

Scenario-Based Forecast for Post-Conflict's Growth in Syria

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SCENARIO-BASED FORECAST FOR POST-CONFLICT'S GROWTH IN SYRIA

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Abstract

This paper investigates the relationship between the main macroeconomic indicators, namely real GDP, consumer prices and parallel market exchange rate in the Syrian economy during the period 1990-2017. We provide a comprehensive analysis for the macroeconomic policies and performance in the pre-conflict and during the conflict periods. For this purpose, we employ two advanced estimation approaches, namely, nonlinear ARDL and Structural VAR. these techniques are very useful to estimate how real GDP has reacted to shocks stemming from three major macroeconomic variables namely, money supply, consumer prices, and parallel exchange rate market. The empirical results indicate that the responses of real GDP to negative shocks in money supply are greater than its responses to positive shocks in money supply during the conflict period. Moreover, we distinguish four different scenario for money supply as possible views of rebuilding scenarios. The achievement of this scenario depends on the political settlement agreement and the size of capital inflow into the economy.

Keywords: Conflict, Economic Growth, SVAR, Nonlinear ARDL.

JEL Classifications: D74, O40, C01.

1. Introduction

In recent years, several countries have witnessed severe conflicts, which resulted in huge human and economic losses. In particular, a number of countries in the MENA region have been drastically affected by the 2011's Arab uprisings. In addition to dramatic human losses, they have experienced great economic destruction accompanied by a deteriorating social situation. Not surprisingly, the economic debate about post-conflict reconstruction has tended to receive a rapidly growing interest among economists and policy makers. In particular, it has focused on the cost of the conflicts, the extent of destruction, and the possible pathways of economic and social recovery with a special emphasis on the factors that would determine post conflict economic growth.

The main goal of this paper is to understand the dynamics of Syrian economic growth in three periods: pre conflict, 1990-2010, the conflict period, 2011-2017 and the whole period 1990-2017, and to forecast possible post conflict growth scenario. This is done by estimating empirically how real GDP has reacted to shocks stemming from three major macroeconomic variables namely, broad Money Supply (MS), Consumer Price Index (CPI) and parallel Exchange rate market (EX). For this purpose, we employ two estimation approaches, namely, nonlinear ARDL and Structural VAR that we discuss in section 4.

The paper is divided into six sections: an introductory section I and section II analyzes the economic context of the Syrian conflict with reference interventions; section III assesses the economic impact of the conflict: the physical destruction and the deterioration of macroeconomic conditions; section IV discusses the methodology used; section V details the empirical estimations that the paper employs; and section VI concludes.

2. Contextualizing the economic policy in Syria

Understanding the internal and external political context of the economic policy in Syria, though it is out the scope of this paper, is an imperative to understand the dynamics of Syrian economic growth. This because this context does not only influence the residual's parameter of the quantitative analysis but also the exogenous and endogenous variables.

Geopolitical conflicts in the Middle East have been a major determinant for Syria foreign and internal policy (Abboud 2009) (Box I). This has been prominent in Syria's international development cooperation that fluctuated in the recent decades between generous financial and technical assistance (from the Gulf countries in the early seventies and the EU in the 2000s) and tight unilateral economic restrictive measures imposed by the US, EU, and the Arab League at the break out of the current conflict in Syria in 2011.

Empirically, the World Bank (2010) found that Syria’s complex political circumstances—both from a domestic and a geopolitical perspective—need to be taken into account in gauging its growth potential and its reform choices. This conclusion was reached by using a political instability index that accounts for the instances of war, economic restrictions, internal revolution, and violence over the period 1965–2008, all of which have a significant and negative impact on total factor productivity growth in Syria. In the absence of domestic peace and stability, this adverse relationship will continue to limit the potential for accelerated inclusive growth and to constrain the policy choices available to the Government (World Bank, 2010).

As such, the complexity of the conflict in Syria—where internal factors are manipulated by external powers makes it hard to unambiguously identify the exact root causes of the conflict (Elbadawi and Makdisi, 2017; Rafizadeh et al., 2013). What adds to this difficulty are the conflict-generated drivers for violence such as economic sanctions and other war related economic issues. This complexity will inevitably shed doubts on the reliability and the stability of post-conflict economic policy.

Box 1: The Geopolitical Context of the Conflict in Syria

Syria that is known today emerged as a result of the Sykes-Picot agreement secretly made mainly by Britain and France in the World War I to share among themselves the Ottoman empire in the Middle East and North Africa.⁴ This agreement resulted in the division of the Natural Syria into four states, namely Syria, Lebanon, Palestine and Jordan, within their current political borders, as well as the mapping of Iraq and the principalities and kingdoms of the Arabian Peninsula and North Africa. Most of these states were later fell under the French and British Mandate. The borders have been painted with the ruler and without basing any historical or tribal foundations, by which most of the natural boarders in the world are defined, planting the seeds for many conflicts in the region and leading to a century of protracted violence and death in the whole region and (the Economist 2016)⁵ draining its resources and impeding its socioeconomic development.

Among these seeds of conflict were the division of the Kurds region, who have always aspired for autonomy, between four countries: Turkey, Iran, Iraq and Syria. In addition, and most importantly, was also issuing the Balfour Declaration by Britain in 1917 by which it committed to help establishing a "national homeland" for Jews in Palestine, which was materialized by the proclamation of "Israel" in 1948. Since then, the region witnessed a major Israeli- Arab war every ten years on

⁴ Named after the representatives of the two governments who had prepared it.

⁵ “Sykes-Picot and its aftermath: Unintended consequences,” The Economist [URL: <https://www.economist.com/special-report/2016/05/12/unintended-consequences>] accessed 16 May 2019.

average, resulted in Israel occupying additional Arab lands in Palestinian, Egypt, Syria and Lebanon along with hundreds of thousands of victims, displaced people and refugees.

The historical role of Syria as a trade hub along the silk road in addition to its strategic location and proximity to oil resources in the middle east made controlling it worthy to international and regional power. Therefore, when the uprising was triggered in Syria, it was seen by many of these countries as an opportunity to have the geopolitical upper hand over this country. This was translated by the generous political and military support extended to the opposition and the government in Syria that transformed the internal political uprising into a geopolitical proxy war. What protracted the conflict and increased the level of violence is that the opposition supporters viewed this war as a strategic so still subject to cost-benefit analysis but made huge resources to have their goal achieved. On the other hand, the Syrian government and its supporter viewed it as an existential war that they had to won at any price (Haddad, 2018).

2.1. Pre-conflict economic policy

After several short-lived initiatives for reform in 1970, 1986, and 1991⁶ to limit public sector dominance in the economy associated with the prevailing system since the Ba'ath party assumed power in 1963, Syria entered the millennium faced by a gloomy medium-term outlook and growing weaknesses. It was facing two main challenges: 1) achieving fiscal sustainability, and 2) diversifying the production and export base (IMF, 2005), in addition to suffering from a low administrative capacity to implement reforms, weak industrial base and a constrained business environment (Arslanian, 2009). In response to that outlook, the authorities commenced in early 2000s, a series of policy and institutional shifts suggesting that Syria had committed to initiating a structural transition from a centrally planned to a market-oriented economy (Abboud 2009). The reform initiatives covered private sector development and business environment, the financial sector, public finance, and trade and the exchange rate (World Bank, 2010).

Regarding the business environment, a new Investment Law streamlined the incentives system, allowed repatriation of profits, and treated foreign and domestic investors equally. Several economic sectors were opened to the private sector. In addition, the financial sector witnessed major reforms, the most important of which was the licensing private commercial and Islamic banks and insurance companies, and opening the Damascus Securities Exchange. At the public finance level, income tax regulations were simplified

⁶ In 1986, the establishment of joint public-private venture—mainly in agri-food and tourism industry was allowed. In 1990, Syria embarked a relatively aggressive reform by issuing the investment law No. 10 in 1991 that provided incentives for the national and foreign private investments.

and the Tax administration significantly improved. Relative autonomy was given to the public enterprises including borrowing from the banking sector, engaging in joint ventures with the private sector, contracting management teams, and the right to keep their operational surpluses. A program to phase out petroleum subsidies was launched in May 2008 (World Bank, 2010).

Trade reform started by applying to WTO membership in 2001. This was followed by reducing the maximum tariff rate from 255 percent to 50 percent and the elimination of number of non-tariff barriers. The number of products on the prohibited list of imports was substantially reduced and the remaining ones were published. In addition, an Export Development and Promotion Agency was established in 2009 and Free Trade Areas were signed with Turkey (in 2007) and 16 Arab countries (GAFTA, in 2005). The Syria-EU Association Agreement was initialed at the end of 2008⁷. Finally, the exchange rate was effectively unified, the foreign exchange market was opened to the private sector and restrictions on access to foreign exchange to finance imports were eliminated (World Bank, 2010).

During the first decade of the millennium Syria undertook considerable steps towards completing various aspects of the market economy at the legislative, regulatory and institutional frameworks. However, these reforms lacked a clear roadmap (Seifan, 2010) under various claims such as adopting a gradual, or a trial and error approaches to reform. Nevertheless, these approaches, especially at the institutional level, were selective, slow, reluctant, and scattered, thus yielding middling results. This was mainly because the foregoing claims opened the floor for having the reform process compromised by existing internal networks of interests (Abboud, 2009). In addition, it exacerbated concerns that further reforms might undermine the state's legitimacy and its popular base in that they would lead to lessening its role in providing basic goods and employment. Also fears were triggered that further economic liberalization would lead to instability at the national level (UNESCWA, 2017) given, in particular, the fragile and uncertain geopolitical context (World Bank, 2010).

Unfortunately, those fears came true in early 2011. The introduction of neoliberal policies was considered as one of the most direct factors that provided context to the political unrest in Syria for two main reasons. First, they not only did come as a top-down initiative rather than as an outcome of a participatory process to maintain the interest of the various social groups, but, secondly, they also lacked the accompanying political reforms and the proper governance structures needed to oversee the reform process and ensure equal redistribution of its outcomes. Consequently, these policies severely aggravated not only actual inequality

⁷ Nevertheless, later on, it was not endorsed by the EU.

but also the perception of inequality between the poor and the rich by slashing the middle-class areas and cities between a small portion of the crony capitalists that benefited the most from these policies and the vast majority of the population that was alienated. For example, the worker and peasant unions in Syria were viewed as obstacles to the neoliberal policies and their privileges and entitlements necessary to continue to function eroded (Rafizadeh, et al., 2013). Thus, the social contract on which the Ba'ath party established its legitimacy since assuming power in 1963 was perceived to have been broken.

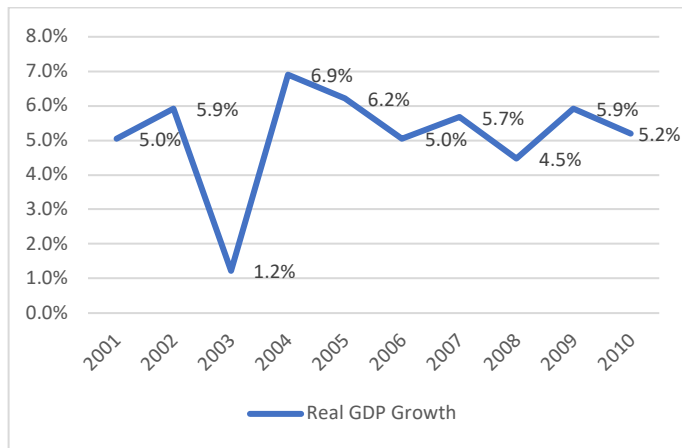
2.2. Pre-conflict Macroeconomic Performance

2.2.1. Real GDP growth developments

To spot the transformation that might have occurred in the Syrian economy because of the pursued reforms, the first decade of the millennium is split into two periods 2000-2005 and 2006-2010 for both of which the relevant averages of the macroeconomic indicators are compared. Over the first decade of the millennium, the Syrian economy achieved remarkable real GDP growth rates of 5.2% on average during the period 2000-2010 (**Error! Reference source not found.**), despite the decline in oil production and the large fluctuations in agricultural production due to unfavorable climate conditions in most years. This average would be 0.2% higher if 2003 is excluded, the year of the US invasion of Iraq as Syria was adversely affected by the war in Iraq due to the negative impact on its exports and investment in addition to the influx of Iraqi refugees (IMF 2014).

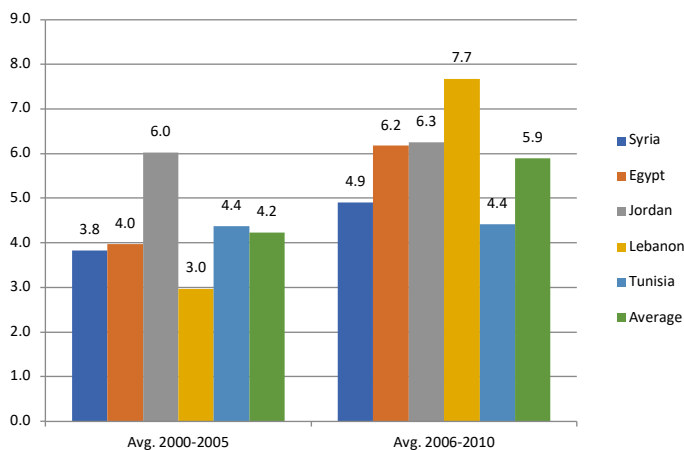
Nonetheless, compared to a number of Arab non-oil economies, namely Egypt, Jordan, Lebanon and Tunisia, the figures 1 and 2 below show that Syrian economy performed on average lower than the average performance of this group during the two periods 2005-2006 and 2006-2010. This reflecting special challenges faced by the Syrian economy due to the geopolitical tensions and the internal economic reform bottlenecks. Except for Tunisia, all countries in the group made notable upward shift in its economic performance during 2006-2010.

Figure 1. Syria: Real GDP Growth during 2001-2010 (percent)



Source: The Syrian Statistical Abstract, several years. Central Bureau of Statistics, Syria.

Figure 2. Average real GDP growth rates in Syria, Egypt, Jordan, Lebanon, and Tunisia during the periods of 2000-2005, 2006-2010, and 2000-2010 (percent)



Source: International Monetary Fund, World Economic Outlook Database, April 2019.

On the supply side, the contribution of the services sectors increased from 45.7% to 53.7% on average between both periods on account of the relative decline in the contribution of the main productive sectors, agriculture and manufacturing and mining from 24.5% and 27% to 19.2% and 23.3% respectively in between the two periods (**Error! Reference source not found.**). The agricultural sector in Syria has always suffered from mismanagement, erratic rain falls and weather patterns, below-average yields and outdated cultivation techniques (Abboud, 2009), which exacerbated the impact of severe drought that hit Syria's eastern region in 2008. Nevertheless, the contribution of agriculture remained significant standing at about 19% for the second period.

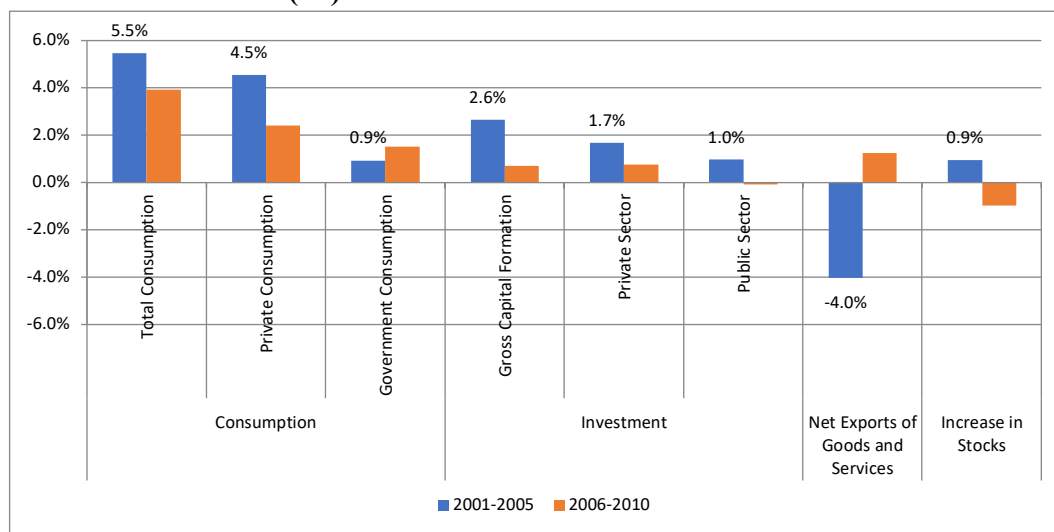
The decline of the manufacturing and mining sector's contribution to the GDP was mainly led by the decline in oil production in addition to the competition from openness to trade with Turkey and General Arab Free Trade Area (GAFTA). Such openness, is believed to had contributed to fueling the protests in 2011 as many handicrafts were forced out of the market due to the competition of cheaper imported goods. On the other hand, among the service sectors, the tourism sector experienced very rapid growth as it was envisioned by the government as one of the drivers of the economy (World Bank, 2010).

Sectoral growth weighted by their relative contributions to the real GDP shows that, in the first period, each one percentage point of GDP growth was mainly driven by wholesale trade (0.39), agriculture (0.17) and government services (0.18). Other sectors accounted for the remaining 0.26 point of growth. In the second period, the steep increase in oil prices after the US invasion of Iraq from USD 28.1 in 2003 to USD 94.1 in 2008 boosted the mining and manufacturing sector to GDP growth to reach (0.18) for each one percentage point of growth. Wholesale & retail trade (0.19), transport & communication (0.2), and Government services (0.27). This highlights the growing role of the service sectors in leading economic growth. Nevertheless, agriculture's contribution to GDP growth was negatives by (-0.07) as Syria witnessed in the second half of 2000s the driest three years ever between 2006/07-2008/09, which was claimed by many to have fueled the break out of the unrest in Syria in 2011 (Selby, Dahi, Fröhlich, & Hulme, 2017).

On the demand side, growth in both periods was mainly driven by private consumption that constituted 63.8% and 65.4% of GDP respectively (**Error! Reference source not found.**) adding 0.9 and 0.5 percentage points to the average growth rates of the two periods respectively. Aggregate capital formation formed 21.1% and 22.2% of real GDP in both periods respectively and added 0.52 and 0.14 to each one percentage points of the average GDP growth rate in both periods, indicating a decline in public and private investment efficiency in the economy. Nevertheless, private investment ratios, representing 12% of real GDP during 2006-2010, considered strikingly low in Syria, compared to other countries in the region, which in turn has much lower private investment ratios than other regions in the world (World Bank, 2010).

Net export of goods and services contribution to GDP growth inverted from being negative by -4% over the first period to 1.3% over the second period reducing each percentage point of GDP growth by -0.8 on average during the first period and adding 0.26 to each percentage point of GDP growth on average during the second period.

Figure 3. Syria: Average real GDP composition by expenditure item During 2001-2005 and 2006-2010 (%)



Source: The Syrian Statistical Abstract, several years. Central Bureau of Statistics, Syria.

2.2.2. Prices

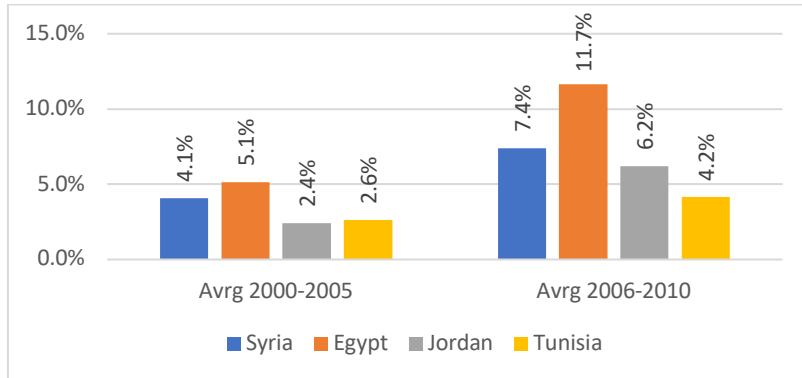
The reforms initiated in Syria after 2000 encompassed substantive price liberalization measures. The pricing system used to govern all aspects of imports, exports, production and consumption within the country. Syrian price liberalization aimed to reduce distortions by introducing incentive mechanisms through expanding public sector autonomy; commencing selective and gradual price liberalization; aligning prices to domestic supply and demand; gradual harmonization of international and neighboring country prices, and trade liberalization (Abboud, 2009).

Error! Reference source not found. shows that average inflation rate increased to 7.4% during 2006-2010 compared to 4.1% on average during 2001-2005. Essential goods were subject to increases due to subsidy “rationalization” as called by the government and to being consequently exchanged to parallel market, which made it out of the reach of ordinary people.⁸ For example, as the price of fuel rose due to the reduction of subsidies, the price of many dependent products and services had to adjust to this input new prices. In the same way, increasing the cement prices drove up real estate costs, which were already under inflationary pressures due to a number of other factors, such as the influx of Iraqi refugees (Abboud, 2009). External factors—of which the fluctuation in international prices of steel and food for example—also contributed to

⁸ The consumer price index published by the Central Bureau of Statistics in Syria accounts for the black-market prices of the administratively priced goods.

price increase in the in Syria and the region as shown by figure 5 that compares Syria’s inflation to three diversified Arab economies that are Egypt, Jordan and Tunisia.

Figure 4. Average inflation rates in Syria and selected Arab countries during 2001-2005 and 2006-2010 (percent)



World Bank, World Development Indicators database.

2.2.3. Monetary Policy and the Financial System

Since early 2000s, financial reforms in Syria addressed a series of important elements of a market monetary system by creating the necessary regulatory and supervisory frameworks for financial liberalization. During 2001-2005, the door was opened to allow private banking into the economy, Central Bank’s Basic Money Law was updated and the Money and Credit Council (MCC) was created to conduct monetary policy, and interest rates—after being fixed since 1981—were lowered to attract local capital into the banking system and to enhance competition among local banks (Abboud, 2009). Credit policy was also eased by raising the ceiling on single loans and relaxing the collateral requirements (Arslanian, 2009).

In the second half of the decade, private insurance companies, Islamic banks and foreign exchange bureaus and companies were allowed to operate. Additionally, the Securities and Financial Markets Authority was created in 2005 with the task of launching a stock exchange. The Damascus Securities Exchange (DSE) was subsequently established in 2006 and opened in early 2009. However, the reforms of public banks were minimal and did not exceed adjusting their organic laws to meet with the criteria set by the new banking law.

Structurally, the public banking sector maintained its dominance in the market in terms of deposits and assets. Nevertheless, it exhibited a high percentage of demand deposits compared to total deposits and a high percentage of unclassified debts. Moreover, a high proportion of public bank credits were given to the public sector and government which

represented, when none performing, deficit financing through loans from the public banks crowding out the private sector. Thus, despite the series of ambitious financial sector reforms, the financial sector in Syria on the eve of the conflict remained underdeveloped.

2.2.4. Fiscal Policy

Fiscal sustainability became a major concern in the early 2000s due its high dependence on the depleting oil reserves⁹, the effects of which was exacerbated by the declining oil prices, and necessitated adjustments on both the revenue and the expenditure side of the budget.

On the revenue side, tax reforms aimed at streamlining tax regulations and reducing tax evasion through lowering tax exemptions and imposing severe penalties on tax evaders while widening the tax base by bringing in new activities not previously taxed. Moreover, a general consumption tax law was passed in 2004 replacing a large number of indirect taxes, representing a shift in Syria's tax policy towards indirect taxes (Arslanian, 2009).

However, although the government tried to improve tax administration and established a large Taxpayers Unit, the capacity of tax administration remained weak in mitigating tax evasion, let alone implementing an ambitious plan for comprehensive Value Added Tax (VAT).

As a result, of these reforms, the contribution of oil revenues to total revenues decreased in relative terms from 45% (9.5% of GDP) on average during the period 2001-2005 to 26% of (5.5% of GDP) on average during the period 2006–2010. In contrast, the contribution of tax revenue rose from 38% of total revenue (10% of GDP) to 47% (9.7% of GDP) on average between the two periods.

Public spending fell from about 30% of GDP in 2001 to 25% in 2010. The current spending that accounted for roughly two thirds public expenditure went 63% of it on average during 2001-2010 for salaries and wages. Government subsidies gradually decreased from about 20% of total expenditure in 2000 to 10.3% in 2010 as part of a plan to rationalize subsidies in the light of declining oil resources. Nonetheless, 2009 was an exception when subsidies jumped to 14.5% of public expenditure due to increase in the world food prices. As a result of rationalizing public expenditure, public finance maintained a low deficit of only 2% of

⁹ Oil production in Syria peaked at 620,000 b/d in 1995 comparing to 170,000 b/d in 1985. The news on the depleting oil reserves emerged in the late 1990s where oil production started to gradually decrease until it reached around 380,000 b/d by the end of 2010 (Source: Organization of Petroleum Exporting Countries (OPEC), www.ceicdata.com).

GDP in 2010, while public debt decreased from 63% of GDP in 2000 to nearly 23% in 2010 (UNESCWA, 2017).

2.2.5. International Trade

Foreign trade and the exchange rate experienced considerable liberalization measures too. The maximum tariff rate has been lowered from 255 to 65% (IMF 2006) while the average tariff rate has been lowered from 20 percent in 2003 to 14.5 % in 2006 (IMF 2007). Important steps were taken towards removing quantitative restrictions through tariffication, while positive lists of importable goods have been replaced with a negative list. In addition, the multiple official exchange rates were eliminated and the exchange rate was unified. In addition, Syria entered into a number of bilateral agreements with neighboring countries such as Jordan, Iraq, Turkey, Iran and Saudi Arabia, in addition to its multilateral commitments, the Euro-Mediterranean Partnership (EMP) and the GAFTA (Seifan, 2010).

Starting from 2004, trade indicators shifted from surplus to deficit mainly due to a decline in oil exports and a high level of domestic demand for imports. Exports rose gradually from about 24% of GDP in 2000 to about 29% in 2005 and maintained this level until 2008, after which it fell to about 20% of GDP in 2009 and 2010. Imports rose from about 23% in the period 2000-2003 to over 34% in 2007 and 2008, falling back to about 29% in 2009 and 2010. Economic openness (the ratio of exports and imports to GDP) in Syria was 65% of GDP in 2010¹⁰ ranking the fourth among a group of five diversified Arab economies that are Jordan (117.3%), Tunisia (105.8%), Lebanon (96%) and Egypt (48%) of GDP in the same year.¹¹

2.3. The aftermath of eight years of conflict

The protracted and widely-spread violence created by the Syrian conflict has resulted in huge human and economic toll. At the human level, the conflict has claimed, as of end 2019 more than 0.5 million lives,¹² and much more wounded. According to UNHCR, the conflict has internally displaced 6.6 million person seeking safety and livelihood while over 5.6 million people had to seek refuge in neighboring countries and beyond, mainly in Europe.¹³ It also smashed the social development Syria had achieved sending it decades back by shredding the social fabric and destroying education and health infrastructure as well as the livelihood of the major segments of the populations and, consequently; unemployment and poverty rates rocketed to unprecedented levels.

¹⁰ National Data.

¹¹ World Bank Data.

¹² the Syrian Observatory for Human Rights (SOHR) (2019); Syria: 560,000 killed in seven yrs of war, SOHR; <http://www.syriahr.com/en/?p=108829>.

¹³ UNHCR 2019, <https://www.unhcr.org/syria-emergency.html> [Accessed 28 May, 2019].

On the economic side, the conflict has caused massive damage to the physical infrastructure in Syria that was estimated by UN ESCWA¹⁴ to have reached by the end of 2017 **USD 114.1 billion** at the constant prices of 2010. The damage took place mainly in the capital-intensive sectors and hit cities with high population and business density. The hardest hit sectors were housing, mining, and security sectors with 17.5%, 16% and 15.3% of the total physical damage, while transport, manufacturing, electricity and health received 12.6%, 9.9%, 6.2% and 4.5% respectively of the total physical damage. Education and tourism sectors incurred physical capital damage estimated at 3.7% and 3% respectively. Aleppo and Rural Damascus governorates received more than 50% of this damage (UNESCWA, 2019, forthcoming).

As a major consequence of the human and physical loss, Syria's GDP fell by the end of 2017 by more than 55% (down to USD 27.5 billion) of its level in 2010 (USD 61 billion). As the conflict raged in 2012 and 2013, together with the imposition of economic sanctions by the USA, EU, and the Arab League, real GDP was fell by more than 26% in each of these two years. Subsequent years GDP contraction rate due to the shrunken GDP base. In spite of the relative improvement in 2017 in the security situation in 2017 that allowed for the utilization of some idle production capacities and facilitated transactions among in many of the Syrian governorates, the downturn continued that year with the real GDP contracting by a further 1.5%.

The sectoral physical damage was reflected in the composition of real GDP. Mining and manufacturing sector contribution fell from 23% on average during 2006-2010 to 10.7% on average during 2011-2017. The contribution of the internal trade sector also dropped on average from 20.2% to 13.7% respectively for the same period due to lack of security and the effective partition of Syria under the control of various armed groups. The fall of these sectors' contribution to GDP allowed for government services and transport and communications sectors to account for a greater share in GDP: from average of 12.7% and 12.2% during 2006-2010 to 26% and 16.6% respectively during 2011-2016.

For 2011-2017 real GDP contraction occurred mainly, in internal trade; mining and manufacturing; and agriculture sectors by -0.2 each out of each one percentage point of contraction, while transport and communication; finance and real estate; and government service contributed by -0.1 each.

¹⁴ UN ESCWA, 2018

https://www.unescwa.org/sites/www.unescwa.org/files/press_reviews/press_clippings_escwa_news_10_august_2018.pdf [Accessed 12 June, 2019].

On the demand side, the share of total expenditure in consumption in real GDP increased, mainly by government consumption, from 82% as average during 2006-2010 to 105% as an average during 2011-2017 as a result of the increased reliance on external resources in fulfilling basic needs. This was reflected by both aggravating the negative share of net exports in goods and services to GDP by -21% as an average during the conflict years 2011-2017 comparing to -4% as a five-year average before the conflict, and the decline in aggregate investment share in GDP from 22.2% as five-year average before the conflict to 16% as an average of 2011-2017.

Aggregate consumption contributed to each one percentage point of real GDP contraction by -50% on average during 2011-2017 comparing to 73% of each one percentage point of real GDP growth on average of five years before the conflict. Total investment and trade balance contributed by -20% and -23% respectively of real contraction during the same period of the conflict comparing to 16% and 11% respectively on average of five years before the conflict.

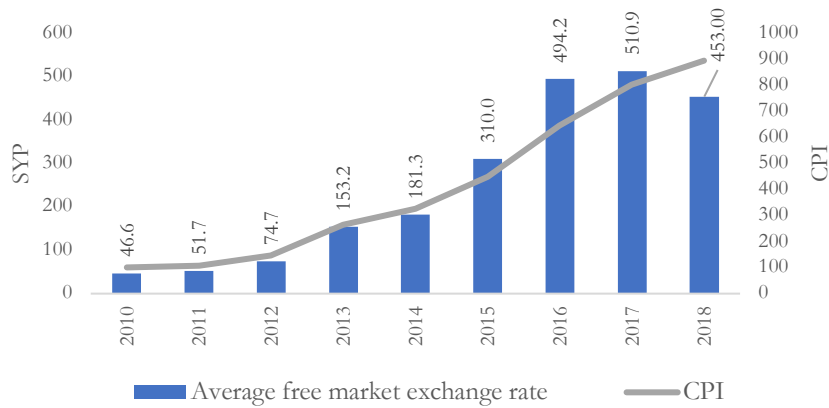
Foreign trade followed the same tragic downward trend of other macroeconomic indicators as a result of the destruction of the productive base, internal and external population displacement and economic sanctions. As such, International Trade Center (ITC) data shows that Syrian exports collapsed from USD 8.7 billion in 2010 to reach USD 0.8 billion in 2017, while imports dropped from USD 18.8 billion in 2010 to USD 4.8 billion in 2016. Nonetheless, Syrian imports in 2017 surged back to USD 6.1 billion. Consequently, trade deficit as a percentage of GDP deepened from 16.6% in 2010 to 37.3% in 2017.

The widening trade deficit, capital flight, external displacement, and economic sanctions placed huge pressure on the Syrian Lira leading it to lose more than 90% of its value in 2019 comparing to 2010. As such, the exchange rate of the Syrian lira against the USA Dollar fell from 46 Lira per 1 USD in 2010 to reach 580 Lira in 2019. The Central Bank efforts to maintain the value of Lira by intervening in the foreign exchange market, administratively managing demand, and restricting liquidity were ineffective in containing the currency deterioration, rather it induced the parallel foreign exchange market to flourish.

Though foreign exchange indicator reflects many macroeconomic variables, including price level, it became a reference for forming expectation on price level in the Syrian economy. Consumer price index published by the Central Bureau of Statistics in Syria reached 790.1 by the end of 2018 comparing to 2010, implying around 800% inflation rate over 8 years of the conflict. Prices in Syria during the conflict were driven mainly by supply side shocks resulting from the destruction and disruption of production and supply chains

because of violence, lack of security, and the fragmentation of the country according to battel lines. Administrative measures to control price level, especially for basic goods that were subsidized to some extent, has not been able to suppress inflation, rather it created incentive to push those goods to the black market.

Figure 6. CPI and Free Market Exchange Rate of the USD in SYP during 2010-2018



Source: Central Bank of Syria and authors calculations.

3. Data and Empirical Methodology

3.1. Data

This research paper investigates how real GDP reacts to structural shocks stemming from the specified macroeconomic variables. This analysis is based on available quarterly dataset of Syrian economy that covers the period 1990:Q1 up to 2017:Q4. The selected period will enable us to explore and identify the behavior of the selected macroeconomic variables in the Syrian economy before and during the conflict of 2011. The selection of the macroeconomic variables is based mainly on the theoretical framework of the reduced form of IS/LM model. Following this model, the main determinants of real GDP growth money supply, price level and exchange rate (see for example Kandil et al., 2007 and Arratibel et al., 2011). To investigate the reaction of real GDP to these three macroeconomic variables, we use the Structural Vector Autoregression (SVAR) approach and the NARDL method.

The first is the Structural Vector Autoregression (SVAR) of Blanchard and Quah (1989), which will be used to inspect the interaction between the selected macroeconomic variables. SVAR is important to construct impulses responses function, variance decomposition and forecasting the possible growth scenarios. The time series data are transformed into their logarithms forms as the log linear model provides better estimation results in comparison with linear model. This transformation reduces the variability of data, stabilizes the variance of the series and help in interpreting the results as elasticities (Chiu, 2017; Shahbaz, 2010).

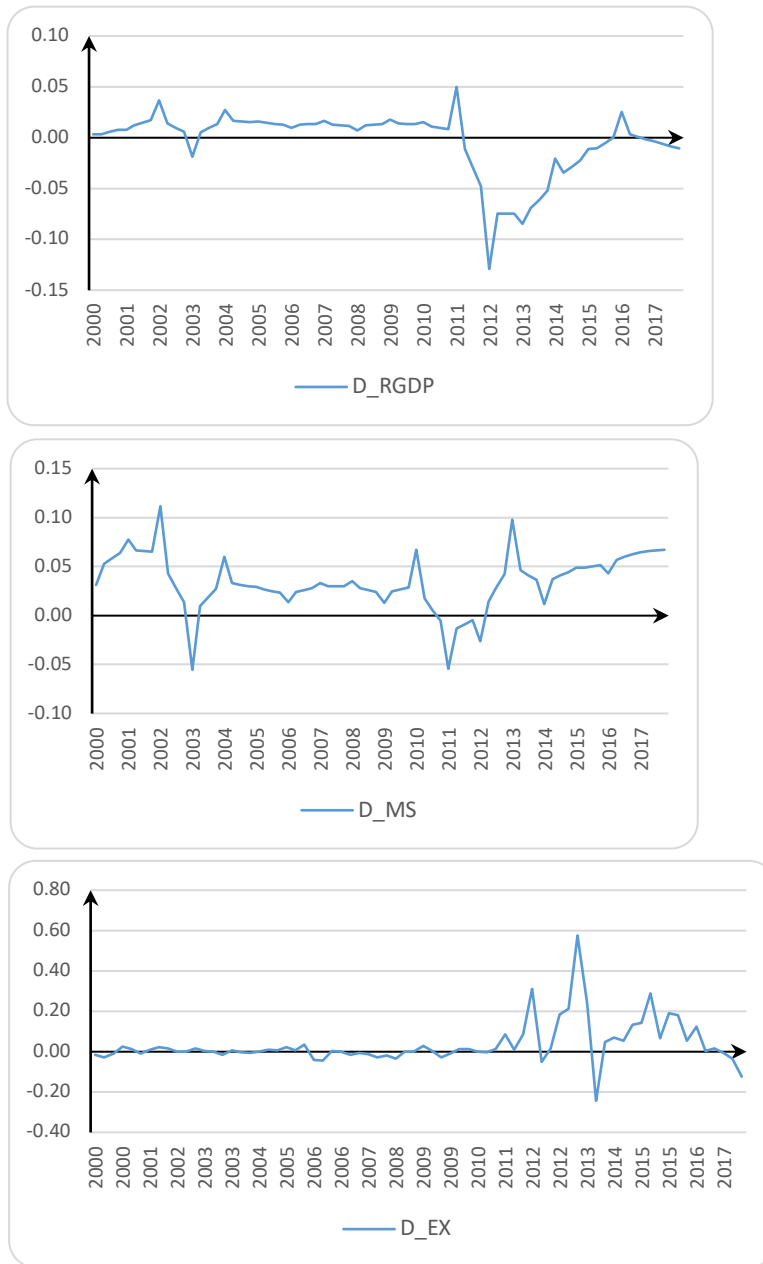
Given that, SVAR approach does not account for a possible asymmetric structure, we will employ a complementary methodology that impose an asymmetric structure. The second methodology is the nonlinear Autoregressive Distributed Lag (ARDL) of Shin et al. (2014) and it will be used to examine the long- and short-run nonlinear response of Real GDP to a sudden shock in the other macroeconomic variables.

Table (1) shows the descriptive statistic of the first differences in real GDP, money supply, consumer prices and exchange rate for the period under study [1990-2017]. For instance, the growth rates of real GDP growth (D_RGDP), money supply (D_MS), consumer price index (D_CPI), and exchange rate (D_EX) were on average 2, 15, 12 and 13 percent, respectively. However, the standard deviation of these variables was very high and greater than the mean (with the only exception of money supply). This and the estimates for kurtosis and skewness indicate that the selected variables do not have normal distribution, two of them being left skewed (RGDP and MS) and two right skewed (CPI and EX).

Table 1. Descriptive statistical analysis of the main selected variables

	D_RGDP	D_MS	D_CPI	D_EX
Mean	0.02	0.15	0.12	0.13
Standard Deviation	0.10	0.09	0.21	0.30
Sample Variance	0.01	0.01	0.04	0.09
Kurtosis	3.31	0.04	5.94	11.12
Skewness	-1.95	-0.27	1.98	3.04
Range	0.45	0.43	1.37	1.95
Minimum	-0.31	-0.08	-0.27	-0.15
Maximum	0.14	0.35	1.10	1.81
Number of observations	108	108	108	108
D_ : Refers to the first difference				

Figure 7. Quarterly year-on-year changes of RGDP, MS, CPI, and EX



3.2. Empirical Methodology

The main purpose of this paper is to identify and estimate the transmission mechanism of shocks from nominal variables such as money supply, consumer price index, and exchange rate to real GDP. To this end, this paper aims to estimate the real GDP model in the Syrian economy. Our model may be derived either from the standard neoclassical growth model or the reduced form IS/LM model (Kandil et al, 2007; Arratibel et al., 2011; Mrabet and Alsamara, 2018). Thus, the model of real GDP can be specified as follows:

$$\ln RGDP_t = \beta_0 + \beta_1 \ln Ex_t + \beta_2 \ln MS_t + \beta_3 \ln CPI_t + \varepsilon_t \quad (1)$$

Where RGDP is the real gross domestic product, EX is the parallel market exchange rate, MS is the broad money supply, CPI is the consumer price index, and ε_t is the error term. This approach focuses on the demand side of the economy rather than the supply side as is customarily derived from a Cobb-Douglas production function (Antras, 2004). As earlier mentioned, we will proceed in to two methodology: SVAR and NARDL to investigate the main determinates of real GDP in Syria and its possible pathways.

3.2.1. Structural Vector Autoregression (SVAR)

Our objective in this part is to examine the interaction of diverse macroeconomics variables to any structural shock. The VAR methodology introduced by Sims (1980) is a multivariate framework where the change in a specific variable is determined by the history of own change and the history of the other variables (Koitsiwe and Adachi, 2015). The VAR model is therefore a very useful to examine the dynamic behavior of macroeconomic variables. The simple structure of the VAR, however, does not recognize the structural relationship between variables and poses the problem of identifying the causality mechanism present in the equation system (ordering of impulses in econometric jargon). This problem led Blanchard and Quah (1989) to develop the structural VAR (SVAR) analysis. The SVAR is a dynamic empirical analysis that allow explaining the economic phenomena supported by economic theories. This characteristic makes the SVAR remarkably convenient to analyze macroeconomic shocks. In this consideration, to trace the effect of any shock on the response of variables in the system the impulse response function (IRF) analysis is used. Once we get sufficient intuition through IRF analysis, we will apply Forecast Error Variance Decomposition (FEVD) analysis. The FEVD shows the percentage change of the response variables because of the shock. In our analysis, the SVAR framework will allow us to perform the impulse response function (IRF) analysis and Forecast Error Variance Decomposition (FEVD) analysis to inspect the impact of money supply, price and exchange rate shocks on the real GDP in Syria. The IRF illustrate the dynamic response of each variable to a one-unit innovation to a series. Algebraically, the IRF is specified as:

$$\Phi_i = \frac{\partial y_{t+k}}{\partial \vartheta'_t}$$

Where Φ_i represents the response of a variable is in the future to an impulse / shock that currently occurs.

In this regard, the mathematical representation of SVAR model can be written as follow:

$$A_0 Y_t = c_0 + \sum_{i=1}^p A_i Y_{t-i} + \vartheta_t$$

(2)

Where A_0 represents a (4x4) matrix, Y_t represents a (4x1) vector of endogenous variables ($Y_t = [MS, CPI, EX, RGDP]$), ϑ_t represents the (4x1) structural innovations vector supposed to have a covariance equal to zero and be non-correlated.

The covariance matrix for the structural disturbances has the following form:

$$E[\vartheta_t \vartheta_t'] = D = [\sigma_1^2 \ \sigma_2^2 \ \sigma_3^2 \ \sigma_4^2] \times I.$$

By pre-multiplying both sides of equation (2) by A_0^{-1} , we obtain the reduced form of our structural model, as follow:

$$Y_t = b_0 + \sum_{i=1}^p B_i Y_{t-i} + \mu_t \quad (3)$$

Where $b_0 = A_0^{-1} c_0$, $B_i = A_0^{-1} A_i$ and $\mu_t = A_0^{-1} \vartheta_t$. The errors μ_t are linear combinations of errors ϑ_t , with the matrix of covariance $E[\mu_t \mu_t'] = A_0^{-1} D A_0^{-1'}$.

The four variables of structural VAR model can be written as follow:

$$\begin{bmatrix} \Delta MS \\ \Delta CPI \\ \Delta EX \\ \Delta RGDP \end{bmatrix} = \begin{pmatrix} 1 & 0 & 0 & \beta_{15}(L) \\ \beta_{21}(L) & 1 & \beta_{23}(L) & 0 \\ 0 & 0 & 1 & 0 \\ \beta_{41}(L) & \beta_{42}(L) & \beta_{43}(L) & 1 \end{pmatrix} \times \begin{bmatrix} \vartheta_t^{MS} \\ \vartheta_t^{CPI} \\ \vartheta_t^{EX} \\ \vartheta_t^{RGDP} \end{bmatrix}$$

This poses an identification problem with simultaneous equations, which we solve by imposing some restrictions to resolve the system of equations. In our case, we use theory and economic intuitions to identify such restrictions. The structural disturbances can be obtained by making appropriate constraints on A_0 matrix.

The order of variables and the specified restrictions in the SVAR system can be described as follows:

First, the theoretical Keynesian model of economic growth argues that the money supply (MS) affects the demand for aggregate demand and subsequently output. Moreover, based on the quantitative theory of money the increase or decrease in money supply will influence the price level. This means that an expansionary monetary policy shock will directly increase the price level and income. However, the increase of money supply might have no direct impact on exchange rate under fixed or pegged exchange rate regime.

Second, according to the theory of aggregate demand when the price level increases the quantity demanded will decrease and vice-versa. Moreover, based on the quantity theory of money the price level is affected by the change of money supply. Any increase of money supply will rise the price level and negatively affects the income. Therefore, a shock in CPI will decrease the income but might have no direct effect on money supply and exchange rate.

Third, based on the quantity theory of money and the monetary approach, an increase in exchange rate (depreciation) will increase the CPI and decrease the income. Whereas, a decrease in exchange rate (appreciation) will lower prices and rise income. Finally, the size of income and the money supply will increase in reaction to a positive income shock. However, the income increase has no contemporaneous effect on inflation and exchange rate.

Hence, considering the previous theoretical restrictions we can write as follow:

$$\begin{bmatrix} \Delta MS \\ \Delta CPI \\ \Delta EX \\ \Delta RGDP \end{bmatrix} = \begin{pmatrix} 1 & 0 & 0 & \beta_{15}(L) \\ \beta_{21}(L) & 1 & \beta_{23}(L) & 0 \\ 0 & 0 & 1 & 0 \\ \beta_{41}(L) & \beta_{42}(L) & \beta_{43}(L) & 1 \end{pmatrix} \times \begin{bmatrix} \vartheta_t^{MS} \\ \vartheta_t^{CPI} \\ \vartheta_t^{EX} \\ \vartheta_t^{RGDP} \end{bmatrix}$$

Where L is the operator lags.

Based on the previous form of matrix we can distinguish 6 unknown coefficients to estimate. The estimation of these coefficients we will use the same technic of Amisano and Giannini (1997) and imposes restrictions on two matrices A and B in the following form:

$$A = \begin{pmatrix} 1 & 0 & 0 & \beta_{15}(L) \\ \beta_{21}(L) & 1 & \beta_{23}(L) & 0 \\ 0 & 0 & 1 & 0 \\ \beta_{41}(L) & \beta_{42}(L) & \beta_{43}(L) & 1 \end{pmatrix} \quad B = \begin{pmatrix} b_{11} & 0 & 0 & 0 \\ 0 & b_{22} & 0 & 0 \\ 0 & 0 & b_{33} & 0 \\ 0 & 0 & 0 & b_{44} \end{pmatrix}$$

3.2.2. The Nonlinear ARDL Methodology

This methodology investigates whether the impact of the explanatory variable is symmetric or asymmetric on real GDP. It is well known that the standard ARDL model of Pesaran et al. (2001) fails to capture the nonlinearity in the long run relationship between the selected variables. In this context, Shin et al. (2014) have recently developed the nonlinear ARDL approach to investigate the nonlinear relationship between two variables y_t and x_t in the long and short run. The methodology is based on decomposing the changes in x_t into its positive and negative partial sums (x_t^+, x_t^-) as follows:

$$x_t = x_0 + x_t^+ + x_t^-$$

Where x_0 is the starting point of x

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

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

Thus, the long run cointegration equation of y_t with the asymmetric component of x_t can be expressed as follow:

$$\begin{aligned} y_t &= \alpha^+ x_t^+ + \alpha^- x_t^- + \mu_t \\ \Delta x_t &= v_t \end{aligned} \quad (4)$$

Where α^+ and α^- are the long run coefficients related to the positive and negative changes in x_t , respectively and μ_t and v_t are i.i.d. processes. Shin et al. (2014) embed the nonlinear asymmetric conditional ARDL in the standard error correction framework as follows:

$$\Delta y_t = \alpha_0 + \rho y_{t-1} + \theta^+ x_{t-1}^+ + \theta^- x_{t-1}^- + \sum_{i=1}^{p-1} \varphi_i \Delta y_{t-i} + \sum_{i=0}^{q-1} (\delta_i^+ \Delta x_{t-i}^+ + \delta_i^- \Delta x_{t-i}^-) + \mu_t \quad (5)$$

Where $\theta^+ = -\frac{\alpha^+}{\rho}$ and $\theta^- = -\frac{\alpha^-}{\rho}$

The NARDL allows for testing the existence of asymmetric components. Note that whenever $\rho = 0$, the model reduces to the regression involving only first differences, implying that there is no long-run relationship between the levels of y_t , x_t^+ and x_t^- . A simple t-test of the null hypothesis $\rho = 0$ against $\rho < 0$ is sufficient. A second useful test is an F-test of the joint null hypothesis, $\rho = \theta^+ = \theta^- = 0$, to check for the presence of asymmetries in the long run relationship between variables. Wald tests can be employed to check for the presence of the short and the long-run asymmetries. Finally, we assess the dynamic adjustment to the long run equilibrium in response to a long-run sudden shock. The nonlinear ARDL model provides two dynamic multipliers (m_h^+ and m_h^-) to evaluate the dynamic adjustments. These multipliers are constructed as follows:

$$m_h^+ = \sum_{i=0}^h \frac{\partial y_{t+i}}{\partial x_t^+}, \quad m_h^- = \sum_{i=0}^h \frac{\partial y_{t+i}}{\partial x_t^-}$$

The main use of these dynamic multipliers is to describe the asymmetric adjustment toward the long-run equilibrium.

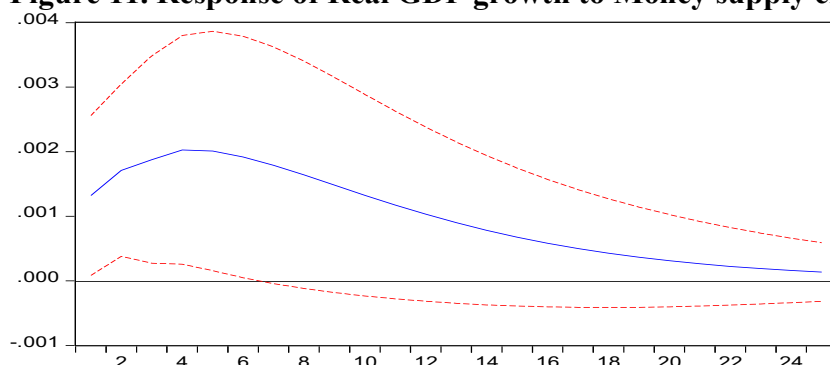
4. Empirical Estimation

4.1. Structural VAR (SVAR) Analysis and Estimation

The SVAR estimation provides two important outputs: Impulse Responses Function and Variance Decomposition. Impulse Responses (IR) indicate how each variable will respond to a sudden shock and show the short and long run path of this variable. Additionally, variance decomposition designates the share of the error variance that is attributable to its own shock and the shocks in other variables (Iwayemi and Fowowe, 2011). The horizontal line in the IR graph represents the periods whereas the vertical one represents the response magnitude to a sudden shock.

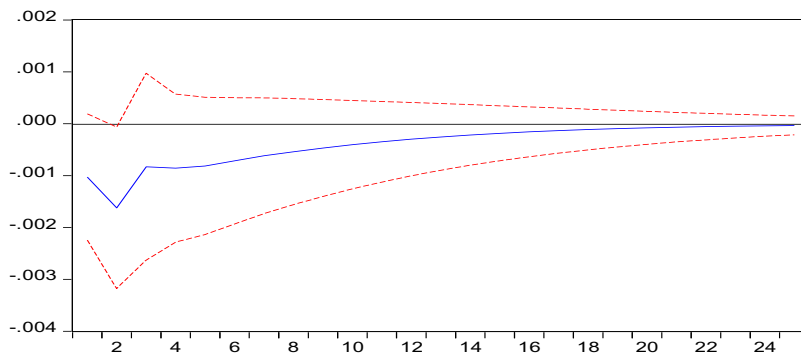
Figure 11 shows the impact of unexpected shocks in money supply on the economic growth. Our empirical analysis indicates that a sudden shock in money supply changes will lead to a significant positive impact on real GDP growth.

Figure 11. Response of Real GDP growth to Money supply changes



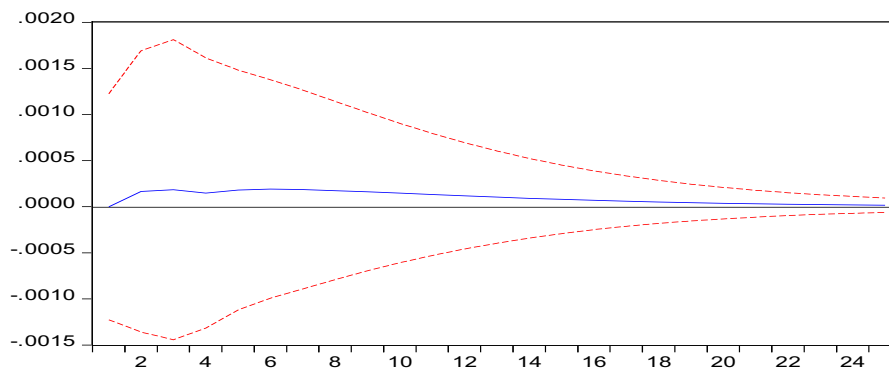
In addition, figure (12) depicts the real GDP growth response to a shock in the parallel market exchange rate changes. The SVAR estimations indicate that an increase exchange rate (currency depreciation) will lead to a significant negative impact on real GDP growth.

Figure 12. Response of Real GDP growth to exchange rate changes



In contrary, the response of real GDP growth to a shock in consumer price changes seems to be insignificant and very trivial.

Figure 13. Response of Real GDP growth to consumer price changes



As earlier mentioned, SVAR analysis enables to investigate the decomposition of the error variance. Table 2 indicates that in the short run, 94 percent of error in real GDP is attributed to shocks in real GDP itself, 2.5 percent is attributed to shocks in exchange rate, and 4 percent is attributed to shock in money supply. Whereas, in the long run, 74 percent of error in real GDP is attributed to shocks in real GDP growth itself, 4.65 percent is attributed to shocks in exchange rate changes, and 21 percent is attributed to shock in money supply growth.

Table 2. Variance decomposition

Period	S.E.	DMS	DCPI	DEX	DGDP
1	0.007881	4.093799	3.45E-06	2.470234	93.43596
2	0.009507	7.168110	0.041683	5.646071	87.14414
3	0.010261	9.519772	0.071059	5.073025	85.33614
4	0.010583	11.90316	0.080260	4.934856	83.08173
5	0.010738	13.88334	0.097991	4.896345	81.12232
6	0.010824	15.48481	0.117699	4.854473	79.54302
7	0.010881	16.77116	0.134853	4.809368	78.28462
8	0.010925	17.79497	0.149124	4.772983	77.28293
9	0.010963	18.59984	0.160964	4.744603	76.49460
10	0.010996	19.22627	0.170594	4.722067	75.88107
11	0.011025	19.70971	0.178261	4.704300	75.40773
12	0.011050	20.07979	0.184275	4.690512	75.04542
13	0.011071	20.36090	0.188940	4.679930	74.77023
14	0.011089	20.57285	0.192519	4.671874	74.56276
15	0.011102	20.73156	0.195239	4.665791	74.40741
16	0.011113	20.84963	0.197288	4.661232	74.29185
17	0.011122	20.93693	0.198820	4.657840	74.20641
18	0.011129	21.00112	0.199956	4.655333	74.14359
19	0.011134	21.04807	0.200795	4.653490	74.09765
20	0.011137	21.08223	0.201410	4.652142	74.06422

The empirical results of variance decomposition reveal that the main two factors that can drive real GDP growth are exchange rate and money supply changes. Therefore, we are going to discuss several scenarios represents different capabilities of controlling money supply in the environment of stable exchange rate regime to mitigate the negative impact of exchange rate and money supply changes on real GDP growth.

4.2. Nonlinear ARDL Model Estimations

The nonlinear ARDL method will account for the asymmetric response of real GDP to money supply changes. Additionally, to consider the structure change caused by the 2011 conflict on the selected macroeconomics variables, we have the study into three different periods: before the conflict (1990 - 2010), during the conflict (2011 -2017) and the whole period (1990 -2017).

The empirical results of the nonlinear real GDP model provide strong evidence indicating that consumer prices, parallel market exchange rate, and money supply (positive and

negative changes) explain the long and short run behavior of real GDP (see table (3)). The long and short run symmetry tests indicate that in the period 1990-2017 real GDP responds asymmetrically only to money supply changes¹⁵ but not to consumer prices, or exchange rate. The impact of money supply on real GDP is consistent with the assumptions of quantitative theory of money. A one percent increase in money supply (positive changes) lead to an increase in real GDP by 0.44 percent before conflict, 0.54 percent during the conflict, and 0.47 percent for the whole period. In contrast, a one percent decrease in money supply (negative changes) lead to a decrease in real GDP by 1.85 percent before conflict, 15.45 percent during the conflict, and 5.03 percent for the whole period.

The long run impacts of parallel market exchange rate (EX) and consumer prices (CPI) on RGDP are significantly negative in particular during the conflict period. The EX impact is estimated by -0.41 for the whole period and -1.044 during the conflict period. Similarly, the CPI impact is estimated by -0.18 for the whole period and -1.34 during the conflict period. These long run effects are attained by normalizing the long run coefficient of exchange rate in the estimated nonlinear ARDL based on the following formula ($\theta^+ = -\frac{\alpha^+}{\rho}$, $\theta^- = -\frac{\alpha^-}{\rho}$) as explained in equation 4. This result means that an increase of 1% in parallel market exchange rate will cause a decrease in RGDP by more than 1% during the conflict period. This real GDP's response to currency depreciation is extremely greater than its response when we take the period as a whole.

As a robustness test, we further investigate the patterns of real GDP adjustments to its equilibrium level. Thus we perform the dynamic multiplier analysis that suggested by Shin et al., (2014). The dynamic multiplier provide an addition evidence on the asymmetric adjustment of real GDP following money supply shocks. In the case of Syrian economy, this dynamic multiplier shows that real GDP responds more to money supply decreases (MS negative changes) in comparison with money supply increases (MS positive change) (figure (8)).

¹⁵ We further estimate the nonlinear impacts of parallel market exchange rate and the CPI on RGDP, but the empirical results were statistically insignificant. Thus, we limit our analysis on the nonlinear impact of money supply on RGDP.

Table 3. Asymmetric impact of Money Supply on real GDP Growth 1990-2017 (quarterly data)

Dependent variable: RGDP		
$RGDP = F(EX, CPI, MS^+, MS^-)$		
Variables	Estimated Coefficient	P_value
$lrgdp_{t-1}$	-0.08	0.000
lms_{t-1}^+	0.04	0.000
lms_{t-1}^-	0.45	0.000
$\Delta lrgdp_{t-1}$	0.44	0.000
Δlms_t^+	0.19	0.04
Δlms_{t-1}^-	0.67	0.03
lex_{t-1}	-0.033	0.011
Δlex_{t-2}	0.049	0.02
$lcpi_{t-1}$	-0.015	0.26
$\Delta lcpi_{t-4}$	-0.09	0.000
LR_{lms}^+	0.47	0.027
LR_{lms}^-	5.033	0.000
Long and Short Run Symmetry Tests		
Long run test : $W_{LR,lms}$	18.13	0.000
Short run test: $W_{SR,lms}$	15.9	0.000
F-test : F_PSS	15.36	
Diagnostic statistic		
Autocorrelation test : X_{SC}^2	28.6	0.90
Normality test : X_{NORM}^2	6.34	0.31
Heteroscedasticity test: X_{HET}^2	2.08	0.25
X_{FF}^2	1.11	0.4

Figure 8. Dynamic Multipliers

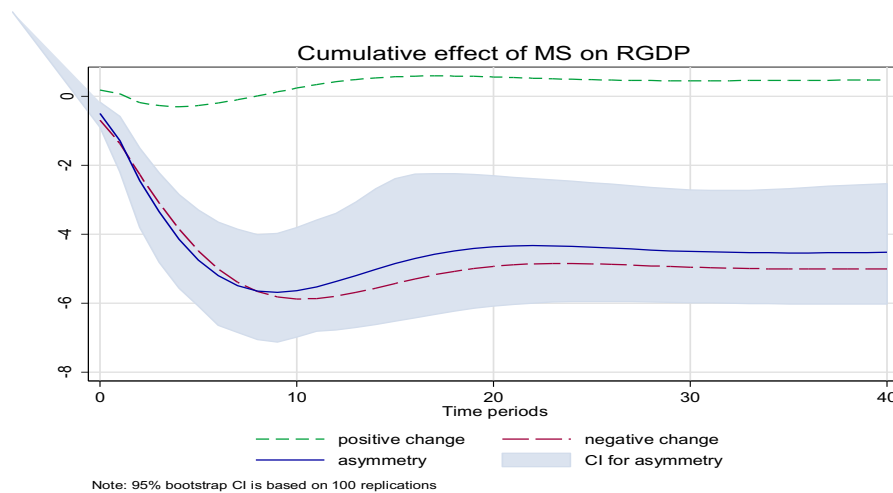


Table 4. Asymmetric impact of Money Supply on real GDP Growth 1990-2010

Dependent variable: RGDP		
$RGDP = F(EX, CPI, MS^+, MS^-)$		
Variables	Coefficient	P value
$lrgdp_{t-1}$	-0.01	0.018
lms_{t-1}^+	0.022	0.012
lms_{t-1}^-	0.09	0.000
$\Delta lrgdp_{t-1}$	0.57	0.000
Δlms_t^+	0.30	0.000
Δlms_{t-1}^-	0.44	0.003
lex_{t-1}	-0.033	0.11
Δlex_{t-1}	-0.019	0.67
$lcpi_{t-1}$	-0.01	0.43
$\Delta lcpi_{t-1}$	-0.015	0.45
LR_{lms}^+	0.44***	0.002
LR_{lms}^-	1.85*	0.11
Long and Short Run Symmetry Tests		
Long run test : $W_{LR,lms}$	0.53	0.46
Short run test: $W_{SR,lms}$	3.2*	0.07
F-test : F_PSS	5.36	
Diagnostic statistic		
Autocorrelation test : X_{SC}^2	46.6	0.15
Normality test : X_{NORM}^2	80.34	0.00
Heteroscedasticity test: X_{HET}^2	0.08	0.95
X_{FF}^2	1.11	0.4

Figure 9. Dynamic Multipliers

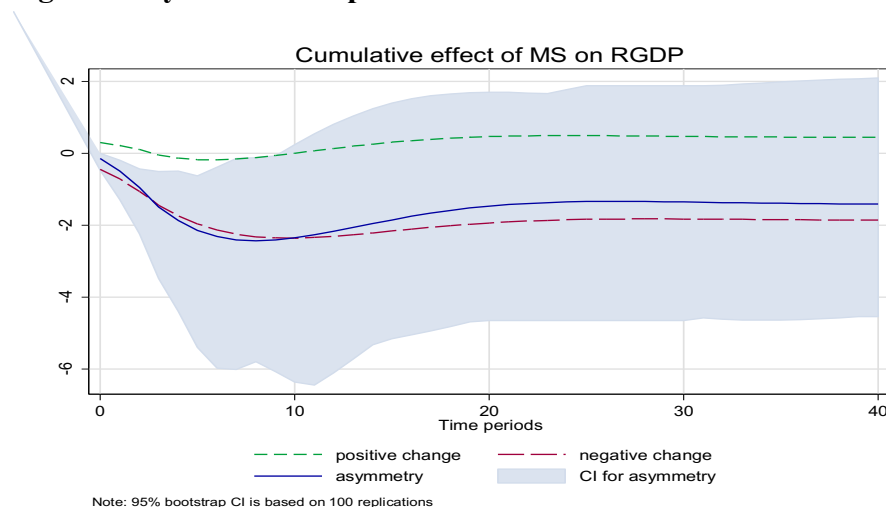


Table 5. Asymmetric impacts of Money Supply on real GDP Growth 2011-2017

Dependent variable:		
Model: 1 $RGDP = F(EX, CPI, MS^+, MS^-)$		
Variables	Coefficient	P value
$lrgdp_{t-1}$	-0.089	0.028
lms_{t-1}^+	0.048	0.29
lms_{t-1}^-	1.38	0.04
$\Delta lrgdp_{t-1}$	0.26	0.07
Δlms_t^+	-0.38	0.021
Δlms_{t-1}^-	3.85	0.000
lex_{t-1}	-0.093	0.011
Δlex_t	0.048	0.04
$lcpi_{t-1}$	-0.12	0.04
$\Delta lcpi_t$	-0.17	0.02
LR_{lms}^+	0.54	0.09
LR_{lms}^-	15.45	0.05
Long and Short Run Symmetry Tests		
Long run test : $W_{LR,lms}$	3.84	0.06
Short run test: $W_{SR,lms}$	49.7	0.000
F-test : F_PSS	5.36	
Diagnostic statistic		
Autocorrelation test : X_{SC}^2	14.6	0.2
Normality test : X_{NORM}^2	1.34	0.39
Heteroscedasticity test: X_{HET}^2	2.25	0.13
X_{FF}^2	9.4	0.03

Figure 10. Dynamic Multipliers

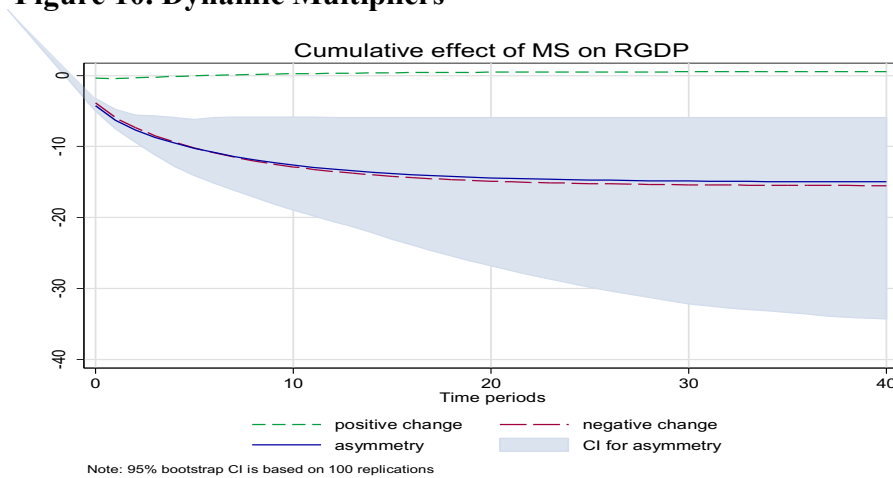


Table (6) summarizes the long and short run nonlinear response of real GDP to money supply changes in the three investigated periods. These results indicate that the responses of real GDP to negative shocks in money supply are greater than its responses to positive shocks in money supply. More interestingly, real GDP responses to the negative changes of money supply are particularly large and significant during the conflict period compare to those responses during period before the conflict and the period as a whole from 1990 to 2017.

Table 6. Summary of long- and short-run response of RGDP to MS changes

RGDP response to MS changes	LR_{lms}^+	LR_{lms}^-	SR_{lms}^-	SR_{lms}^-
Before the conflict (1990 - 2010)	0.44***	1.85*	0.30***	0.44***
During the conflict (2011 - 2017)	0.54*	15.45**	-0.38**	3.85***
Whole period (1990 - 2017)	0.47**	5.03***	0.19**	0.67**

In fact, the estimated money supply coefficients during these three periods denote three different scenario analysis. The first scenario (Before the conflict) represents the situation of non-conflict. In this scenario, real GDP will decline by 1.85 percent in response to money supply negative shock. The second scenario (During the conflict) represents the situation of lasting conflict, where real GDP response extremely high to money supply negative shocks.

The third scenario (whole period) represents the ending conflict situation or a lower level of intension in the country. In this scenario, real GDP response is extremely low in comparison to its response in the second scenario. This scenario reflects the role of the existing institution and the internal factor of growth that can mitigate the impact of any external shocks. In particular, this scenario cover the whole period and capture the role of many government policies in encountering the impact of historical negative shocks in the economy.

4.3. Scenario Forecast of Real GDP Growth

The objective of this section is to investigate the future evolution of RGDP conditional on several scenarios on money supply to see whether they are a viable pathway for sustained economic growth in Syria. We rely on the output of the structural VAR estimation to provide a horizon forecast of the real GDP level in the Syrian economy from 2018 to 2025. Therefore, in designing the scenarios, we consider quarterly money supply from the first quarter of 2018 to the fourth quarter of 2025.

We distinguish four different scenarios for money supply as a possible view of rebuilding policies, which include baseline, self-resources, capital repartition, and foreign aid. Thus, this empirical research designs several scenarios for the real GDP growth based on the money supply changes in the long-term horizon 2018 -2025 (figure 14). This argument is based on the empirical analysis of real GDP growth model, where money supply is found to have a significant positive impact on real GDP.

The first scenario is the baseline scenario with no significant changes to the current situations of the conflict in Syria. This pessimistic scenario reflects the permanence of conflict and the steadiness situation of the Syrian refugees. The forecasting results of this scenario infers that the real GDP will decrease steadily by 1% if the status quo continue as it is.

The second scenario involves a medium capability of the country to increase money supply by 15 percent. This percentage represents the average growth rate of money supply in Syria during the period 1990-2017. This possible money supply increase reflects a self-financing capacity, which is driven mainly by a partial repatriation of labour force and capital investments. This scenario shows that real GDP increase steadily by 3.9 % in response to the mean of the money supply growth.

The third scenario allows for a 35 percent increase in money supply that will increase the RGDP by 4.5%. The increase in money supply by 35 percent represents the maximum money supply growth rate in Syria during the period 1990-2017. This scenario represents the highest capability to increase the money supply in the economy based on the internal resources and capital repartition. In addition, this scenario does not consider a possible foreign reconstruction funds.

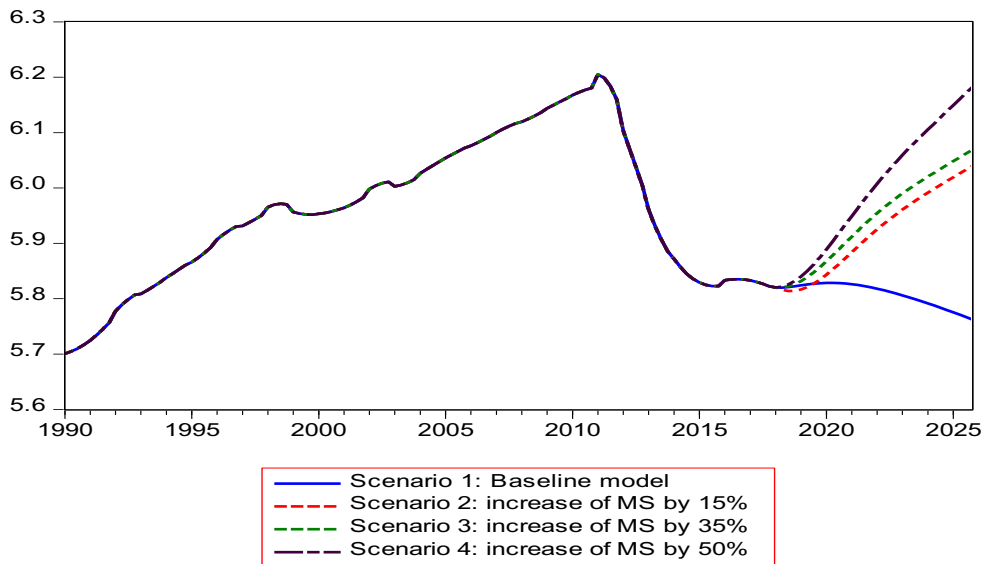
The fourth scenario allows for a 50 percent increase in money supply, which will lead to a substantial increase in real GDP by 6%. This scenario represents unprecedented increase in money supply that may be occurred through both internal resources, capital repartition, foreign aid and foreign reconstruction funds. The pathway of real GDP growth in this scenario is moderately better and enable the economy to reach the real GDP level of 2010. The success of this scenario depends on the political settlement agreement, which will directly influence the process of capital repartition and the flow of foreign aid.

Following inflow of foreign aid, several possible reactions can occur, depending on the exchange regime and monetary policy actions. In case of fixed exchange rates, the net foreign assets of central bank (CBS) will increase. This will expand the money supply, unless CBS sterilizes this by contractionary open market operations. In case of flexible

exchange rates, the currency will appreciate (compared to the level it would have had with no such inflows) and no effect on the money supply.

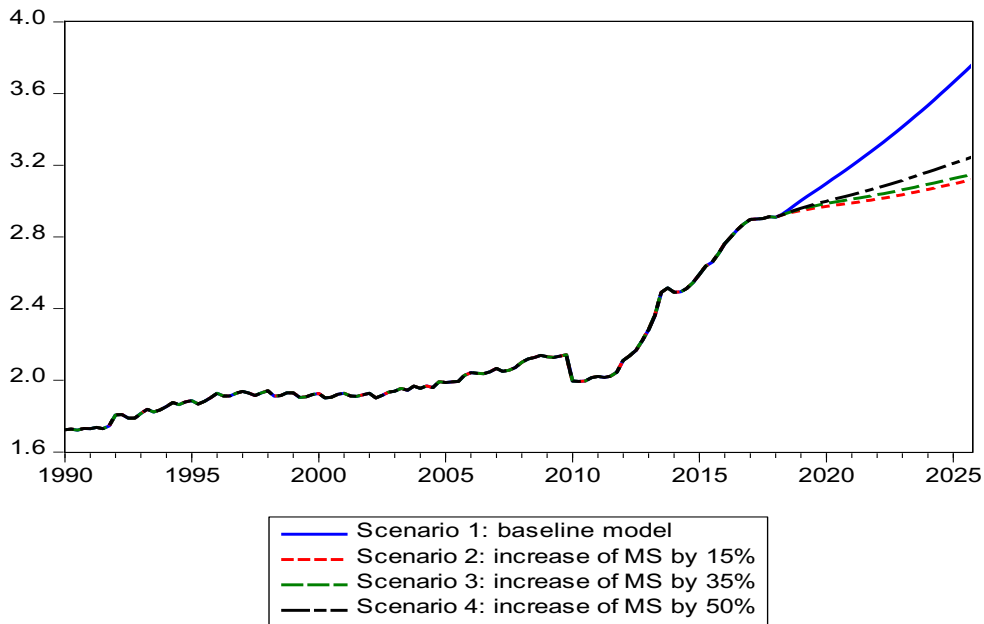
It is worth mentioning that scenarios 2, 3 and 4 are based on some institutional assumptions, especially that the central bank of Syria is able to defend the current level of the foreign exchange rate in 2017.

Figure 14. Scenario based forecast for RGDP



The pathway of consumer prices changes following the four scenarios of the money supply increases are shown in figure 6. The baseline scenario of conflict persistence indicates that the CPI will increase by 27%. Scenarios 2, 3 and 4 reveal that the CPI will increase by 6%, 7.2% and 10.2%, respectively. These scenarios are different from the baseline scenario and represent possible capabilities of Syrian government during the peace-building period. The peace-building period is an assumption reflects the government ability to use its macroeconomics policies in the environment of stable exchange rate regime.

Figure 15. Scenario based forecast for CPI



5. Conclusion and Policy Implications

This paper investigates the relationship between the main macroeconomic indicators, namely real GDP, consumer prices and parallel market exchange rate in the Syrian economy during the period 1990 -2017. To this end, we provide a comprehensive analysis for the macroeconomic policies and performance in the pre-conflict and during the conflict periods. In addition, this paper provides an analysis for the aftermath of eight years of conflict that has resulted in huge damage reached by the end of 2017 USD 119.7 billion at the constant prices of 2010.

As a major consequence to the human and physical destruction, Syria's GDP fell by more than 55% by the end of 2017 (USD 27.5 billion) comparing to its 2010's level (USD 61 billion). The widening trade deficit, capital flight, external displacement, and economic sanctions placed huge pressure on the Syrian lira leading it to lose more than 90% of its value in 2019 comparing to 2010. As such, the exchange rate of the Syrian lira against the USA Dollar fell from 46 lira per 1 USD in 2010 to reach 580 Lira in 2019. Consumer price index published by the Central Bureau of Statistics in Syria reached 773.4 by the end of 2017 comparing to 2010, implying almost 800% inflation rate over 7 years of the conflict. Given these outcomes about the Syrian economy, this paper proceed further to estimate the interaction between the main macroeconomic indicators. We use two different estimation approach to explore the main determinants of real GDP growth in the Syrian economy and to investigate the real GDP response to shocks in other macroeconomic variables such as Money supply, consumer prices, and exchange rate.

First, the empirical analysis of SVAR approach indicates that a sudden shock in money supply changes will lead to a significant positive impact on real GDP growth. In contrary, the real GDP growth response to a shock in the parallel market exchange rate changes is negative. Moreover, the variance decomposition of the error variance indicates that, in the long run, 74 percent of error in real GDP is attributed to shocks in real GDP growth itself, 4.65 percent is attributed to shocks in exchange rate changes, and 21 percent is attributed to shock in money supply growth.

Second, the nonlinear ARDL method is used to investigate the main determinants that influence the real GDP and its growth in the Syrian economy over the period 1990:Q1 – 2017:Q4. The empirical results of the nonlinear real GDP model provide a strong evidence indicating that real GDP responds asymmetrically only to money supply changes. A one percent increase in money supply (positive changes) lead to an increase in real GDP 0.54 percent during the conflict. In contrast, a one percent decrease in money supply (negative changes) lead to a decrease in real GDP by 15.45 percent during the conflict. The dynamic multiplier analysis shows that real GDP responds more to money supply decreases in comparison with increases.

More interestingly, findings indicate the responses of real GDP to negative shocks in money supply are greater than its responses to positive shocks in money supply. In particular, real GDP responses to the negative changes of money supply are particularly large and significant during the conflict period compare to those responses during pre-conflict period and the period as a whole from 1990 to 2017. In fact, the estimated money supply coefficients during these three periods denote three different case analysis. The first period (Before the conflict) represents the situation of non-conflict. In this scenario, real GDP will decline by 1.85 percent in response to money supply negative shock. The second period (During the conflict) represents the situation of lasting conflict, where real GDP response extremely high to money supply negative shocks.

The third period (whole period) represents the ending conflict situation or a lower level of intension in the country. In this scenario, real GDP response is extremely low in comparison to its response in the second scenario. This scenario reflects the role of the existing institution and the internal factor of growth that can mitigate the impact of any external shocks. In particular, this scenario cover the whole period and capture the role of many government policies in encountering the impact of historical negative shocks in the economy.

Furthermore, we depend on the output of the structural VAR estimation to provide a horizon forecast of the real GDP and CPI level in the Syrian economy from 2018 to 2025. We distinguish four different scenarios for money supply as possible views of rebuilding scenarios which include baseline, self-resources, capital repatriation, and foreign aid. The last three scenarios include the increase of money supply by 15%, 35%, and 50% respectively. The fourth scenario, which allows for a 50 percent increase in money supply, will lead to a substantial increase in real GDP by 6%. The pathway of real GDP growth in this scenario is moderately better and enables the economy to reach the real GDP level of 2010. This scenario represents an unprecedented increase in money supply that may be achieved through both internal resources, capital repatriation, foreign aid and foreign reconstruction funds. The achievement of this scenario depends on the political settlement agreement and the size of capital inflow into the economy. Following the inflow of foreign aid, several possible reactions can occur, depending on the exchange regime and monetary policy actions.

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