Import Dynamics in Turkish Republic Of Northern Cyprus

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ABSTRACT

This thesis attempts to investigate the import dynamics for Turkish Republic of Northern Cyprus (TRNC) by using the ARDL approach to cointegration for the period 1977 to 2018. More specifically, this study aims to analyse the impact of real domestic income, real exchange rate and external macroeconomic instability on imports of TRNC. The results indicate a long-run cointegration relationship among the three variables. The findings of this study suggest that while domestic income positively affects imports of TRNC, the external macroeconomic instability affects imports negatively. However, real exchange rate has no effect on imports. Our results implies that the special relationship between TRNC and Turkey and the use of common currency unfavourably affects the import dynamics of TRNC. Also, the results reveal that the income is the main domestic indicator that affects TRNC's imports.

Keywords: TRNC, cointegration, ARDL, Imports, Instability

ÖZ

Bu çalışma, 1977-2018 dönemi için ARDL eşbütünleşme yaklaşımını kullanarak Kuzey Kıbrıs Türk Cumhuriyeti'nin (KKTC) ithalat dinamiklerini araştırmaya çalışmaktadır. Daha spesifik olarak, çalışma, reel yurt içi gelir, reel döviz kuru ve dış makroekonomik istikrarsızlığın KKTC'deki ithalata etkisini analiz etme hedefindedir. Sonuçlar, üç değişken arasında uzun dönemli bir eş bütünleşme ilişkisini göstermektedir. Bu çalışmanın bulguları, yurtiçi gelirin KKTC ithalatını olumlu etkilediğini, dış makroekonomik istikrarsızlığın ise ithalatı olumsuz etkilediğini göstermektedir. Ancak, reel döviz kurunun ithalata etkisi yoktur. Sonuçlarımız, KKTC ile Türkiye arasındaki özel ilişkinin ve ortak para birimi kullanımının KKTC'nin ithalat dinamiklerini olumsuz etkilediğini göstermektedir. Ayrıca, sonuçlar bize gelirin KKTC'nin ithalatını etkileyen temel yurtiçi gösterge olduğunu ortaya koymaktadır.

Anahtar Kelimeler: KKTC, eşbütünleşme, ARDL, İthalat, İstikrarsızlık

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Chapter 1

INTRODUCTION

1.1 General Background

International trade can have a significant impact on the growth performance of the countries. This role is greater in the case of small countries than in the case of highly populated countries. The reason of that is, they don't have many sectors that produce their own products. Instead, they import most of the products from foreign countries. International trade has many advantages. The most important one is that countries can reach a wide variety of goods and services. Also, it makes countries to specialize on different products due to comparative advantage which means goods and services are produced at lower comparative costs that benefit all countries trading with each other. On the other hand, there are disadvantages of international trade as well. The high dependence on trade makes the country vulnerable economically (e.g. via external shocks), as well as politically. In the case of small economies, highly limited labour and capital means less production of goods and services which, in turn, results in high dependence on imports from other countries. As there are limited resources and domestic production, exports are dependent on imports as well. Moreover, excessive economic dependence brings high political dependence on some countries.

This study attempts to investigate the relationship between imports, domestic income (real Gross Domestic Product (GDP)) and Real Exchange Rates (RER) in the Turkish Republic of Northern Cyprus (TRNC), which is struggling with international trade due

to political and economic constraints. TRNC is an island country with a small open economy (with a narrow production base) that makes it highly dependent on imports. Also, TRNC cannot export to the European Union countries because of the embargo imposed by European Union, (European Court of Justice) in 1994, after the declaration of independence of TRNC in 1983. Moreover, transportation and related costs are very high because TRNC is only recognized by Turkey and exporting firms have to export to Turkey first then to other countries which makes TRNC goods and services much less competitive in the world market. TRNC like many other small countries is based on a few sectors for development such as tourism and higher education. TRNC is using Turkish Lira (TL) as the domestic official currency but TRNC authorities cannot use independent monetary policy to control TRNC economy. Furthermore, Turkish Cypriots are suffering from highly volatile exchange rates in some other ways too. The prices in TRNC are based on mainly Great Britain Pound (GBP) such as house prices and car prices etc. Also, since imported goods are generally paid in foreign currencies; consequently, exchange rate affects value of imported goods directly and hence a dramatic change in exchange rate of Turkish Lira makes the life harder for Turkish Cypriots.

1.2 Research Questions

This thesis attempts to investigate the import dynamics for Turkish Republic of Northern Cyprus (TRNC) by using the ARDL approach to cointegration for the period 1977 to 2018. The following questions are the research questions that were raised:

What effect does a change in the Gross Domestic Product (GDP) have on the imports of the TRNC?

What impact does external instability have on the imports of a dependent country?

To what extent is the abrupt movement in the real exchange rates affect TRNC imports?

This study will use econometric techniques such as Augmented Dickey Fuller (ADF) unit root test and Autoregressive Distributed Lag (ARDL) approach for cointegration, developed by Pesaran et al. (2001). The most important advantage of the ARDL framework is that it has better small sample properties than the popular methods like Johansen Cointegration and Engle-Granger Cointegration approaches. Pesaran and Shin (1995) have shown that ARDL-based estimates of the long-run and short-run coefficients are consistent in small sized data. Moreover, ARDL bounds testing approach is the most useful technique to evaluate long-run relationship between economic variables which allows mixed order of integration.

This thesis comprises from five chapters; Chapter 2 provides an overview of TRNC's economy to understand the dynamics of the country to efficiently discuss the empirical results. Chapter 3 reviews the related literature. Chapter 4 provides the empirical model, the methodology and the empirical results used in this thesis. Chapter 5 summarizes the study's final findings and gives suggestions in this context.

Chapter 2

AN OVERVIEW OF TRNC ECONOMY

TRNC is a small island country with peculiar attributes. It has a small domestic market, minimal natural and human resources, and a service-based economic structure. These are all typical attributes of the small island economy. TRNC has a gross domestic product (GDP) of 18 billion 334 million Turkish Lira (TL) with a 13,277 dollars per capita income in 2018 (SPO, 2020). Accessing foreign markets and increasing foreign demand is the most crucial way for TRNC to achieve its economic development.

As shown in Figure 1, the TRNC economy does not have a stable growth. As we shall explain below, this is mainly due to the imported external instability. Consequently, deep fluctuations in the micro-scaled TRNC economy causes a constant hit on businesses and households thus reduce predictability.

Figure 1: GDP growth rate (2001-2018, %)
Source: TRNC State Planning Organisation

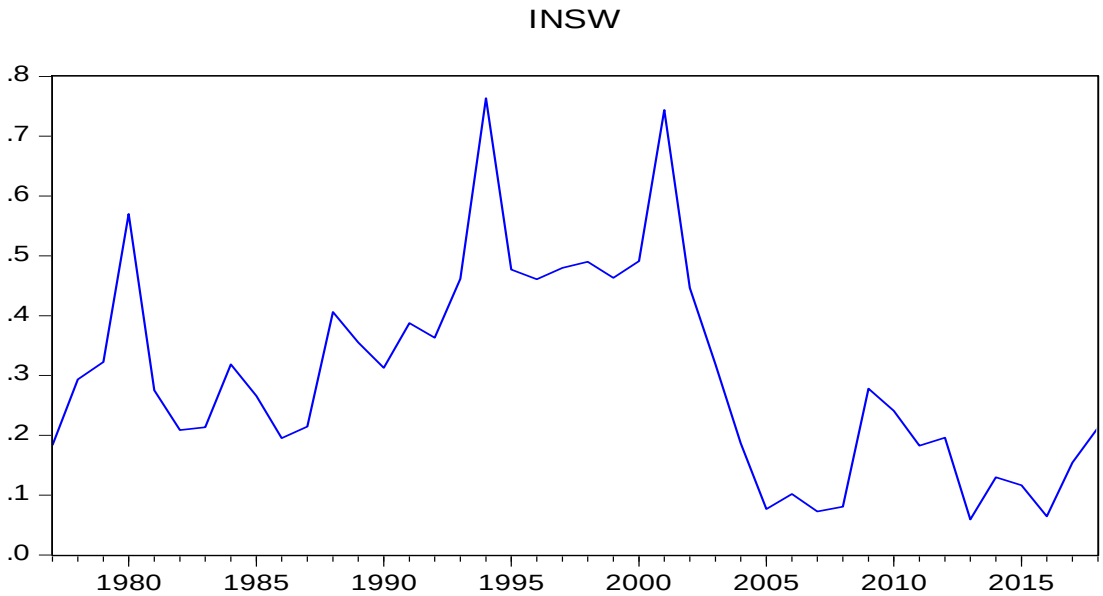

Figure 2: Turkey's Macroeconomic Instability Index (INSW)
Source: Ismihan (2009) and Ismihan et al. (2016)

Macroeconomic stability is an important factor in the development processes of countries. In this context, price and exchange rate stability, fiscal sustainability and hence interest rate predictability have a great importance. For that reason, policy makers try to ensure that the indicators are at stable and controllable levels with the

policies they develop and the different policies they use. Unfortunately, due to the use of Turkish Lira (TL) as the official currency in TRNC, the changes and developments in the Turkish economy can directly affect the TRNC economy. When a comparison between the growth rate (Figure 1) and macroeconomic instability index of Turkey (Figure 2) is made, a clear pattern can be observed. That is, a rise in macroeconomic instability index (INSW) decreases the economic growth rate in TRNC. In years, 2001, 2008, 2009 and 2018 this effect is very visible. Therefore, TRNC imports macroeconomic instability from Turkey.

The imported macroeconomic instability from Turkey causes many problems to households and businesses in TRNC. For instance, besides the price increases arising from depreciation of TL, it also occurs as a results of additional costs created by TRNC economy due to its own structural problems.

The economy of TRNC is largely dependent on foreign markets as a small island. Because of the limited production, it is required to import goods to meet the needs of the society. As a result of the problems related to the embargo imposed by European Court of Justice (see Chapter 1), there is a further dependence of the Northern Cyprus economy on the aid from Turkey. Furthermore, the geographical proximity, the ethnic and cultural relations with Turkey and the political conditions make the Turkish economy essential for the TRNC economy. The country is also close to Europe geographically and have 26 commercial relations. The development and growth of the TRNC economy is necessary for accessing to new foreign markets, thus, it will be necessary to increase the competitiveness of business in the age of high globalization.

Another dependency of TRNC that can affect imports is the exchange rate fluctuations in Turkish Lira which is a result of using Turkish Lira as local currency. A volatile exchange rate with low predictability makes it a very important factor for TRNC economy. Nowadays, it is even more important where it is increasing dramatically, which makes it to be seriously considered. Financial systems positioned as the most important factor in the world exchange market and plays a huge role in economic development. There are five key functions of a financial system which are, (i) producing information for possible investments and allocate capital; (ii) monitoring investments and applying corporate governance after providing finance; (iii) easing the trading, diversification, and management of risk; (iv) organizing and pooling savings; and (v) simplifying the exchange of goods and services (imports and exports) (World Bank, 2016). Foreign exchange rate policies can be counted among the most important macroeconomic indicators and for that reason, they affect the investment decisions of businesses. Such that, importers are very hesitant or very decisive to risk and therefore can react differently to the fluctuations in exchange rates. If imports are affected by foreign exchange rates, the success of the policies will also be affected, in terms of a reduction in trade deficit.

The distribution of imports and exports by countries in TRNC are shown in Figure 3 and Figure 4 by using yearly data from State Planning Organisation (SPO). As is clear from these figures, TRNC's trade has shifted significantly from foreign countries to Turkey after the 1990s. The main reason for this change is the decision of the European Court of Justice regarding the importation of TRNC origin products to the EU market in 1994. With the decision, the third country status started to be applied for the TRNC origin products to enter the EU market. However, due to the trade agreement signed

between the Republic of Cyprus and the European Economic Community (EEC) in 1972, products originated from Cyprus could enter the EU markets with a "preferential tariff" until 1994. Because of this advantage in trade with EU, export goods mostly consisting of agricultural and ready-made garments were easily exported to EU countries. With these decisions, additional tariffs and certification conditions on entry to EU market made it difficult to access this market and trade shifted towards the Turkish market over years. TRNC foreign trade structure, which has deviated in the 1990s, has not only changed the destination, but also changed the structure of export products.

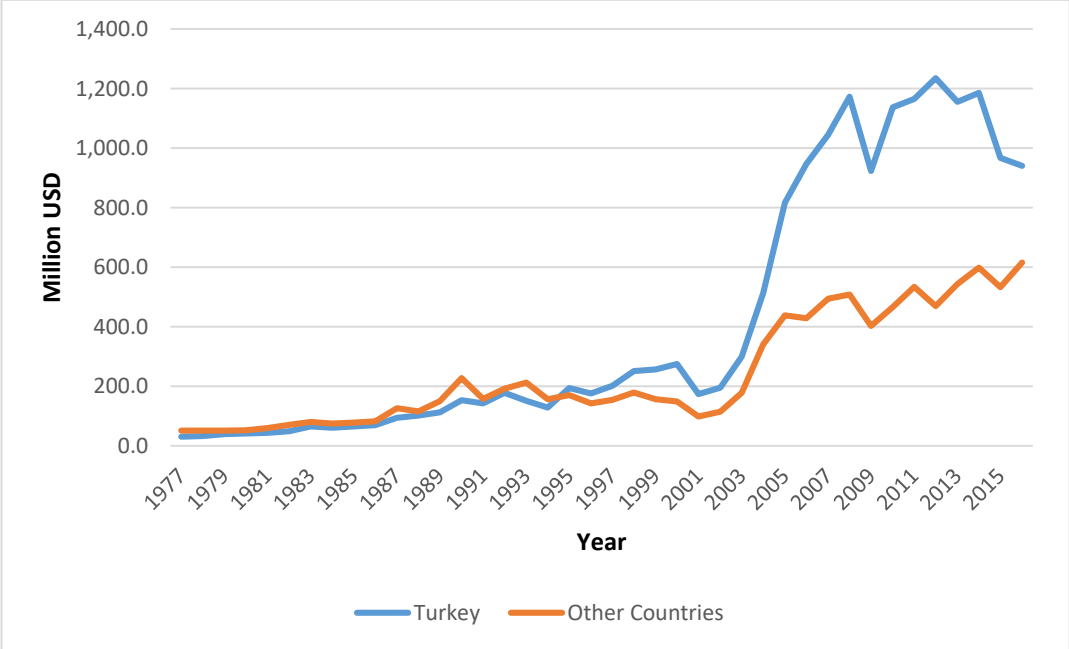

Figure 3: Imports by Countries

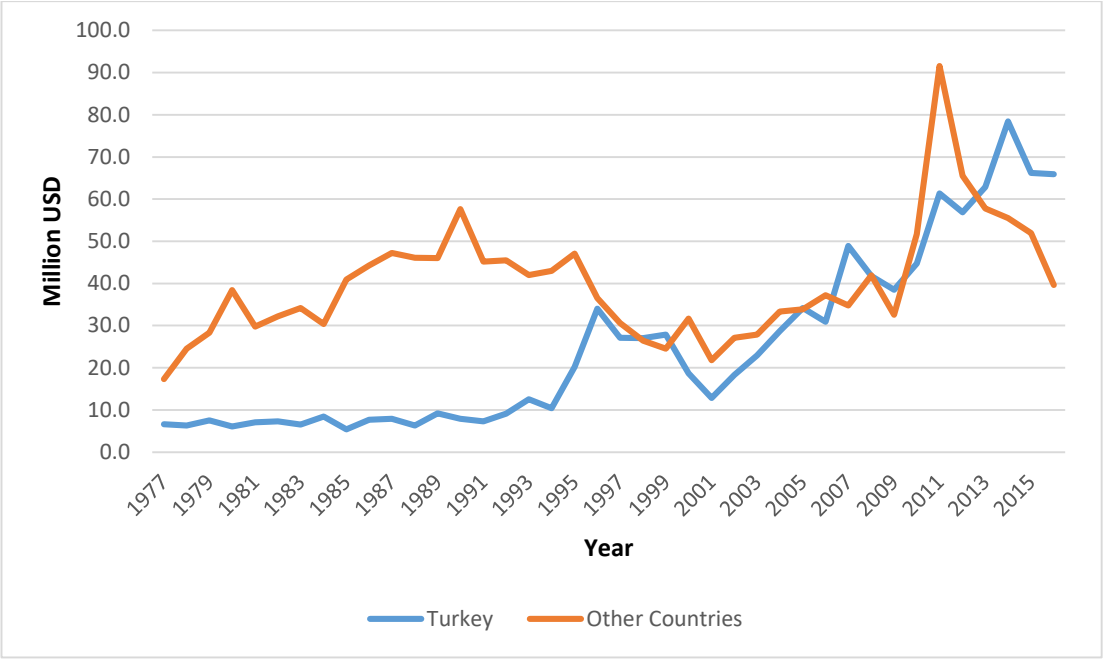

Figure 4: Exports by Countries

Chapter 3

LITERATURE REVIEW

This chapter initially provides the main theoretical framework of the model used in this study and, then, it presents a condensed overview of the related empirical literature.

3.1 Theoretical Review

3.1.1 Economic Theory

The Mundell-Fleming model distinguishes itself from its predecessor, the traditional closed-economy IS-LM model, by including open-economy elements such as import and export of goods and services (items in the current account), saving and investment flows (items in the capital account), and exchange rates in the IS and BP equations. The model is developed by Robert Mundell and Marcus Fleming as it extends the IS-LM model to an open economy. The IS, LM, and BP curves make up the Mundell-Fleming model, which is found in most intermediate macroeconomics textbooks (see Dornbusch, Fischer and Startz (2010) for more detail).

The simple import function expressed as $IM = M_0 + mY$, where m is the marginal propensity to import, is defined as the amount that imports (IM) rise or decrease with each unit change in income (Y). However, in the open-economy IS-LM model, the imports are a function of national income and the exchange rates (e);

$$IM = f(e, Y)$$

If e rises which is a depreciation, imports will be more expensive and exports will be more competitive that will lead to an increase in the net balance of the current account. Also, if Y increases, imports will also increase and the net balance of the current account falls. The idea behind marginal propensity to import is that a rising income for businesses and households drives greater demand for goods from foreign countries or vice versa.

According to Dornbusch, Fischer and Startz (2010), in an open economy, a portion of domestic output is sold to foreigners (exports), and a portion of domestic expenditure is spent on foreign goods (imports). Net exports, or the difference between exports and imports, are influenced by domestic income, which influences import expenditure. An increase in real depreciation (R) improves trade balances, as demand shifts from products produced abroad to those produced at home:

$$NX = X(Yf, R) - \mathbf{IM(Y, R)} = NX(Y, Yf, R)$$

Two important results can be stated;

- A real depreciation in the home country enhances the trade balance and, as a result, aggregate demand
- As household income rises, so does import spending

According to this theoretical framework, domestic income and exchange rates are the two main determinants of imports. More specifically,the following linear model can be specified;

$$IM = \beta_0 + \beta_1 Y + \beta_2 R$$

where IM represents imports, Y is the domestic income and R is the real exchange rate.

3.2 Empirical Review

This sub-section provides a condensed overview of the related literature.

3.2.1 Import Function for Developing Countries

Narayan and Narayan (2005) studied an import demand function of a small island country Fiji during 1972 to 1999 period. They employ the bounds test approach for cointegration developed by Pesaran et al. (2001) within an ARDL framework by emphasizing that this approach is better with small sample properties than Johansen and Engel & Granger cointegration approaches. They found that with the dependent variable of import volume there is cointegration in the import demand model. Overall, they discovered that domestic income has a favourable impact on import volumes, whereas an increase in relative prices reduces imports in the long-run.

Hye and Siddiqui (2010) estimated an import demand function for Bangladesh with ARDL approach to find the long run relationship between variables. An Augmented Dickey Fuller and Phillips Perron unit tests are done and they found that the variables are integrated order one [I(1)] and the ARDL Bounds test rejected the null hypothesis of no-cointegration. As a result, the long-run relationship between imports, national income and relative pricing is maintainted by the ARDL estimation outcome. Also, the national income is positively and relative price is negatively determined import demand in the short run.

Alam and Ahmed (2010) estimated the import demand function for Pakistan from 1982 to 2008 periods with quarterly data by employing ARDL approach. Import demand, real economic growth, relative import prices, real effective exchange rate, and real effective exchange rate volatility were all included as variables. They discovered a

long-run relationship between the variables. They also discovered that aggregate import demand is favourably influenced by real GDP, indicating that import demand in Pakistan is driven by growth. Import demand may not be affected by the influence of relative import prices, which is a clear sign of a growth-driven economy. To discover the short-run dynamics, an error correction model is used. It is also shown that economic growth, relative import prices, the real effective exchange rate, and the volatility of the real effective exchange rate all Granger cause import demand.

Kotan and Saygili (1999) use local income, foreign exchange reserves, and exchange rates changes as factors to analyse Turkey's import developments. They use two different econometric approaches to estimate the import demand function. To incorporate long-term dynamics into short-term fluctuations, the Engle-Granger Two Step Cointegration technique is adopted. In the short term, income has a greater impact on import demand; but, in the long term, income elasticity of import demands falls to 0.3. The VAR method likewise reveals that there is a positive effect on income innovations in the first four quarters, but that this benefits fades by the end of the third year. In absolute terms, the inflation coefficient is bigger than the nominal depreciation coefficient, resulting in a positive sign for the real depreciation rate coefficient in the long run. Both approaches produce similar results in the short run. As a result, the most effective policy instrument in the short run is the exchange rate on import demand, whereas in the long run, domestic demand and the stock of international reserves are the key drivers of import demand.

Durmaz and Lee (2015) aimed to investigate the import demand behaviour of Turkey as an emerging country and search for a long-run relationship between the import demand and the components of GDP by using ARDL approach. The study examines

the long-run and short-run elasticity of Turkey's disaggregate import demand using an annual dataset from 1980 to 2011. To check for the presence of cointegration, Durmaz and Lee found the F-statistics as 5.274 which is higher than the upper bound critical value of 4.696 at the five percent level, yielding cointegration. Furthermore, all of the variables in the model are statistically significant in the long-run. Total consumption is the only independent variable that have an elastic effect on imports. In the short-run, all the other variables except the investment variable are statistically significant.

Mehmood, Ali and Chani (2013) used the ARDL bounds testing technique to cointegration to investigate the role of the import demand function for Tunisia between 1980 and 2009. Their findings support a long-term link between Tunisia's variables of interest. Furthermore, import demand and investment have a positive and statistically significant relationship.

Hibbert, Thaver and Hutchinson (2012) investigates the aggregate import demand function of Jamaica with United States and United Kingdom from January 1996 to September 2010. To analyse if cointegration exists between the variables, a bounds test is implemented. For trading between Jamaica and the United States, the F-statistic was 6.613, and for trade between Jamaica and the United Kingdom was 16.413. At the 1% level of significance, both of these test values are larger than the upper bound critical value of 5.06. As a result, the null hypothesis of no cointegration for Jamaica's trade with the United States and the United Kingdom is rejected, and a cointegration relationship between imports and real gross domestic product, relative price of imports, real foreign reserves and exchange rate volatility is discovered.

Sweidan (2013) calculated the impact of the exchange rate on Jordanian exports and imports from 1976 to 2009. They found cointegration using the bounds test. Their model separates Jordan's demand for real exports and imports into two functions, with the real exchange rate serving as a common factor in both. As a result, they discovered that the real effective exchange rate is one of the most important factors, affecting real exports and imports in the short run but having no impact on the two economic variables in the long run.

According to Oluyemi and Isaac (2017) international trade have effects on GDP growth both in the short run and long run with the arrangement of foreign exchange and raw materials for industrialization in developing countries. However, these countries are not achieving these benefits with the effect of their volatile exchange rate. The Vector Auto Regression model is used to analyse the data and the results shows that exchange rate in Nigeria is not affecting the volume of imports and exports.

From 1971 to 2011, Odili (2015) studies Nigeria's exchange rate movements and the implications of volatility on imports. They provide annual statistics for each variable, including imports, real exchange rates, exchange rate volatility, domestic income and terms of trade. Initially, they utilized the ADF unit root test to see whether the data was stationary. At first difference, the variables are stationary, and none of the variables are integrated to a higher degree of I(1). Secondly, they used Johansen cointegration approach to check the long-run relationship among the variables. The trace statistics shows that there are three cointegration equations that can reject the null hypothesis at the 5 percent level and one cointegration equation at the 5 percent level using Max-Eigen statistic which means that there is cointegration between variables. Then, they estimated an error correction model for the short-run dynamics. The study

found that in both short-run and long-run, Nigeria's imports are chiefly affected by exchange rate trend and volatility, domestic income, terms of trade and exchange rate policy switch.

The latter findings implies that exchange rate and its volatility can have significant effects on imports and hence on international trade.

3.2.2 The Impact of Macroeconomic Instability on Output, Spending and Import Dynamics

Macroeconomic instability is defined as the phenomenon that makes the macroeconomic environment less predictable and increase the volatility of leading macroeconomic variables and hence yields to a perceived unsustainability in their behaviour (Montiel and Serven, 2006).

Fischer (1993) conceptualises macroeconomic instability in two ways via uncertainty. Firstly, policy-induced uncertainty which reduces the efficiency of the price mechanism that affects output. The productivity and the rate of increase of the investment is reduced as the uncertainty is associated with high inflation or instability. Secondly, temporary uncertainty which tends to reduce the rate of investment as potential investors wait for a clear resolution of the uncertainty before investing. Investments can be lower at times that the uncertainty is high and becomes more visible in the time series data. Fischer also stated that the macroeconomic stability is occurring when;

- The inflation is predictable and low,
- The real interest rates are applicable,
- The fiscal policy is stable and sustainable,
- The real exchange rate is competitive, and

- The balance of payments is viable.

Low and predictable inflation rates are basic requirements for macroeconomic stability. Because of its effects on people's lives and macroeconomic factors such as production, exchange rates, investments, and employment, determining the causes of inflation has long been a priority. Supply-side shocks and demand-side shocks are the two main variables that causes inflation. Cost pressure is created by increases in manufacturing costs, labor, and the prices of other factors of production on the supply side, resulting in soaring prices of manufactured items. On the demand side, nominal money demand is rising as a result of an imbalance in money supply and demand in the money market, and as a result, prices are rising as well. Unsound fiscal policies also contribute to the inflation rate. Moreover, the real exchange rate is unquestionably one of the most important indicators for assessing a country's level of international competition. Volatility in real exchange rate performance implies an economic imbalance, and a rise in volatility can lead to instability, which can have disastrous effects. Changes in the context of production and investment, changes in the status of internal and external markets, and being impacted by foreign trade are all possible consequences of this dilemma (Elahi, Salimi and Masoomzadeh, 2016).

Some of the theoretical arguments on macroeconomic instability focus on its harmful effects on private investment and productivity and therefore economic growth (see Ismihan, 2009). More recently, Mohamed (2018), stated that macroeconomic instability has negative effects on aggregate investment for developing countries and private investment for Latin American countries thus economic growth. However, the increase in macroeconomic uncertainty is the major reason for reduction in private

investment and the reduction in the fiscal and political ability of the government is the main reason for the decrease in public investment (Ismihan, 2009).

Ismihan (2009) developed the macroeconomic instability index for Turkey and the analysis has shown that macro instability is detrimental for capital accumulation and economic growth. INSW, which is used in this study, is a reconstructed macroeconomic instability index (see Ismihan et al. 2016) developed by Ismihan, Metin-Ozcan, and Tansel (2005) that is used for Turkey as a measure for macroeconomic instability. The level of overall macroeconomic instability can be represented by INSW. It is based on four measures of macroeconomic instability. First, there's the deficit-to-GDP ratio. Second, there's the rate of inflation. Finally, there's the current account balance to GDP ratio, and the change in the exchange rate.

To sum up, macroeconomic instability is harmful for private spending (both investment and consumption), and output as well as for import dynamics.

3.3 Main Findings from the Literature and the Case of TRNC

There are many factors that can affect the imports of a country. However, in the literature, national income of a country and the fluctuations in exchange rates are the most common variables that are used as the long-run determinants of imports. When we consider the context of Turkish Republic of Northern Cyprus, there is a crucial variable that needs to be considered; the external macroeconomic instability "imported" from Turkey. Accordingly, fluctuations in Turkish Lira and the effects of exchange rates on the Turkish economy, directly affect TRNC economy.

(Ozkan, 2020) argues that in the Turkish economy, the appreciation of the dollar and other foreign currencies should be analysed carefully when looking at the effects of

the exchange rate changes, since the movement in the exchange rate has been in the direction of depreciation of the TL for a long time. The effect of the appreciation of the dollar on the Turkish economy mainly occurs through two main channels; Trade Channel and Financing Channel. The focus is mainly on the Trade Channel; an appreciation in dollar may affect the foreign trade balance positively by increasing the exports, which are cheaper in dollar terms, and decreasing the imports, which are more expensive in terms of domestic currency. This also plays a role in increasing the national income. On the other hand, changes in exchange rates also negatively affect the foreign trade balance. Since an increase in dollar will also increase the prices of imported goods used in the production of exported products, the production costs and thus the export prices will be affected and it will affect the foreign trade balance negatively. The magnitude of this negative effect depends on the share of imported input in the exported products. Furthermore, the stages of production of goods and services are completed in different countries. For instance, most of the inputs required for a smartphone manufactured in China are imported from USA, Japan, South Korea, and Germany. This type of production is called Global Value Chains (GVCs) that is applied in most of the globally produced products. For that reason, the relationship between exchange rates and foreign trade has to be reassessed. Finally, the increase in exchange rates affects inflation by increasing the price of imports in terms of domestic currency in two ways. Firstly, the price of both imported products that use imported inputs as raw materials are increasing. Secondly, in times of depreciation in domestic currency, unfavourable inflation expectations are also unfavourably affected through indexation.

To sum up, during times of crises, a negatively affected Turkish economy is negatively affecting TRNC economy in terms of imported goods and services. The reason is that, the volume of trade between TRNC and Turkey is more than 80 percent of total trade of TRNC (SPO, 2020) and also changes in the value of TL against other currencies directly affects the trade and prices in TRNC. Money market in TRNC is substantially affected by monetary policy changes of the Central Bank of Turkey. Also, a potential channel of instability as mentioned above is Turkey's financial aid to TRNC. The dependence of TRNC on fiscal aid from Turkey also jeopardizes the financing of the current budget deficit as well as the flow of capital budgeting for infrastructure investments when Turkey faces financial difficulties. Moreover, as macroeconomic instability develops, private credit may drop, prompting consumers to lower purchases. Additionally, if businesses decide to invest and consumers decide to consume, banks will refuse to lend to them because of the significant risk involved owing to macroeconomic uncertainty. These are all described as potential channels for transmitting external instability to the economy of TRNC. Because of this, Macroeconomic Instability Index (INSW) is added to the model to better analyse the dynamics of import in TRNC.

Chapter 4

THE MODEL, METHODOLOGY AND EMPIRICAL RESULTS

4.1 The Model and Methodology

The purpose of this study is to discover the long-run relationship between the imports and real GDP, real exchange rates and external macroeconomic instability index in TRNC. Therefore, cointegration analysis and error-correction modelling are the appropriate techniques to follow. The first procedure to apply is to determine the degree of integration of each variable in the model for the application of cointegration because the method used depends on the unit root test results. Nevertheless, the cointegration method of Autoregressive Distributed Lag (ARDL) developed by Pesaran et al. (2001) will be applied because ARDL bounds approach is a proven approach that is trustworthy in small-sized data.

The model is based on a traditional import function with addition of the Macroeconomic Instability Index to augment the standard model that explained in theoretical review section of Chapter 3. The long-run import function can be written as;

$$IMR_t = \beta_0 + \beta_1 YR_t + \beta_2 RER_t + \beta_3 INSW_t \quad (1)$$

where IMR_t is real imports at time t, YR_t is real gross domestic product at time t, RER_t represents the real exchange rates at time t, and $INSW_t$ represents the external macroeconomic instability index at time t. Firstly, an ARDL approach to cointegration

will be used to examine if there is a long run relationship between the variables included in the above equation. More specifically, the Bounds test will be utilized towards this end. The null hypothesis is that the model have no cointegration, while the non-rejection of the alternative hypothesis reveals cointegration in the model. The importance of the Bounds test is that it has a non-standard distribution. If the computed F-statistic falls above the upper bound of I(1), the null hypothesis can be rejected and cointegration exists. On the other hand, if the F-statistic is less then the lower bound of I(0), we cannot reject the null hypothesis and there is no cointegration. If the computed F-statistic is between the lower and upper boundaries, the decision is inconclusive. Schwarz Information Criterion (SIC) is used to determine the lag length of ARDL equation. The long-run and short-run dynamics are derived from the estimated dynamic equation.

4.2 The Data

Dataset used in this project are annual data from 1977 to 2018. The variables are obtained from Economic and Social Indicators of State Planning Organization (SPO). These variables are gross domestic product (GDP) and imports (IMR). Furthermore, real exchange rate (RER) is calculated by multiplying the relevant exchange rate by UK price deflator divided by TRNC deflator. The TRNC deflator found by the nominal GDP of TRNC in TL divided by the real GDP of TRNC in TL which are acquired from SPO and the UK deflator is obtained from the World Bank. Lastly, as a measure for macroeconomic instability, the Macroeconomic Instability Index (INSW) is used which is developed by Ismihan (2009). The human development index (HDI) methodology is used to generate this index, which is composed of four macroeconomic instability factors: change in exchange rate, change in current account balance to GDP ratio, inflation rate and public deficit to GDP ratio. The two variables (GDP and IMR)

are measured in constant Turkish Lira (TL) and hence they represent real values. The reason of that is, the real values are the values adjusted for inflation which is obtained by removing the effect of price level changes from the nominal value of time-series data. This will give us an opportunity to see a truer picture of economic trends.

4.3 Unit Root Tests

From this point forward, the abbreviations listed below will be utilized as;

IMR: real imports

YR: real Gross Domestic Product (GDP)

RER: Real Exchange Rate

INSW: Macroeconomic Instability Index of Turkey.

It is essential to determine the time-series properties by checking the presence of unit root in the variables. Standard Augmented Dickey-Fuller (ADF) test procedure is used for this purpose (see Table 1). When we consider the levels of all of the variables, we cannot reject the null hypothesis of a unit root at five percent significance level. However, the null hypothesis of a unit root for the first differences of the variables is rejected at one percent significance level. This can also be seen in the graphs of the variables in their first differences where they have no trend lines upwards or downwards (see the Appendix). Thus, all of the variables contain a unit root at five percent significance level. RER and INSW do not have a visible trend (see Figure 5); so, the trend terms will not be considered in the ADF testing.

Table 1: ADF - Unit Root Tests

Variables	**Unit Root Tests**		
	Level		**First Difference**
	Without Trend	**With Trend**	**Without Trend**
IMR	-0.3971 [0.9002]	-3.0239 [0.1386]	-4.8321 [0.0003]
YR	0.5925 [0.9877]	-2.7601 [0.2197]	-4.0335 [0.0033]
RER	-1.5797 [0.4836]	--------- -	-6.3061 [0.0000]
INSW	-2.5736 [0.1066]	--------- -	-7.4832 [0.0000]

Note: p-values are provided in square brackets

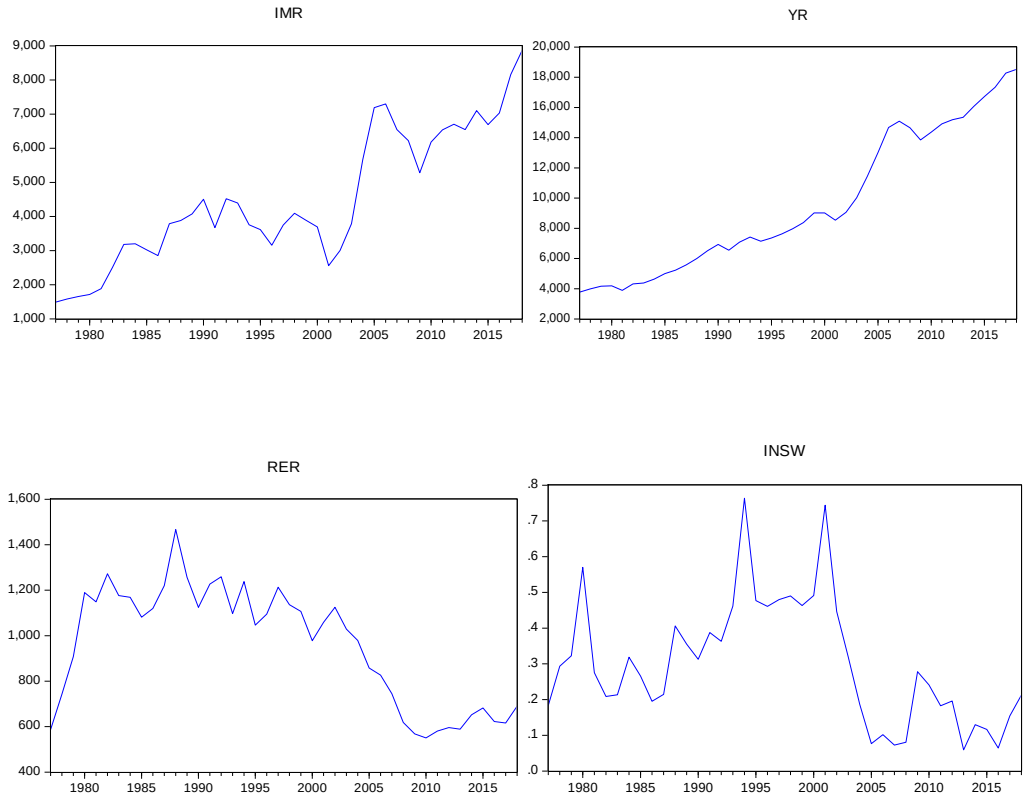

Figure 5**:** Time Plots

4.4 Empirical Analysis

As noted earlier, long-run and short-run relationships between variables can be analysed by using the ARDL Bounds approach. The import model can be estimated with the ARDL method since it can take a possible mix of I(0) and I(1) variables into account. In our case, INSW variable contains unit root but the p-value is nearly in the zone of ten percent level of significance; however, the ARDL approach is a stronger approach for this type of results. As noted earlier, this approach is also preferred for small sample data.

Lag selection Criteria of Schwarz Information Criterion (SC/SIC) is used to select the optimal lag length. Note that, Koehler and Murphree (1988) emphasized that, the Akaike Information Criteria (AIC) will overfit the data and the SIC is a better criterion. In this analysis, the Schwarz Information Criteria (SIC) suggests an ARDL (1,1,0,0) model (see the Appendix).

4.4.1 Long-Run Equilibrium

In equation (1), β's represent the coefficients of gross domestic product (GDP), real exchange rate and macroeconomic instability index of TRNC. As real GDP level (YR) increases, real imports (IMR) increases, so β_1 is expected to be positive. On the other hand, β_2 is predicted to be negative. Real Exchange Rate can be defined as nominal domestic currency price that takes the inflation differentials among the countries into account (Kipici and Kesriyeli, 1997). As a result, real depreciation occurs when the real exchange rate rises, while real appreciation occurs when the rate falls. Real depreciation raises the foreign currency price of imports, which tends to reduce import volume in local currency terms. Furthermore, the impact of macroeconomic instability index represented with the coefficient β_3 is predicted to be negative. The

macroeconomic environment in TRNC is not easily predictable because of many reasons which are discussed above. This causes an increase in the volatility of economic variables and creates an unsustainable economy. Thus, the imports should be negatively affected by the rise in the external macroeconomic instability.

The F-statistic value (4.377549) of Bounds test presented in the Appendix A is greater than the upper bound value of I(1) at five percent significance level. For that reason, the null hypothesis of no cointegration is rejected and alternative hypothesis is accepted which reveals a cointegration relationship among variables. Thus, the result of the study confirms that a long-run relationship exists among the real imports of TRNC and real Gross Domestic Product of TRNC, real exchange rate and macroeconomic instability index. On the basis of these results, the long run estimation results are given in the Appendix A which is relevant to real imports in context of macroeconomic instability index, real exchange rate and real GDP in TRNC. The estimated long-run equation is given as follows;

$$IMR = -1109 + 0.413YR + 2.485RER - 3205.367INSW \quad (2)$$

[0.0000] [0.0542] [0.0204]

Note: p-values are provided in brackets

The above equation reveals that in the long-run, real GDP and macroeconomic instability index are the major determinants of TRNC's real imports. If there is a 1 TL increase in real GDP, this would lead to a 0.41 TL increase in real imports. This means that the marginal propensity to import in TRNC is 0.41. On the other hand, real exchange rates are not statistically significant as the p-value is higher than the five percent significance level. However, if we consider a ten percent level of significance, the real exchange rate has positive effect on imports. There are limitations in the RER

calculations. The RER is calculated by using the exchange rate of Sterling, Pound and UK deflator. Unfortunately, other crucial foreign currencies are missing in the formula such as Euro and Dollar. For that reason, the positive effect of the RER cannot be considered fully accurate because of the absence of other currencies which are frequently used in TRNC economy. Nevertheless, the insignificance of RER can be caused by the limited substitutability between imported and domestic products. Moreover, this result (insignificance of real exchange rates) does not mean that the foreign monetary policies and dependency to another country (Turkey) is not affecting TRNC. This can be seen in the significance of external macroeconomic instability as it is negatively affecting imports in TRNC. This is due to the uncertainty that comes with macroeconomic instability, which can induce businesses (consumers) to postpone investments (consumption) and hence lowers the imports. Furthermore, as the level of macroeconomic instability rises, private credit may decline, causing consumers as well as producers to postpone their spending decisions. That is, if the firms decide to make investments and consumers decide to make consumption, banks would refuse to grant them credits due to the high risk involved because of macroeconomic uncertainty (Ismihan, Dincergok and Cilasun, 2017).

4.4.2 Short-Run Dynamics

The short-run real import function is computed once a long-run equilibrium relationship is identified, and the results are shown in the Appendix A. The short-run error correction equation is given as follow;

$$\Delta IMR = 0.736\Delta YR - 0.41Res\,(-1) \qquad (3)$$

[0.000] [0.000]

Note: p-values are provided in brackets

Engle and Granger (1987) representation theorem necessitates that an existence of cointegration among variables required the presence of short-run error correction relationship associated with them. For that reason, the attractiveness of the Error Correction Model (ECM) is that it represent the links between the short-run and the long-run approaches to econometric modelling.

The error correction term, ECT [Res(-1)] is negative and is statistically significant, implying that any divergence from the long-run equilibrium will be corrected in the short-run by the amount of its coefficient. In other words, ECT measures the speed of adjustment of the variable back to its long-run value following a shock. The model suggests a reasonably quick adjustment (41%) back towards equilibrium. Explanatory variables of the model are not statistically significant in the short-run except real GDP as shown in ECM equation. The impact of real GDP is relatively higher when compared to its long-run estimate.

4.4.3 Diagnostic Checks

For checking the validity of the relevant assumptions and the normality of the residuals, serial correlation, normality, heteroskedasticity and RESET tests are conducted on the ARDL model (see Table 2).

Table 2: Diagnostics Tests

Tests	**Results**
Serial Correlation	Prob. Chi-Square(1) = 0.6349
Heteroskedasticity	Prob. Chi-Square(8) = 0.8366
RESET	Probability = 0.5538
Normality	Jarque-Bera = 0.5441 Probability = 0.7618

Firstly, considering the p-values (chi-square values are greater than the five percent level of significance), the null hypothesis of no serial correlation and heteroskedasticity cannot be rejected. This indicates that residuals from the empirical model indicate no serial correlation and heteroskedasticity problems. The model also passes the Jarque-Bera Normality test, which suggest that the errors are normally distributed. And the RESET test reveals no misspecification error. The model's stability also examined with two additional tests. The purpose of the stability test is to determine if the estimated model of real imports is stable or instable across the research period by using Brown, Durbin, and Evans (1975) Cumulative Sum of recursive residuals. The plots of the CUSUM and its square tests are shown in Figures 6 and 7. These graphs show that all estimated coefficients are within the five percent significance level, indicating that estimated real imports function is stable.

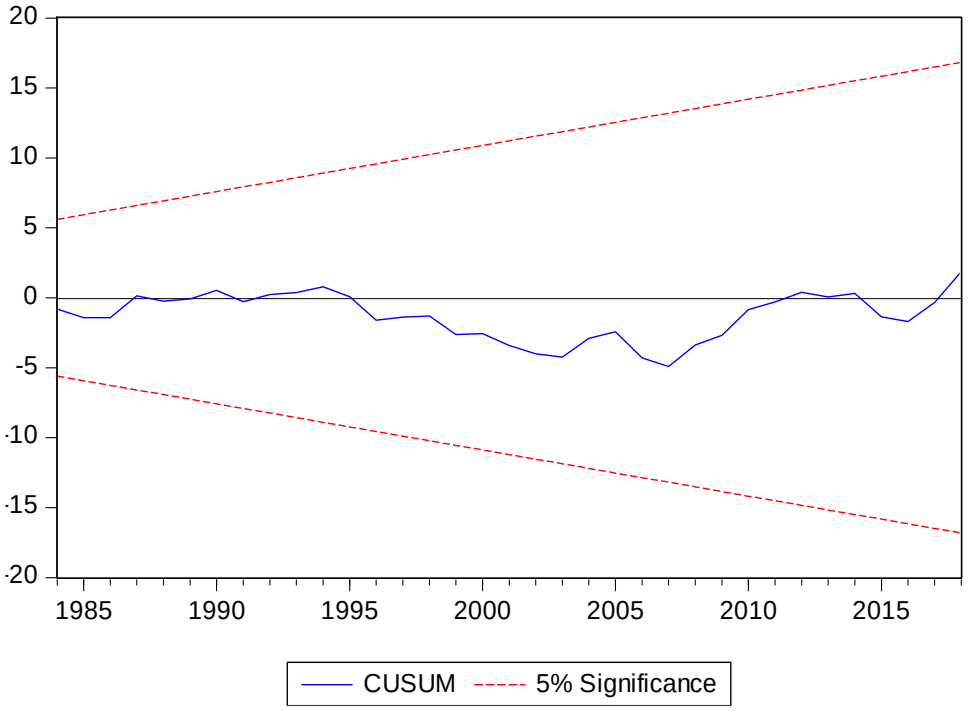

Figure 6: Cumulative Sum Test (CUSUM)

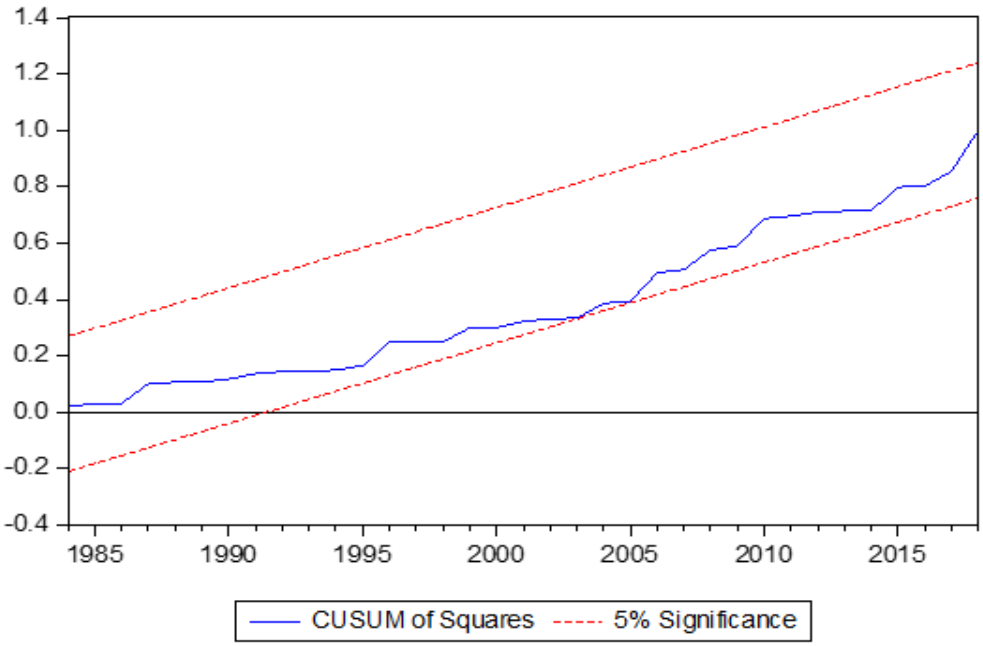

Figure 7: Cumulative Sum of Squares Test (CUSUM of Squares)

Chapter 5

CONCLUSION AND POLICY RECOMMENDATIONS

This study aimed to investigate the influence of internal and external factors on real imports in a small island country of Turkish Republic of Northern Cyprus by utilizing time series econometric approaches over the 1977-2018 period. For the empirical investigation, we conducted an ARDL bounds approach to test for a long-term relationship between real imports (IMR), real GDP (YR), real exchange rates (RER) and macroeconomic instability index (INSW) for TRNC and found an evidence of a cointegration relationship among these variables. This method not only allows us to explore the long-run dynamics, it also allows us to explore the short-run dynamics of TRNC's real imports.

The following are the key findings of the cointegration analysis: while external macroeconomic instability deeply and negatively affects imports, the real Gross Domestic Product (GDP) of the country affects imports positively in the long-run. However, in the short-run only real GDP influences imports. From a theoretical point of view, we were expecting a significant negative effect of real exchange rates on imports in TRNC. However, the results shows us that the RER is not statistically significant. This can be caused by the limited substitutability between imported and domestic products. On the other hand, the effect of external macroeconomic instability is highly detrimental on the TRNC economy. Finally, TRNC is a small island country that cannot produce all the needed products domestically, and when producing, highly

dependent on imported raw materials and semi-finished products. Therefore, imports play a crucial role in this type of countries. Furthermore, the external factors are very effective on the country mainly because of the financial dependence to Turkey.

The following recommendations can be made based on the findings of this study, even if they seem assertive: To begin with, macroeconomic stability is critical not just for boosting investment but also for a country's ability to import and to stand on its own in terms of finance. The TRNC government should create its own unique fiscal tools and make them more effective in countering economic instability. Secondly, the TRNC government must avoid over-reliance on foreign aid in order to lower the detrimental effects of external macroeconomic instability index. Thirdly, increasing the country's productivity will help to alleviate instability. A further study can be done to search if an increase in productivity will be effective to decrease the detrimental effects of external macroeconomic instability.

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APPENDICE

Appendix A: ARDL Analysis – Bounds Testing, Long and Short Run

Table 3: ARDL Bounds Testing

F-Bounds Test				Null Hypothesis: No levels relationship
Test Statistic	Value	Signif.	I(0)	I(1)
		Asymptotic : n=1000		
F-statistic	4.377549	10%	2.37	3.2
k	3	5%	2.79	3.67
		2.5%	3.15	4.08
		1%	3.65	4.66
		Finite Sample: n=45		
Actual Sample Size	41			
		10%	2.56	3.428
		5%	3.078	4.022
		1%	4.27	5.412
		Finite Sample: n=40		
		10%	2.592	3.454
		5%	3.1	4.088
		1%	4.31	5.544

Table 4: Long-Run Analysis

Dependent variable is IMR				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
INSW	-3205.367	1319.708	-2.428845	0.0204
RER	2.484692	1.247338	1.991995	0.0542
YR	0.412793	0.065618	6.290868	0.0000
C	-1109.291	1621.080	-0.684292	0.4983

Table 5: Short-Run Analysis

ARDL Error Correction Regression

Dependent Variable: D(IMR)

Selected Model: ARDL(1, 1, 0, 0)

Case 2: Restricted Constant and No Trend

Date: 07/02/21 Time: 16:23

Sample: 1977 2018

Included observations: 41

ECM Regression

Case 2: Restricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(YR)	0.735511	0.096278	7.639454	0.0000
CointEq(-1)*	-0.410266	0.083074	-4.938542	0.0000

R-squared	0.656581	Mean dependent var	180.0305
Adjusted R-squared	0.647776	S.D. dependent var	636.4307

Appendix B: Time Plots in First Difference

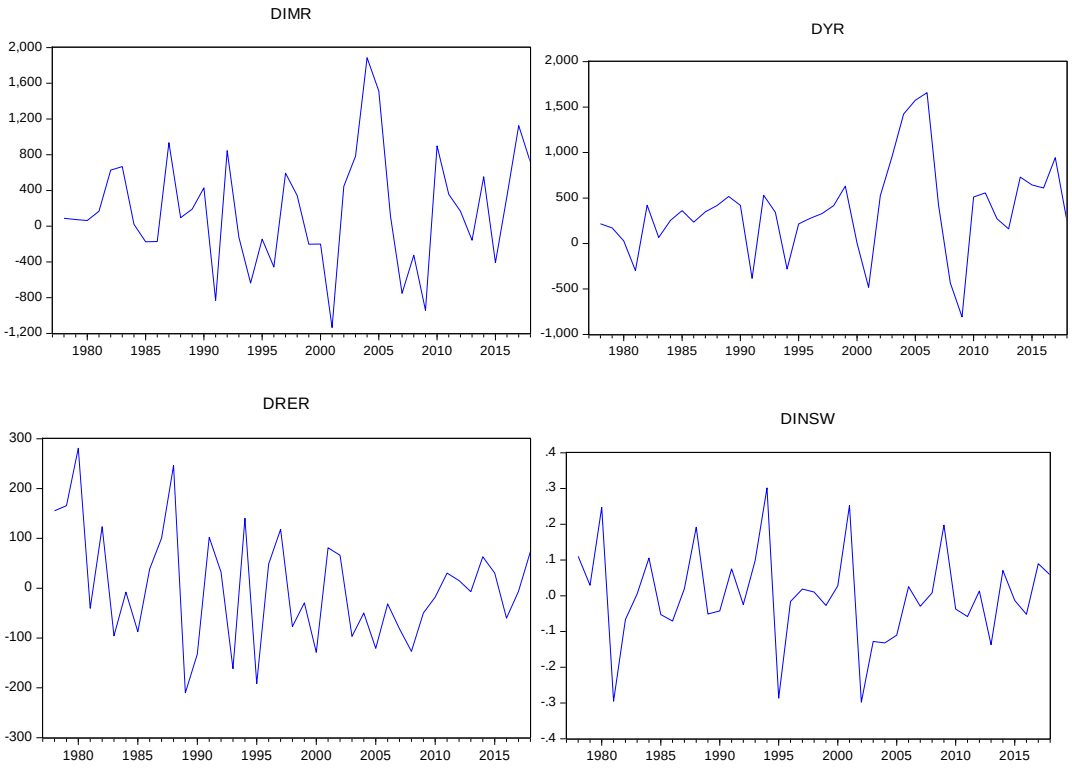

Figure 8: Time Plots in First Difference

Appendix C: Diagnostic Tests

Figure 9: Serial Correlation Test

Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	0.170054	Prob. F(1,30)	0.6830
Obs*R-squared	0.225461	Prob. Chi-Square(1)	0.6349

Figure 10: Heteroskedasticity Test (White)

Heteroskedasticity Test: White			
F-statistic	0.457263	Prob. F(8,31)	0.8763
Obs*R-squared	4.221931	Prob. Chi-Square(8)	0.8366
Scaled explained SS	2.140690	Prob. Chi-Square(8)	0.9764

Table 6: Ramsey's RESET Test for Specification Errors

Ramsey RESET Test

Equation: ARDL_LONG_RUN

Specification: IMR IMR(-1) YR YR(-1) RER INSW C

Omitted Variables: Squares of fitted values

	Value	df	Probability
t-statistic	0.598069	34	0.5538
F-statistic	0.357687	(1, 34)	0.5538

F-test summary:

	Sum of Sq.	df	Mean Squares
Test SSR	57924.95	1	57924.95
Restricted SSR	5563990.	35	158971.1
Unrestricted SSR	5506065.	34	161943.1

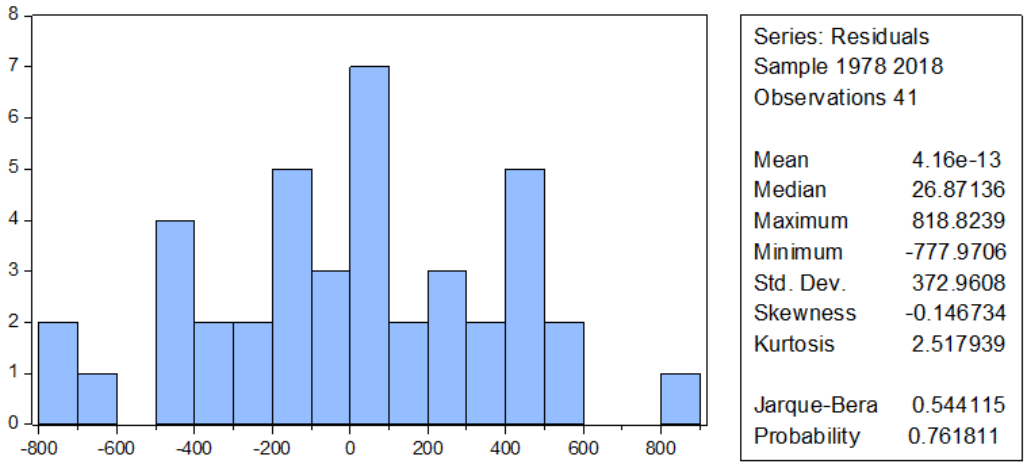

Figure 11: Normality Test