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The Impact of Fiscal Policy on the Unemployment Rate in Egypt

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ABSTRACT

Unemployment is one of the main challenges that the Egyptian economy faces. The purpose of this paper is to examine how the unemployment rate responds to fiscal policy shocks. The study used annual time series data for the period from 1976 to 2018 collected from the world bank and the international monetary fund. Based on Blanchard and Perotti approach, the study used a five-variables structural vector autoregressive (SVAR) model with the impulse response function (IRF) tool. The main findings of this paper are that 1) At the earlier stages, a one standard deviation shock to the government spending decreases the unemployment rate until the period two, then it started to increase until reached to zero in period ten which means a positive shock to government spending has a negative impact unemployment rate. 2) At the earlier stages, a one standard deviation shock to the tax revenue temporarily decreases the unemployment rate, then it increases after the period two until it hits the zero level in the period six after that it became positive which means that in the long run, a positive shock to tax revenue has a positive impact on the unemployment rate. The study recommends the Egyptian government to run an expansionary budget to decrease the unemployment rate.

INTRODUCTION

Fiscal policy is the tool that governments use to adjust their budget balance. The first factor of fiscal policy is taxation while the second factor is government spending. There is an ongoing debate among economists about how fiscal policy affects the labour market. According to the new classical real business cycle model, a positive government spending shock has a positive impact on investment and a negative impact on consumption and wages (Baxter and King, 1993). On the contrary, the IS-LM theory suggests that a positive government spending shock has a positive impact on consumption and wages (Fragetta and Melina, 2010).

From another perspective, labour market is considered as the main driver for personal, societal, and economic facets of living. It can be referred to as the market which coordinates employment decisions and assigns workers to jobs (Ehrenberg, and Smith, 2016). The expanding global labour market has its impact on the supply and demand of skills, productivity, organizational structures, and employment (Bilan and Strielkowski, 2016). The importance of the labour market comes from the fact that the economic fortune for all of us comes from our experiences in this market. On the other hand, labour market is one of the business risks that determine the quality of the business environment (Dvorsky et al., 2020) or the propensity of people to start their own business in tourism (Chebli et al., 2020) or the services sector (Khan et al., 2019).

Egypt has been suffering from a severe economic downturn which started with the world financial crisis of 2008/2009 and expanded after the January 25th, 2011 revolution. The Egyptian labour market is in a critical situation. It suffers from many problems including high unemployment rate, poor quality of education, low growth rate in the private sector, high preference of public sector employment between new entrants, and low female participation rate in the workforce (Assaad and Crafft, 2013). Despite the high educational attainment, one-sixth of the economically active youth population in the country is unemployed, and almost one-third of Egyptian youth are engaged neither in employment, nor in education (Barsoum et al., 2014).

Considering the above and the limited research conducted to investigate the relationship between fiscal policy and the labour market in Egypt, this paper seeks to fill in this gap. The research problems can be formalized as follows:

- 1) What are the effects of a government spending shock on the unemployment rate in Egypt?
- 2) What are the effects of a tax revenue shock on the unemployment rate in Egypt?

The research hypotheses can be formalized as follows:

- 1) H0: there is no relationship between government spending and unemployment rate.
H1: there is a relationship between government spending and unemployment rate.
- 2) H0: there is no relationship between tax revenue and unemployment rate.
H1: there is a relationship between tax revenue and the unemployment rate.

1. LITERATURE REVIEW

Fiscal policy plays an important role in fighting unemployment and stabilizing the economy. It is also commonly considered as a tool, which should be used for income inequality and poverty reduction, though, empirical research often undermines its long term effectiveness in these spheres, especially in the case of countries that are not able to implement effective institutional reforms. (Cyrek, 2019). There is a debate between economists regarding the effects of fiscal policy on the labour market. According to Barro (1991), fiscal policy has a short and long-run impact. In the short run, it affects the demand for goods and services and thus moves the output from its potential level while it affects the number of goods and services in the long run (Özerand Karagöl, 2018). IS-LM theory predicts that a positive shock to government spending has a positive impact on wages and consumption (Fragetta and Melina, 2010), while the new classical business cycle theory predicts that a positive government spending shock harms consumption and wages (Baxter and King, 1993).

In the literature, some studies used government spending as a proxy of fiscal policy (Folster and Henrekson, 2001). The others used taxation as a proxy of fiscal policy (e.g. Agell et al., 1997). The recent studies used a composition of government spending and taxation (e.g. Blanchard and Perotti, 2002). Some authors point out that at times governments in advanced economies need to develop a new sector that can help tackle unemployment, rather than pursuing structural policies or increasing aggregate demand.

Ehrenberg and Smith (2004) define the labour market as the market which coordinates employment decisions and assigns workers to jobs. In the literature, some studies focused mainly on examining the role of institutions such as employment protection regulations, minimum wages, and unions on enhancing or stifling labour market performance. The issue of the effectiveness of labour market policies and regulations within the context of rationalization of public expenditure in the EU countries was analyzed by Rollnik-Sadowska and Dąbrowska (2018). They confirmed a need for providing a complex evaluation of labour market policies in the EU. Their research confirmed that the relation between the labour market policy expenditure and the effectiveness of the labour markets is not clear, as the EU countries with the best labour market indicators represent diverse levels of the expenditure. The problem of public spending and effective utilization of resources was also analyzed regional level for Poland by Bieszk-Stolorz and Dmytrów (2019). These authors stress that in the case of research on the effectiveness of public spending is not enough to concentrate on the issue of simple unemployment level, but it is essential to identify the groups of persons threatened by the long-term unemployment, to assess the impact of programs on exit from unemployment and monitoring the disbursement of funds. Their empirical research for Poland showed the scale of the problems with verifying the results of public spending on the labour markets. Their analysis did not enable to unambiguously specify areas with better use of funds allocated in the activation programs. The regions in middle-east Poland were generally characterized by worse values of effectiveness, though, the unemployment rate in these areas was still relatively small. On the other hand, the regions in north-east Poland had a relatively high unemployment rate in spite of the fact that the public funds were used more effectively.

The OECD (1994) suggests that regulations stifle labour market performance. In contrast, Eichhorst et al. (2008) affirm that using a combination of regulations enhances the labour market performance. While other studies focus mainly on examining labour market participation including labour market participation of older workers, which becomes a crucial problem especially in the case of more developed countries with a quickly aging population (e.g. Thalassinou, et al. 2019); Labour market participation of young population (e.g. O'Higgins, 2012), and female labour participation (e.g. Bieszk-Stolorz, 2017). Emerging economies should pay attention to the development of SMEs, as they often offer the only realistic prospects for the development of the labour market and poverty reduction (Nursini and Tawakkal, 2019). Recently, Bite et al. (2020) and Cristea and Grabara (2019) show that international migration can be considered as an important determinant of the labour force participation choices of non-migrants. This factor was also confirmed in the case of immigration from the CIS countries to Russia by Piekutowska and Fiedorczuk, 2018).

At the Egyptian level, Assaad and Krafft (2013) affirms that the labour market in Egypt is in a critical situation due to the increasing unemployment rate, and the decreasing labour force participation among women and the young population. Barsoum et al. (2014) indicate that despite high educational attainment, one-sixth of the economically active youth population is unemployed, and almost one-third of Egyptian youth are neither in employment nor in Education. Assaad and Crafft (2013) found that there is a significant degeneration in employment conditions in the Egyptian private sector while there is stability or slight improvement in employment conditions in the public sector. Hassan (2008) examines the interaction between the supply and demand sides of the Egyptian labour market. The study finds that unemployment has both demand and supply sides. The supply side comes from the rapid growth of the labour force and populations. The demand side comes from the unbalanced economic performance and low job content of the growth. Ucal and Gunay (2019) explore the relationship between female labour force participation and socio-cultural variables in 13 member states of the Arab League including Egypt. It is found that the importance is given to tradition and religion by women and the number of children negatively affects the female labour force participation.

2. RESEARCH METHODS

2.1 Data Issues

To examine how the unemployment rate responds to fiscal policy shocks in Egypt, we will use annual timeseries data for the period 1976-2018 and apply a five variables structural vector autoregressive model (SVAR) with the impulse response function (IRF). The data was collected from different sources including the central bank of Egypt, the world bank, and the international monetary fund. The variables of the study are introduced in table 1.

Table 1. Definition of variables

Variable	Definition
LRGDP	Log of real gross domestic product
TAX	Tax revenue (% GDP)
UNEMP	Unemployment rate
RINT	Real interest rate %
GOVEXP	Government spending on goods and services (% GDP)

Source: Authors

2.2 Methodology

To test the effects of government spending and tax revenue shocks on unemployment in Egypt, we will apply the recursive vector autoregressive correction model (VAR) introduced by Blanchard and Perotti (2002). According to this model, the reduced form of the VAR model can be written as follows:

$$X_t = \alpha_0 + \alpha_1 X_{t-1} + A(L)X_t - 1 + ut \quad (1)$$

Where

X_t refers to the K dimensional vector

α_0 refers to the constant of the equation

$A(L)$ refers to the lag polynomial

t represents the time trend

Then we multiply the above reduced VAR equation by $(k \times k)$ matrix (A_0) to transform it to a structural VAR model as follows:

$$A_0 X_t = A_0 \alpha_0 + A_0 \alpha_1 X_{t-1} + A_0 A(L)X_t - 1 + B e_t \quad (2)$$

Where:

A_0 represents the contemporaneous restrictions among the variables collected in the vector X

$B e_t = A_0 X_t$ represents the relationship between reduced form disturbances X_t , and the structural disturbances e_t .

The next step is to get the variance-covariance matrix by restricting A_0 to a unit diagonal matrix and B to a K dimensional matrix. And finally, we use Cholesky ordering to set the order of the variables as follows: To test the effects of a government spending shock on the unemployment rate, we start with GOVEXP then UNEMP, LRTGDP, TAX, and finally RINR. To test the effects of a tax revenue shock on the unemployment rate, we start with TAX then UNEMP then LRTGDP then GOVEXP and finally RINR.

2.3 Determination of the Stationary of Data

Here we want to make sure that the variables of our interest are stationary. In other words, there is no unit root in them. According to Granger and Newbold (1974), using nonstationary variables may cause fake relationships among them which leads to a spurious regression. We will apply the Augmented Dicky Fuller test (ADF) at a 5% level of significance. The null hypothesis of this test is that there is a unit root in the variables which means they are not stationary. On the other hand, the alternative hypothesis of the test is that there no unit root in the variables which means they are stationary.

Table 2 presents the Augmented Dicky Fuller test with intercept. We can see that in levels all the variables of our interest except RINR are not stationary at a 5% level of significance. Nevertheless, when we took the first difference, they became stationary at the same level of significance.

Table 2. Augmented Dickey fuller test (Intercept):

VARIABLE	P-VALUE	UNIT ROOT	STATIONARY
<i>LEVELS</i>			
UNEMP	0.2996	YES	NO
LRGDP	0.2173	YES	NO
RINR	0.0002	NO	YES
TAX	0.2298	YES	NO
GOVEXP	0.2052	YES	NO
<i>FIRST DIFFERENCE</i>			
UNEMP	0.0012	NO	YES
LRGDP	0.0025	NO	YES
RINR	0.0000	NO	YES
TAX	0.0000	NO	YES
GOVEXP	0.0005	NO	YES

Source: Authors' calculations

Table 3 presents the Augmented Dicky Fuller test with intercept and trend. We can see that in levels all the variables of our interest except RINR are not stationary at a 5% level of significance. When we took the first difference, UNEMP and LRGDP stayed non-stationary. Nevertheless, when we took the second difference, all the variables became stationary at the same level of significance.

Table 3. Augmented Dickey fuller test (Trend and intercept):

VARIABLE	P-VALUE	UNIT ROOT	STATIONARY
<i>LEVELS</i>			
UNEMP	0.0535	YES	NO
LRGDP	0.2170	YES	NO
RINR	0.0015	NO	YES
TAX	0.5175	YES	NO
GOVEXP	0.2436	YES	NO
<i>FIRST DIFFERENCE</i>			
UNEMP	0.6836	YES	No
LRGDP	0.1797	YES	No

RINR	0.0000	NO	YES
TAX	0.0000	NO	YES
GOVEXP	0.0058	NO	YES
<i>SECOND DIFFERENCE</i>			
UNEMP	0.0000	NO	YES
LRGDP	0.0000	NO	YES
RINR	0.0000	NO	YES
TAX	0.0000	NO	YES
GOVEXP	0.0000	NO	YES

Source: Authors' calculations

Table 3 presents the Augmented dicky fuller test with no trend and intercept. We can see that at levels all the variables of our interest are not stationary at a 5% level of significance. Nevertheless, when we took the first difference, they became stationary at the same level of significance.

Table 4. Augmented Dickey fuller test (No trend and intercept):

VARIABLE	P-VALUE	UNIT ROOT	STATIONARY
<i>LEVELS</i>			
UNEMP	0.8211	YES	NO
LRGDP	0.9998	YES	NO
RINR	0.1664	YES	NO
TAX	0.4823	YES	NO
GOVEXP	0.0604	YES	NO
<i>FIRST DIFFERENCE</i>			
UNEMP	0.0000	NO	YES
LRGDP	0.0000	NO	YES
RINR	0.0000	NO	YES
TAX	0.0000	NO	YES
GOVEXP	0.0001	NO	YES

Source: Authors' calculations

In table 5, sequentially modified LR test statistic, Final prediction error, Schwarz information criterion, and Hannan-Quin information criterion suggests estimating our mode using one lag.

Table 5. Lag selection criterion test

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-305.9864	NA	21.92678	17.27702	17.49696	17.35379
1	-99.46631	4.2002*	0.000929*	7.192573	.512172*	7.653148*
2	-78.04541	29.75126	0.001234	7.391411	9.810677	8.235800
3	-44.64525	37.11128	0.000976	6.924736*	10.44367	8.152937

Source: Authors' calculations

To ensure the validity of the results, the author applied diagnostic tests. The results of these tests confirm that the model does not suffer any normality, autocorrelation, stability, or heteroscedasticity problems. The results of these tests are summarized in table 6.

Table 6. Diagnostic tests for the VAR model.

<i>Diagnostic test</i>	<i>Test statistic</i>	<i>P-value</i>
Residual Serial Correlation LM Test	28.18199	0.3103
Residual Heteroskedasticity Test	317.2458	0.2363
Stability Test	VAR satisfies the stability condition	No root lies outside the unit circle
Normality Test (Jargue-Bera)	1.054950	0.592754

Source: Authors' calculations

3. INTERPRETATION OF THE EMPIRICAL RESULTS:

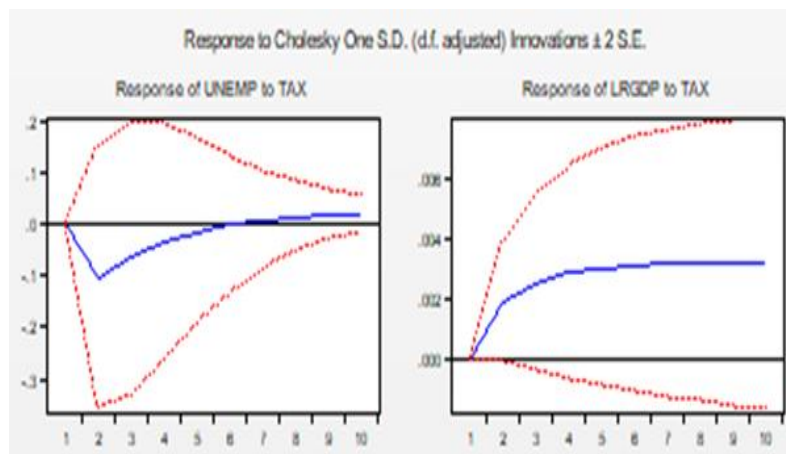
We will start our analysis by testing the response of our variables to a one standard deviation shock to tax revenue then we test their responses to a one standard deviation shock to government spending.

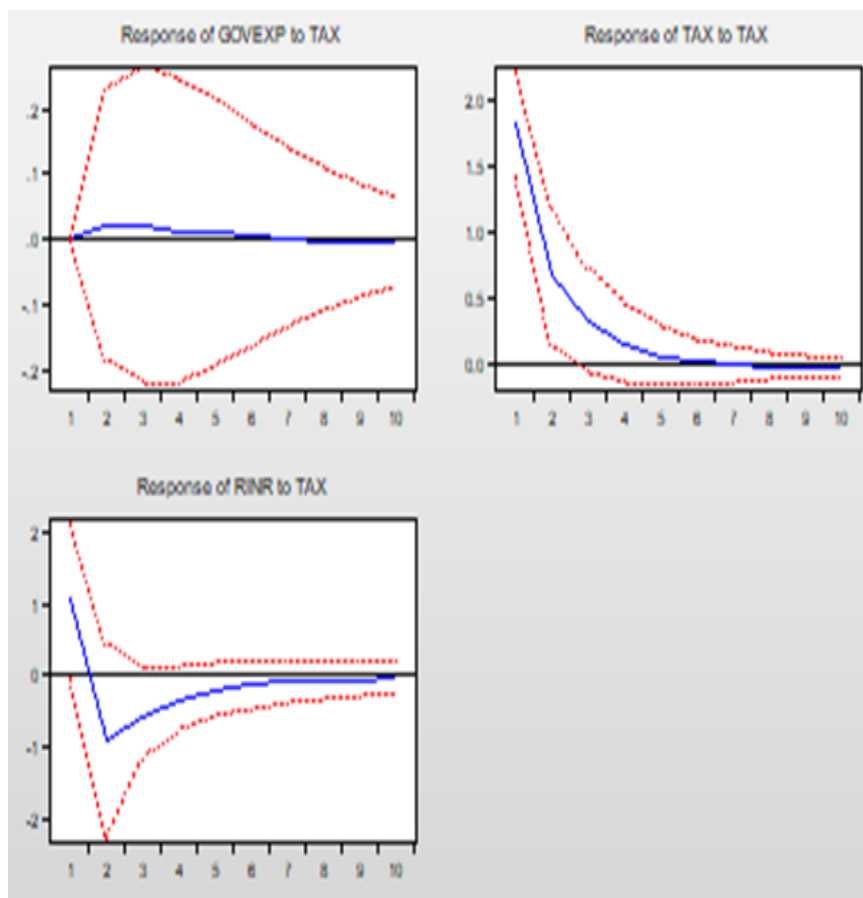
(A) Responses to a tax revenue shock:

Figure 1 shows the responses of our variables to a tax revenue shock. According to Cholesky ordering, we start with UNEMP then LRGDP, GOVEXP, TAX, and finally RINR. The impulse response function was calculated for ten years ahead. Looking at the response of unemployment rate to a tax revenue shock, we can notice in the first panel that a one standard deviation shock to the tax revenue temporarily decreases the unemployment rate then it increases after the period 2 until it hit the zero level in the period 6 after that it became positive which means that in the long run, a positive shock to tax revenue affects positively on the unemployment rate. This result is consistent with the findings of Bassanini and Duval (2006).

Looking at the second panel of the figure, we can see that gross domestic product (GDP) gradually increased until it became fairly constant after period 6 which means that GDP responds positively to a one standard deviation shock to tax revenue. Looking at the third panel of the figure, we can see that a tax revenue shock has a negative but weak impact on government spending. Looking at the fourth panel, we can notice that tax revenue is decreasing until it became constant after period 6. And finally, we can see in the fifth panel that the real interest rate responds negatively to a one standard deviation shock in the tax revenue.

Figure 1. Responses to a tax shock



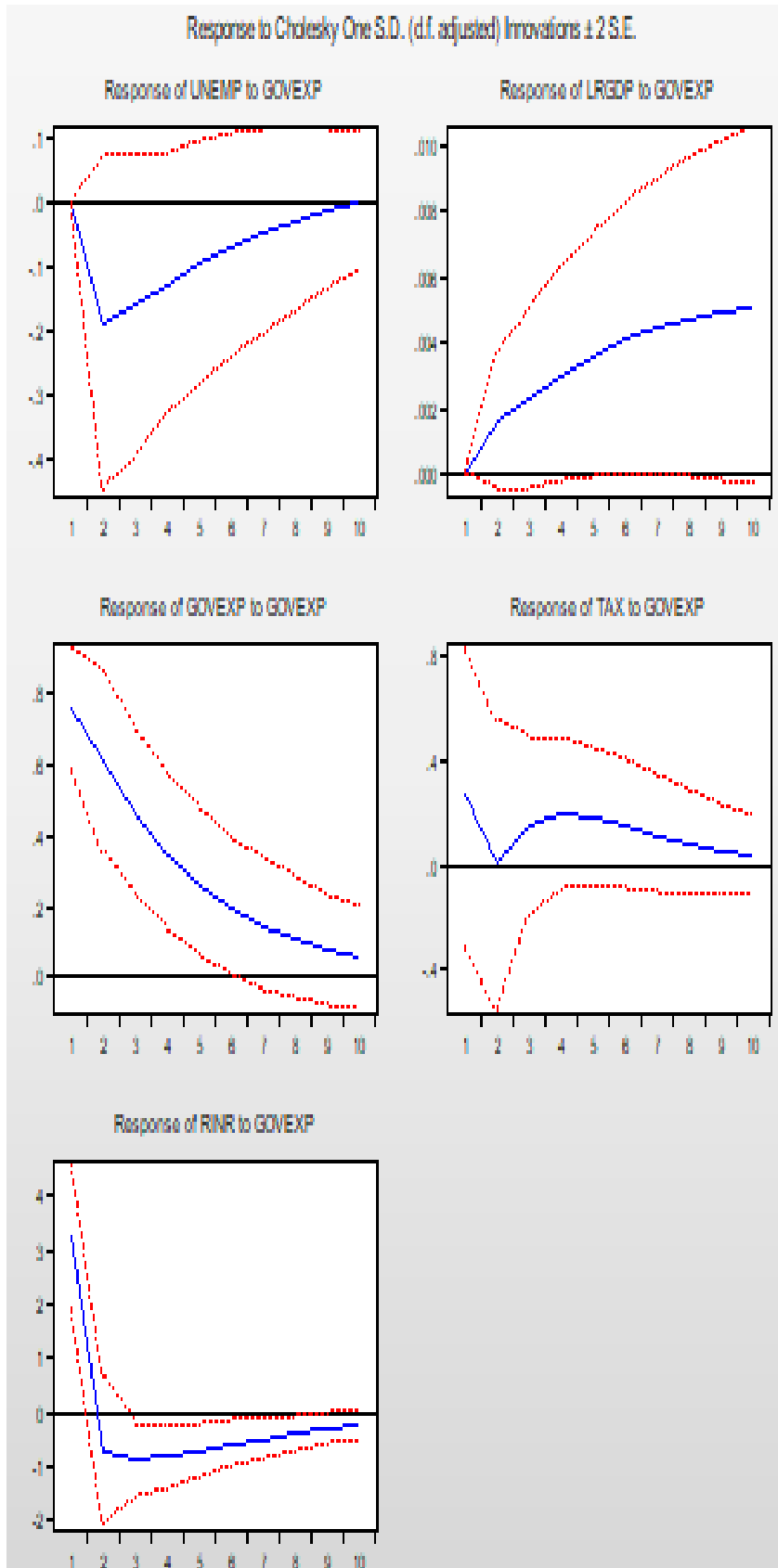


Source: Authors' calculations.

(B) Responses to a government spending shock:

Figure 2 shows the responses of our variables to a government spending shock. According to Cholesky ordering, we start with UNEMP then LRGDP, GOVEXP, TAX, and finally RINR. The impulse response function is calculated for ten years ahead. Looking at the response of the unemployment rate to a government spending shock in the first panel, we can notice that at the earlier stages unemployment decreases until the period 2 then it started to increase until it reached to zero in period 10 which means that a positive shock to government spending has a negative impact unemployment rate. This result is consistent with the new Keynesian models which imply that a positive government spending shock will increase the aggregate demand which increases the labour supply (Leith and Thaden, 2008). Looking at the second panel, we can see that GDP decreases at an increasing rate until period two. After that, it continued to increase but with a decreasing rate which means that GDP responds positively to a one standard deviation shock to government spending. Moving to the third panel, we can notice that government spending is responding negatively to a one standard deviation shock to itself. Looking at the fourth panel we can notice that tax is decreasing until reaches Zero at period two then it started to increase in an increasing rate until period five, then in a decreasing rate which means that it responds positively to a one standard deviation shock to the government spending. Looking at the fifth panel, we can see that at the earlier stages RINR decreases until it becomes negative in period two which means that real interest rates respond negatively to a one standard deviation shock to government spending.

Figure 2. Response to a government spending shock



Source: Authors' calculations.

CONCLUSION

Motivated by the recent developments in the labour market in Egypt, the study investigates the effects of fiscal policy shocks on the unemployment rate based on Blanchard and Perotti (2002) structural vector autoregressive model. Due to the lack of quarterly data, the authors used annual time series data for the period 1976-2018. The study found that an increase in government spending decreases the unemployment rate while an increase in tax revenue increases the unemployment rate. This result is consistent with the Keynesian model which implies that aggregate demand including fiscal policy has a short-run impact on income and employment and the total effect of fiscal policy depends on the magnitude of the fiscal multiplier and the crowding-out effect.

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