Impact of Government Expenditure on Unemployment: Evidence from Euro zone Countries

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Abstract

The relationship between government expenditure and unemployment is an essential topic of study in economics. Public expenditure has been blamed for causing higher unemployment, contrary to the belief that it would help in reducing unemployment. The present paper reexamines the Unemployment Rate - government expenditure nexus in a panel of 16 States of UE. To examine the government expenditure effect of unemployment in a panel of 16 states of UE for the period 1990–2019. In this study, both the static and dynamic panel estimation techniques are estimated by using the OLS, Fixed and Random effect for static panels, and the generalized method of moments (GMM) to estimate our dynamic panel data model which also allows for the lagged level of unemployment. Evidence from the GMM panel Model results indicate that public expenditure has a significant positive impact on unemployment.

Keywords: government expenditure, unemployment, Keynes, theory of Employment, Effective Demand, government consumption**,** generalized method of moments**,** dynamic panel estimation

1. Introduction

The economic crisis that began in late 2007 in the United States has been accompanied by a sharp worsening of the labor market. Because of these developments, many countries have started to begin to implement a massive economic ‘stimulus package. The size of the package in the United States for example (containing both spending increases and tax cuts) was initially estimated to total $787 billion. 255$ billion of funds has been allocated to direct assistance to fiscally distressed State and Local Governments (SLGs). Proponents of this policy emphasized the urgent need to stabilize the levels of economic activity and the Unemployment Rate (uemp).They piercing out that in the nonexistence of the stimulus funds many SLGs, facing both large deficits and constitutional or statutory balanced budget requirements, would have to sharply cut public spending and/or raise taxes both of which would tend to exacerbate the recessionary pressures[1]

The opponents, on the other side, pointed out that the stimulus funds would not be effective in increasing the rate of economic growth and lowering the unemployment rate.

They also pointed out the adverse long-term implications of deficit spending, amplified public debt, and ‘big government’ at the Federal level Riedel (2008) and Ferrara (2009). The public consideration of the special effects of the stimulus package to some extent mirrors the academic debate on the effects of the size and composition of public expenditures on unemployment and output (growth) as highlighted below (Hebous 2011). So, when the private-sector spending is depressed, compensatory fiscal policy in the form of higher public spending or lower taxes is necessary to address the problem of ‘aggregate demand deficiency’ and boost output/income.

Indeed, for consumers, consumption is mainly a function of their income, so they will consume more. This phenomenon will multiply induced investments, which generates a multiplier effect greater than one. Some budgetary compensation may cause the crowding out of private spending and the decrease in net exports if monetary policy is not accommodating enough to keep the interest rate from rising.

[1]See, for example, Stone (2009). In this connection, Krugman (2009) contends that ‘Without the recovery act, the free fall would probably have continued, as unemployed workers slashed their spending, cash-strapped state and local governments engaged in mass layoffs, and more. The stimulus didn’t eliminate these effects, but it was enough to break the vicious circle of economic decline. Aid to the unemployed and help for state and local governments were probably the most important factors. If you want to see the recovery act in action, visit a classroom: your local school probably would have had to fire a lot of teachers if the stimulus hadn’t been enacted.’ (Emphasis added). 2 See, for example, Riedel (2008) and Ferrara (2009).

As it is commonly recognized, the expansion of aggregate output decreases the cyclical component of the unemployment rate. In this paradigm, the increase in government spending must be financed by taxes or by debt.

The Neoclassical-Real Business Cycle (RBC) challenges some of the main Keynesian predictions. According to the models used by Rebelo, 2005 typically assume that the flexible prices, competitive markets, and a forward-looking Ricardian consumer whose consumption decisions are affected by an intertemporal budget constraint as opposed to current income. In this context, a positive government spending shock, whether financed by a lump-sum current tax or borrowing, reduces the present value of the Ricardian consumer's after-tax income. According to Monacelli and Perotti, 2009, to make up for this negative 'wealth effect', the consumer reduces its consumption and works more depending on the degree of substitutability (complementarity) between leisure (labor) hours consumption. As a result, the labor supply curve rises, boosting the equilibrium employment and output levels while lowering the real wage level.

As a practical matter, the spending multiplier is less than one due to the fall in consumption. For some NK models, higher output raises the demand for labor enough to offset the increase in labor supply and raise the real wage level (Pappa, 2009). In a few other models, countercyclical changes in firms' markup over marginal cost serve as a mechanism for transmission of fiscal policy shocks to the labor market. A positive spending shock reduced the markup as firms expand the output to meet the demand at a given price and increased the labor demand. Thus, as predicted by RBC models the equilibrium levels of employment and output rise. Nevertheless, in agreement with Keynesian predictions, consumption goes up due to increased real wage and if private and public consumption are perceived as complements (Gatti, 2009).

According to Christiane et al., 2009 the multiplier can be greater than one if leisure and consumption are substitutes. Barro, 1990 establishes a link between 'public services and steady-state rate of growth of output. One important implication of these Barro- style endogenous growth models is that public expenditures can significantly affect the long-run growth rate through investment in physical and human capital, as it promotes private sector productivity. In this circumstance, Bania et al 2007 state that the net growth effect of total government spending may be non-monotonic depending on allocation to 'productive' versus 'unproductive' expenditures and whether expenditures are financed by 'distortionary' versus 'non-distortionary' taxes. In a related study, Karras (1993) develops a theoretical model in which both output and employment are affected by higher government consumption. In this model, a cyclical change in public spending increases only the demand for labor while a permanent rise increases both demand for and supply of labor due to the negative wealth effect. Phelps (1994, 1999) emphasizes the distinction between public capital and current expenditures: higher government purchases from the capital goods-producing sector raise the real price of capital goods, lower the equilibrium unemployment rate and increase the demand for labor as labor is substituted for capital. Current public expenditures, on the other hand, raise unemployment.

Abrams (1999) accentuates the potential adverse effects of large government on unemployment. He considered that big governments can push up unemployment by offering generous unemployment benefits and public health insurance (which lower the opportunity costs of remaining unemployed) and affect the labor-leisure decision to the extent that they raise income tax rates. With these points in mind and against the backdrop of the increase in the unemployment rate of Eurozone countries hovering around their post-recession peaks despite the fiscal stimulus, we examine the impact of public spending on unemployment in a panel of 16-euro zone countries (1990-2019). Our main objectives are to answer the important question of impact to public expenditure on unemployment. To this end, we employ panel GMM techniques.

The importance of this study is that it has an addition to existing literature as it contributes to recognize the dynamic links between unemployment and public expenditure. Moreover, this study is among very few studies that use regression analysis in the period between (1990) and (2019) to highlight the aforementioned relationship with a technique GMM panel.

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Finally this article is organized as follows. The following section describes various theories about the effects of fiscal policy on unemployment. The theoretical works examined are from the classical theory of unemployment, the unemployment theory in the Keynesian economy, the Optimized finance theory and Public choice theory. A second section gives the results of the impact of public expenditure on unemployment using annual data for the period 1990 to 2019 using the GMM technique.

2. Literature Review

Keynes' Theory of Employment: Concept of Effective Demand

According to classicists, there will always be full employment because of the operation of Say's Law and wage-price flexibility. During the Great Depression years of the 1930s, this classical theory came under severe attack at the hands of J. M. Keynes. He rejected the notion of full employment and instead suggested full employment as a particular case and not a general case. Consequently, full employment is a temporary phenomenon, and astrological coincidence.

Keynes claimed his theory to be 'general'. That is why he christened his epoch-making book: The General Theory of Employment, Interest, and Money (1936). Thus, Keynes' theory is "general". Keynes' theory of employment is demand-deficient. This means that Keynes visualized employment/unemployment from the demand side of the model. His theory is, thus, known as Demand-oriented approach, as opposed to the classical supply-side model. According to Keynes, the volume of employment in a country depends on the effective demand of people for goods and services. Unemployment is attributed to the deficiency of effective demand.

It should be noted that Keynes' theory is a short-run theory when population, labor force, technology, etc., do not change. Keynes remarked that since "in the long run we are all dead," it is of no use to present a long-run theory. Because of this, one can argue that the volume of employment depends on the level of national income/output. Higher (lower) the level of national output higher (lower) is the volume of employment. Since then, the Keynesian theory of employment determination is also the theory of income determination.

Meaning of Effective Demand

Keynes' theory of employment is based on the princi-ple of effective demand. In another way, the level of employment in a capitalist economy depends on the level of effective demand. Thus, unemployment is attributed to the deficiency of effective demand and to cure it requires increasing the level of effective demand. By 'effective' demand, Keynes meant the total demand for goods and services in an economy at various employment levels. The people's total demand for goods and services is the total of all demand meant for consumption and investment. In other words, the sum of consumption expenditures and investment expenditures constitute effective demand in a two-sector economy. According to Keynes, to meet such demand, people are employed to produce all kinds of goods, consumption, and investment goods. However, to describe effective demand, we need another component of effective demand: the component of government expenditure. Thus, effective demand may be defined as the total of all expenditures,

C + 1 +G;

Where **C** stands for consumption expenditure

I stand for investment expenditure,

Gstands for government expenditure.

Here we ignore government expenditure as a component of effective demand. According to Keynes, the level of employment is determined by the effective demand which, in turn, is determined by aggregate demand function or aggregate demand price and aggregate supply function or aggregate supply price. In Keynes's theory; "The value of D (Aggregate Demand) at the point of Aggregate Demand function, where the Aggregate Supply function intersects it, will be called the effective demand."

Aggregate Supply (AS)

Employers hire and purchase various inputs and raw materials to produce goods. Thus, production involves cost. If sales revenue from the sale of output exceeds the cost of production at a given level of employment and output, the entrepreneur would be induced to employ more labor and other inputs to produce more.

At any given labor employment level, aggregate supply price is the total amount of money that all entrepreneurs in the economy expect to receive from the sale of output produced by a given number of laborers employed. For each particular level of employment, there is an aggregate supply price. Here, by 'price' we mean the amount of money received from the sale of output, i.e., sales proceeds. Thus, aggregate supply price refers to the proceeds from the sale of output at each level of employment, and there are different aggregate supply prices for different levels of employment.

If this information is expressed in a tabular form, we obtain "aggregate supply price schedule" or aggregate supply function. The aggregate supply function is a schedule of the minimum amounts of proceeds required to induce varying quantities of employment. Simply, it shows various aggregate supply prices at different levels of employment. Plotting this information graphically, we obtain an aggregate supply curve.

According to Keynes, the aggregate supply function is an increasing function of employment. The aggregate supply (AS) curve slopes upward from left to right because the volume of employment increases with the increase in sale proceeds. But there is a limit to increasing output level. This is called full employment level of output beyond which output cannot be increased; it is because of full employment that the AS curve becomes vertical or perfectly inelastic. This means that the level of employment cannot exceed the full employment (LF) level even by increasing aggregate supply price. This is shown in Fig. 1.1.

Aggregate Demand (AD)

Aggregate demand or aggregate demand price is the amount of money or price which all entrepreneurs expect to receive from the sale of output produced by a given number of men employed. Or it refers to the expected revenue from the sale of output at a particular level of employment. Each level of employment is associated with a particular aggregate supply price and there are different aggregate demand prices for different levels of employment.

Like the aggregate supply schedule, the aggregate demand schedule shows the aggregate demand price for each possible level of employment. Plotting the aggregate demand schedule, we obtain the aggregate demand curve as there is a positive relationship between the level of employment and aggregate demand price, i.e., expected sales receipts. This is shown in Fig. 1.1. It rises from left to right.

Equilibrium Level of Employment

To fully understand the concept of effective demand, we have studied separately aggregate demand and aggregate supply as the two determinants of effective demand. We will now describe how equilibrium employment level is determined in an economy by using the concept of effective demand.The level of employment in an economy is determined at that point where the aggregate supply price equals the aggregate demand price. In other words, the intersection of the aggregate supply function with the aggregate demand function determines the volume of income and employment in an economy.

It is, thus, clear that so long as expected sales receipts of the entrepreneur (i.e., aggregate demand schedule) exceed costs (i.e., aggregate supply schedule), the level of employment should be increasing and the process will continue until expected receipts equal costs or aggregate demand curve intersects aggregate supply curve.

Note that the AS curve starts from the origin. If aggregate receipts (i.e., GNP) are zero, entrepreneurs would not hire workers. Likewise, the AD curve also starts from the origin. The equilibrium level of employment is determined by the intersection of the AS and AD curves. This is the point of effective demand point E in Fig. 1.1 Corresponding to this point, OLE workers are employed. At the OL1 level of employment, expected receipts exceed necessary costs by the amount RC. Entrepreneurs will now hire more labor until the OLE level of employment is reached. At this level of employment, entrepreneurs' expectations of profits are maximized. Employment beyond OLE is unprofitable because costs exceed revenue. Thus, actual employment (OLE) falls short of full employment (OLE). The Keynesian system shows two kinds of equilibrium: actual employment equilibrium determined by AD and AS curves and underemployment equilibrium.

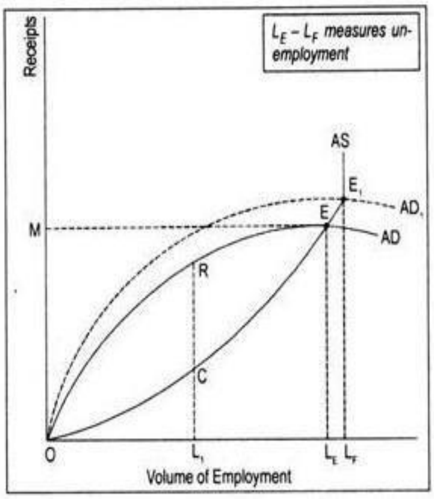

Fig 1.1 effective demand and determination of employment

Keynes made a little emphasis on the aggregate supply function since its determinants (such as technology, supply or availability of raw materials, etc.,) do not change in the short run. Keynes was examining the possibility of unemployment in a capitalistic economy against the backdrop of the Great Depression of the 1930s.

After diagnosing the problem, Keynes recommended policy prescriptions to create more employment in the economy. Indeed, to cure the unemployment problem, he did not subscribe to the supply-oriented policies' classical ideas. Keynes attached great importance to demand-stimulating policies to cure unemployment. In other words, Keynes paid emphasis on the aggregate demand function. That is why Keynes' theory is known as a 'theory of aggregate demand'.

Fig. 1.1 shows the situation of equilibrium at less than full employment level. Actual equilibrium, OLE, is short of full employment equilibrium, OLE. Thus, the distance OLF–OLE measures unemployment. This is called involuntary unemployment, a situation in which people are willing to work but do not find jobs.

This unemployment, according to Keynes, is due to the deficiency of aggregate demand. This unemployment can be removed by stimulating aggregate demand. Aggregate demand is the total of consumption and investment demand or expenditures in the economy. By raising consumption expenditure, the level of employment can be raised.

But there is a limit to consumption expenditure. So, what is needed is the raising of (private) investment demand. Anyway, an increase in consumption demand and investment demand will raise the level of employment in the economy. The point of effective demand has been changed because of the shifting of the AD curve from AD to AD1. New effective demand is now given by E1 corresponding to this point, the equilibrium level of employment is OLF—the level of full employment.

Thus, in Keynes' theory, unemployment is due to the deficiency of effective demand. Only by stimulating effective demand can a higher level of employment be achieved. However, Keynes goes on to argue that the equilibrium level of employment will not necessarily be at full employment.

A capitalist economy will always experience underemployment equilibrium and an equilibrium situation less than full employment. Full employment, according to Keynes, can never be achieved. In Keynes' scheme of things, both consumption and investment cannot be raised enough to employ more workforce. Therefore, he recommends the government to come forward and take appropriate action to cure the unemployment problem. This means that aggregate demand is now the total of all consumption, investment, and the government expenditures. Because of the multiplier effect of both private investment expenditure and government expenditure, there will be larger income, output, and employment. But equilibrium in the economy will be established at less than full employment because of wage rigidity, interest inelasticity of investment, and the liquidity trap.

Ricardian Equivalence

This theory created based on the two assumptions of rational expectations that households are prospective and households' visions until taxation. As taxes reduced and budget deficit supplied through borrowing, the government would have no choice of expanding taxes in the future in order to repay the debts and interests. According to this perspective, Ricardo considers that people found out by experience that increased government bond as a result of diminished taxes offers temporary revenue for the individual at the present time. Next augmented government debt, these consumers save more to provide higher tax paying in the future; thus, increased public saving offers more credit to families and economic enterprises. As a result, amplified loan demand by government would be compromised by higher saving; so, interest rate remains unchanged, and the decrease in taxes may not lead to permanent revenue, households save temporary inco diminished me with no change in order to pay the future tax liabilities, in term of savings, caused by current tax cuts. So, any reduction in current tax must be consistent with increase in future taxes; further, augmenting of private saving would totally compromise reduction in public sector savings.

National saving and thus interest rate remain unchanged, which consequently leads to unchanged private sector investment. In other word, the effects of tax cut resulted from budget deficit cause properly increasing of private sector saving; according to logical consumption by consumers and concerning permanent consuming of consumers, no change in national savings may lead to no change in interest rate. Ricardo believed that budget deficit increased due to increasing costs of government, which may be paid now or in a later time. Consequently, tax cuts generated by the policy of budget deficit have no effect on consumption and saving; it employs no change on other economic variables including economic growth through this (Mangio, 2004).

Optimized finance theory

According to Barro (1974) theory, households definitely predict the government increases taxes in the future due to the generated budget deficit. Therefore, the government issues bonds in the present time; increased bonds are not considered as wealth by public in order to obtain more consumption (this is known as Ricardian equivalence assumption earlier discussed). Probably tax payers save tax cut revenues at the present time meaning that as if permanent tax cut never occurred in the economy. In this regard, Barro (1974) presented a model by which individuals borrow from government according to predicting government budget deficit by state financial deficit, save the loan and pay the loan interest as tax; therefore, budget deficit in long-term is not an effective means for lessening the crisis. The question raised here by Barro is that why politicians use budget deficit for improving production variations and economic crisis?

The questioned is answered in this way that business cycles including tax fluctuations require deficit in recession and surplus in prosperity; in this way, the government keeps tax rate and expenditure constant and achieves macro balance. Thus, optimized finance theory explains budget deficit policy that budget deficit is positively related to general government expenditure deviation from normal way and negatively related to deviation of economic productions. It stated that Barro used a linear relationship between income and government expenditure for its theory.

3. Empirical Review

In literature, there are many studies[2] that investigate the government expenditure and unemployment nexus. In Table 1, we summarize the results of these studies.

Table 1 the Summary of Studies in Related Literature

Author	Country	Period	Method	Result
Abrams (1999)	7 OECD countries	1984-1993	OLS	+
Christopoulos and Tsionas (2002)	10 European countries	1961-1999	Panel VAR	+
Christopoulos et al. (2005	10 European countries	1961-1999	Panel CA	+
Feldmann (2006)	19 Industrial countries	1985-2002	GLS	+
Şahin and Özenç (2007)	Turkey	1988-2006	GC	+
Feldmann (2009)	58 Developing countries	1980-2003	Panel OLS	+
Feldman (2010)	52 Developing countries	1985-2003	Panel FGLS	+
Aslan and Kula (2010)	TurkeY	2000: Q1-2007: Q3	ECM, GC	-
Wang and Abrams (2011)	20 OECD countries	1970-1999	Panel ECM	+
Aysu and Dökmen (2011)	17 OECD countries	1990-2007	Panel CA	+
Mahdavi and Alanis (2013)	US (50 regions)	1977-2006	Panel CA	+
Murwirapachena et al. (2013)	South Africa	1980-2010	VECM	+
Seitaridis and Koulakiotis	15 Eurozone	2000-2011	Panel CA	NO

[2] See Abrams, 1999; Christopoulos and Tsionas, 2002; Christopoulos et al., 2005; Feldmann, 2006; Feldmann, 2010; Wang and Abrams, 2011; Aysu and Dökmen, 2011; Seitaridis and Koulakiotis, 2013; Holden and Sparrman, 2018

(2013)	countries			
Ding (2014)	34 OECD countries	1980-2010	Panel LSDV	+
Kasau et al. (2015)	Indonesia (34 regions	2007-2013	SEM	+
Topal (2017)	Turkey (26 regions)	2004-2016	ECM, ARDL-PMG	-
Holden and Sparrman (2018)	20 OECD countries	1980-2007	WG	-
Sağdıç and Yıldız (2020)	Turkey (26 regions)	2004-2018	Panel ARDL	-
Kovacı et al. (2018)	28 EU countries	2005-2016	DPA	+
Afonso et al. (2018)	8 Emerging countries	1980-2015	Panel OLS	+

Source : prepared by the author

Note: OLS: Ordinary Least Squares, VAR: Vector Autoregression, CA: Cointegration Analysis, GLS

Impact the expenditure on unemployment

The relationship between unemployment and public expenditure has attracted the interest of several economists. Selase, A. E. (2019) tested the impact of disaggregated public expenditure on the unemployment rate in selected African countries with panel data spanning from 2000 to 2017. The study employed Generalized Method of Moments (GMM) techniques for empirical analysis. The findings of the two-step system GMM showed that expenditure on infrastructure and education reduces the unemployment rate, while expenditure on defense and health increase unemployment rate in the region. The short-run elasticity estimate showed that infrastructure and education expenditures reduce the unemployment rate by 9% and 1.83%. A unit rise in defense and health expenditure increases the unemployment rate by 5.2% and 84.5%. The longrun elasticity of infrastructure and education expenditure reduces the unemployment rate by 3.8% and 7.89 %, while the long-run defense and health expenditure elasticity increases the unemployment rate by 22.22% and 364.58% in the selected African countries. Holden and Sparrman (2013) used ex-post factor methodology to estimate the effect of government purchases on unemployment in 20 OECD countries from 1980 to 2007. The findings revealed that an increase in government purchases reduced unemployment by around 0.3 percentage points in the same year. The effect was also observed to be greater in downturns than in booms, while greater under a fixed exchange rate regime than a floating regime. Faramarzi and al (2014) used the Vector Auto Regressive model (VAR), Vector Error Connection (VECM), and co-integration techniques to examine the long-run impact of government expenditure and tax on liquidity and employment in the Iranian economy with time series data spanning 1976-2009.

The results designate that government expenditure positively impacts both employment and liquidity while tax harms employment. Kasau, et al (2015) used SEM (Structural Equation Modeling) to examine the effect of government spending and investment towards job opportunities in Eastern and at the 11 KBI both direct and indirect as well as the total influence in both regions from 2007 to 2013. The result revealed that government spending has a significant positive effect on Investment and Employment either indirectly. Tagkalakis, A. O. (2013) analyzed unemployment effects of fiscal policy in Greece with quarterly data from 2000 to 2012, using the SVAR methodology found a negative relationship between unemployment and government purchases and a positive relationship between tax and unemployment.

Tagkalakis (2013) adopted the Blanchard and Perotti (2002) SVAR methodology to examine the unemployment effects of fiscal policy changes in Greece from 2000 to 2012. He found that unemployment reduced when there was an increase in government purchase, government consumption, the government wage bill, and government investment, but it increased when there was a cut in government purchase and their components. Mahmood, T., Ali, A., Akhtar, N., Iqbal, M., Qamar, S., Nazir, H. Z.& Sana, I. (2014) investigated the causes of unemployment in Pakistan from 1990 to 2010. They discovered that the budget deficit significantly increased unemployment. Their results found that fiscal expansion increased output, private consumption, and private investment and reduced unemployment. Battaglini and Coate (2011) used the OLS of fixed effect technique to explore the interaction between fiscal policy and unemployment in OECD countries with panel data from 2006 to 2010. The result revealed that government spending has a positive relationship with unemployment. Samira and Khalil (2015) examined the effect of government civil expenditures on the unemployment rate in Iran from 1997 to 2013.

Employed Johansen co-integration test, (VAR) and VECM techniques. The result presented a long-run relationship and a negative impact on the unemployment rate. In addition, Feldmann

(2010) using data of 52 developing countries found government size to substantially increase total unemployment rate, female unemployment rate, and youth unemployment rate. Aysu and Dokmen (2011), using panel data of 17 OECD countries during the period 1990 and 2007, suggested that countries that had big governments and high unemployment may consider reducing government size as a way of reducing unemployment. Two findings that were contrary to what many studies have observed may be cited here.

Mahdavi and Alanis (2013) examined the relationship between real per capita expenditure and unemployment in a study of 50 state and local governments of America during the pre-recession period 1977 to 2006 by applying the dynamic ordinary least square (DOLS) and panel cointegration tests. He concluded that larger government size had a small depressing effect on unemployment. 12 Yongjin (2011) used data of 32 advanced and 51 developing countries during the period 1996 to 2006 to examine the impact of government size on economic growth and unemployment. Using the random effects, he concluded that larger government size had a positive effect on unemployment and the impact was much more in developing countries than in developed countries.

Impact the Economic growth on unemployment

Various studies have been conducted on the link between economic growth and unemployment. Mahmoud (2012) studied the relationship between economic growth and unemployment in Arab countries using an application of Okun’s law. The study revealed that although a positive relationship exists between the two variables. A study conducted by Özel (2013) and Mahmoud (2012), this study was based on data collected from 7 industrialized countries (G7) used to examine the correlation between unemployment and GDP growth for the pre- and post-recession periods.

The results discovered that Productivity and GDP growth had a significant impact on the reduction of unemployment before the crises. Conversely, the results had an insignificant effect after the crises as GDP growth decreased unemployment. In addition, Madito, O., & Khumalo, J. (2014) analyzed the unemployment – economic growth relationships and tests for any long-run relationship for the period 1967Q1 to 2013Q4. The vector error correction (VECM) method was used to test for short-run dynamics and the results showed that about 62 percent of economic growth is corrected each quarter. These overall results show that there is a negative relationship between economic growth and unemployment in South Africa. Nonetheless, Doğan, T. T. (2012 investigated the link between macroeconomic variables and unemployment in turkey for 2000: Q1-2010: Q1 using a Vector Autoregressive (VAR) method, and the results of the study focused mainly on the effect of GDP-growth and inflation on the rate of unemployment. AR results confirmed the existence of a negative relationship between GDP growth and unemployment and a positive link between inflation and unemployment. Conversely, Soylu, Ö. B., Çakmak, ©. and Okur, F. (2018) investigated the relationship between economic growth and unemployment in Eastern European Countries for the period of 1992-2014 within panel data framework.

In this paper, this relationship has been examined in the context of Okun's Law. Panel Unit Root, Pooled Panel OLS, and Panel Johansen Co-integration tests are applied respectively. The results show that, unemployment affected positively by economic growth, in other words, 1% rise in GDP will fall the unemployment rate by 0.08% because of Okun's coefficient for Eastern European Countries and there is a co-integration between these important macroeconomic variables. Furthermore, Abdul- 13 Khaliq, S., Soufan, T., and Shihab, RA (2014) examined the relationship between unemployment and GDP growth in Arab countries. They considered 9 Arab Countries between 1994 and 2010. The model adopted for testing the relationship is the Pooled EGLS (Cross-section SUR).

It has been found that economic growth has a negative and significant effect on the unemployment rate. It means that a 1% increase in economic growth will decrease the unemployment rate by 0.16%. Karanasou and Sala (2010) examined the determinants of unemployment in Australia and the results concluded that the reasons behind unemployment differ according to the period investigated. As such, this homework also considers some of the major historical and structural changes which had an impact on the link between GDP growth and other exogenous variables included in the model

Impact the Investment, consumption, on unemployment regarding the framework between the consumption, investment, and unemployment rate in macroeconomic theory; the main three economic points of view have different approaches to explain these relationships. The New Classical Macroeconomics view suggests that aggregate demand may affect employment, but this effect will take place in the short term. However, as wages and prices in the long term are completely flexible and the expectations of economic individuals are corrected, the effect of change in aggregates demand on unemployment will cease to exist and the labor market will converge to natural unemployment rates. Similarly, the Keynesian view argues that an increase in aggregate demand will positively impact employment due to the decline in real wages as prices rise more than nominal wages. Unlike these two views, the New Keynesian view does not accept the fact that the changes in aggregate demand will have a significant impact on unemployment.

The labor market equilibrium, called NAIRU (NonAccelerating Inflation Rate of Unemployment), suggests that workers will be willing to accept certain decisions during wage bargaining and that firms will volunteer to pay. The New Keynesian view argues that as capital stock or investment is a trended variable, the unemployment rate is a trendless variable. Therefore, there is not such a thing as negative interaction among these variables. Ball (1999) revealed that the New Keynesian wisdom is not true and aggregate demands have strong effects on both short-run and long-run unemployment rates.

Arestis andMariscal (1998) also investigated the link between macroeconomic variables and the rate of unemployment tested whether a fall in investment causes long-term unemployment. Their results point out that both capital shortages could significantly influence long-term unemployment and a shortage in demand may have a persistent effect on employment. Arestis et al. (2007) study the importance of capital stock in the determination of wages and unemployment rates for nine EMU countries and make a comparison of the findings across these countries. Their results found a negative relationship between investment and unemployment for all countries covered in the study. Miaouli (2001) used annual data from five European countries. His conclusions state that investments within the private sector positively affect unemployment rates in all countries. In a similar vein, Nickell et al. (2005) examined the empirical analysis of unemployment patterns in the OECD countries which span from 1961 to 1995.

Their result checks that unemployment is always determined by aggregate demand. Despite these studies, Karanassou and Snower (2004) achieve that imposing strong invariance restrictions on labor market activity implies that policies that increase the capital stock do not have any long-run effect on the unemployment rate. The nexus between investments and 14 unemployment rates are also studied by Stockhammer (2004), who seeks to compare and test the validity of the NAIRU and Keynesian theories on unemployment in a time series method. He tests this suggestion and suggests that the NAIRU formation performed poorly with only the tax wedge having a positive effect on unemployment as predicted. Alexiou and Pitelis (2003) tackle the relationship between capital stock and unemployment using a post-

Keynesian approach, where a panel data study is used from 1961 to 1998 for several European countries.

Their result exposes that the negative and statistically significant coefficient of capital stock justifies their hypothesis that capital stocks play a very significant role in explaining unemployment rates. Abiad et al. (2015) examined the macroeconomic effect of increased public investments for 17 OECD countries from 1985 to 2013. Their conclusions reveal that an increase in public investment reduces the unemployment rate by about 0.11% in the short term and by about 0.35% over the medium term. Michaillat and Saez (2015) investigate the reasons for unemployment fluctuations observed in the United States.

Their comparative results suggest that aggregate demand shocks are the principal source of unemployment fluctuations. Mian and Sufi (2012) reveal the importance of aggregate demand shocks on employment in the US. They state that the fall in aggregate demand explains almost 4 million of the lost jobs from 2007 to 2009. Bande and Riveiro (2013) assess the role of consumption patterns on unemployment by considering the investment channel for Spain. Their results show that several transmission mechanisms of aggregate demand shocks are to the unemployment rates as a function of adjusting the capital stock.

4. Data and Methodology

In this chapter, to investigate the impact of government expenditure on unemployment in 16 countries of the euro zone, we give information about the dataset and mythology which are considered in the analysis

Econometric method

Fixed effect (FE), random effect (RE), and dynamic estimators and system GMM) used to examine the unemployment effect of public expenditure .The relation among the variables is specified as follows:

$UNEMP_t = f(Y, EXP, C, GFCF)$ 1

$$UNEMP_{it} = \alpha + \alpha 1EXP + \alpha 2GDP_{it} + \alpha 3\ CFGF_{it} + \alpha 6Cons_{it} + \varepsilon_{it}$$

Where the subscript i=1………, N denotes the country and t=1, T denotes the time period (the period of study is 1990-2016). EXP indicates the public expenditure, GDP indicates GDP per capita growth (annual %), GFCF indicates Gross fixed capital formation, C indicates the final consumption expenditure of households.

We use annual data for public expenditure EXP , Unemployment (UNEMP) , GDP per capita growth, the final consumption expenditure of households per capita growth (CONS), Gross fixed capital formation GFCF , all the data, collected for the period 1990–2019, are sourced from the World Bank's World Development Indicators .Our study covers 16 countries selected based on data availability. namely: France, Portugal, Cyprus, Greece, Ireland, Spain, Slovenia, SlovakRepublic, Luxembourg, Belgium, Netherlands, Germany, Finland, Lithuania, Malta, Italy.

Descriptive Statistics

The section begins the empirical analysis with a descriptive statistic of the variables to examine the characteristics of the variables. Table 2 below presents the summary statistics of the variables used for this analysis. These statistics are for all 16 countries in the sample. These countries are selected based on data availability, especially for the dependent and independent variables of interest.

Table 2 Summary Statistics of Variables

Variable	Obs	Mean	Std. Dev.	Min	Max
UNEMP	480	9.486	4.799	1.48	27.47
EXP	480	41.625	11.086	22.159	98.477
GDP	480	3.2163	2.352	-10.016	12.435
GFCF	480	22.053	3.885	10.135	53.591
CONS	480	2.7102	2.751	-8.666	29.064

Source : stata 13

Test of Stationarity

Table 3 above indicates the stationary of the variables which are the subject of our study

The results show that all variables are stationary at levels.

Table 3 Panels contain unit roots

Variable	Levin-Lin-Chu		Im-Pesaran-Shin	
	Statistic	**P-value**	**Statistic**	**P-value**
UEMP	-3.8342	0***	1.241	0.8927
EXP	-2.0162	0.0219***	-2.6467	0.0041***

GDP	-6.9379	0***	-9.0405	0***
GFCF	-2.8131	0.0025***	-1.4087	0.0795*
Cons	-5.9124	0***	-7.3865	0***

Source: stata13

NB: if the P-value is less than 0, 01; 0.05; 0, 10, that means that the variables are stationary respectively at the threshold of 1 %; 5 %; 10 %.

Correlations

Table 4 Matrix of correlation

	UNEMP	EXP	GDP	GFCF	CONS
UNEMP	1				
EXP	0.1999	1			
	0				
GDP	-0.104	-0.1066	1		
	0.0227	0.0195			
GFCF	-0.2946	-0.1001	0.1591	1	
	0	0.0284	0.0005		
CONS	-0.1718	0.0382	0.3623	0.2997	1
	0.0002	0.4036	0	0	

Source: stata13

The correlation matrix coefficient for the variables is given in Table 2. In fact, all the correlation coefficients between the explanation variables and the dependent variable are statistically significant at 5% at least. Accordingly, GDP, GFCF and CONS are negatively linked to Unemployment.

5. Results of static panel estimations

Table 5 GLS, POOLD OLS and Fixed-effects

VARIBLE	**Pooled OLS**		**GLS Regression**		**Fixed-effects**	
UNEMP	Coef.	P>z	Coef.	P>z	Coef.	P>t
EXP	0.077	0***	0.068	0***	0.067	0***

GDPH	-0.018	0.845	-0.043	0.51	-0.044	0.503
GFCF	-0.302	0***	-0.481	0***	-0.485	0***
CONS	-0.177	0.034**	-0.175	0.002***	-0.175	0.002***
_cons	13.483	0***	17.886	0***	17.997	0***
R-squared	0.1262					
Wald test chi2			245.745(0.000)			
Test of Homogeneity					F(15.460) Prob>F	48.28 0
F Test					F(4.460)=61.95 Prob>F=0.000	
Huasman test chi2(4) Prob>chi2					3.7 0.4481	
Number of obs	30					
Number of countries	16					

Source: stata13

Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

The study adopts the GLS, Pooled OLS, Fixed and Random effects estimation techniques to analyze the relationship between government expenditure and unemployment in the 16 countries of euro zone for the period 1990 to 2019. For GLS, pooled OLS, and Fixed effect presented in table 5 the results show that the GDPH is not statistically significant.

In GLS regression, expenditure EXP has a significant positive impact on unemployment. The coefficient0.068 implies that 1 % increase EXP decrease unemployment by around 0.068. Nevertheless, the coefficient of gross fixed capital formation has a significant and negative impact on the unemployment rate.

Meaning that by increasing GFCF which is the amount that could be used for Job creation and to meet individual needs of a country, unemployment would be reduced. On the other, hand the increase in Gross Fixed Capital Formation was also found to reduce unemployment based on the study period. This result is consistent with the conclusion of Arestis et al. (2007 and Alexiou and Pitelis (2003). However, the final consumption expenditure of a household's per capita growth (CONS) has a significant and negative impact on the unemployment rate. The coefficient 0.176 implies that 1 % increase EXP decrease unemployment by around 0.068

In pooled GLS regression, we find that only GDPH is not significant impact on unemployment. Yet, the results indicate that the coefficient of EXP has a significant and positive impact on unemployment. This implies that a1% increase in public expenditure decreases unemployment by around 0.302.

Similarly, the CONS have a significant and negative impact on unemployment. This implies that a1% increase in GFCF decreases unemployment by around 0.177

In the panels FE model presented in Table 5, we find that public expenditure, GFCF, consumption; has significant impacts on unemployment in the 16 countries Euro Zone. In effect, we find the coefficient of GDP per capita growth has insignificant and positive impact on unemployment.

However, the findings indicate that the coefficient of gross fixed capital formation 0.485 has a negative sign effect on unemployment rate which is also to be statistically significant. Meaning that, the increasing in Gross Fixed Capital Formation was also found to reduce unemployment based on the study period. This result is consistent with the conclusion of Arestis et al. (2007 and Alexiou and Pitelis (2003).

Also, the results indicate that the coefficient of consumption has a significant and negative impact on the unemployment rate. The coefficient0.034 implies that 1 % increase EXP decrease unemployment by around 0.034.

The above table also shows the Hausman test which is actually used to select the model. As stated earlier, while the fixed effect eliminates the heterogeneity from the model. In relation to the Hausman test result shows that the p value is less than (0.4481), therefore the random effect model (REM) is appropriate rather than fixed effect model (FEM). Since the economic behavior is dynamic in nature and in order to explain its evolution over time, the unemployment model must be dynamic. In this context, we will also estimate a dynamic panel data model using both the difference and the system of generalized method of moments (GMM) estimators

6. **Results of dynamic panel estimations**

Table 6 Results of Sys-GMM

variable	Dependent variable : UNEMP			
	Sys-GMM one -step		Sys-GMM Two-step	
UNEMP	Coef.	P>t	Coef.	P>t
UNEMP (t-1)	0.7567926	0***	0.8620934	0***
EXP	0.0502634	0.085*	0.0636921	0***
GDP	-0.1170404	0***	-0.1370379	0***
GFCF	-0.0733529	0.016***	-0.0526215	0.061**
CONS	-0.217755	0***	-0.1882635	0***
_cons	2.761479	0.238	0.7244124	0.448
Observations	488			
No. countries	16			
Sargan test chi2	12.69797		388.4562	
prob	0.991		0	
Arellano-Bond test	0.0309			

Source: stata13

Values in parenthesis are the estimated p values. AR (2) is tests for autocorrelation in differences. Hansen J-test refers to the over-identification test for the restrictions in GMM estimation.

* Coefficient significant at the 1 % level ** Coefficient significant at the 5 % level *** Coefficient significant at the 10 % level.

We also have in this study a dynamic panel specification where lagged levels of unemployment rate are taken into account by using both diff- and Sys-GMM estimators. Consistency of the GMM estimator depends on the validity of instruments. We consider, two specification tests to address this issue: the first is the Hansen test of overidentifying restrictions, which tests the overall validity of the instruments (the null is that the instruments are valid); second is the second-order autocorrelation test for error term, which tests the null according to which there is no autocorrelation

The dynamic panel estimation results are presented in Table 6, which shows that the Hansen test for diff-GMM estimation rejects the null hypothesis of over-identifying restrictions. Therefore, we conclude that the diff-GMM estimation may not be suitable in this context and we proceed to estimate our dynamic model using the sys-GMM estimator wherein both specification tests indicate that the used instruments are valid. Accordingly, we can conclude that the sys-GMM estimation is robust and appropriate.

Based on the sys-GMM estimation, presented in table 6, the public expenditure has a significant positive impact on unemployment in the euro zone countries. This implies that a1% increase in public expenditure decreases unemployment by around 0.050. This implies that the permanent increase in the public finance slows down aggregate demand by reducing consumption, which subsequently weakens the production and profitability of the company which will automatically increase the employment rate. This conclusion is consistent with the result of Faramarzi and al (2014).

We find also that the impact on GDP per capita has a significant negative impact at 1 0% level. The coefficient 0.756 implies that 1 % decrease GDPH decrease unemployment by around 0.756.This result is consistent with the finding of Hussain (2012).

The coefficient of gross fixed capital formation has a significant and negative impact on unemployment rate. This implies that a 1% decrease in gross fixed capital formation decrease unemployment by around 0.073. Meaning that by creasing GFCE which is the amount that could be used for Job creation and to meet individual needs of a country, unemployment would be reduced. On the other hand, the increase in Gross Fixed Capital Formation was also found to reduce unemployment based on the study period. This result is consistent with the conclusion of Arestis et al. (2007 and Alexiou and Pitelis (2003).

The coefficient of the final consumption expenditure of a household's per capita growth (CONS) has a significant and negative impact on the unemployment rate. This implies that a 1% decreases in CONS decrease unemployment by around 0.217.

7. Summary, Conclusions and Recommendations

The major objective of this research work is to examine the impact of gross public expenditure on unemployment rate in 16 euro zone countries with panel data from 1990 to 2 019. To deal properly with static and dynamic panel models, we use OLS, FE, and GMM estimators designed by Arellano and Bond (1991), Blundell and Bond (1998). Our findings may be summarized in these words: The empirical results, for panel fixed effect model results indicate that public expenditure, GDP per capita growth, consumption have insignificant impacts on unemployment in the 16 countries Euro Zone. Nevertheless, we find the coefficient of inflation has a significant and positive impact on unemployment. Also the findings indicate that the coefficient we find the coefficient of gross fixed capital formation has a negative sign impact on unemployment rate which is also to be statistically significant.

Nevertheless for dynamic panel estimations, we find that the public expenditure has a significant positive impact on unemployment for the euro zone countries. However, the coefficient of gross fixed capital formation has a significant and negative impact on unemployment rate.

The problem of unemployment in the Eurozone is a recent phenomenon and difficult to understand. Addressing the high unemployment rate requires action on both sides of the economy, combining policies to boost aggregate demand with national structural policies. Moreover, this strategy will only be successful if it is truly coherent.

Without an increase in aggregate demand, structural unemployment is likely to rise and governments adopting structural reforms may end up simply treading water. Conversely, in the absence of resolute structural reforms, measures to support aggregate demand will quickly run out of steam and may ultimately lose their effectiveness. In other words, the solution to restoring higher employment lies in a combination of monetary, fiscal and structural policies at both the euro area and national levels. This will enable each member of the Eurozone to achieve a sustainable high level of employment.

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