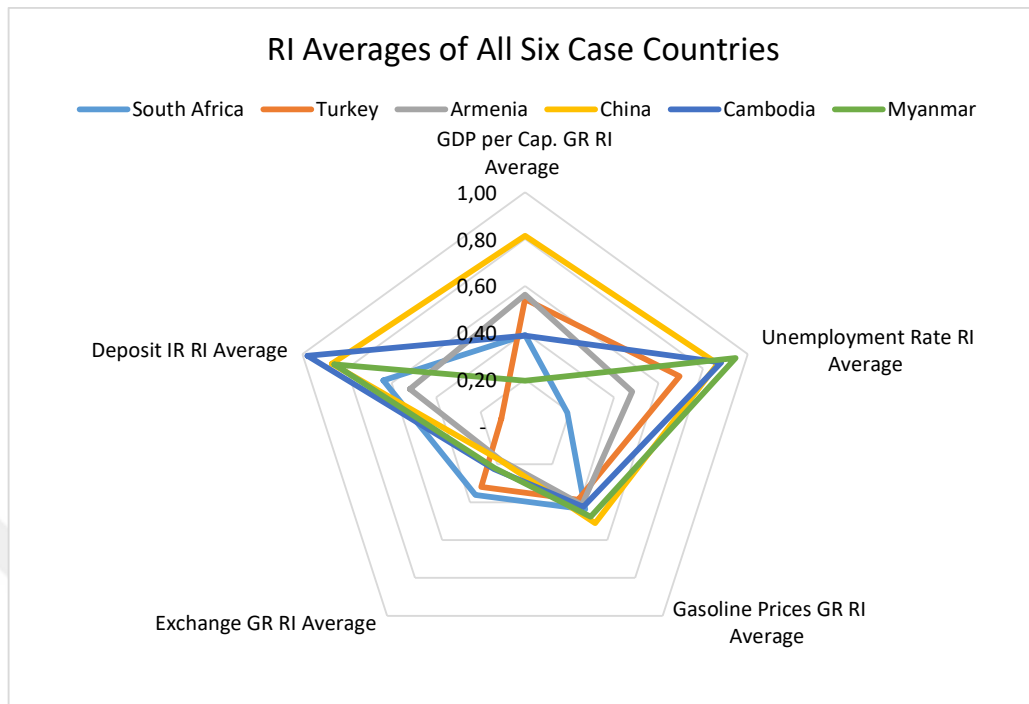


Figure 21. Relative Indicator Scores of All Six Countries

The first three countries are South Africa, Armenia and Turkey which are the least vulnerable countries while the other six countries consisting of Cambodia, China and Myanmar are the most vulnerable ones.

When we look at to Figure 13, South Africa implicates a story of its own. Its GDP per Capita Growth Rate Relative Indicator Average (GDP per Cap. GR RI Average) is 0,39, its Unemployment Rate Relative Indicator Average (Unemployment Rate RI Average) is 0,19 being the lowest RI among other indicators. The other RI Average scores are as follows: Gasoline Prices Growth Rate Relative Indicator Average (Gasoline Prices GR RI Average) is 0,44, Exchange Growth Rate Relative Indicator Average (Exchange GR RI Average) is 0,36 and Deposit Interest Rate Relative Indicator Average (Deposit IR RI Average) is 0,64 being the highest value among other RIs. This tells us that as the lowest value, RI Average of Unemployment Rate is the most ineffective while Deposit IR RI Average is the highest meaning it contributes to the vulnerability scores more than other indicators. Table 4 shows all six countries' RI Averages.

Table 4. Relative Indicator (RI) Averages

Countries	GDP per Cap. GR RI Average	Unemployment Rate RI Average	Gasoline Prices GR RI Average	Exchange GR RI Average	Deposit IR RI Average
South Africa	0,39	0,19	0,44	0,36	0,64
Turkey	0,54	0,69	0,39	0,32	0,11
Armenia	0,56	0,48	0,41	0,18	0,52
China	0,81	0,87	0,51	0,18	0,87
Cambodia	0,39	0,88	0,42	0,22	0,98
Myanmar	0,20	0,95	0,48	0,22	0,86

Figure 19 shows all 3 least vulnerable countries in one graph. With a wide perspective that this graph provides, one can assume that some indicators have the most impact on vulnerability since their relative indicator scores are also the highest. Unemployment Rate and Deposit Interest Rates can be given as examples. There seems like no correlation between least vulnerable countries since every relative indicator affects those three countries differently. This volatility in relative indicators may be the cause of the vulnerability scores being low compared to other 77 countries in general, between the years 2006-2016.

Figure 20 shows all 3 most vulnerable countries in one graph. This perspective shows that, like in the least vulnerable countries, these most vulnerable countries also have indicators that have the highest impact. These most affecting common indicators are unemployment rate, deposit interest rate and GDP per capita (for China) while

gasoline prices growth rate has medium and GDP per capita growth rate (for other 2 countries than China) and exchange growth rate has the least impact on vulnerability scores. For example, China is one of the most marked country when we look at the related figure. While other countries nearly have no or low relationship with GDP per capita growth rate, China's vulnerability is mostly affected by this particular indicator. The reason behind this situation is that the indicator indicates the "per capita". Figure 20 has a common ground between countries in terms of their relative indicators. These are mainly unemployment rate and deposit interest rate. The figure is less complex and has a harmony between lines, indicating that most vulnerable countries' relative indicators have close relationship in terms of these five indicators, and this might be the reason why they stuck in the most vulnerable section between the years 2006-2016.

Figures 22, 23 and 24 show all low, medium and highly vulnerable countries in pentagon shape graphs in order to see the difference between sections. This will show that how sections differ from each other in terms of relative indicators. The results will make it possible to analyze which indicator(s) affected the highly vulnerable countries mostly when compared to other sections; medium and low ones.

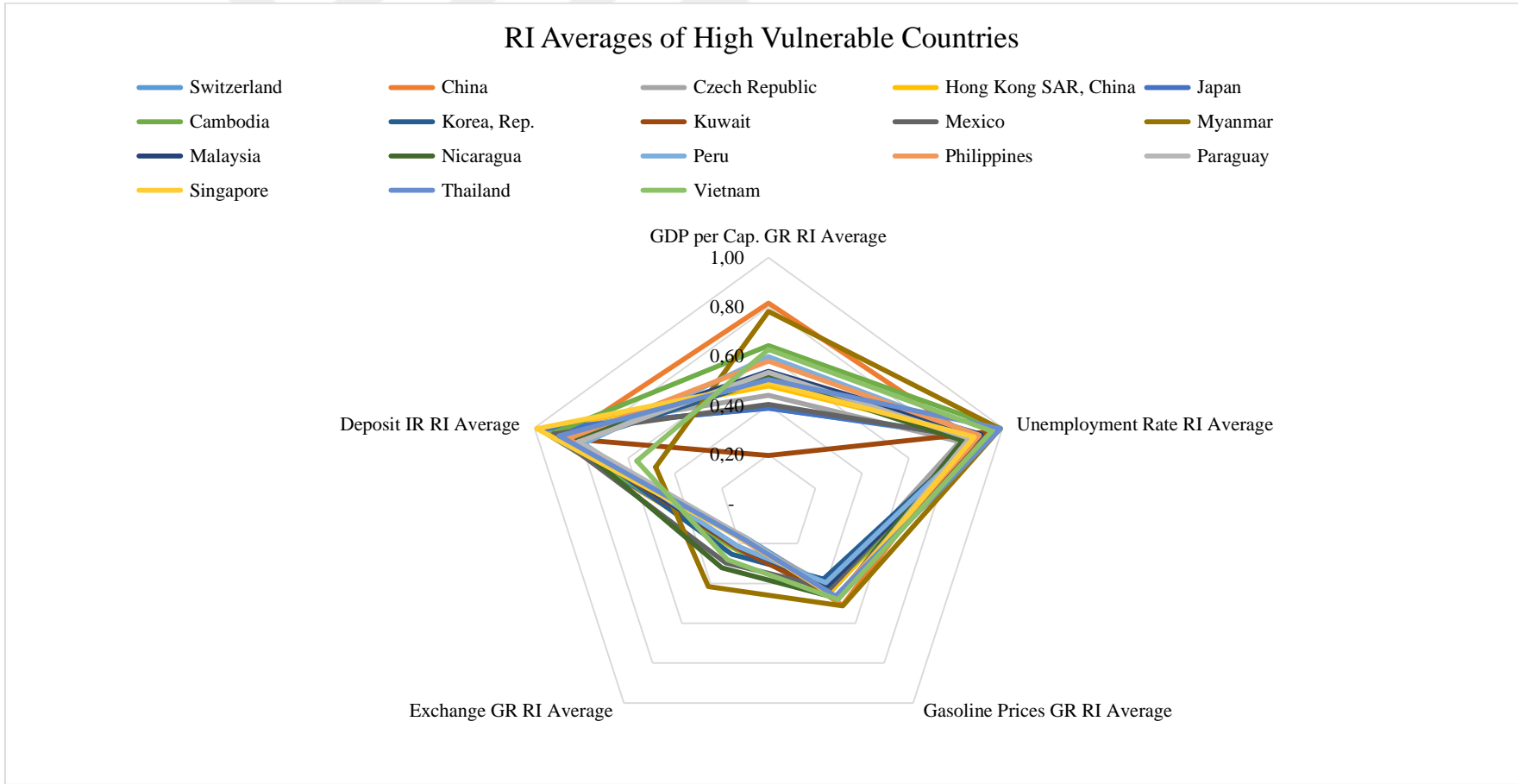


Figure 22. RI Averages of Highly Vulnerable Countries

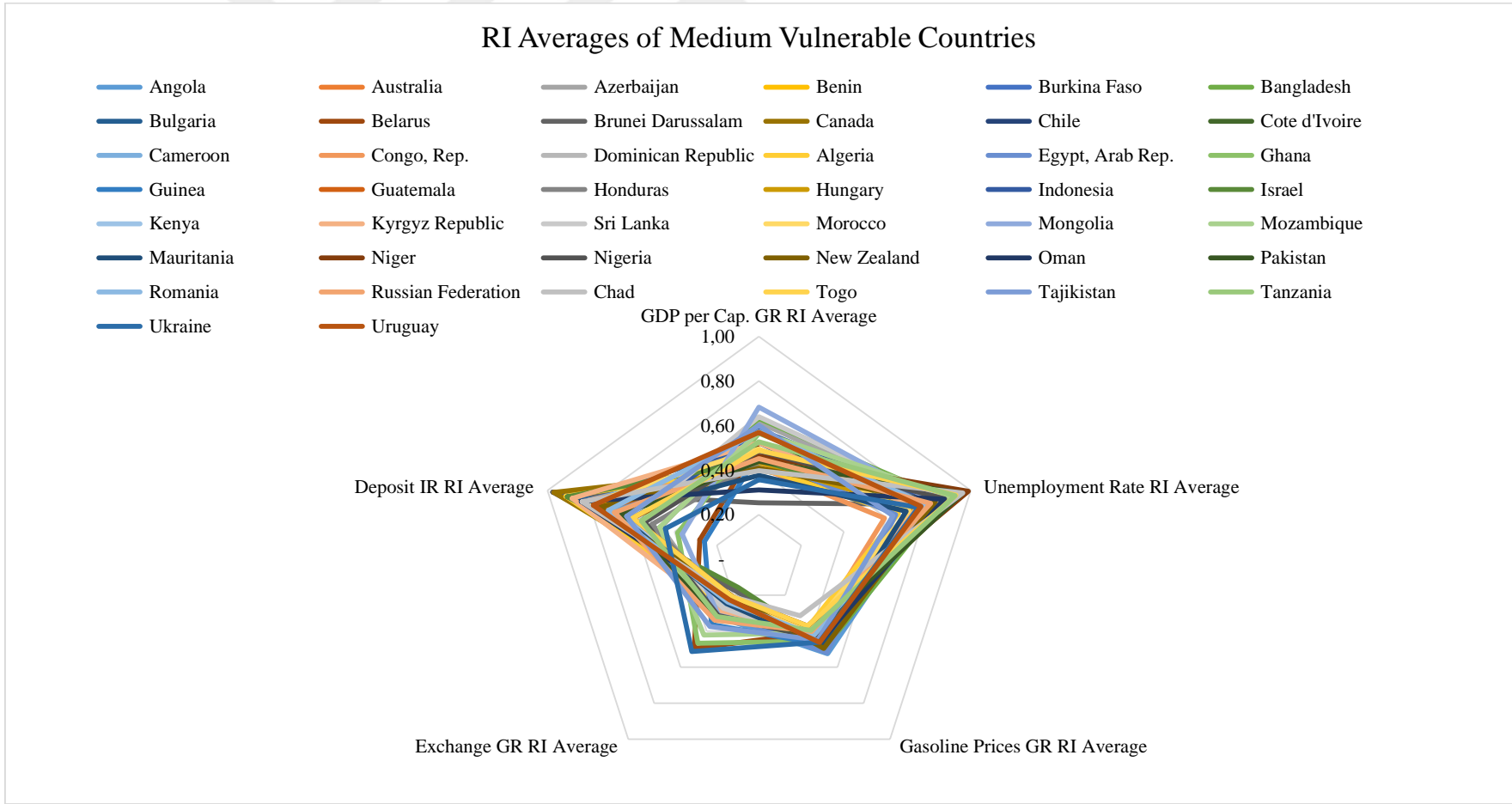
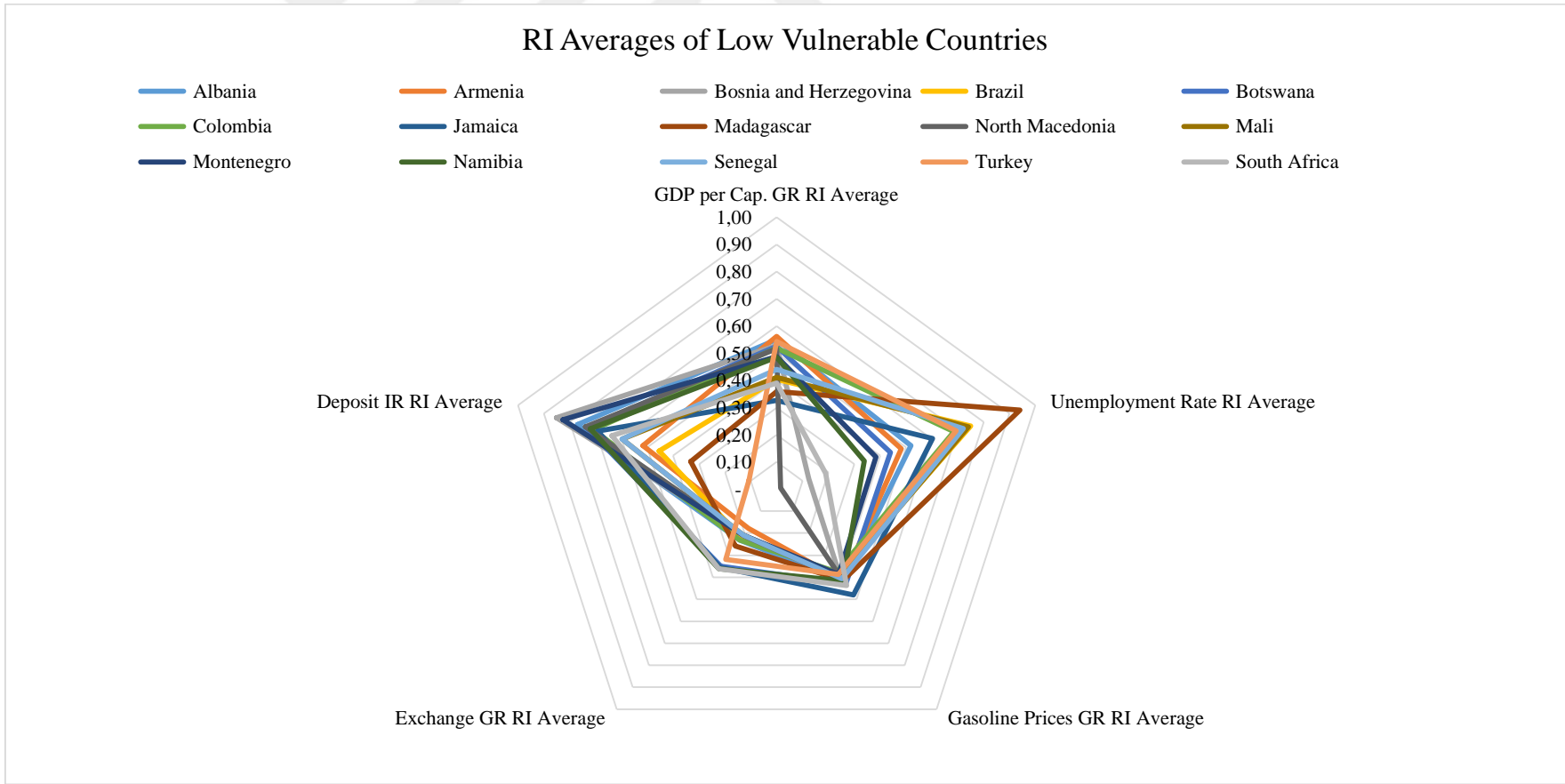


Figure 23. RI Averages of Medium Vulnerable Countries



The figures 22, 23 and 24 above indicate that the general weight of the relative indicators is distributed. The distribution is somewhat similar for nearly all three sections. But when it is analyzed closely, the indicators relative values' averages are more volatile in the low vulnerable section. Also, some indicators such as unemployment rate, deposit interest rate and gasoline prices are the most effective in general due to their high scores. When we look at three of them at the same time, the pattern becomes much clear.

Table 5 shows the average value of relative indicators for all countries. This will show us the weights of indicators based on supply and demand side.

Table 5. Average Value of the Relative Indicators for All 77 Countries

Indicators	GDP per Cap. GR RI Average	Unemploym ent Rate RI Average	Gasoline Prices GR RI Average	Exchange GR RI Average	Deposit IR RI Average
Averages	0,49	0,78	0,43	0,26	0,70

While GDP per capita, unemployment rate and the interest rates are on the demand side, gasoline prices and exchange rates are on the supply side. Figure 25 helps to understand the difference between the scores in Table 5.

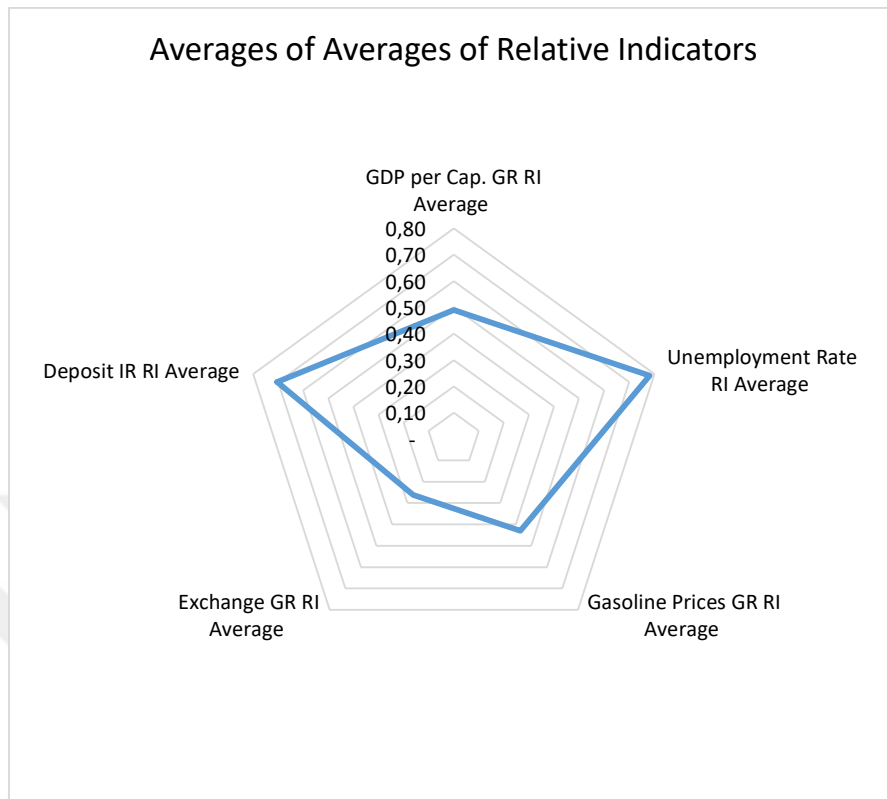


Figure 25. Average Value of Relative Indicators for All 77 Countries

Here, two indicators stand out: Unemployment Rate RI Average and Deposit Interest Rate RI Average. These are the indicators of demand side, meaning that demand is stronger than supply side in terms of having an impact on inflation. Moreover, unemployment is the main reason of creating a demand-pull inflation which is proven by Table 5 and Figure 25. If the unemployment is high in a country, aggregate demand leads to an increase in the price level which brings inflation out.

Following the Table 5, Table 6 shows the average values of indicators by cluster for all threshold sections of vulnerability which will help us understand the impact of demand/supply side of the indicators' weights in the vulnerability index.

Table 6. Average Value of Indicators by Cluster

Indicators	GDP per Cap. GR RI Average	Unemploy ment Rate RI Average	Gasoline Prices GR RI Average	Exchange GR RI Average	Deposit IR RI Average
Average Values of Relative Indicators of Highly Vulnerable Countries	0,52	0,90	0,45	0,23	0,85
Average Values of Relative Indicators of Medium Vulnerable Countries	0,48	0,82	0,43	0,27	0,66
Averages Values of Relative Indicators of Low Vulnerable Countries	0,47	0,51	0,41	0,26	0,62

In this table, the relative indicators that stand out for each section is still the same. But the weights differ from section to section. For highly vulnerable countries, while the unemployment rate RI average is 0,90, deposit interest rate RI average is 0,85. For medium vulnerable countries, while the unemployment rate RI average is 0,82, the deposit interest rate RI average is 0,66. Finally, for the low vulnerable countries, while the unemployment rate RI average is 0,51, the deposit interest rate RI average is 0,62. The figure 26 shows the scores of the Table 6 to see the scores more clearly.

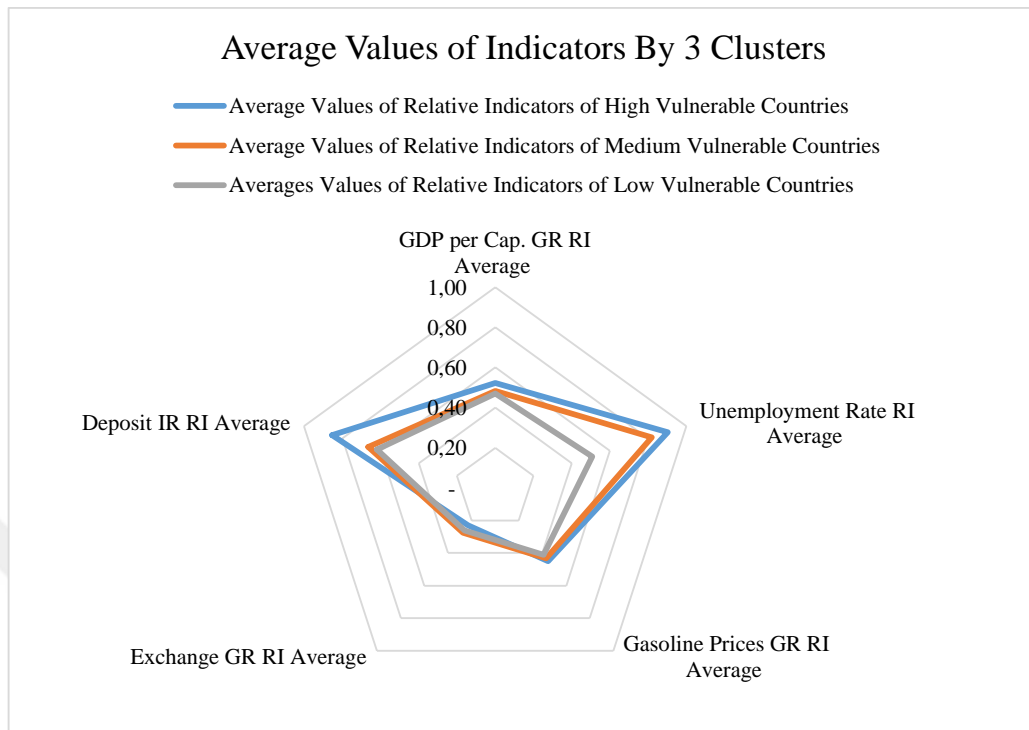


Figure 26. Average Value of Indicators by 3 Clusters in Pentagon Graph

With the help of the figure above, it is now clearer that unemployment rate and interest rate play a big role, affecting the inflation vulnerability. These indicators have more effect on both medium and highly vulnerable countries but while moving through to low vulnerable ones, we see the effect of both indicators diminishes, but still remains the most effective compared to other relative indicators.

These scores also shape a way to analyze the demand/supply sides more efficiently. When we take highly vulnerable countries as they have the highest risk to inflation, we see that still, demand side is more effective. These countries must make changes in their policies according to this table, in the demand side of their laws, partnerships, tariffs, debts and agreements with other countries and maybe even in their governance systems.

Another analysis might be on comparing income levels (from world bank) with vulnerability scores. This will show a correlation, if there are any, between inflation levels and income levels. Table 7, 9, 11 and 13 show which country belongs to which vulnerability section divided by income groups followed by their percentage in the groups provided in tables 8, 10, 12 and 14.

Table 7. Vulnerabilities of low-income level countries

Low-Income	Vulnerability Sections
Bangladesh	Medium
Benin	Medium
Burkina Faso	Medium
Cambodia	High
Chad	Medium
Guinea	Medium
Kenya	Medium
Madagascar	Low
Mali	Low
Mozambique	Medium
Myanmar	High
Niger	Medium
Tajikistan	Medium
Tanzania	Medium
Togo	Medium

Table 8. Group percentages in low-income countries

Vulnerability	Qty
High	2
Medium	11
Low	2
Medium Percentage	73,33%

Table 9. Vulnerabilities of lower-middle-income level countries

Lower Middle Income	Vulnerability Sections
Armenia	Low
Cameroon	Medium
Congo, Rep.	Medium
Cote d'Ivoire	Medium
Egypt, Arab Rep.	Medium
Ghana	Medium
Guatemala	Medium
Honduras	Medium
Indonesia	Medium
Kyrgyz Republic	Medium
Mauritania	Medium
Mongolia	Medium
Morocco	Medium
Nicaragua	High
Nigeria	Medium

Table 9 (cont'd)

Pakistan	Medium
Paraguay	High
Philippines	High
Senegal	Low
Sri Lanka	Medium
Ukraine	Medium
Vietnam	High

Table 10. Group percentages in lower-middle-income countries

Vulnerability	Qty
High	4
Medium	16
Low	2
Medium Percentage	72,73%

Table 11. Vulnerability of upper-middle-income level countries

Upper Middle Income	Vulnerability Sections
Albania	Low
Algeria	Medium
Angola	Medium
Azerbaijan	Medium
Belarus	Medium
Bosnia and Herzegovina	Low
Botswana	Low
Brazil	Low
Bulgaria	Medium
China	High
Colombia	Low
Dominican Republic	Medium
Hungary	Medium
Jamaica	Low
Malaysia	High
Mexico	High
Montenegro	Low
Namibia	Low
North Macedonia	Low
Peru	High
Romania	Medium
South Africa	Low
Thailand	High
Turkey	Low

Table 12. Group percentages in upper-middle-income level countries

Vulnerability	Qty
High	5
Medium	8
Low	11
Low Percentage	45,83%

Table 13. Vulnerability of high-income level countries

High Income	Vulnerability Sections
Australia	Medium
Brunei Darussalam	Medium
Canada	Medium
Chile	Medium
Czech Republic	High
Hong Kong SAR, China	High
Israel	Medium
Japan	High
Korea, Rep.	High
Kuwait	High
New Zealand	Medium
Oman	Medium
Russian Federation	Medium
Singapore	High
Switzerland	High
Uruguay	Medium

Table 14. Group percentages in high-income level countries

Vulnerability	Qty
High	7
Medium	9
Low	0
Medium Percentage	56,25%

In tables 8, 10 and 14, medium vulnerable countries have the majority. The percentages tend to decrease as income groups rise from low-income to high-income meaning the highest percentage belongs to Table 8. This indicates that most of the low-income countries consist of medium vulnerable countries and this means that because most of the medium vulnerable countries are developing countries, their volatile economy, mixed-type market systems and being depended of foreign investment creates a vulnerability to inflation even if they are in lower-middle or

upper middle income. The analysis continues with these low-income countries' economies. This will also show if the statement above is correct, there will be additional cases like corruption, government influence, and any other political influence on economy. Like Figures 13 to 21, and as Gnansounou also did in his research, a case of 5 countries will be selected from low-income group not randomly but respectively starting from the countries which has the highest vulnerability scores regarding medium vulnerable section. Table 7 will help to analyze in this section.

The first and second countries are Cambodia and Myanmar, and these two countries' economies were discussed in pages 49 and 50. The third most vulnerable country in the low-income section is Chad which is a medium vulnerable country in overall. Compared to Cambodia and Myanmar, Chad's case is simpler. Its geographical remoteness, lack of infrastructure, lack of technology and political issues makes the country's economy very weak. The inflation rate is also high between the years 2006-2016. Still, its oil resources are getting the interest of foreign investment as in 2003, Exxon Mobile Company started a business in Doba to extract oil.

Mozambique is next in line. Its economy improved since Mozambican Civil War that happened between 1977-1992. The aftermath was a hard situation to handle for the government, but new policies helped the economy to recover in short term. Even the policies and other revenue collection methods are in place, the country's economic state and survival capabilities proved that its still in need of foreign assistance which made the country vulnerable to price changes in the world which led to the concept of vulnerability to inflation.

The last country is Bangladesh. It is a developing market economy and also classified as next eleven emerging market economies, but as all emerging and fast developing countries face, Bangladesh also faces with vulnerability to inflation. The inflation rates getting higher and higher in the years between 2006 and 2016 is also a proof for that matter. The reasons for this vulnerability against good economic conditions is that the country faces with the challenges of infrastructure issues, insufficient power and gas supplies which implies that it is dependent to other countries in terms of gas which is an indicator of vulnerability index. Other challenges are bureaucratic corruption, natural calamities and lack of skilled workers.

After all these economic condition examinations, another quantitative analysis needed for proving the efficiency of country analyses. In that matter, regression method used to see the correlation and trustworthiness of the data and statistically significance.

Regression is a statistical way to estimate the relationship between a dependent variable and more independent variables. As mentioned above, this will show how much our scores can be explained by five indicators combined and if it is statistically significant. The regression formula is shown below:

$$Y_i = f(X_i, \beta) + e_i \quad (4.2)$$

The Y_i is a function of X_i and β and e_i representing error. The function formula also can be seen below:

$$f(X_i, \beta) = a + bX_i \quad (4.3)$$

In this f function, X_i indicates the variables. With the f function placed in the first formula, the regression formula takes its final form:

$$Y_i = a + bX_i + e_i \quad (4.4)$$

Here, Y_i is the dependent variable while X_i is the independent variable and a being the y-intercept and b is the slope of the line. According to the formula above, Table 15 shows the regression statistics of inflation rates averages with vulnerability scores of each year as independent variables, inflation rate averages being the dependent one.

Table 15. Regression Statistics of Inflation Rates' Averages and Vulnerability Index

<i>Regression Statistics</i>	
Multiple R	0,680629706
R Square	0,463256797
Adjusted R Square	0,372423332
Standard Error	3,04361852
Observations	77

In this table, the r square is the most important piece which is 0,46. This indicates the percentage that the index can be explained with five indicators data of eleven years. This means that nearly half of the index data explains the inflation rates. In other words, %46 of the variation in our dependent variable (inflation rate) is explained by the independent variables (vulnerability index scores of all countries between 2006-

2016).

The next table, Table 16 is Anova table, which shows the significance F meaning how much the analysis is statistically significant.

Table 16. Anova Table of the Regression of Inflation Rates and Vulnerability Index

ANOVA					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	11	519,6955993	47,24505448	5,10006743	0,000011
Residual	65	602,1348901	9,263613693		
Total	76	1121,830489			

Table 16 marks another point called “Significance F”. This rate is being used to measure if a regression statistic is reliable. The closer to 0, better the significance is. Since our score is 0,000011, the r square and other statistical values have a high significance.

Finally, Figure 27 shows the trendline between vulnerability index and inflation rates as well as the slope of the regression line: -0,0015.

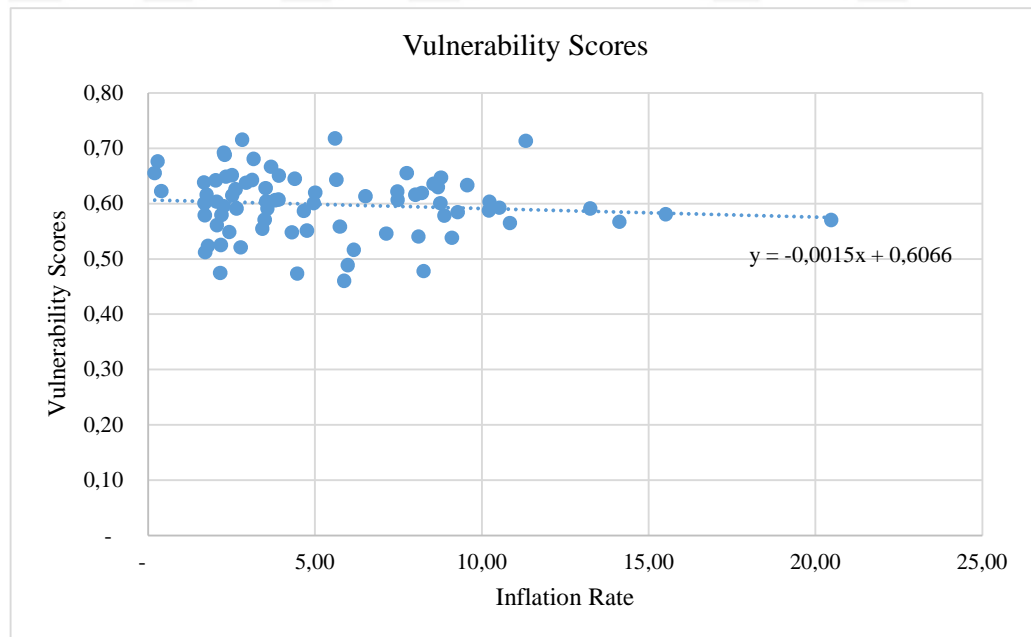


Figure 27. Regression Trend Line of Inflation Rates and Vulnerability Index Scores

In the figure above, the results of regression are much clear. The scores of vulnerability index is not %100 equals to inflation since the index implicates a risk of having inflation according to 11 years data of 5 indicators but still, it shows a trend as

R square and significance F expresses so. Still, the score of R square tells that there are room for more indicators. In the upcoming section, World Governance Indicators (WGI) are taken into consideration since latest researches and the analysis of the random countries in the previous sections revealed that indicators like corruption, law, government effectiveness are some of the critical reasons behind inflation. WGI consists of six indicators in total; “Voice and Accountability”, “Political Stability”, “Government Effectiveness”, “Regulatory Quality”, “Rule of Law” and “Control of Corruption. All these data sets are taken from World Bank between the years of 2006-2016. The average scores of estimates’ averages of years are taken into consideration. Moreover, another average of all averages of the six indicators is calculated to find WGI Index.

As the first indicator, “Voice and Accountability” reflects perceptions of the extent to which a country’s citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media. The second indicator, “Political Stability” measures perception of the likelihood for political instability and politically motivated violence, including terrorism. “Government Effectiveness” reflects perceptions of the quality of the public services, the quality of civil service, and the degree of its independence from political pressure, the quality of policy formulation and implementation, and the celebrity of the government’s commitment to such policies. “Regulatory Quality”, reflects perceptions of the ability of the government to formulate and implements sound policies and regulations that permit and promote private sector development. The “Rule of Law” reflects perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence. The last indicator, “Control of Corruption” reflects perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as “capture” of the state by elites and private interests.

The WGI data is shown in Table 17 below. The VA stands for Voice and Accountability, PS stands for Political Stability, GE stands for Government Effectiveness, RQ stands for Regulatory Quality, RL stands for Rule of Law and CC stands for Control of Corruption.

Table 17. WGI Indicators' Data and Their Averages (WGI Index Scores)

Countries	VA	PS	GE	RQ	RL	CC	Average
Angola	-	-	-	-	-	-	-
	1,14	0,40	1,11	1,03	1,24	1,34	1,04
Albania	-	-	-	-	-	-	-
	0,11	0,01	0,24	0,16	0,48	0,61	0,18
Armenia	-	-	-	-	-	-	-
	0,69	0,08	0,15	0,28	0,40	0,62	0,28
Australia	-	-	-	-	-	-	-
	1,40	0,95	1,68	1,78	1,78	1,95	1,59
Azerbaijan	-	-	-	-	-	-	-
	1,36	0,57	0,59	0,37	0,79	1,08	0,79
Benin	-	-	-	-	-	-	-
	0,29	0,27	0,54	0,44	0,58	0,61	0,27
Burkina Faso	-	-	-	-	-	-	-
	0,25	0,33	0,62	0,24	0,40	0,35	0,37
Bangladesh	-	-	-	-	-	-	-
	0,43	1,39	0,76	0,90	0,80	1,00	0,88
Bulgaria	-	-	-	-	-	-	-
	0,48	0,26	0,11	0,61	0,08	0,21	0,19
Bosnia and Herzegovina	-	-	-	-	-	-	-
	0,04	0,51	0,59	0,15	0,31	0,34	0,32
Belarus	-	-	-	-	-	-	-
	1,56	0,17	0,90	1,16	1,00	0,53	0,83
Brazil	-	-	-	-	-	-	-
	0,50	0,17	0,14	0,01	0,15	0,12	0,01
Brunei Darussalam	-	-	-	-	-	-	-
	0,77	1,16	0,94	0,98	0,57	0,59	0,58
Botswana	-	-	-	-	-	-	-
	0,47	1,03	0,49	0,51	0,64	0,95	0,68
Canada	-	-	-	-	-	-	-
	1,41	1,10	1,78	1,70	1,81	1,96	1,63
Switzerland	-	-	-	-	-	-	-
	1,56	1,31	1,97	1,66	1,84	2,10	1,74
Chile	-	-	-	-	-	-	-
	1,06	0,47	1,18	1,46	1,32	1,42	1,15
China	-	-	-	-	-	-	-
	1,66	0,54	0,16	0,23	0,46	0,44	0,53
Cameroon	-	-	-	-	-	-	-
	1,02	0,66	0,85	0,84	1,06	1,11	0,93
Congo, Rep.	-	-	-	-	-	-	-
	1,13	0,52	1,18	1,25	1,17	1,16	1,07
Colombia	-	-	-	-	-	-	-
	0,08	1,45	0,05	0,32	0,35	0,30	0,32
Czech Republic	-	-	-	-	-	-	-
	1,01	1,02	0,97	1,12	1,01	0,36	0,91
Dominican Republic	-	-	-	-	-	-	-
	0,14	0,07	0,52	0,14	0,61	0,79	0,31

Table 17 (cont'd)

Algeria	-	-	-	-	-	-	-
	0,93	1,19	0,53	1,04	0,78	0,57	0,84
Egypt, Arab Rep.	-	-	-	-	-	-	-
	1,13	1,13	0,58	0,48	0,39	0,66	0,73
Ghana	0,48	0,00	0,06	0,01	0,03	0,08	0,07
Guinea	-	-	-	-	-	-	-
	1,06	1,44	1,16	1,07	1,40	1,09	1,20
Guatemala	-	-	-	-	-	-	-
	0,28	0,72	0,67	0,19	1,04	0,66	0,59
Hong Kong SAR, China	0,53	1,01	1,81	1,97	1,61	1,78	1,45
Honduras	-	-	-	-	-	-	-
	0,40	0,46	0,68	0,31	0,99	0,82	0,61
Hungary	0,79	0,73	0,64	0,98	0,70	0,37	0,70
Indonesia	0,04	0,78	0,21	0,28	0,56	0,64	0,40
Israel	0,69	1,19	1,30	1,19	0,96	0,90	0,64
Jamaica	0,57	0,09	0,21	0,24	0,35	0,25	0,05
Japan	1,02	0,99	1,58	1,16	1,39	1,50	1,27
Kenya	-	-	-	-	-	-	-
	0,22	1,28	0,49	0,24	0,78	0,99	0,66
Kyrgyz Republic	-	-	-	-	-	-	-
	0,72	0,90	0,78	0,38	1,18	1,20	0,86
Cambodia	-	-	-	-	-	-	-
	0,99	0,21	0,86	0,47	1,07	1,18	0,80
Korea, Rep.	0,69	0,32	1,13	0,94	0,98	0,50	0,76
Kuwait	-	-	-	-	-	-	-
	0,59	0,26	0,03	0,06	0,39	0,07	0,04
Sri Lanka	-	-	-	-	-	-	-
	0,45	0,87	0,11	0,19	0,04	0,29	0,33
Morocco	-	-	-	-	-	-	-
	0,69	0,43	0,11	0,14	0,21	0,32	0,32
Madagascar	-	-	-	-	-	-	-
	0,54	0,46	0,95	0,52	0,71	0,54	0,62
Mexico	0,09	0,72	0,21	0,35	0,52	0,46	0,17
Mali	-	-	-	-	-	-	-
	0,02	0,81	0,88	0,47	0,52	0,65	0,56
Myanmar	-	-	-	-	-	-	-
	1,74	1,08	1,43	1,82	1,37	1,29	1,46
Montenegro	0,20	0,42	0,06	0,01	0,02	0,20	0,07

Table 17 (cont'd)

Mongolia	-	-	-	-	-	-	-
	0,19	0,63	0,50	0,27	0,33	0,59	0,14
Mozambique	-	-	-	-	-	-	-
	0,19	0,08	0,64	0,48	0,69	0,59	0,42
Mauritania	-	-	-	-	-	-	-
	0,88	0,72	0,93	0,69	0,87	0,75	0,81
Malaysia	-	-	-	-	-	-	-
	0,45	0,13	1,05	0,58	0,47	0,16	0,32
Namibia	-	-	-	-	-	-	-
	0,45	0,88	0,13	0,04	0,21	0,34	0,34
Niger	-	-	-	-	-	-	-
	0,38	0,94	0,69	0,57	0,58	0,68	0,64
Nigeria	-	-	-	-	-	-	-
	0,65	2,01	1,06	0,79	1,09	1,10	1,12
Nicaragua	-	-	-	-	-	-	-
	0,43	0,23	0,87	0,38	0,74	0,78	0,57
New Zealand	-	-	-	-	-	-	-
	1,53	1,33	1,79	1,86	1,90	2,32	1,79
Oman	-	-	-	-	-	-	-
	1,07	0,70	0,28	0,55	0,47	0,30	0,21
Pakistan	-	-	-	-	-	-	-
	0,81	2,53	0,69	0,62	0,84	0,94	1,07
Peru	-	-	-	-	-	-	-
	0,14	0,76	0,30	0,41	0,59	0,33	0,24
Philippines	-	-	-	-	-	-	-
	0,00	1,36	0,05	0,10	0,45	0,62	0,42
Paraguay	-	-	-	-	-	-	-
	0,12	0,56	0,89	0,40	0,84	0,92	0,62
Romania	-	-	-	-	-	-	-
	0,44	0,19	0,22	0,58	0,07	0,16	0,15
Russian Federation	-	-	-	-	-	-	-
	0,97	0,90	0,35	0,38	0,82	1,01	0,74
Senegal	-	-	-	-	-	-	-
	0,01	0,21	0,42	0,22	0,26	0,30	0,24
Singapore	-	-	-	-	-	-	-
	0,18	1,28	2,23	1,95	1,69	2,15	1,52
Chad	-	-	-	-	-	-	-
	1,38	1,47	1,48	1,11	1,43	1,38	1,38
Togo	-	-	-	-	-	-	-
	0,91	0,26	1,35	0,88	0,87	0,94	0,87
Thailand	-	-	-	-	-	-	-
	0,62	1,18	0,29	0,22	0,14	0,38	0,30
Tajikistan	-	-	-	-	-	-	-
	1,44	0,98	0,99	1,05	1,19	1,18	1,14
Turkey	-	-	-	-	-	-	-
	0,20	1,11	0,28	0,32	0,02	0,01	0,11
Tanzania	-	-	-	-	-	-	-
	0,18	0,22	0,58	0,41	0,44	0,55	0,39

Table 17 (cont'd)

Ukraine	-	-	-	-	-	-	-
	0,07	0,63	0,64	0,55	0,78	0,95	0,60
Uruguay	1,10	0,88	0,52	0,41	0,65	1,29	0,81
Vietnam	-	-	-	-	-	-	-
	1,45	0,20	0,18	0,59	0,44	0,56	0,50
South Africa	-	-	-	-	-	-	-
	0,61	0,03	0,40	0,40	0,14	0,11	0,27

After constructing a simple WGI Index based on the averages of six indicators, another rate must be constructed in order to compare WGI Index with.

The comparison is going to be made with the rate; Vulnerability ÷ Inflation. The scores of this calculation are shown below, in Table 18.

Table 18. The Rate of Vulnerability to Inflation

Country Name	Vulnerability/Inflation
Angola	0,10
Albania	0,19
Armenia	0,12
Australia	0,15
Azerbaijan	0,05
Benin	0,18
Burkina Faso	0,21
Bangladesh	0,05
Bulgaria	0,11
Bosnia and Herzegovina	0,29
Belarus	0,02
Brazil	0,09
Brunei Darussalam	0,97
Botswana	0,06
Canada	0,22
Switzerland	1,76
Chile	0,11
China	0,10
Cameroon	0,14
Congo, Rep.	0,13
Colombia	0,11
Czech Republic	0,18
Dominican Republic	0,08
Algeria	0,09
Egypt, Arab Rep.	0,04
Ghana	0,03

Table 18 (cont'd)

Guinea	0,03
Guatemala	0,08
Hong Kong SAR, China	0,10
Honduras	0,08
Hungary	0,12
Indonesia	0,06
Israel	0,22
Jamaica	0,05
Japan	1,16
Kenya	0,04
Kyrgyz Republic	0,04
Cambodia	0,05
Korea, Rep.	0,15
Kuwait	0,08
Sri Lanka	0,05
Morocco	0,25
Madagascar	0,06
Mexico	0,09
Mali	0,22
Myanmar	0,03
Montenegro	0,17
Mongolia	0,04
Mozambique	0,04
Mauritania	0,09
Malaysia	0,14
Namibia	0,08
Niger	0,24
Nigeria	0,04
Nicaragua	0,04
New Zealand	0,19
Oman	0,11
Pakistan	0,04
Peru	0,11
Philippines	0,09
Paraguay	0,06
Romania	0,10
Russian Federation	0,04
Senegal	0,27
Singapore	0,14
Chad	0,12
Togo	0,15
Thailand	0,14
Tajikistan	0,05
Turkey	0,06

Table 18 (cont'd)

Tanzania	0,05
Ukraine	0,03
Uruguay	0,05
Vietnam	0,04
South Africa	0,09

A simple regression is also made between the scores of WGI Index and Vulnerability/Inflation Rates. Therefore, it will be possible to see how much WGI explains the rate of Vulnerability to Inflation which also tells us that WGI Index is the independent variable here, in Tables 19 and 20.

Table 19. Regression Scores of Vulnerability/Inflation & WGI Index

<i>Regression Statistics</i>	
Multiple R	0,440931387
R Square	0,194420488
Adjusted R Square	0,183385153
Standard Error	0,228822694
Observations	75

Two of the countries, which are North Macedonia and Cote d'Ivoire did not have any data for WGI, so they were neglected. The R square tells us that 20% of WGI Index explains the Vulnerability/Inflation rate. With the regression scores of Vulnerability Index and Inflation Rates, it is conceivable that there are still some room for more indicators to detect the real risk of having inflation. Significance F is low for this regression meaning that the scores are trustworthy as shown in Table 20.

Table 20. Anova Table for the Regression Scores of Vulnerability/Inflation & WGI Index

ANOVA					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	0,922475131	0,922475131	17,6179948	0,0000752
Residual	73	3,822267252	0,052359825		
Total	74	4,744742383			

Figure 28 is the scatter plot with a trendline of the regression scores shown in both Tables 19 and 20. It also shows the slope: 0,2744.

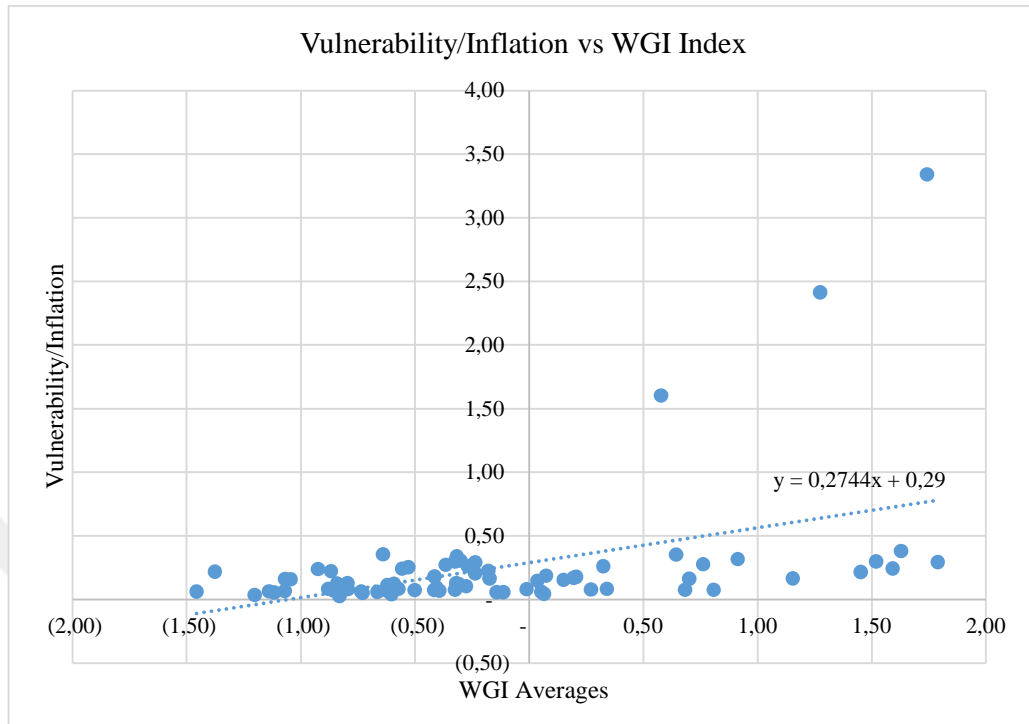


Figure 28. Regression Trend Line of WGI Index and Vulnerability/Inflation

This scatter plot shows that there is not a high standard error and nearly all scores are close to trendline meaning that WGI and Vulnerability/Inflation have close relationship with each other. Furthermore, both the score of r square of WGI vs. Vulnerability/Inflation and r square of Inflation vs. Vulnerability Scores taken into consideration which are 0,46 and 0,24, the uncharted area of vulnerability remains in a low percentage.

In final, it appears that all these analyses revealed that, in order to move between the sections of high, medium and low vulnerability and lower the value of vulnerability while ascending the ranks in the tables, making some policy changes in demand side as well as in governance is a must, and these are mentioned in the next chapter.

CHAPTER 5: CONCLUSION

Inflation is considered as one of the most important problems of today's world economies. It has become a subject that does not fall on the agenda of world economies with the impact of globalization. Inflation makes it difficult for economic actors to make decisions due to the uncertainty environment that it creates. It decreases the purchasing power of currencies of countries. Therefore, the fight against inflation has a great importance for the national economies. As the currencies in the globalized financial system are indexed to each other and the countries' inflation rates influence the whole economic system, the inflation is tried to be decreased or at least kept at a stable and minimum level. For this reason, Central Banks have used various methods to prevent inflation.

Scholars define inflation as an overall increase in prices of goods and services used frequently in daily life. Inflation rates give an idea about the growth rates of the economies. Inflation is regarded as a threat against the economic growth. In recent months, positive developments regarding the solution of the ongoing trade tension between the USA and China caused expectations for global trade and global growth for 2020 to turn positive. Similarly, the election results in England in December contributed to eliminate the uncertainties regarding Britain's exit from the European Union. The softening trend, which emerged in the second half of last year in global monetary policies, is expected to become much more visible by 2020.

Since inflation has a significant role on economic growth, it is worth studying in inflation literature. Within this framework, the assessment over inflation literature shows that multiple studies have focused on the dynamics behind inflation, comparisons between several countries' inflation profile, and results of inflation for national economies. While doing these assessments, it is seen that the concept of vulnerability is significant to observe and evaluate the risks towards certain incident. There are many studies that measure the vulnerability towards energy crises, climate change, and socio-economic leverages. However, there is not any comprehensive study that focuses on the inflation vulnerability. Therefore, this study aims to construct a composite Inflation Vulnerability Index that could measure and assess the risk of sample countries to experience high inflation.

In accordance with the purposes of this study, certain variables have been selected to

construct the index. These variables consist of unemployment rate, deposit interest rate, GDP per capita growth rate, exchange growth rate, and gasoline prices growth rate. Based on these variables, the Inflation Vulnerability Index was constructed. The constructed index covers the time period between 2006 and 2016. The sample countries are selected at the maximum variance and there are 77 countries in the index from different geographical regions and economic profiles.

For the analysis of this thesis, the sample countries are categorized according to their inflation vulnerability scores as high vulnerable, medium vulnerable and low vulnerable countries. The results of the analysis show that South Africa, Armenia, North Macedonia, Turkey, Brazil, Bosnia and Herzegovina, Namibia, Montenegro, Senegal and Mali are the countries whose vulnerability for inflation is the lowest. Among these countries South Africa performs the best economic profile regarding inflation vulnerability with a score of 0,46. When Turkey's ranking is considered, it is seen that Turkey is the fourth country that has the lowest inflation vulnerability score. Most of the countries included in the index are seen to have intermediary score regarding inflation vulnerability. Among these, certain countries such as Uruguay, Australia, Romania, Hungary, Ukraine, Belarus etc. are categorized as the medium inflation vulnerability countries. On the contrary, 18 countries are listed as the high vulnerable countries. These include Mexico, Malaysia, Switzerland, Nicaragua, Philippines, Japan, Hong Kong SAR, China, Singapore, Thailand, Myanmar, Cambodia etc.

It is also provided in the analysis that demand side factors create more vulnerability according to RI averages. This means that in order to avoid inflation vulnerability and decrease the scores, this side of the economy can be focused on more than supply side.

When inflation rates and vulnerability scores are compared, the outcome is explainable and acceptable in general. But there are some countries that go outside the framework. This is the reason of having five indicators and eleven years but not more. Data limitations caused this problem and hopefully, in the future, there will be more data to work with. Moreover, because this thesis mainly focused on economic indicators to see the effect of economy's impact over inflation, political or geographical indicators etc. wasn't included. So, if those also were added as more indicators, the outcome could be more accurate.

Besides constructing the Inflation Vulnerability Index, this thesis also aims to provide certain policy recommendations for the countries that have high levels of inflation vulnerability. To this end, the following policy recommendations are offered:

- An austerity policy might be implemented in the short-term to minimize the negative impacts of inflation.
- Saving measures might be taken in current expenditures and compliance with these measures should be closely monitored.
- Current and investment transfers, particularly grants, might be reassessed.
- The investments that have low efficiency levels might be reconsidered.
- Resource allocation for certain projects that will increase the efficiency and revive competition might be encouraged.
- Unnecessary use of resources might be prevented by closely monitoring the efficiency of resources with strict monitoring and evaluation activities.
- Some policy changes like introducing new laws, adjusting tax laws, increasing the severity of punishments for corruption, stealing, unfair competition etc. can be taken into consideration.
- Creating more employment areas and adjusting interest rates in order to eliminate the high effects of demand side.

Based on the analysis conducted in this thesis, the study also provides particular suggestions for further research. First, with this study, it is seen that the vulnerability index model proposed in energy research might be implemented in other fields as well. However, one of the major limitations in this research is caused by data limitations. For example, particular countries are seen that they do not have any statistical information for certain time periods. Therefore, in case these deficiencies in the datasets are compensated and the relevant data is completed, the Inflation Vulnerability Index might cover a large time period and more sample countries. Second, there are alternative variables that might more effectively measure inflation vulnerability. For example, the datasets for industrial production, export of goods, import of goods, exchange rate pass through and currency growth are lacking. However, the literature shows that these variables have an important impact on inflation vulnerability. Also indicators from other areas like politics, geography, energy, technology etc. can be included. For this reason, if big organizations that

produce datasets in the world can give the necessary information for these variables, the extent of Inflation Vulnerability Index might be improved to obtain more concrete results.



REFERENCES

Abson, D.J., Dougill, A.J. and Stringer, L.C. (2012) *Using Principal Component Analysis for information-rich socio-ecological vulnerability mapping in Southern Africa*. Applied Geography, Vol. 35(1–2), pp. 515-524.

Adrian, T., Boyarchenko, N. and Giannone, D. (2019) *Vulnerable Growth*. American Economic Review, Vol. 109(4), pp. 1263-1289.

Alpanda, S. and Honig, A. (2014) *The impact of central bank independence on the performance of inflation targeting regimes*. Journal of International Money and Finance, Vol. 44, pp. 118-135.

Álvarez, L.J. and Sánchez, I. (2018) *Reference variables for analysing inflation in Spain*. Economic Bulletin 3/2018 Economic Notes [online]. Available at <https://www.bde.es/f/webbde/SES/Secciones/Publicaciones/InformesBoletinesRevistas/NotasEconomicas/2018/T3/bene1803-nec10e.pdf>. (Accessed 1 January 2020).

Amadeo, K. (2020) *Monetarism Explained*. The Balance [online]. Available at <https://www.thebalance.com/monetarism-and-how-it-works-3305866>. (Accessed 2 February 2020).

Andıç, S.B. and Ögünç, F. (2015) *Variable Selection for Inflation: A Pseudo Out-of-sample Approach*. Central Bank of the Republic of Turkey [online]. Available at <https://www.tcmb.gov.tr/wps/wcm/connect/810fb6da-4255-478d-b033-d97311f80360/WP1506.pdf?MOD=AJPERES&CACHEID=ROOTWORKSPACE-810fb6da-4255-478d-b033-d97311f80360-m3fw6bl>. (Accessed 1 January 2020).

Apaitan, T., Disyatat, P. and Manopimoke, P. (2020) *Thai inflation dynamics: A view from disaggregated price data*. Economic Modelling, Vol. 84, pp. 117-134.

Artis, M.J. and Kontolemis Z.G. (1998) *The European Central Bank and inflation targeting*. International Journal of Finance & Economics, Vol. 3(1), pp. 27-37.

Assenmacher-Wesche, K., Gerlach, S. and Sekine, T. (2007) *Monetary factors and inflation in Japan*. Journal of the Japanese and International Economies, Vol. 22(3), pp. 343-363.

Balima, W.H., Combes, J.L. and Minea, A. (2017) *Sovereign debt risk in emerging market economies: Does inflation targeting adoption make any difference?*. Journal of

International Money and Finance, Vol. 70(2), pp. 360-377.

Ball, L. and Mazumder, S. (2011) *Inflation Dynamics and the Great Recession*. IMF Working Paper [online]. Available at <https://www.imf.org/external/pubs/ft/wp/2011/wp11121.pdf>. (Accessed 4 January 2020).

Banarjee, A., Marcelliona, M. and Masten, I. (2003) *Leading indicators for Euro area inflation and GDP growth*. European Commission [online]. Available at <https://ec.europa.eu/eurostat/documents/3888793/5830033/KS-AN-03-039-EN.PDF/db9b0ace-7708-4066-ac33-decced3428d3>. (Accessed 13 March 2020).

Banerjee, A. and Marcellino, M. (2005) *Are there any reliable leading indicators for US inflation and GDP growth?*. International Journal of Forecasting, Vol. 22(1), pp. 137-151.

Barr, D.G. and Campbell, J.Y. (1997) *Inflation, real interest rates, and the bond market: A study of UK nominal and index-linked government bond prices*. Journal of Monetary Economics, Vol. 39(3), pp. 361-383.

Bates, J.B. and Gabor, A. (1986) *Price perception in creeping inflation: Report on an enquiry*. Journal of Economic Psychology, Vol. 7(3), pp. 291-314.

Beirne, J. (2009) *Vulnerability of inflation in the new EU Member States to country-specific and global factors*. Economics Bulletin, Vol. 29(2), pp. 1420-1431.

Berg, T.O. and Henzel, S.R. (2015) *Point and density forecasts for the euro area using Bayesian VARs*. International Journal of Forecasting, Vol. 31(4), pp. 1067-1095.

Bernanke, B.S., Laubach, T., Mishkin, F.S. and Posen A.S. (2001) *Inflation targeting: Lessons from the international experience*. New Jersey: Princeton University Press.

Biresselioglu, M.E., Demir, M.H., Gonca, A., Kolcu, O. and Yetim, A. (2019) *How vulnerable are countries to resource curse?: A multidimensional assessment*. Energy Research & Social Science, Vol. 47, pp. 93-101.

Boroumand, S., Mohammadi, T., Pajooyan, J. and Memarnejad, A. (2019) *The Effect of Exchange Rate, Oil Prices and Global Inflation Shocks on Macroeconomic Variables for the Iranian Economy in the form of a DSGE Model*. Iranian Economic Review, Vol. 23(4), pp. 1057-1083.

Boussard, D. (1984) *The Impact of the Definition of Inflation on the Effectiveness of Inflation Accounting Adjustments*. Abacus, Vol. 20(2), pp. 157-169.

Broadbent, B. (2017) Brexit and the pound. *Imperial College, London* [online]. Available at <https://www.bankofengland.co.uk/-/media/boe/files/speech/2017/brexit-and-the-pound.pdf?la=en&hash=FE9B32473A20665C2F3A23EF4126D03C23221431>. (Accessed 4 May 2020).

Cabalu, H. (2010) *Indicators of security of natural gas supply in Asia*. Energy Policy, Vol. 38(1), pp. 218-225.

Cachanosky, N. (2009) *The Definition of Inflation According to Mises: Implications for The Debate on Free Banking*. Libertarian Papers, Vol. 1(43), pp. 1-8.

Cerisola, M. and Gelos, G. (2009) *What drives inflation expectations in Brazil? An empirical analysis*. Applied Economics, Vol. 41, pp. 1215-1227.

Chinese Government's Official Web Portal. (2008) *China vows to stabilize prices, prevent price hikes*. Embassy of the People's Republic of China in the Republic of Liberia [online]. Available at <http://lr.china-embassy.org/eng/majorevents/t398361.htm>. (Accessed 9 June 2020).

Chu, A.C., Cozzi, G., Fan, H., Furukawa, Y. and Liao, C.H. (2019) *Innovation and inequality in a monetary Schumpeterian model with heterogeneous households and firms*. Review of Economic Dynamics, Vol. 34, pp. 141-164.

Claessens, S., Dell'Ariccia, G., Igan, D. and Laeven, L. (2010) *Cross-country experiences and policy implications from the global financial crisis*. Economic Policy, Vol. 25(62), pp. 267-293.

Costantini, V., Gracceva, F., Markandya, A. and Vicini, G. (2017) *Security of energy supply. Comparing scenarios from European perspective*. Energy Policy, Vol. 35, pp. 220-226.

Danlami, I.A. (2020) *Assessing the Asymmetry of the Exchange Rate Pass-Through to Inflation in West African Commonwealth Countries*. Academic Journal of Economic Studies, Vol. 6(1), pp. 93-109.

David, R.C., Chaudhry, M. and Koch, T.W. (2000) *Do macroeconomics news*

releases affect gold and silver prices?. Journal of Economics and Business, Vol. 52(5), pp. 405-421.

Forbes, K., Hjortsoe, I. and Nenova, T. (2015) *Discussion Paper No. 43 The shocks matter: improving our estimates of exchange rate pass-through*. External MPC Unit of the Bank of England [online]. Available at <https://www.bankofengland.co.uk/-/media/boe/files/external-mpc-discussion-paper/2015/the-shocks-matter-improving-our-estimates-of-exchange.pdf?la=en&hash=A2CB9E202EECC1F7EBFD3A3644431BE861E926C2>. (Accessed 2 March 2020).

Frisch, H. (1977) *Inflation Theory 1963-1975: A "Second Generation" Survey*. Journal of Economic Literature, Vol. 15(4), pp. 1289-1317.

Garner, C.A. (1995) *How Useful Are Leading Indicators of Inflation?*. Federal Reserve Bank of Kansas City [online]. Available at <https://core.ac.uk/download/pdf/6799565.pdf>. (Accessed 2 March 2020).

Gnansounou, E. (2008) *Assessing the energy vulnerability: Case of industrialised countries*. Energy Policy, Vol. 36(10), pp. 3734-3744.

Goodhart, C. and Hofmann, B. (2002) *Asset Prices and the Conduct of Monetary Policy* [online]. Available at <http://repec.org/res2002/Goodhart.pdf>. (Accessed 13 March 2020).

Gupta, E. (2008) *Oil vulnerability index of oil-importing countries*. Energy Policy, Vol. 36, pp. 1195-1211.

Ha, J., Stocker, M.M. and Yilmazkuday, H. (2020) *Inflation and exchange rate pass-through*. Journal of International Money and Finance, Vol. 105. DOI: <https://doi.org/10.1016/j.jimonfin.2020.102187>.

Holzman, F.D. (1959) *Creeping Inflation*. The Review of Economics and Statistics, Vol. 41(3), pp. 324-329.

Hossain, A.A. (2005) *The Sources and Dynamics of Inflation in Indonesia: An Ecm Model Estimation for 1952-2002*. Applied Econometrics and International Development, Vol. 5(4), pp. 93-116.

Hurd, M.D. and Shoven, J.B. (1985) *The Distributional Impact of Social Security*.

NBER Working Paper Series, Working Paper No. 1155, National Bureau of Economic Research [online]. Available at <https://www.nber.org/papers/w1155.pdf>. (Accessed 15 April 2020)

Iacoviello, M. and Navarro, G. (2019) *Foreign effects of higher U.S. interest rates*. Journal of International Money and Finance, Vol. 95, pp. 232-250.

Ishida, H. and Matsuzaki, S. (2020) *A walking dilaton inflation*. Physics Letters B, Vol. 804. DOI: <https://doi.org/10.1016/j.physletb.2020.135390>.

Jahan, S. (2017) Inflation targeting: Holding the line, international monetary fund, finance & development. International Monetary Fund [online]. Available at <https://www.imf.org/external/pubs/ft/fandd/basics/target.htm>. (Accessed 1 May 2020).

Karwowski, E., Shabani, M. and Stockhammer, E. (2019) Dimensions and Determinants of Financialization: Comparing OECD Countries since 1997. New Political Economy, DOI: [10.1080/13563467.2019.1664446](https://doi.org/10.1080/13563467.2019.1664446). [online]. Available at https://www.researchgate.net/publication/336408728_Dimensions_and_Determinants_of_Financialisation_Comparing_OECD_Countries_since_1997#read (Accessed 3 April 2020)

Khezri, M., Hosseinidoust, S.E. and Naziri, M.K. (2019) *Investigating the Temporary and Permanent Influential Variables on Iran Inflation Using TVP-DMA Models*. Iranian Economic Review, Vol. 23(1), pp. 209-234.

Kim, S. and Yim, G. (2020) *Do inflation-targeting central banks adjust inflation targets to meet the target?*. Journal of Economic Dynamics and Control, Vol. 113. DOI: [10.1016/j.jedc.2020.103858](https://doi.org/10.1016/j.jedc.2020.103858).

Lanzafame, M. (2016) *Inflation targeting and interest rates: A panel time-series approach*. Oxford Economic Papers, Vol. 68(2), pp. 484-505.

Lee, H.M. (2013) *Running inflation with unitary Higgs*. Physics Letters B, Vol. 722(1-3), pp. 198-206.

Leigh, D. and Rossi, M. (2002). *Leading Indicators of Growth and Inflation in Turkey*. IMF Working Paper [online]. Available at <https://www.imf.org/en/Publications/WP/Issues/2016/12/30/Leading-Indicators-of->

Growth-and-Inflation-in-Turkey-16221. (Accessed 5 February 2020).

Long, J.T., Neogi, S., Caldwell, C.M. and DeLange, M.P. (2018) *Variation inflation factor-based regression modeling of anthropometric measures and temporal-spatial performance: Modeling approach and implications for clinical utility*. *Clinical Biomechanics*, Vol. 51, pp. 51-57.

Lu, X., Guo, K., Dong, Z. and Wang, X. (2017) *Financial development and relationship evolution among money supply, economic growth and inflation: A comparative study from the U.S. And China*. *Applied Economics*, Vol. 49(10), pp. 1032-1045.

Lucey, B. M., Sharma, S.S. and Vigne, S.A. (2017). *Gold and inflation(s) – A time-varying relationship*. *Economic Modelling*, Vol. 67(C), pp. 88-101.

Mahdavi, S. and Zhou, S. (1997) *Gold and commodity prices as leading indicators of inflation: Tests of long-run relationship and predictive performance*. *Journal of Economics and Business*, Vol. 49(5), pp. 475-489.

Makin, A.J., Robson, A. and Ratnasiri, S. (2017) *Missing money found causing Australia's inflation*. *Economic Modelling*, Vol. 66, pp. 156-162.

Mandalinci, Z. (2017) *Forecasting inflation in emerging markets: An evaluation of alternative models*. *International Journal of Forecasting*, Vol. 33(4), pp. 1082-1104.

Mehra, Y.P. and Herrington, C. (2008) *On the sources of movements in inflation expectations: A few insights from a var model*. *Economic Quarterly*, Vol. 94(2), pp. 121-146.

Minella, A., de Freitas, P.S., Goldfajn, I. and Muinhos, M.K. (2003) *Inflation targeting in Brazil: Constructing credibility under exchange rate volatility*. *Journal of International Money and Finance*, Vol. 22(7), pp. 1015-1040.

Minsky, H.P. (1975) *John Maynard Keynes*. New York: Columbia University Press.

Mishkin, F. and Savastano M. (2001) *Monetary policy strategies for Latin America*. *Journal of Development Economics*, Vol. 66, pp. 415-444.

Mishkin, F.S. (2000) *Inflation targeting in emerging market countries*. *The American Economic Review*, vol. 90(2), pp. 105-109.

Morgan, J. (2009) *The limits of central bank policy: economic crisis and the challenge of effective solutions*. Cambridge Journal of Economics, Vol. 33(4), pp. 581–608.

Morgan, J. and Patomaki, H. (2017) *Contrast explanation in economics: Its context meaning and potential*. Cambridge Journal of Economics, Vol. 41(5), pp. 1391-1418.

Moser, G., Rumler, F. and Scharler, J. (2007) *Forecasting Austrian inflation*. Economic Modelling, Vol. 24(3), pp. 470-480.

Nasir, M.A. and Simpson, J. (2018) *Brexit associated sharp depreciation and implications for UK's inflation and balance of payments*. Journal of Economics Studies, Vol. 45(2), pp. 231-246.

Nasir, M.A., Huynh, T.L.D. and Vo, X.V. (2020) *Exchange rate pass-through & management of inflation expectations in a small open inflation targeting economy*. International Review of Economics & Finance, Vol. 69, pp. 178-188.

Obstfeld, M. (2014) *Never Say Never: Commentary on a Policymaker's Reflections*. IMF Economic Review, Vol. 62(4), pp. 656-693.

Öğünç, F., Akdoğan, K., Başer, S., Gülenay-Chadwick, M., Ertuğ, D., Hülagü, T., Kösem, S., Özmen, M.U. and Tekatlı, N. (2013) *Short-term inflation forecasting models for Turkey and a forecast combination analysis*. Economic Modelling, Vol. 33, pp. 312-325.

Özata, E. (2019) *Asymmetric and Nonlinear Pass-Through of Global Crude Oil Price to Inflation in Turkey*. Optimum Journal of Economics and Management Sciences, Vol. 6(1), pp. 17-32.

Ramakrishnan, U. and Vamvakidis, A. (2002) *Forecasting Inflation in Indonesia*. IMF Working Paper [online]. Available at <https://www.imf.org/external/pubs/ft/wp/2002/wp02111.pdf>. (Accessed 5 February 2020).

Reuten, G. (2003) *On 'Becoming Necessary' in an Organic Systematic Dialectic: The Case of Creeping Inflation*. In: Albritton R., Simoulidis J. (eds) *New Dialectics and Political Economy*. London: Palgrave Macmillan.

Saatcioglu, C. and Korap, L. (2006) *Determinants of Turkish Inflation*. Discussion Paper, No. 2006/7, Turkish Economic Association, Ankara [online]. Available at

https://www.econstor.eu/bitstream/10419/83245/1/dp_2006-07.pdf. (Accessed 1 January 2020).

Santacreu, A.M. (2015) *The Economic Fundamentals of Emerging Market Volatility. Economic Synopses*, Vol.2 [online]. Available at https://files.stlouisfed.org/files/htdocs/publications/es/15/ES_2_2015-01-30.pdf. (Accessed 14 April 2020).

Sharma, S.S. (2019) *Which Variables Predict Indonesia's Inflation?*. *Bulletin of Monetary Economics and Banking*, Vol. 22(1), pp. 87-102.

Stock, J.H. and Watson, W.W. (1999) *Forecasting inflation*. *Journal of Monetary Economics*, Vol. 44(2), pp. 293-335.

Uddin, M.N., Saiful Islam, A.K.M., Bala Kumar, S., Islam, G.M.T., Adhikary, S., Saha, D., Haque, S., Fahad, M.G.R. and Akter, R. (2019) *Mapping of climate vulnerability of the coastal region of Bangladesh using principal component analysis*. *Applied Geography*, Vol. 102, pp. 47-57.

Williams, J.C. (2014, October) *Inflation targeting and the global financial crisis: successes and challenges*. South African Reserve Bank Conference, South Africa.

Wimanda, R.E., Turner, P.E. and Hall, M.J.B. (2011) *Expectations and the inertia of inflation: The case of Indonesia*. *Journal of Policy Modeling*, Vol. 33(3), pp. 426-438.

Yadav, I.S., Goyari, P. and Mishra, R.K. (2018) *Financial integration and macroeconomic volatility: evidence from Asia*. *Journal of Economic and Administrative Sciences*, Vol. 35(2), pp. 94-112.

APPENDICES

Appendix A – Scaling Results

1. GDP per capita Growth Rate

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Angola	0,290457	0,511037	0,723306	0,477660	0,441078	0,320864	0,607177	0,372707	0,469044	0,437498	0,195557
Albania	0,262204	0,403770	0,806518	0,760751	0,594743	0,455251	0,382313	0,365240	0,538102	0,750208	0,739738
Armenia	0,471825	0,677009	0,771554	0,035508	0,514565	0,539480	0,766222	0,481769	0,636191	0,763962	0,526569
Australia	0,114764	0,279919	0,344361	0,587721	0,412385	0,376950	0,420821	0,340117	0,450578	0,638282	0,604974
Azerbaijan	1,000000	1,000000	0,804137	0,887606	0,561840	0,204855	0,329631	0,599909	0,496339	0,583122	0,293610
Benin	0,105994	0,273238	0,370120	0,572339	0,353555	0,335788	0,406408	0,582691	0,669254	0,529363	0,566759
Burkina Faso	0,165992	0,204802	0,416243	0,589169	0,643519	0,483545	0,506517	0,471869	0,474661	0,648954	0,706614
Bangladesh	0,225189	0,368182	0,564551	0,753717	0,602952	0,562656	0,649810	0,622066	0,797045	0,929089	0,884372
Bulgaria	0,291409	0,423094	0,703795	0,478044	0,448648	0,463548	0,336093	0,343492	0,582295	0,884330	0,801910
Bosnia and Herzegovina	0,229939	0,374273	0,623614	0,489296	0,466328	0,424666	0,329245	0,576393	0,621092	0,885492	0,796998
Belarus	0,376817	0,483736	0,961326	0,611095	0,778475	0,576759	0,396376	0,351017	0,506491	0,342540	0,380974
Brazil	0,157912	0,341290	0,512902	0,548941	0,707227	0,464300	0,341203	0,430864	0,327218	0,319405	0,297811
Brunei Darussalam	0,161016	0,131456	0,021959	0,473386	0,454202	0,437365	0,237290	0,035747	0,017980	0,490364	0,324435
Botswana	0,251585	0,376468	0,510330	0,203823	0,717157	0,532012	0,500045	1,000000	0,615990	0,392508	0,677063
Canada	0,165839	0,371027	0,228831	0,427223	0,483625	0,425248	0,315898	0,369968	0,525077	0,586743	0,528070
Switzerland	0,171964	0,279503	0,293771	0,451752	0,482931	0,355725	0,263736	0,329667	0,467871	0,604035	0,572195
Chile	0,223959	0,300388	0,401037	0,486213	0,620511	0,554029	0,578559	0,496552	0,421482	0,661712	0,557804
China	0,416356	0,640415	0,859134	0,959239	0,882146	0,729366	0,796568	0,796036	0,979785	1,000000	0,903151

Cote d'Ivoire	0,060583	0,154127	0,252978	0,631450	0,371887	0,037271	0,847500	0,723972	0,909528	0,976965	0,799159
Cameroon	0,097598	0,240799	0,281124	0,569835	0,418606	0,388679	0,392500	0,464241	0,635197	0,771466	0,647303
Congo, Rep.	0,155962	0,000000	0,372423	0,758628	0,656464	0,355823	0,350615	0,346354	0,738345	0,600406	0,229439
Colombia	0,228145	0,356965	0,376963	0,594461	0,554639	0,591956	0,482767	0,578563	0,670123	0,702807	0,577486
Czech Republic	0,262043	0,341756	0,360361	0,373021	0,484907	0,399863	0,200501	0,243927	0,594173	0,912382	0,667964
Dominican Republic	0,294756	0,377861	0,365477	0,581030	0,731293	0,414207	0,376176	0,540642	0,883883	0,950832	0,856140
Algeria	0,084767	0,231938	0,285063	0,588046	0,473710	0,373916	0,369104	0,334943	0,513299	0,692730	0,600680
Egypt, Arab Rep.	0,217452	0,350047	0,596223	0,706720	0,538917	0,314543	0,267183	0,273169	0,414654	0,723668	0,660824
Ghana	0,182527	0,227823	0,672068	0,684881	0,644904	0,830438	0,753212	0,625846	0,410073	0,585198	0,603319
Guinea	0,051672	0,323593	0,356222	0,454815	0,509142	0,476311	0,528392	0,398048	0,475893	0,672182	1,000000
Guatemala	0,169952	0,315369	0,324313	0,537989	0,437086	0,431505	0,351378	0,415375	0,598401	0,739510	0,593937
Hong Kong SAR, China	0,255980	0,361275	0,338696	0,483428	0,680932	0,512257	0,310168	0,472089	0,543309	0,687682	0,626089
Honduras	0,193795	0,301381	0,370352	0,409306	0,469088	0,411783	0,426629	0,348185	0,471819	0,720760	0,660338
Hungary	0,195836	0,183221	0,319225	0,323008	0,431934	0,423732	0,198838	0,440492	0,762771	0,849059	0,682485
Indonesia	0,193446	0,340314	0,551763	0,727661	0,623544	0,540355	0,599960	0,576276	0,687272	0,815351	0,756104
Israel	0,182478	0,304570	0,315613	0,533358	0,568669	0,457161	0,295977	0,438959	0,520070	0,610118	0,650959
Jamaica	0,144686	0,201455	0,145143	0,394861	0,291616	0,382454	0,183090	0,274930	0,369492	0,615435	0,585477
Japan	0,116620	0,222585	0,155927	0,370495	0,592299	0,333700	0,387512	0,433613	0,404835	0,675790	0,573363
Kenya	0,178612	0,305317	0,062356	0,614406	0,656869	0,475861	0,398925	0,504432	0,602089	0,787827	0,731902
Kyrgyz Republic	0,134619	0,428939	0,741139	0,661789	0,307598	0,537108	0,142898	0,902685	0,535628	0,702665	0,666666
Cambodia	0,332592	0,465905	0,586450	0,535687	0,600684	0,568344	0,669954	0,679421	0,846266	0,926860	0,850292
Korea, Rep.	0,210348	0,351362	0,387816	0,604969	0,694990	0,458337	0,402517	0,472674	0,589589	0,734626	0,684656
Kuwait	0,157722	0,185866	0,001809	0,077078	0,000000	0,486631	0,330753	0,000000	0,000000	0,391592	0,522620
Sri Lanka	0,269815	0,377064	0,591441	0,710063	0,744114	0,669724	0,916769	0,465264	0,718537	0,846136	0,731444
Morocco	0,255272	0,249753	0,554996	0,715980	0,509824	0,500031	0,381979	0,498604	0,469915	0,786980	0,519238
Madagascar	0,144774	0,262770	0,489134	0,319002	0,283154	0,278114	0,284902	0,249534	0,411814	0,616855	0,608307

Mexico	0,162091	0,196516	0,209777	0,318085	0,565131	0,428996	0,430004	0,282810	0,494243	0,718663	0,634347
North Macedonia	0,218122	0,388964	0,603682	0,575370	0,548347	0,430167	0,229060	0,482671	0,678684	0,829330	0,698648
Mali	0,114242	0,172827	0,326591	0,653198	0,488015	0,335834	0,000000	0,236464	0,723257	0,786517	0,691943
Myanmar	0,421352	0,558635	0,892176	1,000000	0,822126	0,541948	0,732743	0,815308	1,000000	0,980010	0,830078
Montenegro	0,314167	0,399585	0,717518	0,346040	0,512787	0,468437	0,065995	0,526202	0,511004	0,801359	0,707270
Mongolia	0,279235	0,472079	0,737592	0,477368	0,611329	1,000000	1,000000	0,952608	0,877257	0,616690	0,492189
Mozambique	0,264472	0,334667	0,535519	0,735760	0,564590	0,528998	0,581192	0,568523	0,759020	0,826946	0,587809
Mauritania	0,497488	0,005691	0,016904	0,479319	0,371727	0,381376	0,371039	0,360746	0,473263	0,741053	0,442931
Malaysia	0,177163	0,315794	0,429954	0,457971	0,663196	0,492558	0,553374	0,513539	0,773510	0,823638	0,714037
Namibia	0,226205	0,291247	0,289115	0,530916	0,590980	0,474093	0,501437	0,550092	0,710869	0,758814	0,412806
Niger	0,132939	0,145371	0,493915	0,513138	0,600324	0,263154	0,727088	0,388974	0,583483	0,617074	0,634753
Nigeria	0,171633	0,301484	0,507276	0,808186	0,640469	0,442166	0,374224	0,555092	0,675980	0,590506	0,292015
Nicaragua	0,155105	0,295257	0,373416	0,403411	0,535007	0,546845	0,634215	0,532999	0,667178	0,807847	0,724770
New Zealand	0,123451	0,242485	0,106114	0,546575	0,409506	0,400467	0,389189	0,411951	0,545935	0,697714	0,625216
Oman	0,149518	0,219545	0,544217	0,655220	0,344788	0,000000	0,384403	0,065517	0,003243	0,516345	0,535712
Pakistan	0,176432	0,254720	0,194891	0,616746	0,358942	0,355082	0,363858	0,439006	0,585184	0,753379	0,732121
Peru	0,263764	0,433115	0,801199	0,605456	0,752731	0,572121	0,647597	0,629767	0,476790	0,715489	0,677852
Philippines	0,174926	0,332222	0,414813	0,584866	0,660140	0,424082	0,634860	0,633815	0,774945	0,886005	0,860704
Paraguay	0,168881	0,305001	0,571670	0,527729	0,859933	0,455818	0,131645	0,774777	0,669560	0,699311	0,708194
Romania	0,320842	0,474418	1,000000	0,398468	0,225631	0,441495	0,450569	0,558360	0,701681	0,865874	0,852341
Russian Federation	0,317611	0,469449	0,594784	0,270463	0,605988	0,516966	0,545415	0,390285	0,264728	0,455364	0,536622
Senegal	0,074070	0,245521	0,323886	0,567106	0,425498	0,272747	0,428739	0,279571	0,689404	0,806942	0,735739
Singapore	0,236419	0,327437	0,000000	0,475807	1,000000	0,513656	0,407152	0,505224	0,593282	0,703608	0,647981
Chad	0,000000	0,163491	0,212648	0,627577	0,868605	0,188057	0,648033	0,438538	0,668679	0,561561	0,000000
Togo	0,077547	0,038127	0,321805	0,705533	0,548482	0,489069	0,537979	0,519371	0,647746	0,784855	0,707742
Thailand	0,199815	0,336860	0,316257	0,544504	0,729902	0,346397	0,753729	0,438955	0,408649	0,762949	0,714215
Tajikistan	0,218018	0,363670	0,626409	0,664146	0,594553	0,552672	0,633065	0,632130	0,738739	0,810960	0,787027
Turkey	0,240149	0,300207	0,210092	0,349601	0,729450	0,746880	0,490916	0,755514	0,664972	0,864127	0,624606

Tanzania	0,178691	0,300759	0,421981	0,688272	0,549151	0,531590	0,372040	0,539733	0,682061	0,782142	0,753412
Ukraine	0,306829	0,453973	0,430807	0,000000	0,595949	0,588820	0,303168	0,295038	0,255738	0,000000	0,691032
Uruguay	0,190052	0,388388	0,708702	0,756637	0,754687	0,545320	0,500849	0,587895	0,621048	0,594240	0,613863
Vietnam	0,245881	0,380966	0,553991	0,774033	0,650520	0,558532	0,567545	0,588089	0,798568	0,941798	0,835735
South Africa	0,198199	0,307922	0,359629	0,473941	0,464144	0,406625	0,311914	0,341423	0,381317	0,570913	0,473922

2. Unemployment Rate

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Angola	0,911689	0,906214	0,904343	0,897390	0,718603	0,773181	0,771644	0,756215	0,752527	0,747665	0,742072
Albania	0,559462	0,549224	0,620943	0,584787	0,570492	0,576175	0,575868	0,459766	0,383189	0,388777	0,435038
Armenia	0,731738	0,727415	0,608495	0,434300	0,413920	0,416420	0,447734	0,448806	0,382898	0,345518	0,343009
Australia	0,881500	0,884787	0,885686	0,841171	0,852812	0,846619	0,841995	0,817074	0,798117	0,792645	0,800161
Azerbaijan	0,829642	0,822157	0,831214	0,835514	0,839483	0,835705	0,843105	0,841305	0,840544	0,832717	0,827421
Benin	0,993962	0,988244	0,987672	0,986348	0,985494	0,925016	0,925699	0,921598	0,923762	0,919820	0,921984
Burkina Faso	0,913862	0,915972	0,904523	0,882790	0,868527	0,844623	0,829688	0,802192	0,783502	0,779312	0,775820
Bangladesh	0,915103	0,898946	0,884696	0,858899	0,911089	0,890921	0,880158	0,860354	0,859267	0,854035	0,852377
Bulgaria	0,763874	0,812370	0,844442	0,801479	0,691596	0,647682	0,611974	0,562189	0,603723	0,679499	0,728557
Bosnia and Herzegovina	0,138673	0,172284	0,310637	0,256320	0,149765	0,122183	0,098133	0,054135	0,018650	0,000000	0,043884
Belarus	0,799481	0,809358	0,820985	0,824137	0,823705	0,813876	0,814116	0,803032	0,801607	0,797773	0,795170
Brazil	0,772677	0,770413	0,792429	0,747598	0,772490	0,787508	0,777945	0,771062	0,776885	0,705725	0,574023
Brunei Darussalam	0,864289	0,862375	0,857970	0,814025	0,804078	0,794688	0,787118	0,765810	0,765833	0,724516	0,684942
Botswana	0,514206	0,520095	0,523517	0,505941	0,450439	0,435029	0,428539	0,387807	0,371228	0,364346	0,341396
Canada	0,838106	0,836750	0,828604	0,753223	0,762311	0,768384	0,774484	0,767631	0,767687	0,761437	0,750672
Switzerland	0,903563	0,905779	0,912202	0,886835	0,865664	0,868287	0,866120	0,849114	0,843598	0,838541	0,830569
Chile	0,761815	0,767518	0,734177	0,659398	0,750604	0,773760	0,795149	0,797745	0,776740	0,776016	0,760693
China	0,891403	0,885656	0,875097	0,867747	0,874602	0,863780	0,863346	0,854612	0,851487	0,844841	0,845274

Cote d'Ivoire	0,859182	0,847811	0,837993	0,815226	0,805287	0,786317	0,776737	0,866377	0,886461	0,900773	0,919604
Cameroon	0,912282	0,922834	0,913822	0,897895	0,887836	0,882421	0,887275	0,885391	0,890569	0,885975	0,886086
Congo, Rep.	0,492650	0,507239	0,518867	0,508122	0,574119	0,627173	0,686080	0,664472	0,657093	0,651331	0,640905
Colombia	0,691223	0,687109	0,674546	0,635602	0,669169	0,684675	0,694568	0,698368	0,707409	0,710414	0,685671
Czech Republic	0,814745	0,857482	0,880947	0,806377	0,787028	0,794140	0,784735	0,771868	0,796990	0,829567	0,867696
Dominican Republic	0,856869	0,862173	0,869788	0,844141	0,852780	0,814231	0,793092	0,757896	0,774776	0,735834	0,739768
Algeria	0,670231	0,612231	0,672836	0,695835	0,701743	0,689536	0,654414	0,671476	0,647968	0,603934	0,627697
Egypt, Arab Rep.	0,720453	0,756718	0,757214	0,729743	0,740011	0,628719	0,601299	0,554731	0,542609	0,536317	0,543039
Ghana	0,885647	0,876390	0,869788	0,854949	0,849345	0,829298	0,818719	0,795819	0,781757	0,765100	0,810144
Guinea	0,894168	0,888985	0,886736	0,876944	0,875843	0,865647	0,865565	0,857133	0,856613	0,851983	0,850764
Guatemala	0,931919	0,924919	0,921381	0,911136	0,907336	0,909884	0,922271	0,909693	0,920272	0,922604	0,920218
Hong Kong SAR, China	0,881838	0,895413	0,905903	0,850683	0,881473	0,900097	0,905132	0,896281	0,899077	0,892788	0,889234
Honduras	0,915555	0,918549	0,918021	0,912874	0,887549	0,866162	0,889984	0,871910	0,819530	0,789238	0,761115
Hungary	0,804983	0,797081	0,778211	0,699943	0,663189	0,655119	0,653336	0,659010	0,738203	0,764844	0,823005
Indonesia	0,803374	0,778145	0,796449	0,823948	0,839992	0,844301	0,866675	0,863506	0,871846	0,849053	0,854258
Israel	0,714330	0,739953	0,781601	0,715617	0,748823	0,780361	0,788685	0,797955	0,804915	0,822058	0,835176
Jamaica	0,725108	0,729355	0,702832	0,657850	0,625207	0,601320	0,557783	0,481301	0,519523	0,519505	0,512900
Japan	0,900742	0,898599	0,892705	0,855739	0,856343	0,864649	0,872160	0,875271	0,888170	0,889858	0,900369
Kenya	0,939875	0,935459	0,934729	0,928644	0,928172	0,918641	0,919365	0,914945	0,916382	0,912055	0,913538
Kyrgyz Republic	0,783088	0,776986	0,766123	0,751138	0,743733	0,735576	0,737334	0,723650	0,726387	0,737482	0,742571
Cambodia	0,979827	0,975127	0,987972	0,998610	0,994051	0,991629	0,996050	1,000000	0,993892	1,000000	0,991899
Korea, Rep.	0,917671	0,918867	0,916702	0,903141	0,900878	0,900741	0,908070	0,906786	0,891805	0,882532	0,877332
Kuwait	0,979742	0,968091	0,960196	0,965080	0,960682	0,938860	0,927168	0,913019	0,913619	0,933812	0,936459
Sri Lanka	0,833028	0,838661	0,856110	0,832038	0,866395	0,877624	0,885871	0,866832	0,866575	0,848870	0,856523
Morocco	0,743588	0,734712	0,725628	0,733757	0,729418	0,723342	0,719052	0,692135	0,666400	0,667888	0,662328
Madagascar	0,936856	0,923761	0,913582	0,894893	0,882428	0,945203	0,992981	0,982562	0,970806	0,949013	0,951701

Mexico	0,915808	0,906474	0,896484	0,847649	0,849885	0,843754	0,852997	0,843266	0,844216	0,856416	0,871228
North Macedonia	0,000000	0,000000	0,000000	0,000000	0,000000	0,000000	0,000000	0,000000	0,000000	0,059558	0,108539
Mali	0,713709	0,672458	0,706461	0,723486	0,761865	0,788055	0,780883	0,759717	0,787283	0,731292	0,729402
Myanmar	0,995768	0,991313	0,992081	0,992732	0,993606	0,984900	0,986746	0,987464	0,990766	0,986337	0,975582
Montenegro	0,325029	0,449792	0,498260	0,413633	0,393530	0,376883	0,360473	0,332656	0,364757	0,371781	0,338939
Mongolia	0,814660	0,803046	0,845762	0,831722	0,810249	0,856665	0,885055	0,867183	0,844616	0,836343	0,741611
Mozambique	0,933104	0,927380	0,925220	0,916951	0,914906	0,903799	0,902781	0,895511	0,894823	0,888905	0,889503
Mauritania	0,745366	0,737926	0,730878	0,708665	0,705497	0,693207	0,690487	0,669094	0,662365	0,656972	0,647278
Malaysia	0,922749	0,917999	0,912502	0,900297	0,915193	0,912009	0,913293	0,906436	0,914346	0,900846	0,887315
Namibia	0,404311	0,390230	0,371318	0,323158	0,315562	0,387701	0,465037	0,349044	0,345706	0,249515	0,122821
Niger	0,951415	0,963198	0,976843	0,988181	1,000000	1,000000	1,000000	0,999300	1,000000	0,995531	1,000000
Nigeria	0,913551	0,908299	0,906533	0,899286	0,898747	0,888828	0,890605	0,885671	0,853196	0,856489	0,748330
Nicaragua	0,866603	0,869933	0,826714	0,759038	0,769500	0,802640	0,842518	0,830450	0,854759	0,842240	0,869654
New Zealand	0,907598	0,905519	0,887696	0,823474	0,809995	0,801223	0,786269	0,795959	0,809932	0,817882	0,823581
Oman	0,887368	0,888435	0,888446	0,851789	0,858952	0,861333	0,864619	0,862735	0,877372	0,881360	0,893842
Pakistan	1,000000	1,000000	1,000000	1,000000	0,997805	0,984578	0,957038	0,911899	0,952629	0,883777	0,873915
Peru	0,896228	0,890259	0,890995	0,893661	0,907940	0,899388	0,911041	0,901989	0,911365	0,904509	0,883667
Philippines	0,902096	0,912092	0,901104	0,894988	0,903900	0,894559	0,898146	0,892885	0,888170	0,902018	0,915419
Paraguay	0,867562	0,875058	0,880257	0,844362	0,873235	0,859884	0,879179	0,861790	0,836036	0,847515	0,817630
Romania	0,811331	0,825834	0,839103	0,800152	0,797207	0,779137	0,790742	0,766860	0,771759	0,764880	0,792828
Russian Federation	0,817369	0,837735	0,826564	0,754582	0,784165	0,799775	0,835074	0,824217	0,831455	0,810337	0,805959
Senegal	0,733431	0,726257	0,718669	0,693528	0,689496	0,676658	0,704786	0,716227	0,742347	0,766895	0,761921
Singapore	0,890021	0,898599	0,893905	0,831722	0,887518	0,884965	0,891094	0,880174	0,883080	0,875572	0,862743
Chad	0,981209	0,975649	0,974684	0,970421	0,968635	0,957630	0,956908	0,952973	0,953574	0,947255	0,948130
Togo	0,897102	0,908154	0,921201	0,928549	0,942486	0,946394	0,945547	0,940857	0,940486	0,933665	0,935883
Thailand	0,981999	0,977357	0,977293	0,987328	0,998791	0,988957	0,993601	0,998214	0,998110	0,992528	0,992974
Tajikistan	0,667833	0,669968	0,671156	0,653489	0,649287	0,636285	0,632672	0,606835	0,598451	0,593128	0,581011
Turkey	0,770448	0,754749	0,721429	0,620244	0,679476	0,727012	0,746507	0,709573	0,659856	0,639464	0,603240

Tanzania	0,923342	0,927496	0,934819	0,937903	0,923591	0,898487	0,908299	0,912739	0,941795	0,937365	0,939645
Ukraine	0,824281	0,827629	0,821825	0,737549	0,760911	0,757437	0,766747	0,764269	0,682033	0,679609	0,660409
Uruguay	0,710465	0,739258	0,771942	0,772311	0,790877	0,807147	0,801939	0,789691	0,781030	0,740119	0,718344
Vietnam	0,957735	0,952861	0,958966	0,962015	0,983140	0,949839	0,957822	0,946110	0,950956	0,936559	0,939415
South Africa	0,212623	0,239402	0,339792	0,273069	0,233077	0,216484	0,205145	0,155018	0,113866	0,092964	0,000000

3. Gasoline Prices Growth Rate

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Angola	0,256243	0,395807	0,515615	0,476572	0,612293	0,451780	0,555981	0,400667	0,540928	0,731474	0,832565
Albania	0,197466	0,283838	0,391728	0,350361	0,483328	0,778274	0,842106	0,219113	0,330909	0,301627	0,440840
Armenia	0,317888	0,458790	0,579381	0,289660	0,414281	0,678913	0,762626	0,271587	0,396559	0,147627	0,240210
Australia	0,153383	0,139709	0,208785	0,880918	0,927701	0,602969	0,697664	0,151229	0,238989	0,287432	0,424072
Azerbaijan	0,169767	0,927474	0,954085	0,300816	0,427349	0,505013	0,607878	0,699999	0,804406	0,037092	0,065697
Benin	0,127715	0,600845	0,709804	0,297675	0,423687	0,721039	0,797051	0,109135	0,177579	0,238721	0,364034
Burkina Faso	0,077768	0,531463	0,648274	0,325552	0,455709	0,480537	0,584302	0,224269	0,337559	0,239549	0,365089
Bangladesh	0,284141	0,803754	0,869367	0,233213	0,345356	0,555361	0,654912	0,341761	0,477841	0,377433	0,525316
Bulgaria	0,180907	0,549919	0,665029	0,437997	0,574796	0,632803	0,723643	0,148718	0,235426	0,277931	0,412670
Bosnia and Herzegovina	0,304079	0,185817	0,270521	0,501522	0,635718	0,633422	0,724176	0,201506	0,307860	0,235593	0,360040
Belarus	0,252283	1,000000	1,000000	0,134485	0,212297	0,265397	0,354400	0,399268	0,539480	0,125204	0,207141
Brazil	0,356164	0,337670	0,453076	0,499318	0,633675	0,343772	0,443200	0,173559	0,270153	0,327595	0,470714
Brunei Darussalam	0,134236	0,451665	0,572364	0,311384	0,439568	0,612716	0,706219	0,204457	0,311760	0,412345	0,561567
Botswana	0,203589	0,461896	0,582424	0,336565	0,468069	0,878281	0,916414	0,133301	0,213272	0,213781	0,331707
Canada	0,232268	0,245387	0,345716	0,778461	0,859055	0,598649	0,693851	0,152371	0,240606	0,232984	0,356696
Switzerland	0,084389	0,360559	0,478140	0,518268	0,651093	0,648886	0,737399	0,182764	0,282728	0,353358	0,499374
Chile	0,256395	0,213215	0,305720	0,663321	0,773621	0,646357	0,735247	0,220652	0,332898	0,220456	0,340470
China	0,329338	0,758959	0,836501	0,389724	0,525545	0,771645	0,836986	0,127269	0,204475	0,342415	0,487317

Cote d'Ivoire	0,128139	0,442641	0,563405	0,506905	0,640690	0,366781	0,468117	0,194299	0,298270	0,201079	0,314803
Cameroon	0,213496	0,337670	0,453076	0,333109	0,464207	0,388334	0,491008	0,339307	0,475116	0,351064	0,496860
Congo, Rep.	0,158924	0,186269	0,271111	0,758480	0,844894	0,374870	0,476759	0,227053	0,341131	0,374760	0,522475
Colombia	0,294621	0,396994	0,516853	0,583358	0,708336	0,377634	0,479697	0,119304	0,192745	0,179484	0,285357
Czech Republic	0,215494	0,389845	0,509369	0,518639	0,651430	0,613070	0,706528	0,136014	0,217205	0,240061	0,365739
Dominican Republic	0,219820	0,347077	0,463449	0,440478	0,577256	0,832380	0,882978	0,157059	0,247217	0,289795	0,426884
Algeria	0,094606	0,398230	0,518142	0,241099	0,355277	0,375761	0,477707	0,187034	0,288509	0,527233	0,670588
Egypt, Arab Rep.	0,139702	0,951347	0,969487	0,272812	0,394207	0,413481	0,517181	0,982023	0,989720	0,030038	0,053504
Ghana	0,453038	0,382738	0,501875	0,216279	0,323717	0,636117	0,726492	0,358629	0,496362	0,382884	0,531081
Guinea	0,128575	0,619773	0,725922	0,233006	0,345094	0,984433	0,989700	0,304246	0,435268	0,171853	0,274732
Guatemala	0,184181	0,437051	0,557816	0,376053	0,511099	0,730323	0,804492	0,152061	0,240168	0,309694	0,450229
Hong Kong SAR, China	0,155339	0,486741	0,606446	0,276959	0,399187	0,639797	0,729647	0,204624	0,311981	0,412749	0,561978
Honduras	0,156149	0,239684	0,338729	0,537319	0,668253	0,732645	0,806344	0,209510	0,318404	0,339132	0,483667
Hungary	0,094606	0,315309	0,428011	0,549669	0,679195	0,611790	0,705409	0,130901	0,209781	0,279527	0,414594
Indonesia	0,561674	0,218674	0,312606	0,768467	0,852006	0,000000	0,000000	1,000000	1,000000	0,220275	0,340233
Israel	0,312571	0,271754	0,377471	0,578897	0,704535	0,593310	0,689121	0,190362	0,292992	0,354872	0,501028
Jamaica	0,265972	0,243136	0,342964	0,557399	0,685972	0,759883	0,827839	0,201750	0,308183	0,473157	0,621126
Japan	0,000000	0,631026	0,735375	0,394305	0,530334	0,790674	0,851617	0,000000	0,000000	0,297691	0,436222
Kenya	0,222821	0,406881	0,527116	0,379092	0,514331	0,525221	0,626988	0,149925	0,237140	0,312208	0,453136
Kyrgyz Republic	0,281433	0,579911	0,691652	0,341255	0,473285	0,545720	0,646055	0,284141	0,411627	0,150561	0,244456
Cambodia	0,254447	0,270514	0,375997	0,474087	0,609925	0,698836	0,779045	0,234800	0,351003	0,215344	0,333765
Korea, Rep.	0,225385	0,255454	0,357947	0,295127	0,420707	0,711265	0,789162	0,132776	0,212509	0,313892	0,455077
Kuwait	0,037746	0,425757	0,546431	0,255263	0,372853	0,488919	0,592429	0,206811	0,314861	1,000000	1,000000
Sri Lanka	0,225385	0,943273	0,964310	0,151109	0,235919	0,590350	0,686490	0,228518	0,343004	0,233501	0,357359
Morocco	0,162251	0,393266	0,512957	0,251263	0,367921	0,675370	0,759679	0,218690	0,330362	0,254394	0,383787
Madagascar	0,154051	0,674701	0,771177	0,273682	0,395254	0,465097	0,569180	0,167639	0,261983	0,343874	0,488934

Mexico	0,242101	0,337670	0,453076	0,367751	0,502215	0,563427	0,662271	0,393936	0,533940	0,247008	0,374531
North Macedonia	0,127301	0,274647	0,380901	0,555265	0,684107	0,671561	0,756503	0,125262	0,201532	0,277931	0,412670
Mali	0,127576	0,401208	0,521240	0,365863	0,500183	0,480419	0,584187	0,273568	0,398953	0,292389	0,429963
Myanmar	1,000000	0,000000	0,000000	1,000000	1,000000	0,851025	0,896693	0,315160	0,447855	0,046374	0,081530
Montenegro	0,244206	0,183662	0,267707	0,517168	0,650091	0,637934	0,728051	0,146751	0,232624	0,260889	0,391849
Mongolia	0,331588	0,888218	0,928116	0,128143	0,203147	0,684652	0,767381	0,072122	0,120493	0,250536	0,378964
Mozambique	0,268549	0,809513	0,873503	0,000000	0,000000	1,000000	1,000000	0,225815	0,339543	0,000000	0,000000
Mauritania	0,220213	0,857115	0,906952	0,106824	0,171809	0,769864	0,835606	0,294811	0,424247	0,272465	0,406043
Malaysia	0,327102	0,337670	0,453076	0,383116	0,518591	0,550293	0,650265	0,315641	0,448407	0,206913	0,322605
Namibia	0,254916	0,237432	0,335956	0,586004	0,710582	0,693885	0,774988	0,140424	0,223566	0,242711	0,369103
Niger	0,167261	0,210174	0,301865	0,356369	0,489897	0,545322	0,645687	0,219763	0,331750	0,331171	0,474750
Nigeria	0,268978	0,489664	0,609235	0,079779	0,130720	0,982700	0,988547	0,165455	0,258952	0,343197	0,488184
Nicaragua	0,075374	0,626913	0,731931	0,498415	0,632835	0,643950	0,733195	0,209005	0,317742	0,300312	0,439299
New Zealand	0,251541	0,446431	0,567177	0,577459	0,703307	0,735250	0,808419	0,214244	0,324589	0,340879	0,485611
Oman	0,094606	0,337670	0,453076	0,289660	0,414281	0,488919	0,592429	0,240548	0,358263	0,881101	0,931164
Pakistan	0,407513	0,174576	0,255767	0,309315	0,437188	0,881903	0,919006	0,104414	0,170464	0,359412	0,505972
Peru	0,150495	0,496516	0,615741	0,283846	0,407401	0,677249	0,761243	0,159620	0,250810	0,220841	0,340972
Philippines	0,339817	0,528913	0,645937	0,416665	0,553361	0,718828	0,795272	0,116394	0,188427	0,341165	0,485928
Paraguay	0,382485	0,537456	0,653747	0,367274	0,501703	0,922692	0,947740	0,173655	0,270285	0,200361	0,313838
Romania	0,271335	0,222317	0,317178	0,549962	0,679453	0,687334	0,769596	0,190339	0,292962	0,264781	0,396646
Russian Federation	0,312571	0,488677	0,608294	0,243282	0,358006	0,704459	0,783634	0,099464	0,162952	0,263787	0,395423
Senegal	0,208563	0,367256	0,485364	0,424191	0,560982	0,604240	0,698783	0,231525	0,346841	0,214445	0,332581
Singapore	0,116282	0,495653	0,614924	0,559693	0,687973	0,709923	0,788075	0,194360	0,298352	0,317343	0,459041
Chad	0,168433	0,330273	0,444849	0,302360	0,429144	0,150588	0,212211	0,199708	0,305476	0,381811	0,529948
Togo	0,219820	0,205966	0,296510	0,558653	0,687066	0,468462	0,572492	0,300752	0,431201	0,126879	0,209650
Thailand	0,263353	0,572990	0,685573	0,802058	0,875441	0,617326	0,710242	0,106247	0,173231	0,111845	0,186909
Tajikistan	0,210261	0,616247	0,722940	0,281645	0,404783	0,997761	0,998525	0,170979	0,266601	0,101168	0,170441
Turkey	0,267928	0,332516	0,447350	0,576609	0,702579	0,498499	0,601650	0,093910	0,154460	0,230434	0,353416

Tanzania	0,167630	0,402888	0,522984	0,371469	0,506205	0,577962	0,675411	0,228701	0,343239	0,217714	0,336879
Ukraine	0,344625	0,421407	0,542012	0,411613	0,548210	0,895243	0,928495	0,137087	0,218755	0,247574	0,375244
Uruguay	0,150021	0,298281	0,408528	0,506536	0,640351	0,877758	0,916040	0,173587	0,270192	0,353358	0,499374
Vietnam	0,310676	0,525678	0,642963	0,372213	0,507001	0,859255	0,902689	0,166326	0,260162	0,298643	0,437340
South Africa	0,126119	0,360469	0,478043	0,593303	0,716746	0,681637	0,764885	0,133713	0,213870	0,301953	0,441221

4. Exchange Growth Rate

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Angola	0,054894	0,558201	0,397320	0,264766	0,803207	0,208350	0,000553	0,143209	0,108009	0,272898	0,684535
Albania	0,170881	0,427119	0,250992	0,395230	0,635883	0,145646	0,001032	0,077446	0,069419	0,240856	0,127921
Armenia	0,029707	0,027803	0,154358	0,491424	0,464577	0,177592	0,001086	0,159658	0,102072	0,187642	0,157140
Australia	0,232164	0,339504	0,453558	0,296587	0,000000	0,046146	0,000381	0,261336	0,207917	0,247571	0,164855
Azerbaijan	0,099073	0,582395	0,337177	0,127205	0,386489	0,161655	0,000369	0,119385	0,072357	0,373071	0,971057
Benin	0,187302	0,404711	0,262793	0,259941	0,525881	0,123256	0,001128	0,059440	0,072278	0,244627	0,152688
Burkina Faso	0,187302	0,404711	0,262793	0,259941	0,525881	0,123256	0,001128	0,059440	0,072278	0,244627	0,152688
Bangladesh	0,342849	0,737600	0,448933	0,176227	0,413188	0,260358	0,001304	0,033905	0,061572	0,016452	0,159070
Bulgaria	0,186765	0,405966	0,273959	0,255697	0,521095	0,122736	0,001117	0,060920	0,073623	0,244029	0,152255
Bosnia and Herzegovina	0,188239	0,406303	0,270149	0,259899	0,517557	0,123645	0,001115	0,060075	0,074271	0,243316	0,153098
Belarus	0,196678	0,743829	0,447497	0,700596	0,563144	1,000000	0,006203	0,247182	0,360906	0,669649	0,516678
Brazil	0,000000	0,320018	0,291787	0,322443	0,077194	0,121394	0,001848	0,321681	0,246610	0,500070	0,222067
Brunei Darussalam	0,117632	0,534385	0,287470	0,211018	0,227074	0,086785	0,000356	0,124541	0,096975	0,112235	0,156114
Botswana	0,473534	0,953691	0,785415	0,248820	0,258536	0,189404	0,001418	0,312673	0,203623	0,163318	0,261600
Canada	0,082441	0,527739	0,441788	0,286598	0,135881	0,132938	0,000501	0,181209	0,210679	0,197638	0,203199
Switzerland	0,218360	0,569890	0,177158	0,173158	0,281862	0,000000	0,000892	0,100008	0,050747	0,071334	0,184466
Chile	0,103483	0,681903	0,460566	0,293094	0,155081	0,117749	0,000463	0,156824	0,361340	0,185073	0,200675
China	0,153041	0,556893	0,209334	0,135632	0,366844	0,125668	0,000215	0,086624	0,056753	0,027949	0,247928

Cote d'Ivoire	0,187302	0,404711	0,262793	0,259941	0,525881	0,123256	0,001128	0,059440	0,072278	0,244627	0,152688
Cameroon	0,187302	0,404711	0,262793	0,259941	0,525881	0,123256	0,001128	0,059440	0,072278	0,244627	0,152688
Congo, Rep.	0,187302	0,404711	0,262793	0,259941	0,525881	0,123256	0,001128	0,059440	0,072278	0,244627	0,152688
Colombia	0,238402	0,260413	0,306230	0,333762	0,076707	0,148937	0,000175	0,198904	0,208280	0,447924	0,317098
Czech Republic	0,095477	0,332297	0,000000	0,368279	0,394979	0,091692	0,001324	0,121406	0,188259	0,230095	0,139693
Dominican Republic	0,396845	0,725556	0,579300	0,237824	0,451678	0,223391	0,000690	0,242907	0,152757	0,052326	0,182561
Algeria	0,188404	0,555765	0,263413	0,382615	0,452507	0,157604	0,000953	0,167463	0,101858	0,306231	0,277348
Egypt, Arab Rep.	0,189735	0,672607	0,356119	0,200971	0,426524	0,248930	0,000591	0,380255	0,130251	0,114083	0,596619
Ghana	0,226012	0,817770	0,832780	0,749048	0,436548	0,258810	0,002127	0,286737	0,952010	0,344953	0,226673
Guinea	1,000000	0,000000	0,739736	0,240531	0,892072	0,380191	0,000835	0,100658	0,102099	0,091086	0,441170
Guatemala	0,197055	0,778289	0,417758	0,303672	0,357034	0,140097	0,000466	0,127773	0,042647	0,000000	0,138643
Hong Kong SAR, China	0,202602	0,758341	0,455161	0,157180	0,396015	0,183715	0,000383	0,121981	0,072356	0,011455	0,151209
Honduras	0,211384	0,740973	0,461913	0,164233	0,390162	0,182808	0,000678	0,205923	0,132055	0,065655	0,208991
Hungary	0,309245	0,230648	0,278706	0,471057	0,462293	0,140915	0,001438	0,110064	0,148609	0,248793	0,160775
Indonesia	0,096713	0,732973	0,637657	0,289167	0,064330	0,138384	0,001015	0,341907	0,328266	0,163339	0,140284
Israel	0,191268	0,427921	0,093336	0,332240	0,262063	0,128836	0,001078	0,000000	0,055519	0,113652	0,131664
Jamaica	0,312047	0,951417	0,610010	0,527571	0,369474	0,163134	0,000698	0,374094	0,272578	0,075984	0,251621
Japan	0,311215	0,791160	0,105973	0,000000	0,228954	0,070437	0,000411	0,550561	0,235652	0,179924	0,000000
Kenya	0,116928	0,474798	0,540703	0,370948	0,453563	0,329047	0,000000	0,158277	0,112588	0,149415	0,199141
Kyrgyz Republic	0,164619	0,457579	0,402926	0,466575	0,575974	0,186157	0,000573	0,180646	0,277784	0,249424	0,273899
Cambodia	0,210014	0,694962	0,459153	0,201635	0,418850	0,144484	0,000359	0,119346	0,077671	0,020648	0,145931
Korea, Rep.	0,074581	0,633712	1,000000	0,441539	0,143571	0,130910	0,000554	0,068190	0,000000	0,099410	0,187368
Kuwait	0,192926	0,658566	0,303543	0,287904	0,379491	0,136089	0,000536	0,147147	0,079388	0,079314	0,155511
Sri Lanka	0,270426	1,000000	0,400545	0,271363	0,347546	0,154382	0,001733	0,144139	0,094882	0,059623	0,254741
Morocco	0,189872	0,465845	0,304065	0,234001	0,506581	0,133888	0,000983	0,072472	0,073015	0,202367	0,155724
Madagascar	0,338870	0,238329	0,204362	0,417809	0,568272	0,143491	0,001132	0,132536	0,252125	0,265181	0,271349

Mexico	0,205193	0,751652	0,514080	0,538227	0,221004	0,160823	0,000928	0,064133	0,150387	0,238615	0,411146
North Macedonia	0,186122	0,406258	0,274959	0,257959	0,531039	0,122140	0,001122	0,062147	0,074541	0,242963	0,154380
Mali	0,187302	0,404711	0,262793	0,259941	0,525881	0,123256	0,001128	0,059440	0,072278	0,244627	0,152688
Myanmar	0,213156	0,585783	0,369977	0,208234	0,417499	0,140028	1,000000	1,000000	0,176345	0,225437	0,240834
Montenegro	0,187302	0,404711	0,262793	0,259941	0,525881	0,123256	0,001128	0,059440	0,072278	0,244627	0,152688
Mongolia	0,164131	0,709375	0,449190	0,571557	0,243886	0,098980	0,001036	0,357363	0,440035	0,110677	0,276399
Mozambique	0,400364	0,810420	0,287729	0,395749	1,000000	0,005407	0,000208	0,239238	0,151767	0,336487	1,000000
Mauritania	0,227234	0,591438	0,231912	0,341778	0,524490	0,204513	0,000885	0,148377	0,085761	0,097326	0,274988
Malaysia	0,144480	0,488787	0,374728	0,263581	0,165893	0,120297	0,000494	0,160693	0,146492	0,239821	0,240865
Namibia	0,322748	0,911282	0,952968	0,222272	0,025635	0,176346	0,001462	0,486789	0,286156	0,233633	0,358283
Niger	0,187302	0,404711	0,262793	0,259941	0,525881	0,123256	0,001128	0,059440	0,072278	0,244627	0,152688
Nigeria	0,166477	0,652324	0,293605	0,610513	0,414965	0,210357	0,000616	0,119788	0,087841	0,263923	0,616919
Nicaragua	0,301252	0,941587	0,605784	0,252062	0,520417	0,242458	0,000842	0,217990	0,167993	0,070789	0,222994
New Zealand	0,370095	0,269119	0,592878	0,383216	0,043473	0,073985	0,000200	0,098942	0,051014	0,235450	0,151834
Oman	0,204955	0,740996	0,460583	0,165031	0,390162	0,181383	0,000413	0,122084	0,072826	0,011810	0,149212
Pakistan	0,229447	0,772093	0,922415	0,444802	0,501139	0,197865	0,001113	0,291363	0,062923	0,031285	0,177901
Peru	0,192210	0,562112	0,271730	0,216928	0,228929	0,150674	0,000051	0,168903	0,169437	0,155317	0,237462
Philippines	0,073103	0,337124	0,345854	0,296978	0,249740	0,132736	0,000199	0,131969	0,160220	0,041242	0,213675
Paraguay	0,035727	0,312142	0,074714	0,405990	0,280929	0,036442	0,000878	0,070939	0,142833	0,208152	0,281096
Romania	0,135767	0,211515	0,556489	0,531987	0,500007	0,131687	0,001592	0,044418	0,084985	0,243026	0,168909
Russian Federation	0,130497	0,503438	0,378029	0,647915	0,277517	0,141740	0,000838	0,184178	0,463872	0,705188	0,297231
Senegal	0,187302	0,404711	0,262793	0,259941	0,525881	0,123256	0,001128	0,059440	0,072278	0,244627	0,152688
Singapore	0,117632	0,534385	0,283032	0,213866	0,227164	0,086663	0,000358	0,124579	0,096783	0,112145	0,156420
Chad	0,187302	0,404711	0,262793	0,259941	0,525881	0,123256	0,001128	0,059440	0,072278	0,244627	0,152688
Togo	0,187302	0,404711	0,262793	0,259941	0,525881	0,123256	0,001128	0,059440	0,072278	0,244627	0,152688
Thailand	0,092993	0,384762	0,359323	0,215896	0,192601	0,135355	0,000579	0,100023	0,181470	0,076015	0,194354
Tajikistan	0,317327	0,916232	0,450675	0,526643	0,538732	0,245880	0,000650	0,132834	0,142074	0,304592	0,549298
Turkey	0,326611	0,388468	0,457446	0,497634	0,310979	0,321269	0,001032	0,237300	0,357534	0,298259	0,311882

Tanzania	0,414731	0,718998	0,347053	0,345641	0,538763	0,323003	0,000491	0,153674	0,139158	0,253087	0,286685
Ukraine	0,176871	0,740996	0,585366	1,000000	0,438444	0,186297	0,000438	0,122558	1,000000	1,000000	0,399366
Uruguay	0,173071	0,640618	0,148905	0,299662	0,100570	0,136013	0,000855	0,138253	0,329719	0,218911	0,302167
Vietnam	0,221390	0,768807	0,496091	0,246565	0,626451	0,305865	0,000546	0,131802	0,092337	0,042464	0,165345
South Africa	0,329797	0,903218	0,961220	0,209841	0,035854	0,171357	0,001533	0,460059	0,308912	0,219004	0,374607

5. Deposit Interest Rate

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Angola	0,813530	0,705224	0,727978	0,570337	0,271224	0,639838	0,838778	0,845169	0,810644	0,827582	0,622050
Albania	0,779033	0,754195	0,716212	0,616653	0,633645	0,665423	0,757070	0,794837	0,897478	0,923403	0,932131
Armenia	0,750127	0,727633	0,723979	0,510039	0,488836	0,471810	0,571148	0,498711	0,439208	0,287279	0,222642
Australia	0,834302	0,804620	0,808580	0,826042	0,759720	0,752573	0,824735	0,839987	0,844176	0,877977	0,845897
Azerbaijan	0,525046	0,491006	0,475197	0,309175	0,335049	0,378836	0,542171	0,511976	0,506730	0,544117	0,478073
Benin	0,655952	0,658058	0,657467	0,514221	0,521060	0,514532	0,641880	0,622479	0,609745	0,643864	0,531221
Burkina Faso	0,655952	0,658058	0,657467	0,514221	0,521060	0,514532	0,641880	0,622479	0,609745	0,643864	0,531221
Bangladesh	0,743091	0,694652	0,683140	0,557592	0,588289	0,495283	0,542134	0,421598	0,472900	0,581730	0,578970
Bulgaria	0,876524	0,842429	0,821044	0,650383	0,767520	0,807989	0,862083	0,881308	0,911388	0,962276	0,975382
Bosnia and Herzegovina	0,851817	0,848057	0,863705	0,796513	0,819945	0,840719	0,857903	0,852029	0,857226	0,890171	0,882678
Belarus	0,662515	0,635968	0,639647	0,394926	0,480751	0,239661	0,000000	0,000000	0,000000	0,000000	0,023573
Brazil	0,366035	0,534714	0,500485	0,474554	0,493400	0,372077	0,645695	0,614926	0,460860	0,363370	0,168033
Brunei Darussalam	0,977630	0,954406	0,979702	0,960932	0,973668	0,977947	0,990061	0,986451	0,984386	0,976144	0,964859
Botswana	0,606155	0,622120	0,633058	0,577132	0,680510	0,706247	0,838601	0,846918	0,864086	0,868096	0,847124
Canada	0,940458	0,913770	0,951951	0,995181	0,989137	0,973413	0,978765	0,973331	0,970926	0,989153	0,980209
Switzerland	0,759246	1,000000	0,938354	0,995417	0,996474	0,997379	0,998729	0,998848	0,998968	1,000000	1,000000
Chile	0,784797	0,756376	0,685695	0,884526	0,900447	0,698294	0,740771	0,745220	0,789531	0,812923	0,735804
China	0,907484	0,821987	0,918609	0,873051	0,843339	0,800457	0,865859	0,852334	0,852477	0,918083	0,888109

Cote d'Ivoire	0,655952	0,658058	0,657467	0,514221	0,521060	0,514532	0,641880	0,622479	0,609745	0,643864	0,531221
Cameroon	0,821453	0,817078	0,851925	0,816356	0,814751	0,814751	0,854643	0,842045	0,860553	0,870704	0,825613
Congo, Rep.	0,821453	0,817078	0,851925	0,816356	0,814751	0,814751	0,854643	0,842045	0,860553	0,870704	0,825613
Colombia	0,729322	0,649107	0,585585	0,652181	0,791203	0,756782	0,760169	0,794550	0,780362	0,764512	0,540534
Czech Republic	0,970781	0,947670	0,946970	0,928894	0,938732	0,941209	0,954495	0,957945	0,962769	0,966494	0,962242
Dominican Republic	0,560708	0,696065	0,558626	0,557687	0,722937	0,550362	0,664237	0,703192	0,638370	0,665683	0,514391
Algeria	0,944016	0,928645	0,940837	0,901398	0,900515	0,900515	0,921938	0,914067	0,906317	0,905615	0,871663
Egypt, Arab Rep.	0,741589	0,734519	0,725966	0,632571	0,644178	0,615113	0,657619	0,621039	0,628141	0,648352	0,469821
Ghana	0,605484	0,609750	0,516949	0,033166	0,264246	0,491233	0,549574	0,390567	0,305770	0,327626	0,120607
Guinea	0,196774	0,225774	0,240655	0,008457	0,000000	0,000000	0,249738	0,228920	0,293813	0,659015	0,734061
Guatemala	0,813387	0,794170	0,792835	0,684447	0,688822	0,700734	0,762973	0,731254	0,705626	0,720294	0,626610
Hong Kong SAR, China	0,898944	0,898596	0,998703	1,000000	1,000000	1,000000	1,000000	1,000000	1,000000	0,992394	0,986130
Honduras	0,584312	0,659397	0,596710	0,387367	0,439469	0,532752	0,599600	0,425265	0,417839	0,509102	0,418121
Hungary	0,740815	0,684075	0,660482	0,539151	0,718902	0,686672	0,718980	0,814269	0,904839	0,937409	0,948569
Indonesia	0,485668	0,650807	0,641092	0,474582	0,599390	0,604298	0,733662	0,691127	0,529298	0,577116	0,515373
Israel	0,822581	0,850712	0,872021	0,939715	0,911700	0,856444	0,901601	0,929797	0,957591	0,970095	0,954956
Jamaica	0,587881	0,610159	0,613045	0,452174	0,632245	0,755914	0,832166	0,817975	0,757045	0,798654	0,752865
Japan	0,994651	0,970676	0,992461	0,975957	0,971979	0,974180	0,979004	0,973718	0,978181	0,972632	0,967025
Kenya	0,783243	0,776368	0,782923	0,662316	0,740002	0,678756	0,481286	0,573705	0,549710	0,534611	0,415199
Kyrgyz Republic	0,937901	0,910674	0,909614	0,841158	0,888325	0,874753	0,896548	0,885304	0,866454	0,870286	0,827488
Cambodia	0,939667	0,921742	0,933937	0,906312	0,928268	0,924069	0,940610	0,934148	0,924152	0,922134	0,892254
Korea, Rep.	0,813387	0,775836	0,757641	0,803175	0,780065	0,763150	0,834418	0,857725	0,864008	0,902664	0,884327
Kuwait	0,793407	0,763676	0,804994	0,840137	0,866968	0,876999	0,908847	0,900699	0,891552	0,898184	0,879924
Sri Lanka	0,704345	0,601531	0,534546	0,399036	0,606108	0,632743	0,611652	0,495226	0,596868	0,694319	0,520037
Morocco	0,853082	0,842999	0,844626	0,784655	0,789356	0,785782	0,828436	0,807186	0,790964	0,803292	0,759004
Madagascar	0,087653	0,270401	0,429593	0,355003	0,412140	0,391652	0,533872	0,499424	0,410759	0,261419	0,000000

Mexico	0,870636	0,863713	0,883377	0,886611	0,931246	0,945921	0,951922	0,934727	0,955312	0,963509	0,902089
North Macedonia	0,803403	0,782279	0,743660	0,559944	0,573649	0,652612	0,768541	0,781132	0,800723	0,848246	0,822118
Mali	0,655952	0,658058	0,657467	0,514221	0,521060	0,514532	0,641880	0,622479	0,609745	0,643864	0,531221
Myanmar	0,487368	0,471221	0,485163	0,320278	0,314465	0,352582	0,641543	0,605400	0,569813	0,593907	0,460501
Montenegro	0,787021	0,785245	0,848710	0,784513	0,789049	0,821490	0,854079	0,856694	0,885354	0,920174	0,752928
Mongolia	0,409955	0,406103	0,512207	0,247588	0,322528	0,401703	0,494671	0,405596	0,337493	0,345601	0,113700
Mozambique	0,535096	0,477891	0,530296	0,460711	0,446859	0,258275	0,487552	0,566132	0,538692	0,567380	0,279500
Mauritania	0,647491	0,649728	0,662987	0,547057	0,543168	0,543168	0,820184	0,835520	0,759916	0,760654	0,635888
Malaysia	0,877634	0,865461	0,879673	0,882595	0,857490	0,834143	0,866719	0,853815	0,836426	0,836566	0,787586
Namibia	0,728225	0,669959	0,645908	0,646745	0,714885	0,755718	0,811631	0,804058	0,771805	0,757824	0,615322
Niger	0,655952	0,658058	0,657467	0,514221	0,521060	0,514532	0,641880	0,622479	0,609745	0,643864	0,531221
Nigeria	0,564385	0,547607	0,491053	0,265945	0,627740	0,675100	0,623374	0,608116	0,497802	0,536636	0,493710
Nicaragua	0,796215	0,735625	0,726444	0,659992	0,829541	0,894973	0,955772	0,950588	0,944127	0,940661	0,914274
New Zealand	0,698963	0,659368	0,682928	0,771579	0,738522	0,756315	0,816146	0,811490	0,784548	0,806824	0,774190
Oman	0,847341	0,820094	0,845445	0,749546	0,785468	0,828364	0,879849	0,874269	0,881981	0,898184	0,818552
Pakistan	0,829004	0,769848	0,711073	0,508457	0,534877	0,530255	0,642478	0,646308	0,609386	0,695025	0,668768
Peru	0,799647	0,787067	0,776484	0,753740	0,878766	0,790951	0,826472	0,826266	0,794795	0,787855	0,663488
Philippines	0,775867	0,841802	0,819049	0,845214	0,816486	0,806866	0,858864	0,918421	0,934377	0,913495	0,881783
Paraguay	0,708220	0,783497	0,881821	0,918076	0,931246	0,770440	0,824772	0,791094	0,768665	0,817713	0,739707
Romania	0,800814	0,707743	0,595710	0,321034	0,582428	0,640509	0,753477	0,775743	0,837940	0,898716	0,913546
Russian Federation	0,833709	0,777286	0,762642	0,513985	0,657042	0,746617	0,752206	0,724339	0,675251	0,534267	0,528315
Senegal	0,655952	0,658058	0,657467	0,514221	0,521060	0,514532	0,641880	0,622479	0,609745	0,643864	0,531221
Singapore	1,000000	0,983127	1,000000	0,984031	0,988803	0,990947	0,994355	0,993580	0,992776	0,984581	0,974289
Chad	0,821453	0,817078	0,851925	0,816356	0,814751	0,814751	0,854643	0,842045	0,860553	0,870704	0,825613
Togo	0,655952	0,658058	0,657467	0,514221	0,521060	0,514532	0,641880	0,622479	0,609745	0,643864	0,531221
Thailand	0,821197	0,879967	0,905894	0,942676	0,931980	0,860031	0,883798	0,880333	0,906151	0,921404	0,901244
Tajikistan	0,575474	0,516122	0,602070	0,570833	0,506138	0,529631	0,656140	0,675587	0,704979	0,782119	0,754340
Turkey	0,000000	0,000000	0,000000	0,000000	0,127549	0,187726	0,266861	0,221994	0,097900	0,248951	0,025656

Tanzania	0,707910	0,619403	0,651755	0,548655	0,621869	0,613059	0,572227	0,508204	0,469925	0,499321	0,296339
Ukraine	0,667949	0,644361	0,576351	0,220446	0,397044	0,548979	0,418969	0,468235	0,349053	0,344018	0,231187
Uruguay	0,940159	0,901370	0,874986	0,751124	0,762390	0,740158	0,800815	0,770947	0,736824	0,713488	0,620637
Vietnam	0,665046	0,672376	0,452691	0,552159	0,360563	0,200486	0,529221	0,647872	0,690551	0,756120	0,655556
South Africa	0,688372	0,598296	0,502390	0,516630	0,630932	0,676244	0,756543	0,746028	0,688218	0,686006	0,514994

Appendix B – Vulnerability Scores of All Sample Countries

