MONETARY POLICIES FOR FULL EMPLOYMENT AND PRICE STABILITY IN
SAUDI ARABIA: AN ENDOGENOUS MONEY APPROACH

A DISSERTATION IN
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and
Mathematics

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DOCTOR OF PHILOSOPHY

by

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Despite being a relatively young and prosperous country, Saudi Arabia has recently suffered from substantial rises in unemployment. This dissertation thus examines the root causes for the rise in unemployment and limited monetary policies in Saudi Arabia. It then attempts to provide feasible solutions for these problems. It includes an explanation of the Saudi economic structure and its features. It additionally investigates the historically-rooted causes of unemployment issues in the nation. The dissertation explains the high economic and social costs of unemployment and also calculates the empirical relationship between unemployment and loss in Gross Domestic Product (GDP) utilizing Okun’s law and applying recently-developed panel econometrics techniques; additional details about the social costs of unemployment are also explained. Knowledge of money’s effect on unemployment in Saudi Arabia is currently limited and thus the dissertation explores the ability and affordability of implementing a comprehensive solution to persistently high rates of unemployment. This is done through examining whether or not the nation experiences endogenous money processes wherein loans create deposits and deposits create reserves. In addition to exploring potential methods of achieving full employment and the expected benefits of these methods, the study explained the unique features of the Saudi economy that make said methods particularly easy to facilitate. In essence, this study revealed the
possibility for the nation to achieve full employment using statistical evidence and the endogenous money supply hypothesis. The primary goal of the dissertation is to develop an approach to achieve full employment ultimately resulting in significant economic benefits for the society as a whole. It employs the endogenous money approach to offer policy solutions for unemployment in Saudi Arabia through transforming the economy into a Knowledge-based economy (KBE). KBE’s pillars are all present in Saudi Arabia save for innovation which could easily be improved because of the high numbers of educated individuals among the unemployed. Thus, this approach could benefit the nation with no foreseeable risks of harm threatened or seen from previous attempts at solutions from Saudi policy-makers.
APPROVAL PAGE

The faculty listed below, appointed by the Dean of the School of Graduate Studies, have examined a Dissertation titled “Monetary Policies for Full Employment and Price Stability in Saudi Arabia: An Endogenous Money Approach,” presented by Abdulelah Alrasheedy, candidate for the Doctor of Philosophy, and hereby certify that in their opinion it is worthy of acceptance.

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<tr>
<td>ADF</td>
<td>Augmented Dickey-Fuller test</td>
</tr>
<tr>
<td>ARAMCO</td>
<td>The Arabian American Oil Company</td>
</tr>
<tr>
<td>BLUE</td>
<td>Best Linear Unbiased Estimators</td>
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<tr>
<td>CDSI</td>
<td>Central Department of Statistics and Information</td>
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<td>FGS</td>
<td>Feasible Generalized Square</td>
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<td>GDP</td>
<td>Gross Domestic Product</td>
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<tr>
<td>GCC</td>
<td>The Gulf Cooperation Council Countries</td>
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<td>IMF</td>
<td>International Monetary Fund</td>
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<td>ICT</td>
<td>Information Communication Technology</td>
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<td>KBE</td>
<td>Knowledge-Based Economy</td>
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<td>LL</td>
<td>Lag of the Total Commercial Bank Loans</td>
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<td>LB</td>
<td>Lag of the Monetary Base</td>
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<td>LM3</td>
<td>Lag of Money Supply</td>
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<tr>
<td>M-C-M’</td>
<td>Monetary production</td>
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<tr>
<td>MEK</td>
<td>Marginal Efficiency of Capital</td>
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<tr>
<td>OPEC</td>
<td>The Organization of the Petroleum Exporting Countries</td>
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<td>OP</td>
<td>Oil Prices</td>
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<td>OLS</td>
<td>Ordinary Least Squares</td>
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<td>PK</td>
<td>Post-Keynesian</td>
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<td>Q1</td>
<td>First Quarter</td>
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<td>R&amp;D</td>
<td>Research and Development</td>
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<td>SAMA</td>
<td>Saudi Arabian Monetary Agency</td>
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<td>SIBOR</td>
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<td>UN</td>
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<td>USA</td>
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<td>VECM</td>
<td>Vector Error Correction Model</td>
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CHAPTER 1
INTRODUCTION AND RESEARCH PROBLEM

Saudi Arabia’s Economic Structure and the Economic Indicators

Brief History of Saudi Economy

Soon after the unification of the Kingdom of Saudi Arabia in 1932, the discovery of oil caused a shift in economic dependence wherein the nation turned to oil as one of the primary economic resources. The current government expenditure is constrained by the production and price of oil. However, before oil was discovered, the Saudi Arabian economy was not easy to speak of as a unified entity. Before the 1930s, the region now referred to as the Kingdom of Saudi Arabia constituted several different regions that relied on specific limited resources and differentiated human activity. For example, the western province, known as Hijaz, depended mainly on subsistence agriculture and long-distance trade, with some people taking advantage of the opportunity to serve pilgrims traveling to the holy cities of Mecca and Medina. On the other side of the peninsula, the eastern provinces of Al Ahsa and Asharqiyah had a plantation economy, based on the cultivation of dates and certain other cash crops (Eickelman, 1982; Niblock, 1982, 2015). Between these two thriving societies was a harsh and nearly uninhabitable desert terrain throughout the central region of the peninsula. Because permanent habitation could only exist where stable sources of water could be found, the small, isolated clusters of people living in this region were situated around any available sources of water, often with vast distances separating one camp from the next. Additionally, travel between cities or camps was particularly dangerous, making contact between societies very limited. The combination of a lack of
readily exploitable natural resources and the extreme difficulty of the journey played a crucial role in discouraging influence or trade from surrounding cultures (Kay, 1982).

In essence, before the discovery of oil, self-sufficient clusters of people concentrated around wells and oases had defined the Saudi Arabian economy as one dependent primarily on agriculture (Amuzegar, 2001; Metz, 1993). A nomadic lifestyle, following the scarce rains to provide food and water for livestock, was the most common way of life for those living in the peninsula. The pastoral nomads were forced to overcome this limitation of resources by creating other sources of income such as working with merchant caravans and pilgrims to provide safe passage through the harsh desert. The local craftsmen would have produced limited goods to meet the needs of the few people living in the small tribes surrounding the water sources. In short, the production was constrained to serve the needs of a relatively small market and existed primarily on a subsistence level (Niblock, 1982).

Moreover, trade was limited primarily to the pilgrimage seasons or the intermittent arrival of camel caravans. By the late nineteenth century, most of the larger merchant families had migrated to settle in the prosperous and lucrative trade regions around the newly developed Hejaz Railway. In conjunction with the spread of industrialization worldwide, European colonial expansion, and international growth, these families cemented their positions as “old money” throughout the Eastern regions of Saudi Arabia and across the Levant, Turkey, and Iran (Al-Rasheed, 2010).

The structure of the current Saudi Arabian economy was forged within the context of certain key events in history. First, the unification of fragmented regions of the peninsula under a single government called the Kingdom of Saudi Arabia allowed for a more homogenous economic environment. Six years after the unification, the discovery of oil
within the eastern region of the Kingdom sparked an era of financial prosperity and rapid economic growth. Coincidently, within a few years, the demand for reliable sources of oil was extremely high in Europe as a necessary resource for the reconstruction in the aftermath of World War II (Niblock, 1982). Thus, the Saudi government took hold of this advantageous opportunity to establish a well-developed oil sector. As a result, Saudi oil became one of the primary factors in the stabilization of the global economy in that Saudi oil production and investment policies as well as strong control over international oil supplies and prices have become of the utmost significance for the industrialized and developing worlds in recent decades (Niblock & Malik, 2007).

Up until the late1990s, focused development of the oil sector was the heart of Saudi economic policy. However, in the wake of the oil crisis of 1986, Saudi policy-makers have made attempts to diversify the economy by increasing development of the non-oil sector (Stevens, 1986). As a result of the prosperity brought on by the discovery of oil, the Saudi government significantly raised citizens’ standard of living to become one of the highest in the world. Some of the steps taken to do this include the establishment of world-class infrastructure and exceptional social services. The impetus for such development originated with the first five-year development plan introduced in 1970. The first and second five-year plans concentrated on developing the infrastructure of roads and desalinization plants, as well as the establishment of electrical grids. Furthermore, the need for highways, seaports, and power stations was emphasized in these initial two plans (first and second five-year

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1 The Saudi government recognized the necessity for investing in infrastructure in forming a sizeable foundation for strategic economic growth and views it as jumping off point for future investments (Khatib, 2012; Smit & Trigeorgis, 2009). Thus, the Saudi government has invested in infrastructure to stimulate the economy and improve performance and productivity.
Moving forward, the third plan placed emphasis on education, health, and other social services. In this early period of growth, oil constituted 90% of Saudi exports, comprised 75% of the Saudi government revenue, and represented 70% of the total GDP (International Monetary Fund, 1999). The fact that the economy is so clearly dependent on oil highlights the need for taking steps towards a more diversified economy and reformation of the government investments (Goetz, 2003). Generally speaking, Saudi Arabia was and still is the leading producer of oil, with the highest surfeit capacity of oil production. However, real income growth still depends heavily on government spending directly financed by oil revenues. Consequently, the government cannot neglect the critical role of oil within the gigantic machine of Saudi economic growth (Hambleton, 1982).

Historically, the immense revenues from oil have carried the country through even the most severe of financial burdens since the establishment of the Kingdom in 1932 (Niblock & Malik, 2007). The oil revenue creates vast financial surpluses for the government and private sectors alike. Large portions of government surpluses were invested in Western government securities and international finances. Since 1982 the government authorities changed their emphasis from the handling of surpluses to the managing of budgetary growth, balancing finances, and paying deficits in response to the sudden drop in oil prices. Adding to the new considerations, the Saudi government had to work to adapt to the regulations set by OPEC’s quota system, which effectively reduced the Saudi Arabian market share (Fakeeh, 2009). As a result, the government’s commitment to significant

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2 The Saudi Arabian Government controls all oil by owned the Arabian American Oil Company (ARAMCO) (Amuzigiar, 2001).
expenditures that had been planned (in the third development plan) had to be postponed until the price of oil rose back to previous prices. The expansive budget coupled with the deficit at the time meant that much of the money had to be drawn from foreign assets until the price of oil was restored. Therefore, this event provided the impetus needed to encourage government authorities to thoroughly review the investment plan that was first set in place in 1975 (Amuzigar, 2001; Vassiliev, 2013). Further, in response to the loss of the market share, the Saudi government’s response in 1985 was to sharply increase oil output to renew the market share and restrict the outputs of other OPEC members. As a result of the market being flooded with oil production, the price of oil crashed in 1986, sharply reducing national revenue in the following years.

**Saudi Arabian Economy Transformation and Oil**

The most significant turning point of the Saudi Arabian economy was the discovery of oil in 1938. From this point forward, the nation broke out of its prior isolation within the global economy as valuable new goods and services were being produced, managed, and distributed. The initial impact of the blossoming oil industry was felt indirectly by the primitive agricultural economy of the time. The establishment of the Arabian American Oil Company (Aramco) allowed the changes brought on by the discovery of oil to be fully realized. From the outset, the managing and processing of oil fields required basic construction of housing, roads, powers plants, modern ports, and water systems. Thus, the native-born Saudi laborers needed to be trained to develop the skills necessary to support the new industry. The oil fields and numerous services needed to support the oil companies opened up a new avenue for economic activities that was previously untouched in the nation. As a result of the influx of laborers, the local traders and merchants had a larger market to
whom they could provide their goods and services. Finally, Aramco and the oil industry provided other supports to local businesses through increased money circulation, logistical and infrastructural improvements, and technological development.

The Saudi Arabian economy has endured several severe economic states as a result of budget deficits. Therefore, every time the Saudi government faces this kind of deficit, it attempts to deal with it in a number of ways: cutting back government expenditures, reducing foreign assets, and the sale of the government bonds. In the late 1980s, the Saudi government employed all of these methods as a means to stabilize its financial status after the oil crisis. By 1989, the Saudi economy had faced other grave problems such as a significant growth in banking debts that eventually led to the financial crisis, a sequence of major private companies filing for bankruptcy, and vast depletion of private capital overseas. However, the fifth development plan was made as a means to create a more solid foundation for all sectors of the Saudi economy. This plan was made in a period when the global oil consumption and prices had recovered, which, in turn, assured policy-makers that the funds would be available to finance new plans to promote the projected rate of economic growth. Therefore, the Saudi economic policy involves a more diversified focus on both the oil and non-oil sectors, as well as development plans and new business.

Since the government made sure that reduction of the public spending was minor, the private sector was not very greatly affected. Nevertheless, domestic public expenditure was increasing to support a war against Iraq’s invasion of Kuwait. Consequently, many Saudi companies saw growth as a result of contracts drafted to provide supplies and services for the war. In the same context, operation Desert Shield and Operation Desert Storm, which had attracted more than 600,000 companies from multinational forces, increased domestic
spending on consumer goods. This helped to balance out the fact that the government had deported a great number of immigrant workers during the war. However, the Saudi government responded to the interruption that the Iraqi invasion had on some projects by reviving them with increased spending. In that period, certain requirements needed to be met, such as certainty for investors, to stimulate the economy. A lucrative relationship between the Saudi government and the U.S. greatly reduced uncertainty that had been plaguing the private sector by bolstering the Saudi economy with the strong American economy as allies. Another factor that helped to stimulate the economy was the government’s reduction by half of domestic fines and utility charges. In short, the Saudi government recognized the necessity of diversifying the economy and thus introduced the five-year plans to do so. The development of the Saudi Arabian economy has coincided with establishment and expansion of the Saudi Arabian state starting in 1932 (Niblock, 1982). The process of building the nation into one of the top economic players was entirely dependent on oil revenues which have been used to develop modern industry and unify the country.

Today, the Saudi economy can be considered a “Resource-Based Growth” economy. In essence, the Saudi economy relies almost entirely upon the natural resources available to it, with huge dependence on global market demand to provide a large portion of its per capita income. Undoubtedly, this natural resource has provided the Saudi economy with vast revenues. However, the vast instability of the market demand and limited availability make this resource a fragile one on which to develop an entire economy. Thus, it is essential to invest in research and development towards developing an economy based on scientific

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3 The government had so greatly reduced the number of foreign workers because they deported a great number of residents who did not show support for the war and condemned the Iraqi government.
evidence and guaranteed stability. In short, the Saudi Arabian dependency on oil makes it susceptible to “Dutch Disease.”4 In other words, Saudi enjoyment of and investment in the oil sector has caused the other sectors to be neglected and weakened (Shabsigh & Ilahi, 2007). As a result, the fluctuation in oil prices and demand can greatly affect the Saudi economy as a whole; i.e., government expenditure and economic growth.

As evidence of this, a reduction of oil prices in the late 1990s led to an $18 billion reduction in Saudi oil revenues in a single year (Saudi Arabian Monetary Agency [SAMA], 1999). In response to this sudden drop in revenues, the government was forced to cut spending on many programs such as infrastructural investment, agriculture, and defense. However, the government maintained the direct subsidies to utility expenses such as water, telephone services, and electricity. Recently, the oil prices have dropped by more than half, again forcing the government to cut spending and subsidies on certain valuable projects. In order to stabilize funds for government spending, major investments must be made to meet the needs of a population growth wherein the youth represent the largest age group. Since the unemployment rates are very high at the moment, the first priority for policy makers is job creation.5

**Analysis of Saudi Labor Force and the Impact of Oil Revenue on It**

The Saudi labor force has experienced a vast change in the second half of the twentieth century as a result of the decline in traditional pastoral and agricultural livelihoods and the emergence of a modern economy in the peninsula (Birks & Sinclair, 1982). After the discovery of oil, large numbers of Saudi people shifted from these traditional lifestyles to

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4 The Dutch disease is the idea that increasing development in one sector leads to negative impacts to other sectors.
5 According to some unofficial estimates, unemployment among Saudi youths aged 16 to 24 years old and university graduates is more than double of what the official statistics report.
positions within the government (Kay, 1982). Moreover, the private sector brought in vast numbers of immigrant workers as a result of increasing demand for cheap labor. Thus, in the period of 1975 to 1985, the average annual growth of the domestic labor force was 5%, whereas the population growth was 3.5% (Central Department of Statistics and Information [CDSI], 1986; SAMA, 1986). With jobs growing faster than the population, it became necessary to import labor from foreign nations to complete ambitious projects and maintain growth. In context, in 1980 Western sources indicated that the total number of employed individuals had increased to 2.2 million, from only 1.7 million in 1975. In 1975, the native Saudi workers made up one million or roughly 59% of the total labor force in the country. By 1980, there were more than a million foreign workers in the nation, making up 46% of total workers (SAMA, 1989).

Ministry of Planning (1980) estimates broke down the distribution of employment into sectors. In 1979 the nation employed 2.9 million people, of which the production sector constituted 1.3 million workers; the service sector employed 1.6 million. In 1979, workers could be grouped into four main sectors: agriculture represented 15.8% of the total workforce, with trade workers making up 10.6%, construction workers comprising 20.4%, and community, social, and government services making up 34.1% of the total labor force. By 1989, the number of employees in the nation had increased to roughly 5.8 million, with laborers in production accounting for 2.1 million of that total, and the service laborers comprising 3.7 million workers. In comparison to the previous years, agriculture’s share had fallen to only 9.9% of the total labor force. Additionally, the percentage of workers in construction reduced to 16.4%, while community and social services increased to 42.4% and trade rose to 15.6.
Throughout the 1980s, the government started from scratch in launching a brand new modern industrial sector for the Saudi economy. Essentially, the government set the main goal as the establishment of an industrial process to attain the great wealth available from the production, refinement, and reprocessing of oil into different chemicals or petrochemicals for export (Hambleton, 1982; Stevens, 1986). In the same manner, the Saudi government employed the industrial sector as a means to launch the construction of new energy plants and to meet the needs of the nation’s infrastructural development. Meanwhile, the Saudi labor force ballooned during this time of development, and a great number of native Saudi workers moved to employment in the public sector (Shabon, 1981). Hence, the government began to have a direct role or influence on the livelihood of the average Saudi (Saudi Arabia Ministry of Planning, 1980).

By the time the sixth plan was completed, significant changes and improvements were already visible across the nation. Nearing the 21st century, many large projects were already complete, yet the nation had saved a few major expansions to be completed in the seventh development plan. At this time the government was sure that the infrastructure needs had stabilized and were sufficient to meet citizen and industry needs. Thus, the primary goal of the government’s five-year increment plans was to maintain and improve productivity and efficiency of human capital and fiscal capital (Ministry of Planning, 1995).

While oil registered as 94% of total budgetary revenues in 1990s, the number of workers directly employed by the oil sector made up only 2% of the total labor force in the 1990s (SAMA, 1999). This is a result of the way that the oil sector relies heavily on capital-intensive rather than human capital. Thus, when considering employment opportunities, the oil sector remains relatively insignificant compared to other sectors. According to Central
Department of Statistics and Information (2015), currently, the number of employees in indirect oil jobs in the public sector has touched 3.3 million workers.

Although Saudi Arabia is already the largest economy in the Arab world, it continues to reform the labor force and increase investments in education in order to increase employment among Saudi’s young nationals. The Saudi government must have recognized that unemployment rates for citizens have reached alarming levels despite the potential labor force growing 3.6% annually. In context, there are 70,000 Saudi undergraduate students in the U.S. alone, with roughly 86,000 in technical colleges: every year hundreds of thousands of new students graduate and prepare for entry into the workforce (Saudi Arabia Ministry of Education, 2015). Thus, it is essential to reallocate public funds while continuing to improve the public sector simultaneously.

The largest factor for unemployment that economists documented in examining the issues in the Saudi labor force, originated from the social structure of the nation. In other words, the jobs most highly valued and sought out by Saudi nationals are already saturated with workers. The jobs that most desperately need to be filled are often looked down upon by citizens who feel that they are not satisfied to work in these positions (Fakeeh, 2009). Therefore, this dissertation begins with an examination of the structure of the Saudi labor force, to explore and illustrate the problem of unemployment in such a prosperous nation. The purpose is to investigate the Saudi labor market to provide a more thorough explanation of the issue than already exists.

After the initial rise in jobs from the discovery of oil, Saudi participation in the labor force has actually declined as foreign workers now make up 83% of employees in the labor force. Another factor of interest is the imbalance of Saudi workers concentrated in the public
sector and relatively absent from the private sector. Recent figures issued by the Ministry of Civil Service indicated that the number of employees in the public sector was 1.24 million (Saudi and non-Saudi) at the end of 2014—a 1.3% increase from the preceding year (Central Department of Statistics and Information, 2012, 2016; SAMA, 2015; Saudi Arabia Ministry of Labor, n.d.). Out of these employees, Saudi citizens constituted 94.2% of the total employees in the public sector even after a 0.1% decline compared to the previous year the male Saudi citizens constituted 717,600. On the other hand, the total number of Saudi female workers in the public sector increased by 4.3% compared to the preceding year, with Saudi female workers in that sector reached 451,000 workers in 2014. On the other side, foreign male employees in the public sector constituted only 36,100 workers in 2014—an increase of 0.2% compared to the previous year—with foreign female employees in this sector constituting 36,000.

Moreover, foreign female workers increased by 4.6% compared to previous years and reached 36,000 employed within the public sector (SAMA, 2015). The recent increases in foreign workers and concentration of citizens within the public sector has led the government to create interventions to solve the unemployment issues. The most recent intervention came in the form of “Saudization,” which is a program implemented to reduce reliance on foreign labor by substituting Saudi workers for foreign workers in the private sector (Fakeeh, 2009; Johany, Berne, & Mixon, 1986).

In short, the major problem involves reducing and maintaining low unemployment rates while combating lower rates of job creation a large annual population growth and immigration rate in Saudi Arabia. Saudi Authorities must create at least 1.1 to 1.3 million jobs to reduce the unemployment rate to 7% (Akhbaar 24, 2016).
Efforts of the Ministry of Labor in employment supervision. The Ministry of Labor aimed its efforts at encouraging a certain proportion of the Saudi labor force to move toward work in different economic activities in the private sector. The Ministry of Labor has launched programs such as the “Nitaqat,” “Hafiz,” and “Taqat” programs to regulate the employment process and stimulate the private sector to employ greater numbers of Saudi nationals (Saudi Arabia Ministry of Labor, n.d.). All of these programs provide assistance to private sectors in hiring qualified Saudis across different job types. The result of these efforts is that a significant number of Saudi citizens have gained employment within the private sector across the nation. In fact, according to the Ministry of Labor, Saudi Nationals made up only roughly 11.5% of the total number of employees in the private sector before these programs were introduced. After they were put in place, the percentage rose to roughly 15.5 (SAMA, 2015).

Saudi Arabia’s efforts for regulating expatriate workers. The Ministry of Interior and the Ministry of Labor (n.d.) have essayed (by using inspection campaigns) to ensure the legal status of expatriate workers in the country. There are major benefits of altering their status through regulating the relationship between employee and employer to provide a suitable work environment. Therefore, the Ministry of Labor launched a number of programs in recent years to reform the labor force and increase the percentage of Saudi workers employed in the private sector by adjusting the quota system of the private sector and levying penalties on companies that do not meet the required ratios. Additionally, the Ministry of Interior and the Ministry of Labor issued “Rules of Violation and Penalties” that are implemented on both individuals and institutions that hire illegal foreign workers. Also,
employers incur penalties if they allow their workers to maintain a status of self-employed while working within a company or business.

**Unemployment**

The Central Department of Statistics and Information (CDSI) indicated that the rate of unemployment for Saudi nationals was 11.5% in 2015 (CDSI, 2016). In fact, nearly 33.3% of all adult females are unemployed, and 6% of adult males remained unemployed. However, the highest levels of unemployment are found in youth populations where 40% of all citizens under the age of 35 have no stable form of employment. Moreover, with over 35% of the population is still under the age of 19, and with increasing labor force participation by women, the number of Saudi citizens entering the work force will increase rapidly, which will greatly increase the number of people who maintain an unemployed status in the nation unless more jobs are created or immigrant intake is reduced (CDSI, 2001).

The government has taken some steps to reduce the ever-increasing unemployment rate among the Saudi youth, increase the percentage of Saudi workers in the private sector, while reducing the percentage of foreign workers who currently make up 32.7% of the total Saudi population, about 8.1% of total employees in the public sector and 84.5% of the total employees in the private sector. Despite many of the efforts described above, the problem persists as a result of many other variables causing unemployment that have not been addressed.

**The Money and Banking System**

It is essential to explain the role played by modern money in most developed and developing capitalist economies. Money takes on many different roles; in particular, it is
very important to explain how the trade of money generates sufficient demand for a state’s currency. Also, it helps to maintain some degree of price stability, coupled with full employment. Many people think of money as a tool used in all sorts of trade, including the payment of taxes. However, there is demand for money from those who are not required to pay tax. Therefore, for us fully to understand the role of modern money in Saudi Arabia, we must understand the role of money currently and compare that to the era in which there was no unified currency. In 1998, Randall Wray, wrote that an analysis of the current role of money should focus on the value of currency, government deficits, monetary policy, government bond sales, employment policy, and exogenous pricing.

In fact, money plays a vital role in any economy; Saudi Arabia needs to issue its own currency for domestic and global trade. In essence, before the mid-twentieth century, the country had no currency and thus no official banking system. At that time, people primarily used coins that had a metallic content equal to their value (much in the way banks originally backed all currency with real gold). Moreover, most exchange transactions with these coins were concentrated in urban areas. More precisely, people in the region used foreign coins to serve the residents’ monetary needs. The first Saudi Riyals were issued in 1935 to unify and stabilize the monetary units and facilitate circulation. In 1950, the necessity for currency, regulations, controls, and policies were increasing as the government expenditure, foreign oil company spending, and new private banking exploits were sharply increasing. In 1952, the Saudi central bank, known as the Saudi Arabian Monetary Agency (SAMA), was launched. Consequently, the financial system has developed numerous layers intended to fulfill a number of multidimensional economic, exchange, and regulatory roles, with SAMA
acting as the primary control center. SAMA sets Saudi monetary policies and stabilizes the value of Saudi Riyal in an environment of open exchange transactions and capital flows.

SAMA has utilized certain tools of monetary policy to stabilize the value of the Saudi Riyal by setting the domestic interest rate for commercial banks close to comparable U.S. interest rates, managing foreign assets, and introducing short and medium terms for government papers on budgets, payment balance goals, and determining domestic liquidity. Moreover, SAMA is the depository for all public funds which it pays out for certain purposes stipulated by the ministers of finance and national economy. Also, SAMA regulates commercial banks, and moneychangers. However, SAMA gives up, currently, its monetary policy by pegged Saudi Riyal to the U.S. dollar. All the issues embedded in the Saudi money and banking system and how these issues can prevent the policy-makers from providing sufficient policy to solve unemployment are discussed in later sections.

Demographic Features of Saudi Population

One of the unprecedented factors affecting economic growth is population. Population density and age distribution have profound effects on both productivity and economic performance. The great variety in the behavioral norms of people in different age groups has a significant impact on a country’s economic status. For instance, elderly people (60 years or older) have much different behaviors and needs than those who are just graduating high school or college. Since the elderly people save more and consume and work less, their economic impact is in relative decline. Whereas, young people consume and work more and save less because they are in the onset of their life, meaning that their economic performance provides them a status of increasing circulation and flow of finances. The first four decades following the unification of Saudi Arabia gave rise to slow changes in
Saudi age distribution (Niblock, 2015). In fact, SAMA statistic reports show that the Saudi population has substantially changed regarding density and age groups since the nation was first founded. In 1992, 64.2 percent of the Saudi population was concentrated around three, more urbanized centers, (Riyadh, and both the Western and Eastern provinces). By the period from 2004-2015, the share of population increased slightly to reach 64.5 of the total Saudi population during the period of 2004-2015. Additional changes can be seen during the period of 1974-1992 in that individuals under the age of 24 make up nearly half (47%) of the entire population and by the period from 1992-2004 the surpassed the halfway point, rising to 61.5% of the total population (SAMA, 2015). The economic structure saw parallel changes, which eventually affected the rate of economic growth.

The age distribution of the Saudi population has changed as a result of several factors: increased life expectancy, increased fertility rates, and lower death rates. In fact, nearly all of these changes have come about as a result of the increased living standards brought on by the sudden economic growth after the discovery of oil. Theoretically, labor is one of the chief drivers of economic growth. Mainly, the hypothesis of this dissertation is that the dynamic structural changes in the population of Saudi Arabia will have a vast impact on Saudi economic growth in both the short and long term through providing the country with seemingly limitless human capital. In context, with the majority of the population made up of younger generations and older individuals representing only a small fraction of the total population, the future of management for the Saudi population and economy can be compared to other advanced countries with similar age distributions (Abusaaq, 2015).
Theoretically, a country with a population largely comprised of youth will tend to have a relatively large labor supply, more consumption, and less saving (Keynes’ view of saving and investment); as such, populations like this are estimated to have a higher rate of economic growth. Therefore, the large numbers of young people in Saudi Arabia can be expected to bring the country serious macroeconomic and fiscal consequences. However, it is interesting to note that these changes in population, while expected to increase employment and economic growth, have actually only really served to raise unemployment rates in Saudi Arabia. Thus, the phenomenon of augmented numbers of young job-seekers unable to find open positions in the current economy poses a major challenge for the economic policy-makers in Saudi Arabia. It is vital that they take immediate action to alleviate the social and economic costs that such high rates of unemployment would have on the Saudi economy.

As mentioned above, the Saudi economy potentially has much to gain in the labor force and market growth as a result of the high numbers of youth in the nation. The average ages in other emerging economic countries, developed countries in Europe, North Africa, or North America, are all considerably higher than the average age in Saudi Arabia. The most recent statistics show that the ratio of youth (aged 0-19) and those of working age (15-60) is relatively high at 65.21%. Thus, the “demographic bounds” indicates that, within the next few years, the number of Saudi citizens eligible for entrance into the workforce will swell considerably. Thus, Saudi Arabia has a prime opportunity to seize the potential within this young population to further economic and social developments. However, these benefits cannot be fully realized unless the government and society create suitable environments and institutions in conjunction with the implementation of vital policies to promote employment
among the youth. In short, unless the government creates an environment that is ready to accept the high numbers of new workers with open arms, the current youth might eventually become more of a liability than a youth dividend (Murphy, 2012). Ordinarily, a country lacking sufficient diversification, with unstable dependence on foreign laborers in petrol industries, and a rigid set of labor codes enforced upon nationals, is at risk for severe economic, political, and social instability in the future in addition to the problem of employing the aging youth in the labor market.

**Education system.** The education system in Saudi Arabia focuses on a diverse number of goals, with the proper education of Islam at the apex. Additionally, the education system seeks not only to arm all Saudi students with an array of valuable skills and an arsenal of knowledge, but also to instruct them on the proper behavior and etiquette in order to help them grow into responsible and respectful young adults. Thus, the Saudi education system functions on the premise of creating citizens who will contribute to the development of the country in both economic and cultural terms.

By reviewing the Ministry of Education’s ten-year strategic plan for 2004-2014, one will see that the education system is one of the most influential factors in shaping and forming the beliefs and actions of the human capital that will be so essential for future economic development and growth. Thus, the goal of the education system is not only to create responsible citizens for society, but also to act as a significant investment in the standards of living and economic prosperity of the future (Saudi Arabia Ministry of Education, 2005).

As seen in the written outlines of the Ninth Development Plan (2010-2014) (Saudi Arabia Ministry of Planning, 2010), the education system in the country attempts to expand
the capacity for a larger volume of students, while also offering more diverse opportunities for Saudi citizens to gain the knowledge and skills that will most greatly improve this human capital for the future. Thus, the education system is built upon input from both the public, and well-trained, highly qualified education specialists who will participate in students’ learning to help them develop intellectually and prepare them for future innovation within the guidelines set by society (Saudi Arabia Ministry of Planning, 2010). Logically, the country will not actually be able to witness or measure the benefit of improvements to the education system until the students (output) enter the labor market to begin producing goods and performing services for the community. However, the current Saudi labor market is not able to create new jobs fast enough to absorb the current rate of entrants, thus posing a major threat to the economy and presenting a considerable challenge to Saudi policy-makers. It is vital that policy-makers take the quickest action possible to reduce the social and economic strain of an elevated unemployment rate in the nation.

In looking at the first five-year development plans, one finds that policy-makers made it the highest priority to take care of the needs of the workforce and economic development in response to the explosive development of the oil sector. Initially, 1,180,000 new workers were needed to establish and maintain the burgeoning oil industry activities. In context, the native-born unskilled Saudi workers constituted 84% of these new workers. On the other hand, 170,000 expatriate skilled workers were imported from surrounding countries (Saudi Arabia Ministry of Labor, n.d.). With the Saudi population reaching 9.3 million, there were not enough native-born skilled Saudi workers to offset the large demand created by rising oil production and related infrastructure requirements, which led the nation to depend on imported foreign workers. However, new restrictions were placed on workers emigrating
to Saudi to reduce their numbers and encourage native citizens to work. Clearly the nation needed to give some degree of urgency to try to solve the problem of the imbalance in foreign and native workers. Until recently, the government primarily used two techniques to increase the number of skilled Saudi workers: improving the education system to give new workers the skills most in demand, and launching several new training institutes to train workers who have already completed their education but lack the necessary skills to meet the needs of the new industries.

Although the Saudi government comprises the largest economy in the Arab world, the government must continue to reform the labor market and invest in education in order to increase employment among the youth of the nation. It is vital that the government realize the alarming extent to which unemployment has pervaded the citizens despite the labor force growing roughly 3.6% annually. More specifically, around 70,000 Saudi undergraduate students in the U.S. and 86,000 students in technical schools will enter the work force every year (Saudi Arabia Ministry of Education, 2014). Thus, public investment and public sector reform need to happen simultaneously and in such a way as to complement each other. However, there are additional factors that must be considered by policy-makers, such as cultural structure and tradition that has up until now encouraged Saudis to seek work in the public sector to the point of over-saturating the market with labor.

**Research Problem**

What all of the above reveals is that Saudi Arabia, a relatively “young” country with significant oil resources, suffers from an increasing rate of unemployment reaching 11.5% in
2015. At the same time, an insufficient and limited monetary policy resulting from the value of the Saudi Arabian currency (Riyal) being pegged to the U.S. dollar, effectively limits Saudi Arabia’s room for policies with respect to addressing this problem.

Additionally, the unusually high rate of unemployment among Saudi youth costs the nation both socially and economically. Moreover, other unique traits of the Saudi labor force such as low female participation and concentration of native citizens in the public sector distinguish it from labor markets in other countries with similar economic power.

This dissertation seeks to examine the causes of the unusual rate of unemployment and limited monetary policies in Saudi Arabia. This dissertation begins with the root causes of these two issues and then offers possible solutions for these problems. The goal of this dissertation is to develop an approach which will allow the country to reach its full potential for employment and thus achieve the subsequent economic and social benefits for the society as a whole. Moreover, this dissertation explains the historical origins for factors impacting unemployment in the Saudi Arabian labor market. The dissertation specifically outlines the actual connection between unemployment and losses in the Gross Domestic Product (GDP) in Saudi Arabia by utilizing Okun’s law through applying recently developed panel econometrics techniques. Finally, in this study, the endogenous money

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6 According to the Central Department of Statistics and Information (CDSI), the estimates of the mid-year census indicated that the population of Saudi Arabia in mid-2016 increased by 2.6% and reached 322,291,102 million compared to the preceding year, in which the population was 30.8 million. Saudis represented 67.3% of the total population or 21.7 million people. Also, the median age is 25.3 years.

7 Because of the direct connection between the Saudi riyal and the U.S. dollar, Saudi monetary policy-makers have no control over the money supply. Also, the Saudi interest rate is set by the central bank to change in accordance with U.S. fed rate changes.

8 According to the Ministry of Civil Service, the last statistics released indicated that the number of employees in the government sector was 1.24 million (Saudi and non-Saudi) at the end of 2014. Of these, Saudi constituted 94.2% of the total employees in the government sector; whereas the number of workers in the private sector, either Saudis or non-Saudis, was 10.0 million. of which Saudi workers who participated in the private sector was 15.5% of total workers in the private sector.
approach was used to offer policy solutions for high rate of unemployment in the case of Saudi Arabia.

**Background and Rationale**

For the sake of thoroughness, this dissertation addresses the effect of money on unemployment. Both heterodox and orthodox economists have interpreted the effect of money on economic variables. Some of the orthodox theories divide economy into two sectors: that is the real sector, such as output and employment, and the nominal sectors such as price (Laidler, 1991). Neoclassical economics—part of orthodoxy—argues that money does not affect real variables. Moreover, the monetarism school argues the case that the effect of money on the real variables occurs because of unanticipated monetary policy and that any effect would hold only for short time (Friedman & Schwartz, 1986). In other words, in orthodox economics, money is neutral—money has no effect on the real variables such as unemployment and output and government has no policy space or room for intervention. Thus, full employment occurs because of market forces; i.e., market clearing in the labor market. Therefore, unemployment can only be voluntary (Snowdon & Vane, 2006).

In contrast, in heterodox economics, money “rules the roost” because of its special properties,
especially starting from Keynes’ ideas about money through Post-Keynesian economists. According to this theory, money has an effect on economic variables and the government has the opportunity to create related policies that can stimulate the economy. While most of the research on unemployment in Saudi Arabia has used a mainstream approach, this dissertation utilizes the Post-Keynesian approach of endogenous money to explain unemployment and limited monetary policy in Saudi Arabia.

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9 Money has special properties such as zero substitution; i.e., when the liquidity goes up the only thing that people want is money and elasticity of production (Keynes, 1937).
Moreover, most prior research attributed the high rate of unemployment in Saudi Arabia to cultural factors. For instance, Saudis do not value blue-collar jobs as greatly as higher-ranking positions in the private sector, and neither of these as much as positions within the public sector (Fakeeh, 2009). In a sense, they have been spoiled by the burst in government positions and have become accustomed to the luxury and esteem bestowed upon those employed in the public sector. Other research lays blame on the education system, claiming that it does not prepare Saudi citizens for the types of jobs that are currently available in the Saudi labor market (Eldemerdash, 2014; Fakeeh, 2009). Also, it has also been argued that for Saudi Arabia, unemployment issues are not caused by technological progress (Al-Dosary & Rahman, 2005). In reality, there are many reasons that exist beyond what has been described in previous research. Therefore, there is a need for a comprehensive approach to investigate the causes and cost of the high rate of unemployment in Saudi Arabia.

It has been hypothesized that there is a relationship between change in the unemployment rate and the change in a country’s economic growth. Arthur Okun (1965) developed the idea, later called Okun’s law, which indicates that if GDP growth rate increases by one unit, unemployment rate will fall by a given amount. In the case of Saudi Arabia, only one study tested for the validity of Okun’s law by using panel econometrics techniques (Al-Qudsi, 2005). This study concluded that Okun’s law is valid in the case of Saudi Arabia. However, this study does have certain limitations, such as a very short time series and interpolation of missing unemployment data points.

**Proposed Original Contribution**
In this dissertation, there are three main original contributions: (1) I utilize both quantitative and qualitative methods to provide a coherent theoretical explanation of the high and persistent unemployment and limited monetary policy within Saudi Arabia. (2) In response to a lack of sufficient time series data for Saudi Arabia resulting in an insufficient sample size and for increasing the degrees of freedom, I use panel data to estimate Okun’s coefficient for Saudi Arabia. (3) This dissertation utilizes an endogenous money approach to illustrate the unemployment problem in Saudi Arabia; specifically, how money plays an important role in this economy, and how the government may intervene to stimulate the economy. To the best of my knowledge, the high rate of unemployment and the limited monetary policy in Saudi Arabia has not been investigated under the endogenous money approach. Finally, I strive to avoid the shortcomings from which previous studies suffered. I also provided policy proposals to address the issue of unemployment in Saudi Arabia.

**Interdisciplinary Research**

I will examine data statistically coupled with a political economic analysis that endeavors to develop a theoretical explanation of high and persistent unemployment and a limited monetary policy within Saudi Arabia. In most economic theories, there is a need for collecting analytical and theoretical quantitative as well as qualitative information. I will work with monetary and unemployment models which needs many statistical concepts. I will also provide an analysis of economic statistics that provide the empirical data needed for my economic research, whether descriptive or econometric. In order to provide an accurate policy evaluation of microeconomics, macroeconomics and data quality, I must use statistical data as well. Based on the robust relationship between economic and statistical theories, my doctoral research will also cover quantitative analysis.
Methodology and Data

The problem was examined through analyzing data statistically in conjunction with a politico-economic analysis to develop a theoretical explanation for the high and persistent unemployment and limited monetary policy within Saudi Arabia. As with most economic theories, it was necessary to collect data and use both quantitative and qualitative methods to create a coherent response to the hypothesis or problem at hand. Thus, the method used was to work with both monetary and unemployment models. Further, the research provided an analysis utilizing both economics and statistics.

The quantitative methodology in this dissertation focused on panel data to estimate Okun’s law for all of the Gulf Cooperation Council (GCC) countries. By using an annual time series, I investigated the relationship between unemployment and output (growth rate of GDP) over the period from 1994 to 2014. Moreover, I examined the hypothesis of endogenous money (loan creates deposits and then deposits create reserves) and exogenous interest rate within Saudi Arabia, which has a fixed exchange rate. I used quarterly data from 2000 Q1 to 2015 Q4 to test endogenous money supply hypothesis by using the Granger causality test. Graphical analysis was used to illustrate how the central bank exogenously determines the interest rate to change shortly after the U.S. Federal rate changes. Data were collected as a time series to cover different periods. All data in this dissertation were obtained from the Central Department of Statistics and Information in Saudi Arabia, Ministry of Economy and Planning in Saudi Arabia, Ministry of Labor and Human Development, Saudi Arabian Monetary Agency (SAMA), and the International Monetary Fund (IMF).
Organization of the Study

This dissertation is organized into five distinct chapters. Chapter one is the introduction to the topic and research problem. Chapter two provides a brief assessment and overview of relevant literature (theoretical and empirical) covering the topic of unemployment and the role of money on economic factors such as employment in Saudi Arabia. Chapter three illustrates the cost of unemployment in terms of both economic costs and social costs. The chapter then sheds more light on the econometric technique known as Okun’s law that was used to estimate the economic costs of the increasing rate of unemployment. Chapter four presents the endogenous concept before using recent time series data to examine and document whether or not the endogenous money theory holds true in the Saudi Arabian economy. Finally, this dissertation contains a chapter that gives policy recommendations meant to solve the issue of unemployment and limited monetary policy in the Kingdom. This chapter will pave the way towards achieving the benefits of applying an endogenous money approach to solve the very high rate of unemployment by creating a Knowledge-based Economy in Saudi Arabia. This chapter also serves as the conclusion and provides a general summary of the topics covered.
CHAPTER 2
LITERATURE REVIEW

This chapter is dedicated to an exploration of previous studies that have both theoretically and empirically approached the issue of unemployment in Saudi Arabia. It also examines literature about how endogenous money theories explain the general problem of unemployment. The chapter commences with an analysis of prior studies that have covered the topic of unemployment in the Kingdom of Saudi Arabia to illustrate the loss of output as a consequence of the increase in unemployment. Finally, the chapter concludes with a thorough exploration of studies utilizing the endogenous money approach in other countries to explain unemployment.

Previous Studies on Unemployment

Unemployment is a phenomenon that has held interest within the economic and scientific community long enough to have been studied from several fields and viewpoints. For the sake of identifying the root causes of unemployment, economists have found it necessary to distinguish the unique forms of unemployment. The types of unemployment identified and categorized thus far are Cyclical Unemployment, Frictional Unemployment, Seasonal Unemployment, and Structural Unemployment. Thorough research into previous studies reveals a general consensus that the unemployment found in Saudi Arabia is involuntary and most closely resembles structural unemployment. However, the structural unemployment in Saudi Arabia reveals that the younger generation fails to fit into industrial reorganizations despite technological shifts being relatively insignificant. In conclusion, the majority of prior studies tend to attribute unemployment in Saudi Arabia to a disequilibrium
between current education outputs, expertise, and laborer attributes in relation to the current labor market demands.

Manal Al Fakeeh analyzed the phenomenon of unemployment in 2009 by examining only Saudi male unemployment while excluding female unemployment, which she attributed to social and religious restrictions on women’s workforce participation. In other words, she established that the unemployment problem plaguing females deserved its own classification completely separate from those previously identified. Additionally, since the factors impacting female unemployment were not considered to be economically derived, she chose not to address this issue and instead focused her attention on unemployment within the male population of the country. Al Fakeeh concluded that unemployment among eligible Saudi males could be classified as structural unemployment because the education outputs entering the labor force every year are ill-suited to satisfy the current labor force needs. Al Fakeeh additionally evaluated and criticized the government’s attempts at using Saudization to solve unemployment and posited that this was not the ideal solution to reduce the male unemployment rate in the nation because of the mismatch between education outputs and the available vacancies.

Fakeeh (2009) studied the Saudi labor force and how Saudi culture paints different sorts of work in different lights. She additionally attempted to prove a link between certain socio-economic factors and the recent high rates of unemployment in the nation. In her thesis she evaluated the solutions that have been proposed by the government of Saudi Arabia to solve unemployment such as “Saudization.” She placed much of the blame for unemployment rates on the education system for not equipping the native citizens with the skills most highly demanded to build the nation. According to Fakeeh, the skills that most
Saudis are taught in the public school systems do not align with those required by the current labor demands. Furthermore, she points to a lack of a strong work ethic among Saudi natives as another factor in the issue of unemployment. As a consequence, the government’s efforts to solve the unemployment crisis has hardly made a dent in the unemployment rate and had done little to provide the nation with truly skilled workers. She concluded that it is not enough to force employers to take on Saudis who are ill-prepared for a job. Instead, the country should focus on producing workers whose skills are appealing to employers and well-suited to jobs in the private sector.

M.G.H. Al-Asmari (2008) studied the current status of the Saudi labor force and the impact of “Saudization” as a solution for the high rate of unemployment. According to Al-Asmari, the high rate of unemployment is caused by the traditional education system which focuses on creating output that appeals to the public sector. Therefore, those citizens who have received an education in the country typically feel better prepared for, and thus prefer to work in the public sector. Additionally, they feel that positions in the public sector offer better job security, higher salaries, and shorter hours compared with the private sector. Moreover, Al-Asmari highlighted the impact of the large ratio of expatriate workers in the Saudi labor force. He emphasized that the lower pay for foreign workers makes them desirable for private sector companies who often give them preference over Saudi nationals, essentially exacerbating the unemployment issue in the nation. Al-Asmari (2008) criticized the huge amount of public funds being allocated to education in Saudi Arabia because even educated individuals are unable to find jobs. In his paper, Al-Asmari concluded that unemployment is not an issue unique to those who completed only their middle or high school education; the problem has just as significant an impact on job seekers with advanced
degrees and credentials. Also, Al-Asmari argued that the unemployment rate is actually higher than the published figures. He voiced his dissatisfaction with the current government efforts to solve unemployment in Saudi Arabia because he believes that they were not directing their efforts towards fixing the root causes.

In 2012, Caryle Murphy studied the political instability that could occur in Saudi Arabia as a result of the persistence of high unemployment rates among the Saudi youth. She posited that political instability in the nation stemmed from the dramatic changes in the demographic composition of the nation in that citizens under the age of 14 made up 37% of the entire population in 2010. Further, slightly more than half of the population was under the age of 25. Murphy saw that political instability was the inevitable result of the unemployment rate for individuals between the ages of 15 and 25 reaching 30%. Murphy interpreted the ultimate cost of the unemployment phenomenon as being one of instability within the government, which will lead to greater social and economic costs in the future.

Nadia Eldemerdash (2014) utilized domestic news reports as a means to illustrate the impact of nationalized unemployment and migration in Saudi Arabia. In fact, Eldemerdash examined government attempts to solve unemployment from the first attempts at “Saudization” all the way through an analysis of the effect of other methods such as employment quotas and penalties levied against businesses who failed to employ Saudi workers. Eldemerdash concluded that these kinds of policies and practices are insufficient to effectively reduce the unemployment rate among Saudi workers.

Jennifer R. Peck (2014) analyzed the efforts made by the Saudi government to significantly improve active labor market policies to address the serious problems of the ballooning unemployment rate among the youth and relatively low rates of native Saudi
worker participation in the private sector. More specifically, Peck studied the introduction of
the Nitaqat program in 2011. The Nitaqat program imposes a quota system on private
companies requiring them to hire a minimum number or percentage of native Saudi workers.
In this paper, Peck examined the effects of this policy on nationalization, firm size, and exit
from the market by using datasets derived from the Saudi Ministry of Labor comprised of
full overviews of Saudi private sector organizations. Peck’s results revealed that the policies
were successful in increasing native-born worker participation in certain companies. On the
other hand, the negative impact of the program was substantial in that 11,000 different
companies or firms went out of business as a result of the burdens imposed on them through
these new policies. As a result, Peck asserted that the Nitaqat program actually reduced the
total number of employees in the private sector by 418,000.

Saud Kabli (2014) studied the effect of both the Saudization and Nitaqat programs
enacted by the government in a national attempt to raise the employment rate for native-born
workers while reducing dependency on foreign workers. Kabli found that the growth of the
Saudi labor force was more than the rate of employment among Saudi workers. Thus, the
Saudization program had little effect on the unemployment rate of youth, which remained
virtually stagnant throughout the periods in which the Saudization programs were enforced.
Kabli mentioned some of the obstacles that hindered the hiring of nationals, such as their
need for higher wages compared to those of foreign workers in the private sector. Kabli, like
many economists, criticized the education system for not providing the labor force with the
necessary outputs (skills and knowledge) for the positions most desperately needed by the
labor market. Additionally, there is an imbalance between the jobs that are in demand and
the education levels of those leaving the education system. Finally, he claims that the market suffers from the lack of training and technical and vocational skills.

Amani Hamdan (2005) addressed the impact of privatization on public sector employees. She investigated employment within organizations that had switched from the public to the private sector such as Saudi Airlines. She recognized that the nation was making dramatic steps towards privatization in the last decade which led her to emphasize the impact that has had on employees. Before the airline was fully privatized, the author posed five main questions to the high-ranking employees in Saudi Airlines to give insight into the personal issues that would result from the privatization of the company. The questions were as follows:

1. When will privatization occur and would the current employees be displaced at that time or be allowed to continue working for the company?

2. Will there be any reduction in wages or benefits for current workers if privatization occurs?

3. Will current Saudi Airlines employees be required to go through additional training or certification to continue working for the company after privatization?

4. Will Saudization represent any sort of obstacle to privatization or vice versa?

5. Will the current employees reject the idea of privatizing the company?

Husain’s overall findings revealed that the privatization would have a considerable negative on the public workers currently employed at Saudi Airlines. More specifically, results showed that a number of current workers would be displaced, while many others would be required to undergo additional training in order to keep their jobs at Saudi Airlines. Additionally, responses indicated that there would be a large employee outcry and
opposition to privatization of the company. Finally, the results indicated that some workers would not suffer a loss in wages or benefits and there would be a clash between privatization and Saudization.

In 2000, Mohammad A. Al-Harthi attempted to ascertain and describe the various causes of the labor shortage in Saudi Arabia. He divided the main causes into three distinct categories: political, economic, and socio-cultural. He explained how these three factors have influenced the formation, function, and structure of the Saudi labor force in such a way as to create a severe deficiency of workers suited to necessary jobs in the economy. Al-Harthi further examined the state-business relationship and how it could affect the labor force in Saudi Arabia. Moreover, he emphasized the unprecedented nature of having such a rapidly developing nation suffer labor shortages and surplus capital, when most developing countries witness the opposite. He concluded that the labor deficit resulted from the capital surplus seen in the 1970s in Saudi Arabia. Moreover, he maintained that unemployment for nationals in the private sector was a result of employers preferring to hire foreign workers because they are able to pay them lower wages, while foreign workers are also more likely to be equipped with the skills or knowledge necessary to fill private sector positions than Saudi nationals. As a result, the number of expatriate workers surpassed the number of native workers in the labor force. This leads to a large number of remittances, which can be seen as a considerable pecuniary cost. Finally, he argued that the Saudization program could be an effective solution for this issue if it were to place more emphasis on creating jobs that consider the skills of native-born entrants to the labor market instead of ill-fitting jobs that are currently populated by foreign workers.
While many of the aforementioned studies examined the effect of government intervention on unemployment without examining the causes or cost of it, Al-Dosary and Rahman (2005) introduced and explained the goals for the labor market stated by the government in all development plans. Al-Dosary and Rahman determined that the unemployment found in the Saudi economy could be classified as “structural.” This very same conclusion was outlined in the government’s eighth development plan report. Additionally, they claimed that the true unemployment rates far surpass those that are published in official reports. Finally, they explained that the current efforts carried out by the government to reduce unemployment in Saudi Arabia have proven unsatisfactory because those efforts have not significantly reduced the rate of unemployment.

In 2013, the IMF staff examined the Saudi labor force and concluded that Saudi policy-makers should seize the opportunity of a young and increasingly well-educated Saudi labor force to boost economic growth and living standards. However, despite significant economic growth around that time, unemployment has remained very high, particularly among youth and women. In their report, the team pointed out a factor that often differentiates native workers from expatriate workers is that they are, on average, more highly educated. Additionally, they found that native-born workers represent only 17% of the total employment in the private sector, with foreign workers dominating the remaining 83%. Moreover, the team strongly emphasized the danger of such low rates of female participation in the labor force. Finally, they concluded that the cause for such high unemployment rates is the wage deferential between foreign workers and nationals, while cultural gender roles and societal expectations negatively affect female participation.

10 Structural unemployment comes from a fundamental mismatch between the skills or traits of potential workers or job seekers and the jobs that are currently available in the labor force.
Almunajjed (2010) studied women’s employment and the major challenges facing it in Saudi Arabia. They described the Saudi policies and programs promising to increase women’s participation in the labor force. They blamed various social, educational, and occupational limitations for the relatively low rate of female participation in the work force. They implored the government to raise female participation through reforming the education system, work environments, and laws. They pointed to undeniably large figures such as that 90% of native-born women with certifications or degrees participate in the labor force. Moreover, women in Saudi Arabia constituted 57% of all university graduates, meaning that they will play important roles in the work force in the future. However, current female participation is still very low with unemployment among native Saudi women reaching 33%. Almunajjed concluded that Saudi Arabian policy-makers are responsible for creating a work environment conducive to women’s participation.

**Previous Empirical Studies in Okun’s Law**

There are very few studies that have utilized Okun’s law to study the relationship between decreases in economic output and increasing unemployment rates in Saudi Arabia. Thus, this dissertation investigated some of the few papers that have utilized Okun’s law to evaluate a similar phenomenon, even if some were carried out in other nations. “Okun’s law” is described as the negative relationship between the growth rate of a country’s output and unemployment rate as it was documented in the early 1960s by Arthur Okun. This law has been tested and applied to different situations, creating new versions such as the Difference version, the Gap version, the Dynamic version, and the Production version (Knotek II, 2007). However, for the sake of avoiding restrictions based on assumptions
required in other versions, when calculating the potential output and rate of unemployment, this paper employs the use of the Difference version.

In the original estimation of Okun’s law, a 3% increase in output coincided with a 1% fall in the rate of unemployment, on average (Levine, 2013; Okun, 1965; Prachowny, 1993). However, recently, Okun’s law has been retested via regressing the growth of the GDP against the change in the rate of unemployment. It was found that a 1% increase in the rate of unemployment coinciding with a 2% decline in growth of output (Abel & Bernanke, 2005). Thus, the relationship between unemployment and growth in real GDP varies and can differ based on the time period and the country under investigation (Kabanova & Tregub, 2012). Recently, using annual data for the period from 2000 to 2012, Okun’s law was tested in Malta. In this case, there was statistical evidence that Okun’s law holds in Malta in that a 1% increase in growth of GDP decreases the rate of unemployment by 0.16% (Apap & Gravino, 2014). Also, professional forecasters believe in the validity of Okun’s law and provide evidence through testing the relationship between estimated changes in the rate of unemployment and changes in real growth of output (Ball, Furceri, Leigh, & Loungani, 2013; Ball, Jalles, & Loungani, 2015). Moreover, Kabanova and Tregub (2012) argued that there is short run causality running from unemployment to economic growth in Egypt. In this case, however, the authors provided statistical evidence that causality does not run from economic growth to unemployment in the Egyptian economy because the Egyptian economy depends on capital intensity rather than labor intensity.

Knotek (2007) examined how Okun’s law explains short-run unemployment fluctuations within the United States since 1948, and 20 other advanced countries since 1980. Knotek concluded that Okun’s law held true and was stable in most countries.
Mattoscio, Bucciarelli, Odoardi, and Persico (2012) further confirmed that a long-term relationship existed between unemployment and output. Their paper showed that there was an inverse relationship between unemployment and growth GDP for six EU countries. Cháfer (2015) found Okun’s law holds in the Spanish provinces. However, there was at least one instance where Okun’s law was not supported; Fatai and Bankole (2013) found that Okun’s law did not apply in Nigeria, as their results showed that output and unemployment were unrelated. Additionally, there are several other papers that have statistical evidence implying that Okun’s Law does not hold in certain countries, such as Pakistan (Akram, Hussain, Raza, & Masood, 2014).

In addition, certain studies were conducted testing Okun’s law in Saudi Arabia. For example, Sulayman S. Al-Qudsi (2005) utilized a combination of time series and cross sectional data to explore the effect of unemployment on the output in GCC economies. He used one of the standard model specifications of Okun’s Law known as gap model or gap version of Okun’s Law to estimate the long-run unemployment as a result of the falling of the actual output below the potential output in the GCC economies. More specifically, he use the Hodrick-Prescott filter to estimate the potential and the output gaps for each GCC country then ran the rate of unemployment on the output gap (difference between actual output and potential output) to estimate the long-run differenced rate of unemployment in the GCC countries. In short, Al-qudsi’s results revealed that the long-time differenced rate of unemployment is: 2.65+ 0.65*g, where g stands for the output gap. This implies that if output were to fall by 5%, unemployment rates in GCC countries would rise by an average of 8.25%. Finally, on a national level, he contended that the long-run unemployment rate in Saudi Arabia is 3.3%. However, according to his estimations, if the actual output were to
decline to 2.5% below its potential output, then unemployment would rise by 5.7% in the long-run.

Also, he estimated the relationship between unemployment, the lagged unemployment, and output gap. Based on his results the differenced rates of unemployment are affected by higher-order differences of unemployment rates that occurred in earlier periods of time than are shown in table 1.

Table 1.

*The Relationship between unemployment, lagged unemployment and output gaps. GCC Economies 1974-2000*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>T-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\Delta t-2$ log unemployment</td>
<td>0.931*</td>
<td>8.26</td>
</tr>
<tr>
<td>$\Delta t-3$ log unemployment</td>
<td>-0.316*</td>
<td>5.10</td>
</tr>
<tr>
<td>$\Delta t-1$ output gap</td>
<td>0.551**</td>
<td>1.72</td>
</tr>
<tr>
<td>Intercept</td>
<td>0.0427</td>
<td>2.59</td>
</tr>
</tbody>
</table>

Source: Al-Qudsi (2005)

In their 2012 paper, Mahmoud A. Al-Habees and Mohammed Abu Rumman studied the relationship between unemployment and economic growth in several Arab countries, with major emphasis on the country of Jordan. They confirmed that a negative relationship exists between economic growth and rates of unemployment in most Arab countries. However, many of the countries could obtain high levels of growth, yet see very little effect on the significantly high unemployment rates. Al-Habees and Abu Rumman attributed this insignificant reduction in unemployment to the nature of the growth achieved in these countries. For instance, growth within the Saudi Arabian economy depends on the oil sector, which is heavily capital intensive.

Mohamed Ramady (2010) studied the Saudi government’s urgent priority of tackling the unemployment rate in Saudi Arabia. He illustrated the consequences of unemployment
in terms of reduced output, lower standards of living, and high rates of dependency. Ramady used Okun’s law to estimate Saudi Arabia’s potential output losses due to the already high and continually increasing unemployment to total close to SR 968 billion for the period from 1993 to 2008. Furthermore, he saw that the Saudization Program was one method of combating these significant hits to output and rising unemployment rates.

**Previous Studies on the Effect of Money on the Economic Variables**

In order for a country to enjoy sustainable prosperity and economic growth, it has to have both financial and human resources. Thus, the previous section dealt with the latter, which is discussed in more detail in chapter three. The former is addressed here, and is elaborated upon in chapter four. Generally speaking, Saudi Arabia has enjoyed a sizable pecuniary surplus in recent decades, yet the nation still needs to continue to develop and invest this surplus towards alleviating current issues of unemployment. Moreover, the incorporation of both an endogenous money and growth theory, the determination of interest rates, and an articulation of the significance of endogenous money are all necessary for policy-makers to conduct an appropriate economic policy (Palley, 2008). Thus, this dissertation used an endogenous money theory to provide a coherent approach to solving unemployment and creating effective monetary policy.

As far as research shows, the endogenous money hypothesis has not yet been tested in Saudi Arabia. Thus, the literature review here relies on more general descriptions and examples of using the endogenous money approach. In the previous literature, the money supply is endogenous in that central banks cannot control the money supply, while interest rates are exogenous in that the central banks have control over interest rates and banks can influence them (Moore, 1979). The conventional money approach indicates that the money
supply is exogenous because the central banks control the money supply (Choi & Oh, 2000). In literature, Post-Keynesian theory of endogenous money supply can be divided into two approaches: “horizontalist” and “structuralist” (Palley, 2008).

Choi and Oh (2008) used quarterly and monthly data from the U.S. to examine the endogenous money supply hypothesis. In their findings, they contended that money supply is, in fact, endogenous. Moreover, Vera (2001) provided empirical evidence that money supply is endogenous by testing Granger causality within the monetary base, bank lending, and various money multipliers using a Spanish time series from 1986 to 1998. Vera found Granger causality ran from bank lending to the base and to the money supply.

Haghighat (2012) empirically used a co-integration technique to test the long-term equilibrium between the loan demands and deposit, and M1 and M2 with rate of interest. He tested the endogenous money hypothesis in Iran during the period from 1968 to 2007. Haghighat found that the endogenous money supply hypothesis holds for the case of Iran. Moreover, Economists, Shanmugam and Li tested the endogenous money supply hypothesis in the case of Malaysia from 1985 to 2000. They tested which endogenous money perspective (the accommodationist view, the structuralist view, or the liquidity preference view) holds in the case of Malaysia. Arguably, the results are in line with the Post-Keynesian hypothesis, which means the money supply in Malaysia was endogenous from 1985 to 2000 (Shanmugam & Li, 2003). Other studies also provide empirical evidence of money supply being endogenous (Arestis & Mariscal, 1995; Howells, 2006; Pollin, 1991).
CHAPTER 3
THE COST OF UNEMPLOYMENT

Introduction

The most obvious indicator of social and economic problems in a society is unemployment. Theoretically, unemployment is very costly both economically and socially in any society. In contrast, a high level of employment results in numerous social and economic benefits that can improve society as a whole (Forstater, 2003). However, since the idea of full employment and the myriad benefits stemming from this are beyond the purview of this chapter, the idea will instead be illustrated in chapter four, with the primary focus of this chapter on unemployment. Since the state of the economy and society exist in a somewhat symbiotic relationship, any change to the various factors of the economy can have repercussions for society as a whole. Thus, this chapter is devoted to illustrating the social and economic costs of unemployment. More precisely, this chapter provides further insight into the use of Okun’s law in estimating the economic costs of increasing unemployment rates.

The Social Cost of Unemployment

It is hardly possible to deny the inextricable links between the cost that unemployment has to both the economy and the society. As people become unemployed, they may become susceptible to financial hardships if they are not supported by sufficient safety nets such as unemployment insurance or family assistance. Often such support, moreover, has time limits, does not fully offset the lost income due to job loss, and has eligibility criteria such that not all unemployed qualify. The primary income support program in Saudi Arabia, *Hafiz*, is unavailable for anyone over 35 years of age (Nitaqat,
Research has documented the numerous direct and indirect social costs due to unemployment.

Empirically, there is a direct link between unemployment and family disruption. A common reason for marital unrest is money problems. Financial struggles can lead to a rise in dependency rates, as when adult children or even grandparents move back in with their parents or children (Forstater, 2015b). If jobless individuals must rely on family, friends, or public assistance for their livelihood, it may simply become a case of more and more people consuming resources without contributing to economic growth or societal development (Forstater, 2002b, 2002c).

Another social cost of unemployment is the impact on psychological health, including depression, anxiety and even suicide. Several studies have indicated that unemployment is associated with higher rates of suicide, particularly for men ages 18-24 (Blakely, Collings, & Atkinson 2003; Nordt, Warnkey, Seifritz, and Kawohl 2015). Along similar lines, unemployment has been linked to drug abuse. In addition to mental illness, unemployment can also cause other physical or cognitive problems in the event that financial hardship makes it impossible to properly feed oneself, get an education, or pay for medical services or insurance (Berger & Forstater, 2007).

Another serious social cost of unemployment and subsequent financial insecurity is an increase in the problem of homelessness within society. If one is unable to generate income, it could eventually be impossible to afford rent or payments on a house, which can result in eviction or repossession, and the consequent issues that are associated with homelessness (Feather, 1990; Forstater, 2014, 2015b; Jahoda, 1982).
Finally, a potentially harmful consequence of unemployment is social unrest. In the recent past, nearly every Gulf nation has faced political instability rooted in unemployment. In fact, it has been shown that high rates of unemployment or financial insecurity lead to social unrest because it leads citizens to become more susceptible to extremist ideologies, scapegoating, and antidemocratic (antiestablishment) political movements (Wray & Forstater, 2004). In short, unemployment could have profound social consequences for Saudi Arabia. Unfortunately, because of the dearth of measurements and records for the nation, the extent of these costs is impossible to accurately quantify at this time. Nevertheless, even the threat of said costs is enough for Saudi policy-makers to understand the urgent need to examine the scarcity of job creation, since these social impacts could negatively affect the economy and thus exacerbate the issue of unemployment even further. While a lack of sufficient data makes quantifying these social costs impossible for Saudi Arabia at this time, strong evidence for other countries over many years means it is likely to characterize Saudi unemployment as well. It is hoped that this study and research that develops out of it will provide support for proposals for increased data collection.

The Economic Cost of Unemployment

Theoretically and empirically, it has been demonstrated that a negative relationship exists between the rate of unemployment and potential output. The empirical works discussed in the literature review showed that high rates of unemployment cause an overall loss of potential output of goods and services. Thus, a portion of this chapter is dedicated to estimating the extent of output loss resulting in increased unemployment rates with Okun’s law. Before estimating the economic cost in terms of output loss, it is worth mentioning certain other costs that directly or indirectly result from unemployment. For example, high
rates of unemployment can result in a significant reduction in spending, and consequently lower sales, and ultimately a reduction in overall business profits. Extreme unemployment rates greatly reduce income, which results in a sharp drop or even elimination of potential purchasing power. As a result, local entrepreneurs and businesses see a halt in sales that they need to continue investment and maintain their business. In fact, certain businesses are forced to make cutbacks and lay off employees as a result of the decline in sales. This only further exacerbates the issue by reducing total purchasing power even more and spreading the impact to more businesses. This eventually affects the economy as a whole because without consumption, there will be no production and vice versa (Forstater, 2002d; Kaboub, 2015; Marx & Engels, 1990).

The most significant factor affecting the economy is how productivity is impacted by high rates of unemployment. When individuals are not working, it is possible that their skills will deteriorate or become obsolete, which will negatively impact productivity. Additionally, unemployment will have other effects on the health and cognition of potential laborers, which will reduce productivity further. Moreover, when a large portion of the population is unemployed and thus has no purchasing power, the decrease in demand will mean that there are no incentives for businesses to innovate new goods and services without a population who would be willing or able to buy\(^1\) (Darity 1999; Forstater, 2007). This halt in innovation creates even slower productivity growth, which leads to high prices—lowering sales rates and eventually reducing profits. In short, high rates of unemployment will lead the economy to suffer from a declining growth of demand, very low rates of capacity utilization, and decreasing productivity (Kaboub, 2015).

\(^1\) Many economists maintain that high employment levels stimulate technical innovation. From this, one can logically conclude that the reverse must also be true: that unemployment inhibits innovation.
Realistically, stakeholder expectations play a crucial role in all economic activities. If they are uncertain about the future of their investments, then they will be less likely to put forth the capital or means to produce new goods and services; fear of the risk of losing capital often outweighs their outlook for possible profits without strong indicators that they will succeed. One of the factors that would be detrimental to business prospects is unemployment, since it reduces demands and purchasing potential, meaning that stakeholders are hesitant to invest new money into a market that they feel will not reciprocate (Forstater, 2002a, 2007, 2013b; Pasinetti, 1981). In other words, unemployment has an indirect impact on the uncertainty of organizations and which plays a role in the investment (or withholding) of capital investments. If instability and uncertainty are too high, then marginal efficiency of capital (MEK) will decrease, which will lower rates of employment and consequently reduce purchasing power. All of this will reduce demand, which lowers profits and essentially causes the entire economy to suffer (Davidson, 1984; Keynes, 1936/1978, 1937; Kregel, 1988).

**The Economic Cost in Terms of Output Loss (Okun’s Law)**

When a country is at risk of or suffering from high rates of unemployment, it indicates that the nation is not making efficient use of its labor resources. Theoretically, unemployment has a direct impact on economic growth; therefore, economic policies endeavoring to reduce unemployment rates are consequently also attempting to increase the economic growth (Fatai & Bankole, 2013). Recently, Saudi Arabia has suffered from significant rates of unemployment as thousands of students finish school and enter the workforce each year and are unable to find jobs despite having obtained degrees. Thus, one of the primary duties of the Saudi government is to furnish jobs for these newly graduated citizens.
to avoid the risk of loss of output and other issues related to unemployment (Forstater, 2015a). However, it is clear that the policy-makers have failed to maintain a strong hold on this responsibility. Currently, a majority of those unemployed in Saudi Arabia are individuals with high levels of education and prestigious degrees. It is possible that policy-makers have not engaged actively enough in creating jobs for qualified citizens because they are unaware of the inherent costs that will result from such high levels of unemployment. Okun (1965) stipulated the relationship between economic growth and unemployment rate. This section is dedicated to estimating the output losses in Saudi Arabia that result from high unemployment.

**The motivation for using Okun’s law.** Okun’s law is the most suitable for this analysis for myriad theoretical and empirically supported reasons. Okun’s law is theoretically important because it draws from both new Keynesianism and old Keynesianism, while including Phillip’s Curve to install itself as a central element driving the aggregate supply curve (Al-Habees & Abu Rumman, 2012). On the other hand, Okun’s law is empirically valuable because it has been proven to be worthwhile for both forecasting and policy-making (Harris & Silverstone, 2001). Thus, Okun’s law is unique in its combination of other theories, laws, and economic principles, and it has also proven its practical usefulness in direct application to measure the cost of unemployment. Thus, this part will highlight how unemployment affect Saudi Arabian real growth of GDP and drawing Saudi policy-makers’ emphasis on the unemployment.

**Theoretical foundation of the loss of output as a result of an increase in unemployment rate.** This section highlights the importance of defining the relationship between GCC’s real economic growth and unemployment, with specific attention paid to the
case of Saudi Arabia. This section is essential because of how economic growth has shone forth from successive economic schools focusing on development and progress. Increases in economic growth are brought about through the use of specialization and employing the principle of division of labor as Adam Smith postulated (1817). Moreover, Karl Marx claimed that the main source for the creation of absolute surplus values is the exploitation of laborer power. Marx showed how the labor process interplays with the means of production (owned by capitalists) that were built and created from prior labor and natural sources to create valuable commodities; whereas without the labor power, there could be no increase in general value or creating of said means (Howard & King, 1985; Marx & Engels, 1990).

Additionally, Keynes highlighted the crucial role of employment, interest rates, and money within a national economy. Keynes emphasized how the aggregate demand is affected by employment and therefore there will not be growth without more employment. Moreover, Arthur Lewis’s vision for economic growth involved transitioning workers from the agricultural sector into the industrial sector in order to achieve certain economic growth (Fatai & Bankole, 2013). A key factor in understanding the nature of the relationship between economic variables qua growth, investment, inflation rates and wage rates is understanding unemployment issues. Therefore, one can logically conclude that any economic policies intended to spur economic growth must enact measures aimed at tackling unemployment. Previous studies reveal a significant association between keeping unemployment rates low and increased economic growth. The following illustration helps to simplify and clearly represent the correlation between low rates of unemployment and increased economic growth.
Low Unemployment Rate $\Rightarrow$ High Rate of Operation $\Rightarrow$ High Rate of Economic Growth. Capitalists purchase labor power in order to produce commodities that will return a profit and earn them money (Monetary Production Function) (Rochon & Seccareccia, 2013). Thus, labor transforms from a potential to a real commodity within this process. In order for labor to become a commodity, its owner must expend something that has value to the laborer. In this way, it has use value. Man’s interaction with nature will manipulate and change the world. Man can act to adapt nature’s product to fulfill his own desires. This is more or less a simple explanation for how the labor process creates value while maintaining a high operation rate, which increases economic growth. The labor process generates a new use-value in the form of the product, and the other use-value products of the previous laborer enter into the process as means of production. Products can have multiple uses and can act as either an instrument of labor, or raw materials in the production process. Consumption of labor ensures that there is no production without consumption and no consumption without production. In this sense, a very high rate of unemployment is inevitably associated with deterioration in aggregate demand (Keynes, 1936/1978; Marx & Engels, 1990).

Generally speaking, capital buys labor power as a commodity, which then belongs to the capitalist. Capital has the right to consume its use-value as the means of production to ensure the production process will occur adequately. Thus, a capitalist’s primary goal in buying labor power is to produce a use-value that will create more through exchange. The secondary goal is to produce commodities whose net value is greater than the sum of all commodities consumed as the means of production, including labor power. There can be no surplus without labor power, as Marx explained the distinction between the process that
creates value and that which creates surplus value. In a sense, when laborers produce only to meet their own needs, they create value; when they produce beyond their needs, they create a surplus value for capital gain, which leads to increases in the national income (Marx & Engels, 1990).

Moreover, Marx emphasized the role that labor power (variable capital) plays in a capital world in terms of creating and adjusting the value of production. Marx clarified how labor power interacts with other means of production produced with previous labor power and nature in such a way as to create new value in materials. Without the power or labor, there can be no creation of new value in a capital world. Marx did an excellent job of explaining how capital is able to create surplus value. Marx first defined both constant capital and variable capital to outline which one creates surplus value. For Marx, surplus value is defined as the difference between the value of product and total consumption of the means of production and the labor power used in the processing of this product. Constant capital from Marx’s point of view consists of the raw materials, instruments of labor, and the auxiliary materials that are turned into means of production. Variable capital consists of labor power, which actually creates quantitative change in the value of the product. Therefore, the surplus value of a commodity is determined by the quantity of labor or variable capital that goes into making it. The concepts here thoroughly and empirically support the theoretical proposition that unemployment will lead to a loss of national output; the next section using Okun’s Law will attempt to estimate the actual economic costs.

**Okun’s Law**

This study utilized panel data to estimate the Okun’s coefficient of the Gulf Cooperation Countries (GCC) comprising Saudi Arabia, the United Arab Emirates, Kuwait,
Oman, Bahrain, and Qatar. In the last two decades, the GCC have suffered from substantial increases in average unemployment rates. In fact, the ultimate goal here is not to estimate Okun’s coefficient for six individual countries per se, but instead to help create a more accurate estimate of Okun’s coefficient for Saudi Arabia in particular. Using the other Gulf countries can help to fill in the gaps left by insufficient data for Saudi Arabia. The goal here is to estimate Okun’s law by applying panel estimation to all of the six GCC countries to interpret the Okun’s coefficient for the Saudi Arabian economy. While there are three distinct versions of Okun’s law, this dissertation employed the difference version.

The difference version captures the change in the unemployment rate from one year to the next year with the yearly growth in real GDP. As mentioned above, it would be of little use to try to estimate Okun’s law for Saudi Arabia alone because of the presence of such short time series data, which is detrimental to the purpose of the test. Therefore, to combat this issue, the study used recently developed panel econometrics techniques and panel data. In turn, this version of Okun’s law was applied to all of the six countries of the GCC.

**Model specification and data.** The following is obtained data from the World Bank: 1) Percent change in the unemployment rate for each country, 2) percentage change in the growth of real output for each countries and 3) the change in oil price because all these six countries are oil-based economies. Therefore, regression model will be formulated as follows:

\[
\Delta y_{it} = \alpha + \beta^* X_{1it} + \beta^* X_{2it} + u_{it}
\]

\[u \sim i. i. d. N(0, \sigma^2)\]
Where $\Delta y_{it}$ stands for the for real growth of all six countries. $X_{1it}$ represents the rate of unemployment for all six countries and $X_{2it}$ denotes the change oil price, where $i$ is individual dimension ($i = 1,2,3,4,5,6$)\(^{12}\) and $t$ is the time dimension ($t = 1,2,\ldots,21$).\(^{13}\)

**Estimation procedure.** Before running the regression for Okun’s law, it is necessary to test the panel data properties. In order to avoid spurious model (unreliable model), it is essential to test the existence of the unit root for the three variables (real growth of the GDP and unemployment rate and oil price) by using the following tests: Levin and Lin (Levin, Lin, & Chu, 2002) known as Levin-Lin (LL) test, Breitung (Enders, 1995), Im et al. (Enders, 1995) known as Im-Pesaran-Shin (Enders, 1995) (IPS) test and Augmented Dickey-Fuller (ADF) test in which the null hypothesis is that panel data has a unit root (assume individual unit root process) (Non-stationary). The alternative hypothesis is that panel data does not have a unit root. Arguably, after testing for the stationary property, the second step of the analysis is to apply pooled OLS regression model, and to test for the properties of the model such as homoscedasticity and others. If some of assumptions do not hold, it will become useful to employ Feasible Generalized Square (FGS) Estimator to address common issues in panel data such heteroscedasticity, cross-sectional and temporal dependence (Hoechle, 2007; Reed & Ye, 2011).

**Empirical analyses.** Unit root tests. This will detect whether the Growth of GDP (GDP), unemployment rate (UN), and oil price (OP) have unit root or not by utilizing following tests, the results of which are shown in Table 1.

\(^{12}\) $i = (1,2,3,4,5,6 \text{ or Saudi Arabia, the United Arab Emirates, Kuwait, Oman, Bahrain, and Qatar})$

\(^{13}\) $t = (1, \ldots, 22 \text{ or 1994, \ldots, 2014})$
Table 2

Unit Root Tests Results

<table>
<thead>
<tr>
<th>Variables</th>
<th>LLC</th>
<th>IPS</th>
<th>ADF</th>
<th>PP</th>
<th>HZ</th>
<th>Order of Integration</th>
</tr>
</thead>
<tbody>
<tr>
<td>GGDP</td>
<td>-3.741</td>
<td>-3.075</td>
<td>29.375</td>
<td>44.947</td>
<td>0.0127</td>
<td>I(0)</td>
</tr>
<tr>
<td></td>
<td>(0.000)</td>
<td>(0.001)</td>
<td>(0.003)</td>
<td>(0.000)</td>
<td>(0.494)</td>
<td></td>
</tr>
<tr>
<td>UN</td>
<td>-3.0588</td>
<td>-2.131</td>
<td>24.800</td>
<td>25.049</td>
<td>4.771</td>
<td>I(0)</td>
</tr>
<tr>
<td></td>
<td>(0.001)</td>
<td>(0.016)</td>
<td>(0.015)</td>
<td>(0.0146)</td>
<td>(0.000)</td>
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</tr>
<tr>
<td>OP</td>
<td>-7.122</td>
<td>-6.624</td>
<td>62.431</td>
<td>129.757</td>
<td>2.460</td>
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<td></td>
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</tbody>
</table>

Sources: Author’s Computation. Note: P-Values are in brackets under T-statistics

The results in Table 1 reveal that the growth of the real GDP and unemployment rate are stationary at its levels. On the other hand, results show that the oil price is stationary after taking the first difference. Therefore, I will be avoiding spurious model by regressing the growth of real GDP on unemployment and oil price at the first difference.

Table 3

Pooled OLS Model Result

<table>
<thead>
<tr>
<th></th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-ratio</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>7.632</td>
<td>0.834</td>
<td>9.140</td>
<td>0.000</td>
</tr>
<tr>
<td>Un</td>
<td>-0.706</td>
<td>0.184</td>
<td>-3.829</td>
<td>0.000</td>
</tr>
<tr>
<td>OP</td>
<td>0.023</td>
<td>0.0142</td>
<td>1.635</td>
<td>0.001</td>
</tr>
</tbody>
</table>

Source: Author’s computation.


**Testing the model properties.** The first test was for the presence of heteroscedasticity by using White’s test and through visual inspection of a scatter plot of fitted value against the residuals. Heteroscedasticity occurs when there is violation of the OLS assumption that says the variance of the error terms is constant. The error terms are said to be heteroscedastic when their variance is not constant and thus erratic. For example, one instance in which heteroscedasticity issues may arise is when error terms increase as the values of an independent variable become more extreme in either direction. Additionally, heteroscedasticity may sometimes occur because of small misspecifications in the model.

The consequences of the violation of homoscedasticity assumption does not necessary result in biased parameter estimates, but OLS estimates are no longer BLUE because the OLS would not provide the estimate with the smallest variance. Moreover, there is bias in the test statistics and confidence intervals as a result of the presence of heteroscedasticity. Therefore, it is important to test and ensure the absence of heteroscedasticity issue in this model to be sure that it is acceptable to rely on the above results.

**White’s test for heteroscedasticity.** Null hypothesis: heteroscedasticity not present. Test statistic: \( \text{LM} = 16.852 \) with p-value = \( P(\text{Chi-square}(5) > 16.852) = 0.004 \) This decision is based on the p-value therefore since the p-value less than 5%, then the null hypothesis will be rejected and it can be concluded that this model suffers from issues of heteroscedasticity.

**Visual inspection by using scatter plot.** There, scatterplot shall be used to serve as a second check to verify if the conclusion draw by White’s test is true. The conclusion is based on the shape of the distribution of the residuals around zero mean (Rekab & Shaikh, 2005). Arguably, if residuals tend to fall within a horizontal band centered around zero, then the predicted values are close enough to the observed values. Additionally, one could
conclude that there is a constant variance of the error terms. To do this, I plotted the fitted value against the residual and as one can see that there is a distinct pattern in the way the residuals are distributed in the plot 1. That means there is no constant variance of the error terms. Plot 1 shows that the variance of the error terms increases as the fitted values increases and there is a departure from a constancy of the error terms variance.

*Figure 1. Plot 1. The Fitted Value versus Residuals*

Here residual Q-Q plot is used to investigate departures from the normality of residual. One can conclude that there is a slight departure from normality because the residual points did not reveal a straight line. However, this problem can be solved via a transformation to improve the constancy, independence, and normality of the error terms (Rekab & Shaikh, 2005).
Here a histogram is used to investigate the normality of the residual. Arguably, one can draw a conclusion that there is a departure from normality because the residual points do not present a symmetrical distribution around zero.

The take away. The take away from the above test and visual inspection is that some of the underlying regression model’s assumptions did not hold. This indicates that the researcher cannot rely on the statistical inferences of the current model. Therefore, there is a need for some method or transformation to produce a robust standard error to guarantee valid statistical inference (Hoechle, 2007; Reed & Ye, 2011). More precisely, I shall use the Feasible Generalized Least Squares (FGLS) estimator to ensure robust standard error. The
FGLS estimator can be used if and only if the time period (T) is greater than the unit (N). The case at hand fulfills the FGLS condition since the unit here is six counties and the time period (T) is 21 years.

Table 4

The Feasible Generalized Least Squares (FGLS) Estimator

<table>
<thead>
<tr>
<th></th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-ratio</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>5.766</td>
<td>1.010</td>
<td>5.707</td>
<td>0.000</td>
</tr>
<tr>
<td>Un</td>
<td>-0.522</td>
<td>0.148</td>
<td>-3.526</td>
<td>0.000</td>
</tr>
<tr>
<td>OP</td>
<td>0.026</td>
<td>0.010</td>
<td>2.430</td>
<td>0.016</td>
</tr>
</tbody>
</table>

Sources: Author’s computation. \( R^2 \) is equal 0.60 and Adjusted R-squared is equal 0.60. P-Value(F) is equal \( 1.66 \times 10^{-24} \)

Testing the Model Properties after the FGLS was Implemented

White’s test for heteroscedasticity. Null hypothesis: heteroscedasticity not present

Test statistic: \( LM = 9.093 \) with p-value = P (Chi-square (9) > 9.093) = 0.428

I am basing my decision on the p-value; therefore I fail to reject the null hypothesis, so there is evidence in support of homoscedasticity.

---

14 I found the FGLS results by running pooled OLS and saved squared residuals, took the log of the residuals, ran the log of the residuals on the unemployment and oil price, saved the fitted value, took the absolute of the fitted value to create new variables, took the exponential of the new variable to create another new variable, took the squared root of the new variable to generate star variable, then I generated a new variable of (i) GGDP by dividing GGDP over star variable, (ii) unemployment by dividing UN over star variable, (iii) oil price by dividing PO over star variable, and (iv) constant by dividing one over star variable. Finally, I ran new GGDP on new Un and new OP.
Visual inspection by using scatter plot.

Figure 4. Plot 4. The Fitted Value versus Residuals

Figure 4 shows that residual points are distributed around zero mean, indicating that there is no distinct pattern in the shape of the residuals. From this one can conclude that there is no departure from constancy and independence of error terms variance. Shortly, there is an absence of heteroscedasticity and the FGLS estimator improved upon the pattern shown in Figure 1.

Figure 5. Plot 5. Q-Q Plot for Residual
Figure 5 shows that the residual points drew a more or less straight line. Thus, one can conclude the condition of normality of the residuals is satisfied. The residual Q-Q normality plot has improved after using the FGLS estimator compared to the residual Q-Q normality in Figure 2.

Here a histogram is utilized to investigate whether the residuals are symmetrically distributed, which would mean there is normality of the residuals. Arguably, the histogram has improved in comparison to the first one that had originally revealed serious problems of some of the underlying regression model’s assumptions. Shorty, from the histogram one can conclude there is no serious departure from normality.

![Test Statistic for Normality](image)

*Figure 6. Histogram 2. Test for Normality*

**The take away.** Since there is no violation of the underlying regression model’s assumptions, one can interpret these results because the FGLS provided a robust standard error leading there to be valid statistical inference. Therefore, one can now interpret the regression coefficients and estimate the loss of the output as a result of increase of unemployment rate. Table 3 revealed that the real growth of the GDP will be equal to 5.766 when all other explanatory variables are held to be zero. However, the cost of
unemployment in terms of output loss is equal to \(-0.522\), which means that if unemployment rate increases by one percent the real growth of the GDP will decrease by 0.522 on average. Also, I included oil price because the Saudi economy is an oil-based economy, meaning that oil price has an effect on the growth of the real GDP\textsuperscript{15}. Thus, when the oil price increases by one unit (dollar,) the growth of the real GDP will increase by 0.026 on average.

The second step of this analysis, however, is to determine the appropriate model from either a pooled OLS regression model, the Fixed Effect Model, or the Random Effect Model. This is necessary because when running the pooled Model, we ignored the cross section and time series nature of data. In plain terms, all six countries were assumed to be homogeneous. In short, the problem with this model is that this model does not distinguish between the countries (GCC countries in the model). In other words, by using the pooled model we deny the existence of heterogeneity between the countries where significant differences may in fact exist. Thus, it is vital that we determine the best model to use between these three by using joint significance of differing group means and the Hausman Test.

In fact, according to panel diagnostic test the pooled model is not ideal for use in these purposes. I used the joint significance of differing group means to pinpoint which model is the best fit between pooled and fixed.

\begin{align*}
\text{H}_0 & : \text{pooled model is the appropriate model} \\
\text{H}_1 & : \text{hypothesis saying that the fixed effect is the appropriate model,}
\end{align*}

\[ F(5, 112) = 4.845 \text{ with p-value } 0.000 \] Based on the p-value I reject the null hypothesis and conclude that the fixed effect is the appropriate model to use.

\textsuperscript{15} All oil prices based off of Brent Crude prices; the benchmark price for global oil purchases.
Fixed effect Model

Using a fixed effect model allows for heterogeneity or individuality between these six countries by allowing them to have individual intercept values. In other words, the term fixed effect indicates that the intercept may vary across countries while remaining fixed over time, i.e. it is time invariant. In short, the six countries should be individual and thus have their own intercept value.

Table 5

**Fixed effect Model Result**

<table>
<thead>
<tr>
<th></th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-ratio</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>4.822</td>
<td>2.657</td>
<td>1.814</td>
<td>0.072</td>
</tr>
<tr>
<td>Un</td>
<td>0.037</td>
<td>0.694</td>
<td>0.053</td>
<td>0.956</td>
</tr>
<tr>
<td>OP</td>
<td>0.111</td>
<td>0.032</td>
<td>3.468</td>
<td>0.000</td>
</tr>
</tbody>
</table>

The results in table 5 reveal that both constant and oil price are significant but unemployment is not significant. However, I have doubts about the accuracy fixed effects model because the unemployment coefficient has positive sign, which goes against the economic theory that says there is a negative relationship between unemployment and economic growth. Therefore, I must conduct further tests to determine whether the random effect model will be more accurate than the pooled or fixed effect models. This will be accomplished using the Hausman Test. Analyzing the results of the Hausman test will indicate the appropriate model.
Hausman test statistic:

H₀: Random-effect is appropriate

H₁: Fixed-Effects is appropriate

H = 0.981 with p-value = Prob (chi-square (2) > 0.981) = 0.612

Based on the Hausman test results, I fail to reject the null hypothesis which means I must use the random model because the random effect model is the most consistent.

Random Effect model

The random effect model indicates that the six countries have a common mean value for the intercept.

Table 6

*Random Effect Model Result*

<table>
<thead>
<tr>
<th></th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-ratio</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>7.004</td>
<td>1.683</td>
<td>4.161</td>
<td>0.000</td>
</tr>
<tr>
<td>Un</td>
<td>-0.540</td>
<td>0.361</td>
<td>-1.495</td>
<td>0.137</td>
</tr>
<tr>
<td>OP</td>
<td>0.113</td>
<td>0.032</td>
<td>3.531</td>
<td>0.000</td>
</tr>
</tbody>
</table>

Results at table 6 reveal that both constant and oil price are significant but unemployment is not significant. Arguably, the random effect model results are compatible with the economic theory. Finally, by completing all these above steps and after estimating these models, I cannot rely on any of these models to estimate the losses of output that results from increasing unemployment rates because no model is free from errors. For instance, the pooled model is rejected when using the joint significance of differing group
means. The next alternative used was the fixed effects model which were incompatible with trusted economic theories because the unemployment coefficient had the wrong sign. Furthermore, the Hausman Test pointed towards using a random effects model but, even when aligning with economic theories (Okun’s Law), the coefficient of unemployment is no longer significant. Therefore, it is necessary to use an alternative approach to estimate the economic costs of unemployment in Saudi Arabia.

Average Product Method

The average product method is used to estimate loss of output that is caused by unemployment through estimating the average GDP per worker and then multiply that by the total number of unemployed. According to Saudi Arabian Monetary Agency, the total real GDP is $672.213 billion; Saudi laborers total 10.6 million individuals (SAMA, 2016). To proceed with the “average Product” method, I must know the total number of Saudi unemployed, which reached 11.5 percent of the total labor force (1,219,000) and the average real GDP per worker, which reached 71,656 in 2015 (SAMA, 2016).
Table 7

Economic Cost of Unemployment Using “Average Product” Method on the Real GDP

<table>
<thead>
<tr>
<th></th>
<th>Total Real GDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Real GDP</td>
<td>672,213,000,000</td>
</tr>
<tr>
<td>Total Labor Force</td>
<td>10,600,000</td>
</tr>
<tr>
<td>Total Employment</td>
<td>9,381,000</td>
</tr>
<tr>
<td>Real GDP Per Workers</td>
<td>71,656</td>
</tr>
<tr>
<td>Total of unemployed</td>
<td>1,219,000</td>
</tr>
<tr>
<td>Total loss in GDP</td>
<td>87,347,445,000</td>
</tr>
</tbody>
</table>

Source: Author’s computation\(^{16}\).

Results in the table 7 reveal that the total loss of Saudi output is $ 87.3 billion (12.9 percent of the total real GDP) per year as a result of 1,219,000 Saudis unemployed. This estimates were based on the total real GDP of which the oil sector contributes 39.8 percent. In fact, the oil sector is primarily capital-intensive meaning that this sector does not have a significant direct effect on reducing unemployment rates. Theoretically speaking, unemployment would have little effect on the output within the oil sector. Therefore, it worthwhile to use a second alternative estimating the real GDP within the non-oil sector. The non-oil sector registered at 60.2 percent of the total real GDP (total GDP of non-oil sector is $ 404.4 billion) (SAMA, 2016).

\(^{16}\) To precede this method, I first found the average real GDP per worker in Saudi economy by dividing the total real GDP by the total number of employees in Saudi labor force. I then multiplied total number of Saudi unemployed by this number (average real GDP per worker) to determine total loss in the GDP.
Table 8

*Economic Cost of Unemployment Using “Average Product” Method on the Real GDP of non-Oil Sector*

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Real GDP</td>
<td>481,763,700,000</td>
</tr>
<tr>
<td>Total Labor Force</td>
<td>10,600,000</td>
</tr>
<tr>
<td>Total Employment</td>
<td>9,242,647</td>
</tr>
<tr>
<td>Real GDP Per Workers</td>
<td>52,123</td>
</tr>
<tr>
<td>Total of unemployed</td>
<td>1,219,000</td>
</tr>
<tr>
<td>Total loss in GDP</td>
<td>63,359,151,175</td>
</tr>
</tbody>
</table>

Source: Author’s computation\(^{17}\).

Results in table 8 reveal an estimation of economic cost (losses in the real GDP of non-oil sector) from the number of unemployed people in 2015. The lost of real GDP of non-oil sector is 63.3 billion per year (13.1 percent of the total real GDP of non-oil sector). Based upon the above method, Saudi economy has been suffering greatly from high rates of persistent unemployment. To conclude, the Saudi policy-makers must tackle the problem of unemployment to avoid these economic costs and other non-quantified social costs.

\(^{17}\) “Average product” method estimate was determined as follows: finding the total real GDP for non-oil sector and dividing it by the total number of employees in this sector (total employees in the Saudi labor force minus the total employees in the oil sector) to get the average real GDP of non-oil sector per worker, this amount was then multiplied by the total number of unemployed people.
Conclusion

The negative impact of unemployment hits more than just the individual left without a job; in fact, the detriment of unemployment ripples out throughout the entire economy and society as more and more individuals fall into its grasp. Therefore, if the Saudi policy-makers were to look at any of the unemployment, economic, or social costs, they would realize the necessity of implementing an accurate policy to solve the root causes of unemployment. It is inevitable that a country with high rates of unemployment will experience significant social costs, such as poverty, criminal activities, family disruption, suicides, mental and physical ills, and political instability. Through the use of cause and effect analysis, one can see that the social cost will indirectly cause economic costs as well because poverty often leads to under-the-table criminal transactions for income, and also removes certain spending power from the economy. In turn, high crime rates may cause uncertainty in the economy that will cause foreign investors to hesitate to invest in new business in the nation, which, in turn, will slow economic growth. Moreover, the mental and physical ills that unemployed individuals often suffer will reduce the labor power productivity and eventually reduce growth as well. Recently, most Arab countries are suffering from social unrest caused by very high rates of unemployment among youth (SAMA, 2016). Therefore, Saudi Arabia may also come to face this situation of political instability which would have vast effects on the economy if policy-makers do not take an action to solve the problem of unemployment.
Moreover, extreme rates of unemployment tend to reduce overall production and operation, which slows economic growth. More specifically, a capitalist who owns the means of production will not employ more workers and produce more unless he is certain he will turn a future profit. When such large portions of the population are unemployed, the low purchasing power of the population leads to lower sales, a smaller chance for profit, and more uncertainty for the capitalist. Additionally, the phenomenon of unemployment has a directly negative effect on national output. As the results of “average product” method in this study show, the increase of the loss of Saudi output $87.3 billion per year as a result of 1,219,000 Saudis unemployed (based on total real GDP) and the loss of real GDP of non-oil sector is 63.3 billion per year as a result of 1,219,000 Saudis unemployed. Therefore, the estimated output loss is big enough to draw policy-makers’ attention to the unemployment problem.

In conclusion, unemployment is the root of many of the social and economic costs in the modern capitalist economies such as Saudi Arabia. In contrast, full employment would have significant benefits for both the economy and society as a whole. In fact, Saudi Arabia has both vast amounts of skilled labor and capital. This secures its position as a developed country in the modern world. However, these assets could easily turn into a liability for Saudi Arabia if they are not efficiently organized and maintained. Thus, policy-makers must adapt an effective approach to provide full employment such as a Post-Keynesian approach that is able to attain and maintain full employment and environmental sustainability. This approach is explicated in chapter four, underemployment under an endogenous money approach.
CHAPTER 4

UNEMPLOYMENT UNDER AN ENDOGENOUS MONEY APPROACH

Introduction

The role of money (endogenous money) in the Saudi Arabian economy is illustrated in this chapter to provide a reasonable approach to solving the root causes of unemployment. For the sake of clarity and succinctness, the analysis begins with a description of how varied economic schools of thought (Orthodox versus Heterodox) interpret unemployment and full employment and how they have interpreted the effect of money on these two economic factors. Part of this chapter empirically and graphically investigates whether or not the endogenous money hypothesis holds true in the case of Saudi Arabia. The results of this investigation may help uncover the appropriate policies that Saudi policy-makers could implement to solve not only the unemployment problem, but also unaffected monetary and fiscal policies which would consequently lead to full employment. Arguably, if Saudi Arabia is experiencing endogenous money, then unemployment can be solved by using the Post Keynesian approach of providing full employment for the society as a whole. Therefore, that policy mechanism for solving unemployment is illustrated in the Post-Keynesian section as a solution for unemployment and a way to attain and maintain full employment in the case of Saudi Arabia (Davis, 2001; Warner, Forstater, Rosen, & Heilbroner, 2015).

Heterodox versus Orthodox Views on the Role of Money and Unemployment
This section illustrates the Orthodox economic school of thought and then contrasts that with the heterodox perspective on money. Theoretically, money plays an important role in both economic schools of thought, yet certain schools limit the perceived effect of money on nominal variables. This means that money would have virtually no effect on the tangible variables such as output and employment. Money from these perspectives is viewed as neutral. In contrast, other schools (Post-Keynesian) view money as creating the “rules of the roost” because of its unique properties, while still others differentiate the role of money in terms of the short term and long term impact (Sims, 1980). Thus these particular schools would look at money differently relative to the time frame; i.e., money is not neutral in the short run, yet is neutral in the long run (Friedman & Woodford, 2001; Laidler, 1999). To further elucidate the full perspective of these unique schools of thought, this section discusses all of the different perspectives on the role of money on the economy either as it impacts real or nominal variables, and with special focus given to unemployment. There is also a discussion about how these schools of thought interpret money, unemployment, and how full employment could be achieved (Davidson, 1965, 1978, 1998; Taylor, 1995).

Orthodox economists tend to treat money as neutral, which means that money has no effect on the real variables; they also treat money as an exogenous variable. Arguably, according to this school, the main function of money is as a medium of exchange. Therefore, there is a distinct separation of the real variables and the nominal variables. If, for example, there were a sudden increase in money supply, then there would be no effect on real output.

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18 I) Small elasticity of production: when liquidity preference increases, unemployment increases, price goes down, and investment goes down.
II) Rate of substitution is zero, especially when one wants a liquid asset. There is nothing that satisfies money, and Keynes did not define money, whether in cash or financial assets.
III) Money has the lowest carrying cost
Note. Money rules the roost means that when banks lend the economic units, banks allow the economic unit to deficit-spend, thus stimulate aggregate demand.
or real employment. From this perspective, increasing the money supply would lead only to inflation, thus the money supply is vertical meaning that money is exogenously controlled by central banks (Gordon, 1975). Thus, in the world of orthodox economics, authorities would be unable to reduce unemployment by simply increasing the money supply because of the neutral nature of money and the fact that employment is determined in the labor market. Additionally, changes would occur in commodity prices rather than quantity. Consequently, the real output would not increase in response to increasing the money supply; employment and real output are solely determined by the labor demand curve intersecting with the supply labor curve. According to this school, full employment occurs as a result of market forces; i.e., market clearing in the labor force. For example, in the presence of higher rates of unemployment, wages would fall to stimulate demand for labor and counteract the issue. From this perspective, unemployment can only be voluntary. Any fluctuation in money supply will not have any significant effect on the economy. In short, orthodox schools of thought view money as a completely neutral variable; consequently, economists from this school of thought do not rely on the money variable in making attempts to stimulate the economy as is done in heterodox (Post-Keynesian) schools of thought (Forstater, 2013a; Snowdon & Vane, 2006; Snowdon, Vane, & Wynarczyk, 1994).

The Post-Keynesian Heterodox view stems from Keynes’ approach to money that maintains that money dictates the rules of the roost (Wray, 2006). Keynes treated money as a real variable, in contrast with neoclassical views of money. From Keynes’ point of view, money stands as the main force affecting production (monetary production) i.e. M—C—M’. Arguably, in this system one starts with money, and ultimately aims to accrue larger quantities of money; thus the final output, as money, is neither capital nor physical. In fact,
Keynes’ theory generally coincides with the theory of output and employment determination as a whole. Thus, money has an influential role in this school of thought in that it can either implicitly or explicitly dictate output and employment (Forstater & Wray, 2008).

According to Keynes, unemployment exists when people seek money (Wray, 2012). Therefore, if money were non-existent, and another asset existed with the three aforementioned properties, unemployment would be eradicated or not ever exist in the first place. Keynes would argue that, in a nonmonetary economy, unemployment would not exist. Only in a monetary economy does unemployment exist (M—C—M’); thus, if money were eliminated, it could potentially rid the world of unemployment as a result (Dillard, 1984; Forstater, 2013a; Keynes, 1936/1978). Moreover, Post-Keynesian economists, influenced by Keynes’s theory, emphasized that insufficient effective (aggregate) demand is the reason behind unemployment, and market forces alone are insufficient to stimulate the economy. This means that it is impossible to fully exhaust or expend resources even if a perfectly competitive market were assumed (Forstater, 2013a; Keynes, 1936/1978; Kregel & Eichner, 1988). Thus, in heterodox (PK) economics, government action becomes necessary as a means to stimulate the economy into achieving full employment. Avoiding economic issues such as unemployment can only be accomplished with the help of the government and banks. In fact, within a heterodox world, there can be no economic sustainability or prosperity without government action. Therefore, Post-Keynesian economics typically tackles the problem of unemployment through employment in the public sector supported by the government (Forstater & Mosler, 2005; Howells & Hussein, 1998; Kaldor & Trevithick, 1981; Moore, 1989; Nell, 2000; Palley, 1994; Vera, 2001).

Theoretical Background of Endogenous Money Hypothesis
This section examines the conclusion of the classical Modern Money Theory, stating that if a country has a floating exchange rate then the money supply of the nation will be endogenous (loans create deposits and deposits create reserves, meaning that the central bank has no control over the money supply) and the interest rate will be exogenous (central banks determine interest rates). On the other hand, if a country has a fixed exchange rate, then the money supply would be exogenous and the interest rates would be endogenous. However, Saudi Arabia defies this rule with a fixed exchange rate, endogenous money supply, and exogenous interest rates. In general terms, the orthodox monetary theory says that central banks play the crucial role of controlling growth of the money supply. Orthodox monetary approach hypothesizes that central banks are able to increase or decrease available monetary supply. This idea is based in the assumption of stability of money multipliers, meaning that money supply is exogenously determined (Friedman, 1968; Moore, 1989; Shanmugam et al., 2003). On the other hand, the essential gist of the endogenous money supply approach is that the demand for bank credit is what determines money supply; in other words, loans create deposits, and deposits create reserves. In essence, through repaying of the loans, the deposits are destroyed (Wray, 1992). Therefore, from this viewpoint, central banks cannot control the money supply (Howells & Hussein, 1999; Vera, 2001). However, the endogenous money supply approach is not unified and can be divided into three distinct viewpoints. Thus, it is necessary to provide an illustration of the theoretical foundation of the following endogenous money supply hypotheses: accommodationist, structuralist, and liquidity preference (King, 2003).

**Accommodationist Approach**
The accommodationist view insists that the banks can lend indefinitely so long as they have good borrowers without any worries about the reserves since the central bank must accommodate any demand for reserves and currency. At the same time, the central bank uses the overnight interest rates to set the costs of short-term liquidity. In context, the private banks add mark-ups to the costs of short-term liquidity in an endeavor to maintain all demands for bank loans; thus, credit demands determine the money supply. Loans create deposits, and deposits create reserve. In other words, creditworthy bank borrowers create loans and not the other way around; i.e., reserves are what create loans. According to Basil Moore, working capital finance determines the short-term demands for bank loans. More precisely, banks deposit in borrowers’ accounts to meet the demand for loans. On the other hand, the deposits will be destroyed when the loan is repaid. It can be clearly seen that the role of money can stem from these procedures wherein the net bank lending stimulates aggregate demands through allowing the borrowers to deficit-spend. The difference between the loans and deposits will have an effect on the money growth which will, in turn, have an effect on the aggregate income (Moore, 1989).

The Accommodationist view maintains that causality runs from money income to the demand for the bank loans, which has an effect on the monetary growth. In other words, it is the monetary deposits created by bank loans that ultimately finance any increase in aggregate demand (Kaldor & Trevithick, 1981; Shanmugam et al., 2003). Arguably, the accommodationist view emphasizes that central banks accommodate demand for reserves in order to maintain interest rates at a targeted level; i.e., central banks’ main focus is the interest rate and not the money supply. Therefore, the money supply and monetary base are determined endogenously via the measure of bank credit demanded at the interest rate.
setting by the central bank plus the mark-up setting by the commercial banks (Moore, 1979). From this perspective, central banks control only the interest rate through the accommodation of reserve demands (Moore, 1988, 1989, 1991).

To sum up, the accommodationists’ empirical hypothesis is that a unidirectional causality exists from total commercial bank loans (LL) to the monetary base (LB) and the money supply (LM3).

The Structuralist View

This view differs significantly from the accommodationist perspective. The major point of difference between the two is found in the way that structuralists interpret money supply function as being an upward sloping function while the accommodationists have interpreted it as having perfect interest rate elasticity. Therefore, structuralists argue that the central banks do not fully accommodate the private banks’ demand for reserves. In essence, the structuralists posit that the reserves would be seen to rise with increases in the bank lending. In other words, they agree that there is some accommodation from central banks, but that it is not full, as is assumed by accommodationists. Essentially, the structuralists give the central bank a limited amount of control over the reserves supply (and subsequently, interest rates) while accommodationists argue that central banks have ultimate authority over interest rates. Therefore, structuralists assert that the central banks have the option of targeting either the interest rate or monetary base (Palley, 1991, 1994, 2002). Moreover, structuralists argue that commercial banks can use liability management (what Minsky [1992] referred to as innovation) to partially overcome the reserves constraint, which central banks impose on commercial banks in order to keep funding sources cheaper. However, According to Pollin, liability management may be an insufficient instrument in generating
adequate reserves supply to meet the demand of reserves (Pollin as cited in Shanmugam et al., 2003).

To conclude, the structuralist viewpoint is a unique hybrid of orthodox and heterodox hypotheses in terms of explaining control over reserves. Overall, they conclude that causality between total commercial bank loans (LL), the monetary base (LB), and the money multiplier (Lm) is actually bidirectional.

**The Liquidity Preference View**

Followers of the liquidity preference view take their ideas from Keynes’ works (Keynes, 1937) and they therefore submit to the underlying endogenous money hypothesis. Moreover, they contrast sharply with both the accommodationists and structuralist viewpoints. In fact, liquidity preference supporters investigate the accommodationist claim that “credit money can never be in excess supply” (Shanmugam et al., 2003, p. 602).

Accommodationists argue that demand for money is what determines the money supply; consequently, there would be no money supply without demand for money. Further, there exists no independent function for money; i.e., an identical demand and supply function exists in the accommodationist view. Excess supply is impossible. Howells (1995), a staunch follower of the liquidity preference approach, denies the belief that there exists no independent demand money function because each economic unit has differing preferences of liquidity; i.e., how much money one wishes to hold (Townshend, 1937).

To sum up, the liquidity preference view concludes that there is bidirectional causality from total commercial bank loans (LL) to money supply (LM3).
Table 9

Summary of Causality Hypotheses on Endogenous Money Supply Based on the Three Views

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>LL⇒LM, LB</td>
<td>LL⇔LB, Lm</td>
<td>LL⇔LM3</td>
</tr>
</tbody>
</table>

Sources: Llorca (2008) and Shanmugam, Mahendhiran, & Li, p. 605. Notes: Definition of variables: LL stands for log-level of total commercial bank loans; LB donates log-level of monetary base; LM3 stands for log-level of the money supply M3; Lm represents log-level of the money multiplier. ⇒ stands for unidirectional causality from the right to left; ⇔ stands for bidirectional causality.

Econometric Methods

In this section, there are three models of the endogenous money supply: 1) an Accommodationist model, wherein causality runs from commercial bank lending (LL) ⇒ money supply (LM3), monetary base (Lb); 2) the Structuralist model, LL⇒Lb,Lm; and 3) the Liquidity model LL⇔LM3. The sample period is 2000 Q1 to 2015 Q4. The time series will be transformed by taking natural logarithms. The econometric procedure is divided into several stages, such as testing the unit root in the variables by using Augmented Dickey-Fuller test. This test is necessary to ensure whether or not the variable is stationary or non-stationary—if the variables are non-stationary, then the model would become spurious or results would be unreliable. Also, the stationary variable is a prerequisite for implementing later Granger Causality tests (Granger, 1969). There will also be a test for the short-run relationships by using the Vector Error Correction Model (VECM) proposed by Granger (1988).

19 ⇒ Stands for unidirectional causality from left to the right whereas ⇔ stands to for bidirectional causality.
Augmented Dickey-Fuller Unit Root Tests

In this section, the unit root test will be conducted in order to be certain whether the variables have unit roots. A variable is said to have a unit root if the value of the variable does not fluctuate around zero mean and constant variance. In order to search for this, the variables will be tested in their levels and in first differences, with trend and without trend. To do this, the Augmented Dickey-Fuller unit root tests will be utilized (Dickey & Fuller, 1979, 1981). For all four of the time series variables, the tests will be based on two models; one with constant and the other with constant and trend (Harvey, 1985).

(a) With Constant and Without Trend

1) \[ LL_t = \alpha + \delta LL_{t-1} + \mu_t \]
2) \[ LM3_t = \alpha + \delta LM3_{t-1} + \mu_t \]
3) \[ Lbt = \alpha + \delta Lb_{t-1} + \mu_t \]
4) \[ Lmt = \alpha + \delta Lm_{t-1} + \mu_t \]

The hypotheses are:

If \( H_0: \delta = 0 \), we have a unit root.

Otherwise, \( H_1: \delta \neq 0 \), we do not have a unit root.

By using t-test:

If \( t > ADF \text{ critical Value} \), \( \Rightarrow \) fail to reject the null hypothesis, and a unit root exists.

If \( t < ADF \text{ critical Value} \), \( \Rightarrow \) reject null hypothesis, and a unit root does not exist.
Table 10

*Unit Root Results for Model with Constant and without Trend*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Test statistic (lag length)</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>L (Total commercial loans)</td>
<td>-1.304</td>
<td>p-v 0.622 (1)</td>
</tr>
<tr>
<td>DL (Total commercial loans)</td>
<td>-3.348</td>
<td>p-v 0.016 (0)</td>
</tr>
<tr>
<td>LB (Monetary base)</td>
<td>-0.2155</td>
<td>p-v 0.930 (0)</td>
</tr>
<tr>
<td>DLB (Monetary base)</td>
<td>-7.767</td>
<td>p-v 0.000 (1)</td>
</tr>
<tr>
<td>LM3 (Money Supply)</td>
<td>-0.583</td>
<td>p-v 0.866 (0)</td>
</tr>
<tr>
<td>DLM3 (Money Supply)</td>
<td>-6.381</td>
<td>p-v 0.000 (0)</td>
</tr>
<tr>
<td>Lm (Money multiplier)</td>
<td>-3.452</td>
<td>p-v 0.127 (0)</td>
</tr>
<tr>
<td>DLm (Money multiplier)</td>
<td>-7.939</td>
<td>p-v 0.000 (1)</td>
</tr>
</tbody>
</table>

Sources: Author’s Computation. Note. D stands for the first difference of the variables.

The results in the Table 9 reveal that all variables are non-stationary at their levels. Thus, it is clear that the null hypothesis (variable has a unit root) cannot be rejected at 5%. However, all variables became stationary after taking the first difference. Therefore, the test reveals that all variables are integrated of order 1, i.e. I (1). Nevertheless, it is difficult to decide which of the tests should be used, i.e., with constant only or with constant and trend. Since there is currently no test to adequately determine which should be used, and for the sake of thoroughness and accuracy, it is best to use both to determine if they yield the same results. The next section employs the Augmented Dickey-Fuller unit root test with constant and trend.

(b) With Constant and Trend

1) $Ll_t = \alpha + \beta T + \delta Ll_{t-1} + \mu_t$

2) $LM3_t = \alpha + \beta T + \delta LM3_{t-1} + \mu_t$

3) $Lbt = \alpha + \beta T + Lb_{t-1} + \mu_t$

4) $Lmt = \alpha + \beta T + Lmt_{t-1} + \mu_t$
The hypotheses are:

If \( H_0: \delta = 0 \), we have a Unit Root.

Otherwise if \( H_1 \neq 0 \), we do not have a unit root.

By using t-test:

If \( t > \text{ADF critical value} \rightarrow \) fail to reject the null hypothesis, and a unit root exists.

If \( t < \text{ADF critical value} \rightarrow \) reject null hypothesis, and a unit root does not exist.

Table 11

*Unit Root Results for Model with Constant and Trend*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Test statistic (lag length)</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>L (Total commercial loans)</td>
<td>-1.304 p-v 0.622 (1)</td>
<td></td>
</tr>
<tr>
<td>DL (Total commercial loans)</td>
<td>-3.348 p-v 0.016 (0)</td>
<td>( I (1) )</td>
</tr>
<tr>
<td>LB (Monetary base)</td>
<td>-0.215 p-v 0.930 (1)</td>
<td></td>
</tr>
<tr>
<td>DLB (Monetary base)</td>
<td>-7.767 p-v 0.000 (0)</td>
<td>( I (1) )</td>
</tr>
<tr>
<td>LM3 (Money Supply)</td>
<td>-0.583 p-v 0.866 (0)</td>
<td></td>
</tr>
<tr>
<td>DLM3 (Money Supply)</td>
<td>-6.381 p-v 0.000 (0)</td>
<td>( I (1) )</td>
</tr>
<tr>
<td>Lm (Money multiplier)</td>
<td>-2.841 p-v 0.058 (0)</td>
<td></td>
</tr>
<tr>
<td>DLm (Money multiplier)</td>
<td>-7.939 p-v 0.000 (1)</td>
<td>( I (1) )</td>
</tr>
</tbody>
</table>

Sources: Author’s Computation. Note D stands for the first difference of the variables

The results in Table 10 reveal that since the null hypothesis cannot be rejected at 5% for all variables, then all variables are non-stationary at their level, which means the regression cannot be run on the variables at their level because the results would be spurious. However, the null hypothesis rejected at 5% after taking first differences for all variables and all variables became stationary after taking the first difference. Therefore, the test reveals that all variables are integrated of order 1, i.e., \( I (1) \). It can be clearly seen that both ADF tests—with constant and trend and with constant and without trend—result in similar
outcomes. Therefore, it is now necessary to conduct Granger causality tests on the variables at the first difference to ensure accurate results and avoid spurious results.

The Johansen Multivariate Cointegration Tests (Pairwise Maximal Eigenvalue Test and Pairwise Trace Tests)

The results found in the previous section satisfy the conditions required to conduct a Johansen test by showing that all variables are non-stationary at their level, yet stationary at the first difference. Thus, the Johansen test will be conducted for the LL, LM3, Lb, and Lm. The purpose of doing the Johansen test is to check whether the variables have long run association for the purpose of later using the VECM. According to Granger (1988), causality can actually be subdivided into long run and short run causality. Therefore, short run causality is determined by the vector error correction term, whereby if it is significant, then it indicates statistic evidence of short run causality from the explanatory variable to the dependent variable. Therefore, there is a need to test for cointegration as a precondition for the Vector Error Correction Model (VECM) to be conducted.

There are two test statistics produced by the Johansen multivariate Cointegration procedure: trace test and maximal eigenvalue test. Hence, both can be used to determine the number of cointegrating vectors present. However, there are sometimes discrepancies in the number of cointegrating vectors indicated by both tests.

Since the condition for running the cointegration test for all variables is met, it will be conducted to test for long run cointegrating vectors between LL and LM3 (Y), LL and Lb, LL and Lm, LM3 and Lb, LM3 and Lm, and Lb and Lm.

There are six models:

1) \( LL_t = \alpha_0 + \alpha_1 LM_t + \mu_t \quad \mu_t \approx \text{i.i.d.} (0, \Omega) \)
2) $LL_t = \alpha_0 + \alpha_1 Lb_t + \mu_t$  \hspace{1cm} $\mu_t \approx \text{i.i.d.} \ (0, \Omega)$

3) $LL_t = \alpha_0 + \alpha_1 Lm_t + \mu_t$  \hspace{1cm} $\mu_t \approx \text{i.i.d.} \ (0, \Omega)$

4) $LM3_t = \alpha_0 + \alpha_1 Lb_t + \mu_t$  \hspace{1cm} $\mu_t \approx \text{i.i.d.} \ (0, \Omega)$

5) $LM3_t = \alpha_0 + \alpha_1 Lm_t + \mu_t$  \hspace{1cm} $\mu_t \approx \text{i.i.d.} \ (0, \Omega)$

6) $Lb_t = \alpha_0 + \alpha_1 Lm_t + \mu_t$  \hspace{1cm} $\mu_t \approx \text{i.i.d.} \ (0, \Omega)$

Where:

i.i.d- independent and identically distributed

$\Omega$ - variance-covariance matrix, indicating no heteroskedasticity

Table 12

Cointegration Test Results

<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>Independent variable</th>
<th>Max-Eigen Statistic</th>
<th>Trace Statistic</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>L(L)</td>
<td>M3</td>
<td>9.925 (14.264) p-v 0.216</td>
<td>12.297(15.494) p-v0.143</td>
<td>Not cointegrated</td>
</tr>
<tr>
<td>M3</td>
<td>L(L)</td>
<td>9.925 (14.264) p-v 0.216</td>
<td>12.297(15.494) p-v0.143</td>
<td>Not cointegrated</td>
</tr>
<tr>
<td>L(L)</td>
<td>L(B)</td>
<td>4.225 (14.264) p-v 0.834</td>
<td>6.032 (15.494) p-v0.691</td>
<td>Not cointegrated</td>
</tr>
<tr>
<td>L(B)</td>
<td>L(L)</td>
<td>4.225 (14.264) p-v 0.834</td>
<td>6.032 (15.494) p-v0.691</td>
<td>Not cointegrated</td>
</tr>
<tr>
<td>L(L)</td>
<td>L(m)</td>
<td>5.558 (14.264) p-v 0.670</td>
<td>8.257 (15.494) p-v0.438</td>
<td>Not cointegrated</td>
</tr>
<tr>
<td>L(m)</td>
<td>L(L)</td>
<td>5.558 (14.264) p-v 0.670</td>
<td>8.257 (15.494) p-v0.438</td>
<td>Not cointegrated</td>
</tr>
<tr>
<td>L(M3)</td>
<td>L(B)</td>
<td>8.633 (14.264) p-v 0.317</td>
<td>10.509 (15.494)p-v0.243</td>
<td>Not cointegrated</td>
</tr>
<tr>
<td>L(B)</td>
<td>L(M3)</td>
<td>8.633 (14.264) p-v 0.317</td>
<td>10.509 (15.494)p-v0.243</td>
<td>Not cointegrated</td>
</tr>
<tr>
<td>L(M3)</td>
<td>L(m)</td>
<td>8.962 (14.264) p-v 0.289</td>
<td>10.846 (15.494)p-v0.221</td>
<td>Not cointegrated</td>
</tr>
<tr>
<td>L(m)</td>
<td>L(M3)</td>
<td>8.962 (14.264) p-v 0.289</td>
<td>10.846 (15.494)p-v0.221</td>
<td>Not cointegrated</td>
</tr>
<tr>
<td>L(B)</td>
<td>L(m)</td>
<td>8.782 (14.264) p-v 0.304</td>
<td>10.658 (15.494)p-v0.233</td>
<td>Not cointegrated</td>
</tr>
<tr>
<td>L(m)</td>
<td>L(B)</td>
<td>8.782 (14.264) p-v 0.304</td>
<td>10.658 (15.494)p-v0.233</td>
<td>Not cointegrated</td>
</tr>
</tbody>
</table>

Sources: Author’s Computation
The results in Table 11 indicated that the null hypothesis cannot be rejected for all variables at 5%; that means not a single pair of variables is cointegrated. Therefore, the Vector Error Correction Model (VECM) cannot be implemented to investigate the short-term relationship between any variables. Consequently, the standard Granger causality will be employed in the following section to detect the direction of causality in the case of Saudi Arabian money supply.

**Standard Granger Causality Test**

After illustrating that the variables are stationary—i.e. integrated of order 1, but not cointegrating (no long run association thus the Vector Error Correction Model cannot be conducted), then the standard Augmented Granger causality tests can be conducted to ascertain the direction of causality between variables. Moreover, the results will provide a clear view of what category of Post-Keynesian approaches to endogenous money supply Saudi Arabia most closely matches.

Table 13

*Standard Granger Causality Test Results*

<table>
<thead>
<tr>
<th>Direction</th>
<th>Direction of causality</th>
<th>Optimal lag</th>
<th>Test statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Null DLL does not cause DLM3</td>
<td>LL⟲LM3</td>
<td>4</td>
<td>2.895 p-v 0.031</td>
</tr>
<tr>
<td>Null DLM3 does not cause DLL</td>
<td></td>
<td>4</td>
<td>3.755 p-v 0.009</td>
</tr>
<tr>
<td>Null DBL does not cause DLL</td>
<td>LL⟲LB</td>
<td>4</td>
<td>0.705 p-v 0.498</td>
</tr>
<tr>
<td>Null DLL does not cause DLB</td>
<td></td>
<td>4</td>
<td>2.788 p-v 0.069</td>
</tr>
<tr>
<td>Null DLL does not cause DLm</td>
<td>LL⟲Lm</td>
<td>4</td>
<td>2.151 p-v 0.087</td>
</tr>
<tr>
<td>Null DLm does not cause DLL</td>
<td></td>
<td>4</td>
<td>0.636 p-v 0.638</td>
</tr>
</tbody>
</table>

Sources: Author’s Computation. Note: Using AIC to indicate optimal lag length
The final results indicated support for the idea that the liquidity preference view is most accurate in the case of Saudi Arabia; i.e., there is bi-directional Granger causality running from the total commercial bank loans to the money supply and vice versa. Moreover, the tests show that there is Granger causality running from the total commercial bank loans to the monetary base because the null hypothesis that the monetary base does not cause the total commercial bank loans cannot be rejected. However, the additional null hypothesis that the total commercial bank loans do not cause the monetary base can be rejected, thus there is Granger causality running from total commercial bank loans to the monetary base. Finally, it is clear that there is Granger causality running from the total commercial bank loans to the money multiplier because the null hypothesis, which is that the total commercial bank loans do not cause the money multiplier, can be rejected. On the other hand, the other null hypothesis, which is that the money multiplier does not cause the total commercial bank loans, cannot be rejected. In short, the Granger causality here is in only one direction.

In conclusion, the most critical piece of information that can be derived from these tests is that we have statistical evidence showing that the classical Modern Money Theory does not hold in the case of Saudi Arabia. The classical Modern Money Theory maintains that if a country has a floating exchange rate, the money supply in said country will be endogenous (loans create deposits and deposits create reserves; central bank has no control over the money supply), and the interest rate will be exogenous, that is, the central bank determines the interest rate. Further, the classical version of MMT claims that if a nation has a fixed exchange rate, then the money supply will be exogenous, and the interest rate, endogenous. Empirically, Saudi Arabia defies this theory with a fixed exchange rate but
with an endogenous money supply and an exogenous interest rate over the period 2000 Q1 to 2015 Q4. In short, these results are clearly compatible with the post-Keynesian hypothesis, which rejects the orthodox view of exogenous money supply and concludes that the money supply is endogenous. Endogenous money supply hypothesis conjectures that loans create deposits and deposits create reserves and creditworthiness determines the loans; i.e., banks look for good borrowers, not for reserves to issue loans.

**Interest Rate under Endogenous Approach in the Case of Saudi Arabia**

As mentioned above, Saudi currency (Riyal) is pegged to the U.S. currency (U.S. dollar). Therefore, in theory, the Saudi Arabian monetary policies are limited; the Saudi interest rate (Saudi Interbank Offered Rated SIBOR) must follow the U.S. Federal funds rate in order for Saudi Arabia to manage the exchange rate. Thus, it is clearly necessary to examine whether or not the nation’s interest rate is exogenous or endogenous. The most important interbank rate within Saudi Arabia is the SIBOR, which is the benchmark for commercial and consumer lending rates. In fact, Saudi domestic interest rates are influenced by Saudi Interbank Offered Rate (SIBOR), the U.S. Federal Funds rate, and domestic risk. While domestic risk plays some role in determining Saudi domestic interest rates, they are most heavily influenced by the first two factors. Therefore, the Saudi Arabian Monetary Agency policy rate (Reverse Repo Rate) is set to follow the U.S. Fed target rate to relieve potential pressures on the pegged currency.
Figure 7. Saudi Interbank Offered Rate versus U.S. Federal Fund Rate

From Figure 7, one can clearly see that the Saudi interest rate has never fallen lower than the U.S. fed fund rate, meaning that the Saudi authorities set the interest rate to manage Saudi currency. Historically, the Saudi interest rate, which is affected by the SAMA Policy rate (i.e. the Reverse Repo Rate), followed the U.S. interest rate but added to the domestic borrowers’ risk. Thus, this is in line with the theory of the exogenous interest rate and endogenous money supply. In other words, the Saudi Arabian Monetary Agency targets the interest rate, not the money supply, by setting the costs of short-term liquidity. Then, the commercial banks put a mark-up on it to account for the domestic borrowers’ risk. Empirically and graphically, it has been shown that Saudi Arabia is experiencing endogenous money supply and exogenous interest rate. In context, Saudi authorities give up their monetary policy by pegging Saudi currency with the U.S. dollar. Therefore, the only policy that the Saudi policy-makers are left to dictate is the fiscal policies to solve the current grave problem at hand: unemployment. Thus, Saudi policy-makers have an
opportunity to gain from this endogeneity of money supply to solve the detrimental issue of
unemployment among Saudi youth.

**Solution for Saudi Unemployment by Linking Endogenous Money to the Economic Activities**

Many Post-Keynesian economists have supported the idea of a critical relationship linking credit, to money, and to all economic activities (Palley, 2008). Thus, emphasizing both the mechanism of the money supply process and the macroeconomic implication of endogenous money supply would help Saudi Arabian policy-makers to implement a coherent policy to solve unemployment (Forstater, 1999). Theoretically, the endogenous money supply has vast impact on growth by allowing the policy-makers to use the monetary mechanism that helps to finance the growth of aggregate demand, which in turn boosts real growth. Therefore, the endogenous money supply implications will have impacts on Saudi aggregate demand (Forstater, 1998, 2001) and on the Saudi economy’s ability to obtain and maintain full employment through price and other investment channels such as knowledge-based economy (KBE).²⁰

In recent years, the majority of economists recognize that economic growth has been heavily impacted by knowledge. The industrialized economies lead the transition to a knowledge-based economy by adopting and adapting new technology for the production of new products. Many modern economic growth theory scholars conclude that knowledge is a crucial source of not only long-run economic growth but also of job creation (Debnath, 2015; Mankiw, Phelps, & Romer, 1995; Young, 1995). In fact, Saudi Arabian policy-

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²⁰ As Asia Pacific Economic Cooperation (APEC) defines it, a knowledge-based economy is “an economy in which the production, distribution, and use of knowledge is the main driver of growth, wealth creation and employment across all industries” (APEC, 2000, p. 2, cited in Debnath, 2015). Other economists define it as being based on investments given to knowledge (Debnath, 2015).
makers have already taken the first step towards investing in the transition to a knowledge-based economy by putting effort into developing and improving the most important elements of a knowledge-based economy: a strong education system. Unfortunately, the resulting population of highly-educated youth are unable to reach their potential or provide benefits because the current labor force is already too saturated to handle large numbers of additional workers. This is a result of the way that the Saudi Arabian economic structure has essentially remained in stagnation since the oil sector began dominating all economic activities. Moreover, the Saudi private sector has evolved into one composed of low-knowledge, low-skilled workers who are easily and cheaply imported from foreign nations, leaving no room for the nation’s citizens. However, if the manufacturing sector were to rapidly shift from using low-skilled workers, low wages, and low technology to at least medium levels of each of these, then the Saudi economy could effectively be transformed into a knowledge-based economy; i.e. high-technology and high-skill era. This is one step that could potentially solve the problem of unemployment among the well-educated job seekers of the nation.

**Would this Approach Lead to Technological Unemployment or Structural Unemployment?**

When considering the move to a knowledge-based economy, the first concern is that Saudi Arabia’s unemployment problem would simply change to being technological unemployment. This concern can be quickly summed up in the Schumpeter approach, which poses two questions: “Does technological change create more jobs than it destroys?; and does it create more higher-skilled jobs than it destroys”? Also, it can be seen in Maxine Berg’s *The Machine Question and the Making of Political Economy 1815-1848* in which
she has divided “the Machine Question” into two parts: first, what are the sources of technical progress; second, what is the impact of the introduction of modern technology on the total economy and society (Berg, 1982)? Berg analyzed these two questions based on Adam Smith’s work in *The Wealth of Nations* (1776, 1937), in which he attempted to answer these two questions through the division of labor, which is constrained only by the extent of the market. Moreover, Smith prompted the harmonious view of humans and machines, in which humans and machines interact mutually to produce output and build the nation’s wealth. Further, David Ricardo (1821) included a new chapter “On Machinery” to the third edition of his *Principles*, in which he claimed that one can deny neither the existence of technological unemployment nor the apparent social cost of increasing reliance on machines. However, Ricardo ultimately believed that the situation would be short-lived and unlikely to actually occur.

The approach for solving Saudi unemployment through the use of a KBE is rooted in Veblen’s interpretation of machines. Veblen never explicitly claimed that machines could be the cause of unemployment. He seemed to think that machines were more of a blessing to the economy than a curse. On the contrary, Veblen remained insistent that the problem was with the businessman. In fact, he understood that machines may instill a dualistic type of intelligence that involves both analysis and thinking, as well as habits and instinctual response. Consequently, Veblen saw machines as a product of society’s joint stock of knowledge. He saw it as the source of progress. Therefore, Veblen’s analysis seemed to encourage KBEs because increased knowledge would lead to increased production from machines, and ultimately more consumption of goods for the entire society. The beauty of machines is that they can help transform natural resources into
material goods that make lives easier. Thus, machines are also useful in aiding in mankind’s endeavor to live a life with a good meaning or to the end of providing the satisfaction of workmanship. Furthermore, they help build and create a world of comfort and improved quality of life for the generations to come. In short, the Veblenian view of machines is that they can improve life and ensure mankind’s continued survival in the face of an uncertain future (Veblen, 1904, 1918/1963, 1923/1994).

Reviewing Veblen’s works reveals that he believed that machines are not the root of mankind’s problems, but that their improper usage could create significant problems. Thus, Veblen explored the dichotomy between business motives and industrial motives in his Theory of Business Enterprise (1904) The Engineers and the Price System (1918/1963), and Absentee Ownership (1923/1994). The former (business motive) is represented by businessmen who stand for pecuniary motives; i.e., individuals who are driven by the interest in making money — doing good for society would not be one of their major priorities. Moreover, within the idea of the absentee of ownership, individuals become managers or operators of machines without ever being the legitimate owners. By the early 20th century, businessmen and workers no longer owned the machines with which they were working to produce goods. In fact, they even had the freedom to entirely sabotage the production process if they were not compensated with acceptable pecuniary reward. As a result, businessmen focused on the vendibility of their goods as opposed to serviceability. However, the latter (industrial motive) is represented by engineers and technicians. The engineers and technicians would seek to run the machine in such a way as to produce a mass of goods for society and consequently eliminate the problem of scarcity. Veblen seemed to argue that if engineers and technicians were given control of the machines, there
would be more food, goods, and equipment to create a higher quality of life with less manual labor, and that the machines themselves have no negative impact on society. In his chapter entitled “The Technician’s Revolution” in *The Engineers and the Price System* (1918/1963), Veblen clarified that the cause of economic problems such as unemployment, relative scarcity, and poverty has nothing to do with the machines themselves, but instead resides within the nature of how or who is controlling said machines (Sturgeon, 1984, 2010). Thus, following the ideas set by so many economists before, instituting a KBE in Saudi Arabia could effectively solve the unemployment crisis.

Veblen and Schumpeter are considered pioneers of institutional and evolutionary thinking. They have some common ideas stemming from their analyses of economics as a revolutionary science. While there are arguably a number of similarities in Veblen’s and Schumpeter’s systems, the differences between institutional and evolutionary economic views are undeniable. There are differences regarding the process of innovation, wherein Schumpeter views innovation as the core causal factor in capitalist change. This leads to different results based on the status of capitalist and social context (Schumpeter, 1951). Schumpeter emphasized the individual (entrepreneur’s) behavior as an originator of economic change or in his words, the bearer of innovation. Moreover, in Schumpeter’s system, entrepreneurs are the primary key to innovation, which makes it the bearer of change in the capitalist process. In Schumpeter’s system, the emergence of innovation is the driving force of economic evolution (Bögenhold, Michaelides, & Papageorgiou, 2016).

In summary, Schumpeter saw that entrepreneurs are the bearer of realizing technological change through innovation, which results in institutional change. On the other hand, Veblen pinpointed “cumulative causation” as a primary factor of capitalist
development and innovation. Thus, the Veblenian system seemed to attribute innovation and technological change to the institutional change as it was mentioned to be a process of habituation and thus adaptation. Therefore, Veblen seemed to see technology as a joint stock of knowledge, and any new technical emergence is a sequence of great, or as he put it, “no trend,” “no consummation,” and “no final term”; i.e., “the sequence of events” (Veblen, 1898). Moreover, Veblen’s standpoint put technical change, a revolution of capitalism, and institutional structure in favor of the industrial workers and engineers over the pecuniary motives of businessmen. Therefore, Veblen’s analysis of the evolutionary process focuses not on the individual but rather institutions, conventions, and habits of thought. It attributes economic changes and changes in the industrial mechanical processes as the ultimate result of habits of thought. Veblen views innovation and technological change as coming from habituation and therefore adaptation. Therefore, Veblen sees technology as a joint stock of knowledge and any new technology is one step in the sequence of invention, while in Schumpeter’s system, routinization of innovation is the bearer of institutional change (Gurkan, 2005).

To conclude, one can now better understand the unique features of these two approaches of thought. In both Veblen and Schumpeter’s theories of social and economic change, technological change is one of the strongest driving factors. Arguably, they differ when it comes to how said technological development occurs; Veblen viewed the change as resulting from “cumulative causation,” meaning that it does not result from innovation or individual initiative, but rather relies on collective technical action of the community. Veblen seemed to claim that entrepreneurs are not the source of technological change but instead are simply seeking pecuniary reward. However, Veblen considered the “common
man” as one of the bearers of institutional change, because the “common man” does not run the mechanics out of self-interest, but instead to seek to better the lives of the community as a whole. On the contrary, Schumpeter placed profit-seeking entrepreneurs as the source of innovation and thus one of the primary keys to capitalist development. From his viewpoint, without profit there would be no development (Bögenhold et al., 2016; Gurkan, 2005; Papageorgiou, Katselidis, & Michaelides, 2013; Schutz & Rainer, 2016).

The Saudi Economy Structure

The Saudi Arabian economy depends almost entirely on hydrocarbons, primarily the oil sector. This sector is so large, in fact, it represents 44% of the total GDP, and 93% of total government revenues (SAMA, 2016). Thus, the nation’s economy essentially relies on an industry that is capital-intensive. This means that even direct increases to this dominant sector might have little or no direct impact on unemployment. With each new time oil prices crash, the Saudi government grows in understanding the need for economic diversification. Therefore, there has been an increase in policies calling for investment and development of the non-oil sector within the last two decades. The non-oil sector’s contribution has increased to make up over half (56%) of the total GDP (Callen, Cherif, Hasanov, Hegazy, & Khandelwal, 2014; Mehrara, Karsalari, & Haghiri, 2012).
Figure 8. Chart 2. Merchandise Exports

The pie chart in Figure 8 shows that the oil sector accounts for 60% of Saudi Arabia’s total exports, while the agricultural, animal, and food products represent only 1% of total exports; construction materials accounts for 2% of the total Saudi exports; and other goods represent 5% of the total Saudi exports. Most of the industries in the non-oil sector are labor-intensive, yet make up a relatively small portion of the Saudi economy.

Petrochemicals make up 12% of total Saudi exports, while non-oil exports make up 20%. Unfortunately, the sectors considered oil-based, such as the petrochemical and energy industries, are largely capital intensive and thus have had relatively little effect on employment. Consequently, it is necessary to restructure the Saudi economy to make it less susceptible to “Dutch disease” since any change to oil prices will impact the whole economy (Scherer, 2009). Therefore, this section proposes the first step to improve the current dominating sectors, while also developing new sectors that will be able to accommodate large numbers of highly skilled workers in the nation. Saudi Arabia must seize the invaluable opportunity of utilizing a KBE if it only invests in some of the fundamental pillars of a knowledge-based economy.
Foremost, it is necessary to outline which sectors must be fully developed order for the nation to benefit from a KBE. The World Bank has named four crucial elements necessary for a knowledge-based economy: (a) an economic and institutional administration which plays a clearly-defined role in providing incentives for the use of current and new knowledge accurately; (b) a highly skilled and educated population seeking to create, use, and to distribute knowledge; (c) significantly innovative systems of organizations, such as universities, research institutes, and some other institutions, that will adapt and adopt the growing stock of global knowledge to the domestic needs and enhance new technology; and (d) Information Communication Technology (ICT) facilitating invention, innovation, production, and creativity (Debnath, 2015).

In theory, the government ought to play a significant role in all four facets of a KBE. The Saudi government has spent significant effort enhancing the education sector since the 1980s. This is a crucial step in developing economic incentives and organized institutions which will subsequently improve innovation, ICT, and human resources.21 While Saudi Arabia has done well here, it has fallen behind in other important elements necessary for a successful KBE. According to Debnath (2015), who investigated Saudi Arabia’s performance in the four areas of a knowledge-based economy, found that the country has been doing well in education, ICT, economic incentives and institutional administrations, yet is doing poorly in terms of innovation. This prevents Saudi Arabia from transforming into a KBE because it is necessary for all four elements to be

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complemented with an efficient system of innovation to receive the full benefits of a KBE (Debnath, 2015).

In order to make up for this, Saudi policy-makers must endeavor to gain from the benefits of an endogenous money supply to institute clear and precise policies that will transform Saudi Arabia’s economic structure into a KBE. More specifically, the government role begins with providing economic incentives and organizations—the two most important elements for KBE growth. In fact, without sufficient economic incentives, the Saudi Arabian economy would find it extremely difficult to develop into a KBE. One of the factors that most greatly affects economic incentives is the monetary system. Since Saudi Arabia has an endogenous money supply, it has a unique opportunity to use this to provide great incentives that can lead eventually to the development of a KBE. Through improving these economic incentives and institutional regimes, and coupling these with a well-developed education system and ICT systems, Saudi Arabia has found itself on the verge of creating a KBE; it lacks only the sufficient levels of innovation to realize this achievement. According to Debnath, in terms of innovation, Saudi Arabia falls well behind most Middle Eastern countries, yet finds itself performing exceptionally in the other three sectors. Amending this innovation deficiency is as easy as providing adequate investors in the private sector with whatever they need to establish new research and innovation centers that could utilize the best information and technology to develop new products and technologies that average citizens would want or need.

Currently, the very best way to tackle the problem of unemployment among the highly-educated people of the nation is to increase spending on research and development (R&D) to offset the deficiency in innovation. Technically, facilitating credit (loans) for the
private sector would allow it to increase its demand for the highly skilled workers to conduct and complete R&D. This would absorb specialized job seekers, while also making a KBE more attainable. Additionally, increasing R&D could help the cost of production to go down while also reducing prices. While costs go down, the overall equality will increase, which will spur consumption, thereby sparking investments and further employment. This increase in investment and employment will create greater purchasing power, which will benefit the economy as a whole since the outputs of one sector are considered the input for other sectors. This will lead to a nation-wide reduction of unemployment as the other sectors notice increasing demands and thus employ more workers to accommodate this new demand.

In theory, the domestic demand for output and services affects employment rates; the demand can be affected by purchasing power, which is dictated by personal income and ability to obtain loans (other factors are involved but are beyond the purview of this argument). An endogenous money approach solution for Saudi unemployment can be realized through investing effort into creating structural changes such as shifting the economy from being an oil-based economy to a knowledge-based economy to place specialized (highly-educated) workers who are currently unemployed. Moreover, all sectors will be transformed in some ways to become more knowledge-oriented in order to reduce the private sector’s attraction to low-skilled or foreign workers that currently inundate the workforce. By making the educated Saudi population more attractive to potential employers in the private sector, one can end the problem of unemployment and reduce remittances from expatriate workers.
**Inflation under this Solution of Unemployment**

This approach is incompatible with what conventional economists say about inflation; i.e., an increase in the money supply will lead to inflation in the economy, while inflation holds an inverse relationship with unemployment (high inflation means low unemployment) (Friedman, 1968). However, this idea is erroneous as a result of the fact that conventional economists hold the output constant in situations where an increase in money supply and employment would lead businesses to produce more as there is greater purchasing power for the consumption of their goods. Furthermore, businesses would only employ new workers if these new workers will be increasing production and thus inflation would not increase as long as output is increasing. In short, one cannot assume that output must remain constant to see the effects of an increased money supply. Further, there is also no reason to fight this kind of inflation as prices rising before full employment cannot truly be deemed inflation but is rather a temporary augmentation that will last only until full employment is reached. According Keynes, policy-makers should only fight “true inflation,” which results from an economy expending all of its resources including workers. Therefore, policy-makers should not obsess over fighting inflation because the benefits of increased employment that will coincide with this pseudo-inflation will far outweigh its cost (Moosa, 1997).

Thus, policy-makers must make fighting unemployment their top priority. In this way, Saudi policy-makers can develop a comprehensive approach to solve the detrimentally high rates of unemployment among the youth population and change the economic structure from an oil-based economy to a more diverse KBE economy.
Using a KBE as the solution for unemployment is firmly rooted in the mechanism of innovation, which involves the introduction of new capital goods. In other words, innovation expedites the diffusion of new technologies to increase demand for investments which all ultimately results in an absorption of current unemployed citizens into the work force. The benefits are myriad: a decline in the real cost of production resulting from technical innovations in manufacturing, falling prices, increased real purchasing power in consumers’ hands which increases consumption, thereby increasing sales (and consequently profits) for entrepreneurs, leading to an increased demand for workers which creates new buyers and ultimately increases the aggregate demand. In fact, this chain of cause and effect is not isolated to one industry or one sector, but it can be seen as an integrated production process; i.e., a positive shockwave that hits one industry will ripple out and impact other industries and sectors because the output for certain industries acts as the input for others.

Technological and technical change ultimately alters the capital structure in a way that uses more workers with new and improved production methods.
CHAPTER 5
CONCLUSION

This dissertation concludes that there is an important relationship between unemployment and a number of economic and social costs. Further, the dissertation reveals that the Saudi Arabian economy has undergone an unprecedented transformation from a humble nomadic economy to the modern and significantly prosperous society of today. There has been an increasing need in the past century to help the people of the peninsula to become flexible and able to participate in the modern economy. As was made clear in chapter one, there have been significant efforts in the form of several five-year plans that included a focus on the development of human resources in the nation. At that time, there was a dearth of local labors, which meant that employees had to be brought in from abroad. This continued to such an extent that foreign workers now comprise 83% of the Saudi labor force. Consequently, the market is now so saturated with foreign labor that there is no longer any room for Saudi workers to gain employment. Furthermore, it is not only low-skilled workers who are affected by the unemployment crisis; in fact, citizens with university degrees and other forms of higher education are often among the hardest hit. It has been recognized that the Saudi unemployment rate has risen steadily in conjunction with three other factors that have changed rapidly since the discovery of oil: First, the nation’s population has continued to swell since the 1970s (the population growth rate for 2016 is 2.31), which has led to an increase in the number of job seekers (SAMA, 2016); there is additionally an increase in the number of students graduating from universities each year and entering into the workforce; finally, there has been a distinct lack of job creation in recent years. All of these factors combine to create a environment conducive to Saudi
unemployment. At present, there is still room for the government to work towards a solution to this problem that has plagued the Saudi Arabian economy for the past two decades.

In analyzing these factors more thoroughly, one may notice the apparent imbalance in the age distribution of the Saudi Arabian population. At present, the youth, aged from 19 to 24, make up more than 19% of the total population.\textsuperscript{22} As this large portion of the population continues to age, they will seek employment in the labor market, which is already suffering from a lack of job creation and which will ultimately result in additional strain and increased unemployment. Moreover, a large portion of the unemployed population of Saudi Arabia are young and also highly educated; unfortunately, the nation is not benefiting from their education or youth because they are unable to find suitable positions in either the public or private sector. Thus, the issue at hand is how one could develop a policy that could help Saudi Arabia to benefit from the wealth of knowledge stored in its youth population. This study has been built to provide the Saudi Arabia with a coherent approach to gain the advantages of what the country has in terms of resources.

In the first chapter, the study investigated the significant changes in the Saudi Arabian economy that resulted from a transformation from a simple nomadic lifestyle to that of modern luxury. This change took place shortly following the discovery of oil in the nation after it was unified. Before this discovery, the economy relied on a few small activities and essentially involved self-sustenance within small communities. Production was constrained to serve only the needs and wants of a relatively small market and existed primarily on a subsistence level. On the contrary, since the discovery of oil and subsequent national

\textsuperscript{22} Moreover, demographic features of Saudi population show that the majority of Saudi population is comprised of the youth, aged between 15 to 35 years. Another feature of the Saudi population is that most of the population is highly educated.
development, the economy has been heavily dependent on oil as a primary resource. The 
Saudi economy was shaped by a few key historical events. The unification of the peninsula 
under a single government allowed for the homogenization of the economy. As stated, the 
discovery of oil played a pivotal role in the development of the economy. Moreover, from 
the moment oil was discovered until the 1990s, Saudi economic policies maintained focus 
on the development of the oil sector. However, after the oil crisis in 1986, Saudi policies 
have shifted toward more diversification of economic activities. Thus, in the past few years, 
the more recent five-year development plans have focused on the non-oil sector and human 
resources development.

Furthermore, this study has highlighted the government reaction to sharp reduction 
in oil prices. As chapter one mentioned, the government significantly cut its spending in 
response to the decline in oil prices. Additionally, it became necessary to diversify economic 
activities in order to avoid “Dutch disease.” Many of the problems of the Saudi labor force 
can be traced back to when the country first began its rapid development, as the need for 
more advanced roads, buildings, and other infrastructural projects demanded the importation 
of large numbers of foreign workers. Moreover, the private sector benefited from paying 
lower wages to expatriates—leading them to make up more than 83% of the Saudi labor 
force. In fact, the Saudi labor force is unique in many ways. For instance, there are more 
expatriate workers than national workers, and the employment rate among women is 
extremely low compared to other nations.

Chapter one also mentioned the strength of Saudi money and its banking system as 
well. The strength comes from the fact that the nation has a state theory of money; i.e., the
government issues its own money, thereby reducing financial constraints. Despite this, there is some limitation stemming from the fact that the Saudi Riyal is pegged to the U.S. dollar.

The literature review in chapter two showed the ways in which previous studies explored the problem of Saudi unemployment. Generally speaking, nearly all previous studies attributed Saudi unemployment to the failure of the education system to produce outputs that matched jobs currently available in the market. Further, the majority of these studies considered all government efforts to reduce unemployment as complete failures. Most studies blamed the education system, Saudi culture, and certain government policies for creating and exacerbating unemployment. Another section of this chapter was dedicated to highlighting how previous studies looked at the endogenous money supply theory. It revealed that most studies showed that the majority of economies experience endogenous money (deposit creates credit, and credit creates reserve). In these cases, the central banks have no control over the money supply, yet set interest rates, meaning that when commercial banks lend money, all they need are good borrowers and the banks will search for reserves later as opposed to first locating reserves and then borrowers.

The first two chapters were meant to explain the pros and cons of the Saudi economy in order to provide a background understanding of the issue before developing approaches to solve the nation’s unemployment crisis. Chapter three explored both economic and social costs occurring as a result of Saudi unemployment. This chapter explored the high costs of unemployment in terms of family disruption, increased crime rates, as well as mental and physical health issues. Unfortunately, there are no reliable sources documenting the exact magnitude of all social costs. Based on total real GDP the increase of the loss of Saudi output $87.3 billion per year as a result of 1,219,000 Saudis unemployed. Nevertheless, the
lost of real GDP of non-oil sector is 63.3 billion per year as a result of 1,219,000 Saudis unemployed. Finally, this chapter expounded upon the benefits of the opposing situation of full employment by explicating the ways in which the society and economy would prosper under full employment.

Chapter four illustrated how differing economic schools of thought (Orthodox and Heterodox) tend to interpret the effect of money on economic activities. The chapter explained that orthodox economists have generally treated money as neutral, thus having no effect on real economic variables such output and employment. On the other hand, in heterodox economics (Post-Keynesian), the general consensus is that money “rules the roost,” has a significant impact on economic activities, and is therefore able to stimulate the economy. The chapter paid special attention to the Post-Keynesian interpretation of money and how a state could use this approach to solve economic and social issues such as unemployment (Forstater, 2005, 2006). The chapter further investigated the endogenous money supply hypothesis in the case of Saudi Arabia using three models: Accommodationist, Structuralist, and Liquidity preference. Arguably, the empirical results indicate that Saudi Arabian economy is experiencing an endogenous money supply process (Liquidity preference hypothesis). In turn, the study places the foundations of a solution to the unemployment crisis within the framework of an endogenous money supply approach. In fact, this chapter showed the potential for the Saudi government and its banking system to provide economic entities with money that would help to shift the Saudi economy from being an oil-based economy to a knowledge-based economy. Additionally, this chapter aimed to dispel fears of inflation based on ideas from Keynes’ view of real inflation and
reinforced the idea that achieving full utilization of resources, including labor, and increasing real economic benefits would be more than worth any possible resulting inflation.

Chapters three and four elucidated the economic and social costs linked with persistently high levels of unemployment in Saudi Arabia. Moreover, these same chapters highlighted the benefits that the Saudi economy and society stand to gain from full employment.

Providing a feasible solution to the problem of unemployment in Saudi Arabia must emphasize the possibility and affordability of funding policies that could be implemented in working towards a solution. The Saudi Arabian economy is arguably unique in terms of natural resources in that this small nation holds around 18% of the world’s known oil reserves (OPEC, 2016). Moreover, the Saudi economy experiences endogenous money process meaning that there are no financial constraints to employing the majority of the nation’s unemployed. Further, a large percentage of those who are currently unemployed are young and highly educated. The vast supplies of oil reserves and endogenous money supply provide Saudi Arabia with advanced technology, creating the opportunity to transform the entire Saudi economy into a KBE which could potentially absorb most of these highly educated job-seekers. Policy-makers ought to take advantage of these factors in order to create and implement policies that would eradicate the unemployment issue. This dissertation concluded that the problem of unemployment was not rooted in a lack of financing policies to employ job-seekers. Rather, the issue at hand is the lack of sufficient research to uncover the root causes of unemployment, in conjunction with a dearth of innovative ideas to remedy the problem.

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23 As it was mentioned in chapter four the KBE highly depends on high educated people to increase the innovation which will be provided by researchers.
In order to understand what differentiates this dissertation from other studies of the topic, one must start with an examination of government attempts at solving unemployment. The persistence of unemployment has drawn Saudi policy-makers’ attention to political pressure that threatens to weaken Saudi stability. Therefore, policy-makers have made various efforts to remedy the unemployment issue. For instance, six years ago, the Saudi government imposed a nationalization quota policy, Nitaqat, on all companies in Saudi Arabia in an effort to reduce Saudi unemployment. There is also another program, referred to as Saudization, which involves providing incentives for replacing expatriate workers with Saudi workers. Overall, these programs served to provide temporary relief from unemployment, but ultimately resulted in greater unemployment as the programs were detrimental to many Saudi businesses; around 11,000 firms left the Saudi market as a result of the high cost associated with employing Saudis (high-skilled workers) instead of foreign workers (Peck, 2014).

This study provides the entire Saudi economy with a comprehensive policy that would effectively achieve full employment without bringing about additional costs to any entity. In fact, full-employment could most easily be achieved through shifting the economy as a whole to become a KBE in order to gain the myriad benefits stored within the highly-educated Saudi youth. Furthermore, the Saudi government would benefit from the employment of Saudi youth by avoiding political instability or social unrest in addition to undoing economic costs that the economy has suffered from for over two decades.

Previous studies also fell short when attempting to analyze the root cause of unemployment in Saudi Arabia. This study is different in that it does not simply push all blame for unemployment to the education system or cite all political efforts as complete
failures. The study understood that hundreds of thousands of students graduate each year from home and abroad and thus the education system cannot logically be the problem since it is producing large outputs of all kinds. Hence, the problem lies not only in education, but a lack of cohesion between education and job creation. This study revealed the possibility and affordability of ensuring full employment and full use of resources such as human resources.

This study revealed the possibility for the nation to achieve full employment. This was revealed through statistical evidence using the endogenous money supply hypothesis in Saudi Arabia. The study revealed that there will be no significant financial constraints on the government, which issues its own currency, from implementing a comprehensive approach to remedy unemployment. The only obstacles that Saudi policy-makers may face are a lack of creative ideas, policies that may hinder progress, or certain other political constraints. Furthermore, the study showed how a KBE could make Saudi Arabian business more attractive to foreign investors because of its use of highly-skilled workers which would increase foreign direct investment. Once this happens, production process costs would decline and the purchasing power of consumers would increase, which would drive sales and ultimately increase profits; foreign direct investment and investors would then increase their investments in Saudi Arabia thus boost the economy considerably.

In addition to exploring what could actually bring about full employment and how this could benefit the nation, the study explained the unique features of the Saudi economy that make achieving full employment so feasible. First of all, Saudi Arabia is fortunate enough to be in possession of an abundance of natural resources that have created and continue to create enough wealth to hire all job-seekers. Secondly, a vast portion of those seeking jobs is comprised of both young and highly-educated individuals, meaning that their
productivity would be very high if employed. Third, the nation issues its own currency and is experiencing endogenous money supply and thus a state theory of money approach could easily solve any financial constraint that Saudi policy-makers might fear in their attempts to eradicate unemployment. Previous attempts that have proven unsuccessful should not be taken as a sign that the task is impossible; instead policy-makers must seek out more comprehensive programs that do not create any additional losses for any entities within the economy.

This dissertation has endeavored to provide a coherent policy that would provide the Saudi Arabian economy with full employment and price stability by shifting the Saudi economy from an oil-based economy to more diversified economy. By reviewing the different unique features of the Saudi economy, this study has concluded that a sustainable solution for the current vast unemployment rate stems from making large efforts to bring about structural changes by transforming the Saudi economy into a knowledge-based economy. The Saudi government could place all educated and highly skilled workers leaving universities annually. There is, additionally, a need for SAMA to develop a coherent monetary policy that not only collects U.S. dollars seeking to relieve potential pressures on its pegged currency, but to develop a coherent monetary policy that helps to achieve full employment.

Finally, this study focused on developing a coherent and comprehensive policy to face the issue of unemployment in Saudi Arabia using the endogenous money supply approach. In fact, Saudi Arabia is surrounded by countries with similar cultures and economic structures as well as similar social and economic problems. Consequently, this
study could just as easily be adapted to apply to other countries in the Gulf Cooperation Council.

The limitation of this dissertation is lack of quantitated data on the social costs of unemployment in Saudi Arabia. Therefore, future researchers interested in unemployment should take advantage of the opportunity of government efforts to improve national statistics in order to calculate and quantifying the real social costs of unemployment amongst Saudi people.

As far as this research showed, there is a problem within the Saudi labor force regarding hours and wages of work in public sector compared to the private sector in turn Saudis workers prefer working in public sector over in private sector. Thus, there is a need for institutional adjustment in terms of wages and hours of work.
REFERENCES


Bögenhold, D., Michaelides, P. G., & Papageorgiou, T. (2016). *Schumpeter, Veblen and Bourdieu on institutions and the formation of habits.* Available from https://mpra.ub.uni-muenchen.de/74585/


International Monetary Fund. (1999). Article IV Consultation. IMF, 6, 421. Retrieved from

Washington DC: Author.


Retrieved from


Saudi Arabia Ministry of Labor, Nitaqat. (n.d.). Retrieved from
http://nitaqat.mol.gov.sa/Pages/Default.aspx


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