



Nexus Between Unemployment and the Size of the Informal Economy in the Case of Pakistan and its Comparison with the Subcontinent

ABSTRACT

Despite the government's efforts to reduce the shadow economy in Pakistan to raise revenue, workers' involvement in the shadow economy continues to rise, explained via the labour force participation in the shadow economy. The debate regarding the estimation of the shadow economy and its relation to unemployment is highly celebrated in literature. It is not hard to find a few studies while taking Pakistan a particular case that explains the relationship between Unemployment and the size of the Informal Economy, but no study channelizes properly how and through which channels unemployment affects the size of the informal sector. Additionally, this study contributes to filling this void by demonstrating how unemployment is linked to the size of the shadow economy and how unemployment fuels the informal economy's growth in Pakistan. Further, it provides possible economic consequences for public policy decisions. The study posits that changes in the unemployment rate positively contribute to the size of the shadow economy. Due to the unavailability of legal opportunities, workers who work in the shadow economy continue to stay, while other unemployed labor force also tends to participate in informal economic activities.

Keywords

Shadow economy, Informal economy, Unemployment, Labor Force, Growth

JEL Classification

E26, J00, F63

AUTHORS

Ashiq Hussain

MPhil Scholar, School of Economics, Quaid-i-Azam University, Islamabad

Author's Contributions: 1, 4, 6

amir52453@gmail.com

<https://orcid.org/0000-0001-7220-2048>

Amanat Ali *

Assistant Professor, School of Economics, Quaid-i-Azam University, Islamabad

Author's Contributions: 2, 5, 6

amanat@qau.edu.pk

<https://orcid.org/0000-0003-0112-7428>

Muhammad Naeem Akram Abbasi

Ph.D. Scholar, School of Economics, Quaid-i-Azam University, Islamabad

Author's Contributions: 3, 4, 6

naemaitaabbasi@gmail.com

<https://orcid.org/0000-0003-3403-8114>

Please cite this article as:

Hussain, A., Ali, M., & Abbasi, M. N. A. (2021). Nexus between unemployment and the size of the informal economy in the case of Pakistan and its comparison with the subcontinent, *Kashmir Economic Review*, 30(2), 27-42.

*** Correspondence author**

Author's contribution in the article: 1- Conceived and designed the analysis, 2- Reviewed and compiled the literature, 3- Collected the data, 4- Contributed data or analysis tools, 5- Performed the analysis, 6- Wrote the paper, 7- Financial support for the conduct of the study, 8-Other

1. INTRODUCTION

Determining the informal economy's exact size (IE) is complicated. Any significant effort and contribution are required to measure the spectrum of shadow activities. All activities that generate income are included in this category, but it is challenging to include all private income-generating activities. Many types of research have concentrated on some (SE) activities, and these studies have provided estimates of the informal sector that reflect the real-world condition in any economy. Those Researchers who attempt to assess the size of the informal economy (IE) face the challenge of determining how to define it. In literature, there are many definitions, and a few of them are in Table 1. For the sake of simplicity, one working definition includes all present unrecorded economic processes that would otherwise contribute to the official Gross Domestic Product. Because there is a contradiction that the informal economy (IE) is either complementary or contradictory to the formal economy, the informal economy (IE) is a complex and dynamic phenomenon for the entire world (FE). Few studies have been conducted to assess if the informal sector is a source of progress or a threat to economic and social development. The underground economy is a conundrum, especially for the developing world, because it accounts for a considerable share of GDP in developing countries. This heavy reliance on the underground economy provides an opportunity for unemployed individuals due to a lack of legal employment opportunities. Furthermore, unemployment is always high in most developing countries.

Although there are various reasons why workers are attracted to shadow economy activities. However, the most important and frequently cited reasons are an increase in the level of taxes and regulations in the formal sector (FS), particularly in labor market regulations; pressuring employees to work fewer hours and retire earlier, which raises the unemployment (UE) rate and reduces loyalty to public institutions ([Schneider & Enste, 2000](#)).

Although there have been various studies on the size of the shadow economy, researchers have paid less attention to how unemployment affects the shadow economy compared to other crucial links. There are a few studies in the literature on the relationship between unemployment and the scale of the shadow economy, but to my knowledge, none explain this critical relationship in the context of the subcontinent. As a result, the purpose of this research is to look into the relationship between unemployment and the magnitude of the informal economy (IE). Understanding the connections between unemployment and the informal sector may help us better understand how unemployment affects the informal economy (IE). All countries in the subcontinent, including Pakistan, India, Bangladesh, and Sri Lanka, have historically been developing countries. Most people have decided not to report their entire or partial income to their respective revenue institutions over their independence. As a result, the informal economy accounts for a more significant percentage of the economy. According to 2015 data, the informal sector contributed 30.16, 17.8, 27.7, and 35.4 percent of GDP in Pakistan, India, Bangladesh, and Sri Lanka, respectively ([Medina & Schneider, 2018](#)). However, the statistical data proves that the informal economy exists all over the subcontinent. But the exciting thing is that in all those countries of the subcontinent, the informal economy (IE) decreases except Pakistan, but still, the informal sector (IS) accounts for an essential share of the official economy.

However, people involved in the informal economy cheat the system and shift the burden to the rest of the country's residents. Therefore, these activities are referred to as the "informal economy". Business people's wage and salary earners are among those who participate in the underground economy. They work and earn income from the underground economy and cover their income from the revenue collection authority. Furthermore, it has been empirically proven that business sector participation accounts for less than half of informal activities, while the household sector accounts for the remainder ([Bajada, 2002](#)).

The question now is: what are the many pathways via which the unemployment rate influences the size of the informal economy (IE)? From a policy standpoint, it's essential to determine whether shadow economy activities expand or decrease when the unemployment rate changes. Therefore, there is a positive association discovered between the rate of unemployment and the underground economy it can be said that: firstly, change in unemployment is generating an employment cycle in the informal sector and play a vital role as an automatic stabilizer that reduces the volatility of casual business cycle, and secondly, the government requires more effective surveillance of those who pretend to be unemployed and receiving welfare assistance but working in the informal economy ([Bajada and Schneider, 2005](#)). Moreover, policies formulated by policymakers who use government figures to make their policies don't know about the actual volatility produced by the informal economy. This study explores how the change in the unemployment rate influences the size of the shadow economy.

1.1. Shadow Economy in Subcontinent Countries

An economy cannot be managed effectively without knowing the magnitude of the economic activities running along with the formal economy. Therefore, considering the above statement, we can understand that the informal economy can be viewed as the national economy's actual parameter. In the presence of SE, redistribution of income, trade, inflation, tax system economic growth, society's social and economic perspective, and most macroeconomic indicators are affected. This issue is critical in developing and developed countries ([Schneider, 2005](#)).

The Subcontinent economy consists of formal and informal sectors, producing approximately the same good. In the legal economy where firms run productive activities, the self-employed people run productive activities. On the other side is the illegal economy. Furthermore, skilled workers are constantly getting employment because they are assumed to work in a competitive market, but unskilled workers might be unemployed due to wage rigidities. Besides, the only difference between goods and services is the degree of risk. In the informal sector, we can supply goods and services without risk, but there is a risk to providing goods and services ([Bental et al., 1985](#)).

The failure of Pakistan's economic system is due to low tax to GDP ratio, questionable increase in energy requirements, an upward trend in inflation, especially in food items, etc. the upward trend in Pakistan's shadow economy (SE) due to many reasons, including geographical and geopolitical boundaries especially Pak-Afghanistan and Pak-India relations and Pakistan logistic relationship with NATO forces in the War against terrorism. The demolishing of the 2005 Earthquake and the situation of the 2010 flood became the reasons for the enlargement of the shadow sector. In the light of the socio-economic point of view, upward jump in the process, especially in the consumer durable and food items prices, the implementation of new GST/VAT system and increase in the energy sector prices may force the peoples to enter the informal economy.

Pakistan is an underdeveloped country and facing many challenges, according to the estimates of UNCDP 2004-15, 38.3% of people are classified as poor, and 4 out of 10 Pakistanis live in multidimensional poverty. Therefore, if we want to make the policies that policies must be effective, they should be unbiased, and only those policies should be acceptable in which macroeconomic indicators are accurate to improve the economic conditions and speed of growth. Furthermore, to make effective and precise policies about improving Pakistan's economy, we need to understand and estimate the actual size of black and white economies. After calculating the substantial scale of the informal economy, the government will be able to improve the economic system and increase its revenue. Like most other developing countries, Pakistan demolishes bureaucratic formalities and complex processes required for all critical services. These complications turn the economic agents into a path with tax evasion ([Mughal & Schneider, 2018](#)). In Pakistan, the government has extensive control over the economy, and the launching of the automation process is a recently emerging trend in public office. But still, Pakistan is the most challenging country to run the business due to regulations and overlapping procedural formalities. In 2017 Pakistan was placed at

147 positions out of 190 countries in ease of doing business. This position reflects extensive formalities in various processes in the case of Pakistan and forces us to make one window operation to start a business in Pakistan.

Although India, Sri Lanka, and Bangladesh are also developing countries placed in Subcontinent. In India, there is a declining trend in the share of the informal economy to GDP after 2000. But still, there is a significant share of the shadow sector to the official calculated GDP, around 22 percent on average. Furthermore, official calculated GDP is also based on the legal and illegal sectors in the case of Sri Lanka. In the case of Sri Lanka, there is also a declining trend in the size of the shadow economy (SE) like India that we have seen above. The share of the shadow economy falls around 48 percent to 35 percent from 1996 to 2015. But still, the average size of the shadow economy (SE) of Sri Lanka is roughly about 44 percent from 1996-15. Bangladesh's economy consists of the legal and illegal sectors. In the case of Bangladesh, there is also a decreasing trend in the size of the informal economy. These figures are calculated from the data collected from World Governance Indicators.

1.2. Unemployment and Informal Economy

In literature, many studies have been made to explain the link between the rate of unemployment (UE) and the size of the informal economy. There are two possibilities in the relationship between unemployment and the size of the informal economy, either directly or indirectly. According to the study in which the size of the informal economy is a direct function of unemployment, the link is found very relevant in countries with high unemployment and less relevant with a moderate level of unemployment. Unemployment's contribution to the shadow economy is proving to be necessary, especially in economic downturn years such as 2008. The financial crises of 2008 were the worst economic disaster after the great depression of 1929. The financial disaster happened despite many attempts by the Federal Reserve and Treasury department to stop it. The financial disaster leads to a decrease in housing prices by about 31.8 percent. The unemployment was still above 9 percent after the 2008 recession. Furthermore, government expenditure, bank credit, and inflation rates are also positively related to the informal economy (Tran, 2021).

About the shadow economy of Pakistan, different studies have been made to estimate the informal economy's size, different underground economy dynamics, and the effect of the shadow economy on various economic variables. Pakistan is a developing country. Like most developing countries, Pakistan's economy is also divided into formal and informal sectors. In the Pakistan economy, there are some vital shreds of evidence on the growth of the informal sector. The informal sector plays a crucial role in creating job opportunities for unemployed people and rising GDP growth. We ignore the importance of the shadow economy even though the shadow economy has a significant contribution to the GDP and employment. In Pakistan, the bureaucratic model of development, despite heavy reliance on state foreign aid to provide the human development service, has failed to provide adequate job opportunities in the formal sector of an economy.

However, the informal sector of Pakistan absorbs 67% of the urban employed person. Out of 67 percent, 91 percent of people have no formal training in the informal. In the informal sector, there is 80 percent of women work. On average, the earnings of unskilled workers are lower than the similar worker in the formal sector of an economy. In the Pakistan economy, the wage of an educated person is higher in the formal sector than in the informal sector. Due to the importance of the informal sector of Pakistan's economy, several policy recommendations are made regarding the education and training of workers, access to credit facilities, tax exemption to encourage self-employment, management, and technological developments. The formal and informal sectors should coexist to support each other for the overall growth level of an economy (Bodla & Afzal, 1997). The shadow economy encompasses many activities that affect government policies and the official economy either directly or indirectly. The average shadow economy of Pakistan from 1973-2015 as a percentage of GDP is around about 26.41 (Mughal & Schneider, 2018). However, we can say that the informal sector plays a significant role in economic activities.

However, India, Sri Lanka, and Bangladesh are also developing countries, and they are facing the problem of the difference between the actual labor force and demand labor force. Therefore, with a high population rate, the developing countries can't employ all workers looking for a job. Over the last decade, India maintained an average growth rate of 7 but has not been accompanied by growth in job opportunities. In the case of India, the development of new job opportunities does not fulfill the growing demand for jobs. India's annual market for a new job is approximately 12 to 15 million. Therefore, there is an annual shortage of about 4 to 7 million jobs. Furthermore, in India, 300 million working-age individuals are outside the labor force. Most developing countries like Sri Lanka and Bangladesh have faced problems due to low employment opportunities or a mismatch between potential and actual labor force.

As this study has discussed above, in the case of Sri Lanka, the share of the shadow economy has a decreasing trend over time. This is happening because Sri Lanka has been creating employment opportunities to reduce unemployment. Therefore, one of the most important reasons behind the decreasing trend in the share of the informal economy is the drastic reduction in unemployment. There has been a drastic reduction in the unemployment rate throughout 1990-2010 government improved the working environment, especially for women. Furthermore, structural transformation happens during this period, and the economy goes away from the agricultural sector towards the services and manufacturing sector (Byiers et al., 2015).

Since the independence of Bangladesh in 1971, some essential strategies towards growth and poverty alleviation have been made. But still, two of the fifth population is live below the poverty threshold and still among the lowest in the world as per capita income (Muqtada, 2003). Bangladesh's total labor force is about 56.7 million. Therefore, 69.6 percent of the overall labor force is male, and 30.4 percent are female. Furthermore, out of 30.4 percent, most females are employed in household work which is not paid employment. That's why not included in the official calculated GDP.

2. REVIEW OF LITERATURE

Unemployment and shadow economy both are common issues all over the world. In the case of the USA, there is also exist some unemployment. The average unemployment rate from 1948-to 2015 was about 5.8 percent in the case of the USA economy. Shadow economy has great importance because it reduces unemployment in an economy. However, increasing the shadow economy creates a problem for implementing government policies. For example, if the government wants to improve the provision of goods and services for people but persons who are employed in the shadow economy will be a free rider of government goods and services and will reduce the quantity and quality of goods and services for persons who work in the formal sector and pay taxes. But at the same time, the shadow economy absorbs unemployment from the informal economy. Therefore, various research has been conducted to determine the link between unemployment and the shadow economy. One of the research projects conducted from 1970 to 2004 looked into the relationship between unemployment (UE) and the size of the shadow economy (SE) in the U.S. The findings demonstrate a positive relationship between unemployment (UE) and the size of the informal economy (IE) through the use of the structural equation method (Dell'Anno & Solomon, 2008).

Informal agriculture accounts for a significant portion of the agricultural sector. Because the majority of people employed in the informal economy are illiterate. There are two significant consequences: first, the rural agricultural informal sector drains a significant portion of government revenue; second, because they are ignorant, they are unaware of how to employ modern agricultural equipment, leaving them impoverished. According to Ali et al. (2021), technology in the agricultural industry has a favorable impact on farmer income and welfare. As a result, we can conclude that this is one of the most critical variables that can help reduce the informal economy's size.

One of the most important measures of growth and development is institutional quality. If institutional quality improves, the country's growth and development will also improve. Institutional quality, along with growth and development, is one of the most important markers in determining the size of the informal sector. If all of the metrics of institutional quality are functioning correctly, the informal sector's size can be reduced. However, because not all metrics of institutional quality increase in the same direction in Pakistan, institutional quality is positively associated with the extent of the informal economy (Ali & Hussain, 2021).

Two competing factors decide the association between informal economy (IE) and unemployment (UE). On the one hand, an upward rise in the unemployment (UE) rate decreases the informal sector of an economy because, under the Okun law, it is positively linked to the GDP and negatively related to unemployment (UE). If the informal economy is positively related to GDP, it must fall when GDP decreases. On the other side, an increase in the rate of unemployment (UE) leads to a rise in the shadow economy because now people have more time to work in the informal economy (Giles & Tedds, 2002).

Various studies focus on the conceptual question and empirical research, looking at the literature. An economy has two sector frameworks, formal and informal sectors, with the general equilibrium. We want to investigate the impact of government expenditure and unemployment compensation on employment in the formal and informal sectors on real wage and relative commodity prices. The relationship between the shadow economy and the problem of unemployment has become one of the most severe issues of debate. There is a dilemma which faces by the policymaker. On one side, the shadow economy is illegal, and on the other side, it employs the country's labor force. Our labor force is divided into two categories: skilled and unskilled labor. When the government increases its expenditure on development or non-development projects, it leads to mainly an increase in demand for skilled labor. However, the informal sector of an economy uses capital and an unskilled labor force (Saracoglu, 2015).

3. METHODOLOGY

3.1. Theoretical Framework

Consumers get utility from formal and informal sectors. In literature, some studies confirm the growing tendency into informal sectors in many countries, especially in developing countries. Therefore, different hypotheses about the presence of informal sectors in economic modernization, dependence, neoliberalism, and structuralism have been developed by researchers.

3.2. Modernization

Rostow (1960), in their titled book, *The Stages of Economic Growth: A Non-Communist Manifesto* in the aftermath of World War II, proposes a modernization approach to national development. In which he discusses the Rostow stage of economic development. Rostow criticizes underdevelopment as a social and economic issue caused by backward social-economic structures. However, according to Rostow, the policy recommendation was to acquire new legal systems, modern achievement, modern capital list economies, and a democratic system. The word contemporary is considered a synonym of the capitalist in recent times. However, capital exploitation doesn't underdevelop third-world countries, but these countries have not been fully integrated into the industrialized world. However, third-world nations need to take off to catch up with the advanced world. The informal sector was seen by the exponents of modernization theory as the elimination of traditional, pre-capital modes and to cut off rural people. As a result of all these factors, the unemployment rate rises, and the informal sector is becoming a viable source of income for them and their families. Furthermore, other reasons that forced the workers to work in the informal economy were the low level of education, skills, and value orientations. According to the national development prescription, which

the modernists prepare, the urban surplus would gradually vanish with the emergence of the modern or industrial world.

3.3. Structuralism

According to the structuralism approach, informality comes from more regulation and excess labor supply, but the central idea of the structuralism approach is that informality comes from the exploitation of labor by capitalists. While on the other side, [Maloney \(2000\)](#) says the association of informality with labor is not just happening accidentally, but the capitalist prepares this mechanism. Capitalists attract the formal reserve labor to the informal sector and employ them as a cheap labor force.

There are two key contributions to the informal economy of structuralism in literature. The first contribution is that the informal economy has the function of supporting the capitalist system. Furthermore, globalization is the biggest supporter of the capitalist system. According to the context of capitalism and globalization, preserving the market competition as manufacturers seek to produce production costs and wages ([Castells & Portes, 1989](#)). To clarify, he considers Guatemala's research and uncovers how many U.S. clothing companies provide local contracts, but those companies don't provide social security. Most contracts are signed with women because they join for significantly lower wages than the market value.

A second contribution by the structuralisms is that the growth of the shadow economy is crucial for development. Compared with the formal economy, a more significant number of jobs are included in the informal economy. A more substantial number of workers are working in the informal economy. Because an individual considers that their utility from income is higher in the informal economy than in the formal economy. There is a wide range of markets of cheaply manufactured goods and services in the informal economy. To make a further profit, using organized labor, capitalists often use casual labor to minimize cost.

3.4. Theoretical Background of Model

In general, workers will choose to either be in the formal sector or the informal sector at any point in time. Workers who work in the formal sector tax is deducted from their income used to finance government expenditure, but tax revenue can also be wasted because of misuse, while on the other side, informal sector workers pay a proportional fraction of their income as penalties.

3.5. A model with Formal and Informal sector

There are two types of labor force work in the economy: formal and informal. Therefore, we will include only one labor category in the first neoclassical production function: formal labor. The second model will discuss neo-classical production function technologies with informal and formal labor forces.

3.6. The Model with Formal Sector

There is a very effective approach to calculating TFP levels in the neo-classical literature. In this method, we assume that the GDP is a function of factor endowment and productivity at time t is denoted by Y_t and this function follows a constant return to scale Cobb-Dougllass technology as follows:

$$Y_t = (kt)^a (A_t L_t)^{1-a} \quad (1)$$

Where productivity, stock of capital, and the input of labor are represented by A_t , k_T and L_t respectively. Here, productivity is assumed as labor augmenting by the production technology, and this assumption is a standard approach because it will make the productivity measures. The productivity measures will be determined using the following equation based on the production technology given in the above equation:

$$A_t = \left(\frac{Y_t}{(K_t)^a (L_t)^{1-a}} \right)^{\frac{1}{1-a}} \quad (2)$$

The above equation shows that productivity is negatively associated with capital and labor while positively associated with output.

3.7. The model with the informal and formal sector

We will give a new shape to neoclassical production technology by introducing the informal labor force into production function. Therefore, different ways to incorporate the informal sector into production technology. One of them is as follows:

$$Y_t = (K_t)^\sigma [(A_t^F L_t^F)^\sigma + (A_t^I L_t^I)]^{(1-\sigma)/\sigma} \quad (3)$$

Here in equation (3), L_t^F represent formal labor force in the economy, and L_t^I represent the informal labor force in the economy while A_t^F represent the productivity of formal sector contributed to the official economy and A_t^I represent the productivity of the informal sector contributed to the official GDP. Moreover, σ represent the level of the productiveness of a worker in the formal or informal economy. The elasticity of substitution will be measured by $1/(1-\sigma)$. Furthermore, informal economy $\sigma = 1$ means that the more productive workers will be selected for employment in an economy, while $\sigma > 1$ means less productive workers will be employed. In practice, the formal sector employs more productive workers because the formal sector has the availability of skilled workers. In this way, the less productive workers do not include in the production function. In the case of $\sigma = 1$, the above production reduces form, known as the Cobb-Douglas production function (Elgin & Sezgin, 2017). However, when unskilled workers have less productivity, they are ignored from the formal sector. Resultantly, less productive workers move to the informal sector and earn money to survive because they don't have other options.

However, the money obtained from penalties is used to bribes to government officials and partially to finance the regulatory mechanism of government but not used for public services. An informal agent has fractional access to government services due to their illegal status. Therefore, for workers that belong to these two sectors, their net tax/penalty income is given by

$$y^F = (1-t)A \left(\frac{G}{Y} \right)^a ki, \quad 0 < t < 1 \quad (4)$$

$$y^I = (1-\pi)A \left(\frac{\delta G}{Y} \right)^a ki, \quad 0 < t < 1 \quad (5)$$

Where t represents tax rate, π represents the penalty rate, δ is the fraction of public services available to informal agents, F and I represent the formal and informal sector, respectively. It depends on workers working in the informal sector and paying penalties and getting fractional access to public services, or works informal sector pay proportional income tax and get full access to public services. The rate of penalty depends on the government enforcement system.

$$\pi = \pi(\lambda, I), \quad 0 < \lambda < 1 \quad \frac{d\pi}{d\lambda} > 0 \quad \frac{d\pi}{dI} > 0 \quad (6)$$

Here λ measure the strength of the government enforcement system. If there is an increase in the enforcement system, there will be a reduced penalty, which means fewer people will think about working in the informal sector because there is more chance of conviction for illegal work, and I measure the relative size of the informal sector. The size of the informal sector depends on the rate of penalty. If there is an increase in the rate of penalty will lead to a decrease in the informal sector and vice versa.

3.8. Informal Economy and Unemployment

This section will discuss the division of labor, either employed or unemployed, and whether there is a structural relationship between informal economy and unemployment through a model derived by [Hall \(1979\)](#).

Consider a closed economy where L shows the total labor force in an economy and assumes that the labor force is constant. Moreover, the labor force is divided into UE (U) and employment (E):

$$L = U + E \quad (7)$$

Equation (7) represents the total labor force divided into unemployed and employed workers in an economy. Here U/L will be the UE rate. Further, there are two concepts of job separation and job finding. The rate of workplace separation is the rate at which a worker leaves a job, and on the other hand, the rate of job determination is the rate at which a worker finds a job ([Dell'Anno & Solomon, 2008](#)).

In addition, at the study state level, the number of workers who lose their job will be equal to the number of workers who find their job and become employed. In the term of mathematics, we can show the equilibrium will be:

$$\begin{aligned} s &= f \\ sE &= fU \end{aligned} \quad (8)$$

Solving equation 7 for E ,

$$E = L - U$$

Substituting the value of E into equation 8,

$$\begin{aligned} fU &= s(L - U) \\ fU &= sL - sU \end{aligned}$$

We will divide the whole equation by L to obtain the UE rate.

$$\begin{aligned} fU &= \frac{sL - sU}{L} \\ fU/L &= s(1 - \frac{U}{L}) \end{aligned}$$

To get U/L to solve the above equation,

$$\begin{aligned} \frac{fU}{L} &= s - \frac{sU}{L} \\ s &= \frac{fU}{L} + \frac{sU}{L} \\ s &= \frac{U}{L} (f + s) \\ \frac{U}{L} &= \frac{s}{(f+s)} \end{aligned} \quad (9)$$

However, equation (9) represents that a higher job separation rate (s) will lead to an increase in the unemployment rate because these two are positively related to each other while a higher job-finding rate (f) will lead to a decrease in the rate of unemployment. The fundamental purpose of the above equation is to derive the relationship between the shadow economy and unemployment. Therefore, the above derivation

reveals a positive relationship between the shadow economy and the unemployment rate. The above equation shows an exciting channel of how the job separation rate affects the shadow economy size. When more workers lose their job in the formal sector, the unemployment rate leads to an increase in the size of the shadow economy.

3.9. Econometric Model

The following econometric model is used for the estimation:

$$LSE_t = \beta_0 + \beta_1 UE_t + \beta_2 II_t + \beta_3 GI_t + \beta_4 TO_t + \beta_5 LGDP_t + \mu_t \quad (10)$$

Where SE_t represents the log of the shadow economy, UE_t represents unemployment rate, II_t represents the institutional index, GI_t represents the Gini Index, TO_t represents the trade openness that is equal to share of export plus a share of import, $LGDP_t$ represents the log of GDP per capita, and μ_t represents the error term

4. DATA

This research study examines Pakistan and other countries in the subcontinent (including India, Sri Lank, Bangladesh). This study collects data from different sources. This study is not dealing with the estimation of underground economic activities. However, this study takes the underground economy data from [Medina and Schneider \(2018\)](#). Furthermore, unemployment, trade openness (share of export plus import), the Growth rate of Gross Domestic Product per capita (GDP), and inflation are downloaded from World Development Indicators while institutional quality indicators including voice and accountability, the rule of law, government effectiveness, control of corruption, and regulatory quality collected from the World Governance Indicators. The econometric techniques depend upon the behavior of variables. In this study, the variables are mixed order of integrated so that the auto-regressive technique is used for empirical analysis.

The market-based legal production of goods and services that is deliberately withheld from public authorities for the following purposes constitutes the shadow economy:

- to stop paying wages, value-added, or other taxes,
- to stop having to pay into the social security system,
- to avoid following a formal labor market requirement and to complete such administrative tasks, such as filling out organizational forms.

Institution Quality is a broad concept. There are different indicators to measure the institution's quality, like the rule of law, government effectiveness, and protection of individual rights. For development, institution quality is the most critical variable because institution quality and economic development reinforce each other in the longer term. We use the governance index as a proxy for institutional quality when assessing institution quality. This study makes the index of six governance indicators for institutional quality as follows:

Voice and accountability: a review of the political process and democratic rights.

Government effectiveness: measuring the government's ability to develop and execute politics successfully. Government effectiveness refers to the government's ability to develop and enforce successful policies that benefit the public good.

Political stability: this indicator tests perception of the probability of destabilizing the government.

Regulatory quality: this measure focuses more on regulations, such as the effect of business policies and perception of the burden imposed by excessive regulation.

Rule of law: There are different indicators to measure the agent's confidence level, but one of the most important indicators is the rule of law. Therefore, this indicator measures how far society has progressed in establishing an ecosystem where blameless and predictable laws govern economic and social interactions.

Control of corruption: The power to control corruption is a public power used for private gain.

All scores estimated by the word governance indicator lie between -2.5 to 2.5. Therefore, a higher score means that institutions are working well and vice versa.

The unemployment rate is calculated by dividing the number of unemployed people by the total number of people in the labor force. The labor force also includes the number of employed people and the number of unemployed people. Therefore, both employment and unemployment are important to calculate the unemployment rate. All workers of working age who are unemployed during the reference time are counted as unemployed. For example, if a worker can work and is willing to work and doesn't get any paid employment in the reference period, they are included in the unemployed labor force.

The Gini index measures the income distribution across a population. The Gini coefficient in 1992 by Corrado Gini, an Italian statistician. This index may also verify the income or wealth distribution within a population. The coefficient ranges from 0 to 1, with perfect equality as 0 and perfect inequality as 1.

Small countries are involved more in trade than large countries. Countries located away from large markets usually have lower export shares. Factors that determine the trade volume are population, culture, geography, and trade policy in a country. Furthermore, trade openness is a complicated term that requires the country's trade policy orientation and a collection of domestic policies that make the country outward-oriented (Huchet et al., 2018). Trade openness is measured through the share of export to GDP plus a share of import to GDP. If there will be an increase in the share of export plus a share of import to GDP, we can say that trade openness is increasing and vice versa

GDP is a metric that calculates the total value of all goods and services produced in a country over a specified time. Furthermore, the GDP is an important indicator of economic growth. This report looked into the relationship between the size of the shadow economy and GDP per capita growth. Inflation is a quantitative measure of the rate at which the overall average price level of goods and services increases over a specific time. This study uses the annual inflation rate for empirical analysis.

5. RESULTS AND DISCUSSION

Table 1 shows the descriptive statistics for the time series analysis in the case of Pakistan. The second column of Table 1 shows the shadow economy descriptive analysis. The mean value of SE is 28.3815; the median is 28.24, the maximum value is 41.37, and the minimum value is 19.27. The standard deviation value 6.2269 shows the variation in the data from the mean value. Furthermore, the value of skewness should be zero for the normal skewness. Therefore, the skewness value is 0.2732, which shows that the shadow economy mirrors normal skewness.

Moreover, data is normally distributed informal economy the value of Kurtosis will be 3. In this case, the value of Kurtosis 2.25 is less than three. Therefore, we can say that data is platykurtic, meaning that more values are less than the mean value. The Jarque-Bera test also shows the normality of data. In the case of the shadow economy, the value of Jarque-Bera is greater than the probability value, which means that data is normally distributive. However, we can explain all the other variables as we have done for the shadow economy.

Table 1: Descriptive Statistics

	Shadow Economy	Unemployment Rate	Trade Openness	Gini Index	Gross Domestic Product	Institutional Index
Mean	28.3815	6.4250	32.9728	30.0100	2.8733	-0.7788
Median	28.2450	6.0000	32.8922	31.4000	2.8785	-0.7892
Maximum	41.3700	8.3000	38.3301	34.4000	3.1324	-0.6899
Minimum	19.2700	5.2000	27.6546	2.5000	2.6573	-0.8631
Std. Dev.	6.2269	1.0602	2.7230	6.6284	0.1732	0.0545
Skewness	0.2732	0.7084	0.0380	-3.8188	0.0776	0.1412
Kurtosis	2.2558	1.9436	2.6839	16.4593	1.3879	1.6545
Jarque-Bera	0.7103	2.6027	1.0880	199.5742	2.1858	1.5749
Probability	0.7010	0.2721	0.9569	0.0000	0.3352	0.4549
Observation	20	20	20	20	20	20

4.1. Lag length Selection

In Table 2, there are different methods to select the lag length selection criteria, but AIC and SC are most preferable. FPE, AIC, SC, and HQ all suggest two lags. Therefore, we include two lags indicated by lag length selection criteria.

Table 2: Different Methods to the Lag selectionw

Lag	AIC	SC
0	2.9244	3.2227
1	0.3569	2.4447
2	7.8347*	3.9576*

4.2. Bond Test

Table 3: F statistic for the Bond-test

Computed F-statistic 14.0785		
Critical bound	Lower bound	Upper bound
Critical bound value 5 percent	2.39	3.38

The long-run relationship in the model is extremely sensitive to the lag-length choice (Bahmani-Oskooee & Bohal, 2000). The computed F-statistics are presented in Table 3 to determine whether long-run co-integration exists. As a result, at 5%, the lower and upper bound values are 2.39 and 3.38, respectively. Table 3 shows that the estimated value of F-statistics indicates the existence of a long-term relationship. As a result, we can conclude that F-statistics support the long-run relationship between variables.

4.3. ARDL Long Run Results

Table 4 shows the long-run association between dependent and independent variables. In this study, the dependent variable is the Shadow Economy (SE), and independent variables are unemployment (UN), Institutional Index (II), Gini Index (GI), Trade Openness (TO), and GDP per capita (LGDP). On the other hand, unemployment is inversely proportional to the scale of the informal economy. This assumes that as unemployment grows, the scale of the informal economy will grow as well, and vice versa. This positive relationship demonstrates that a change in the unemployment rate causes a job loop in the Shadow Economy (SE), which acts as an automatic stabilizer. The empirical result indicates that a 1% rise in unemployment leads to a 0.2426 increase in the size of the informal economy, which corresponds to the findings of a previous study by Adriana (2014). However, there are many reasons behind the positive link between

unemployment and the Informal Economy (IE) size. Some of the reasons are low employment opportunities, slow process appointments, the mismatch between actual and demanded labor force because the rate of employment creation is lower than the population rate, and lack of proper planning to improve the employment generation process.

Table 4: ARDL Long Run Results (The dependent variable is shadow economy)

Regression	Coefficient	Standard Error	t-Value
UN	0.2426	0.0503	4.8234
II	3.2480	1.1726	2.7697
GI	-1.1337	0.0366	-3.6492
TO	-0.0375	0.0125	-2.9836
LGDP	1.0124	0.3537	2.8619

$R^2 = 0.9739$, Adjusted- $R^2 = 0.9507$, DW = 2.8127, F-Statistics = 8.25

Furthermore, current research indicates that institutional efficiency and the scale of the informal economy have a negative relationship. As a result, differing from established literature, this study shows a positive relationship between institutional efficiency and the size of the informal economy, which is a novel finding in the literature. There are many reasons behind the positive relationship in the case of Pakistan. However, the most important reasons are: low level of institutional infrastructure development, complex regulations, and institutional formalities, rise in literacy rate, less priority by government to the institutional sector, strong informal economy, ineffective policies mean that on one side government wants to increase tax filer and on the other side increases tax rate, and lack of proper planning to improve institutional quality means that when the government wants to improve institutional quality, it focuses on one indicator and ignores all other indicators. Furthermore, current literature supports the assertion that a higher level of education combined with poor institutions extends the shadow economy (Buehn & Farzanegan, 2013). The informal economy's option is driven by the increased regulatory burden and registration costs (Loayza et al., 2005).

Furthermore, a lack of institutional infrastructure contributes to the growth of the shadow economy. Pakistan has a low level of institutional infrastructure development so that the elected government increases voice and accountability and controls corruption progress. Resultantly, corruption is increasing because of the low level of institutional infrastructure. According to the Corruption Perception Index (2019), Pakistan got 32 points and ranked 120 in 180 countries.

Openness to trade is measured precisely by the share of exports plus imports to GDP. Therefore, trade is a good thing for the consumer because, after an increase in trade openness, consumers have more options to buy commodities with different levels of prices. Trade openness and complementary policy reforms decrease corruption (Majeed, 2014). However, some studies show a positive effect of trade on corruption. The absence of trade increases rents and provides more opportunities for corruption. But in this situation should avoid corruption because it's good for society and an increase in voice and accountability (Ades & Di Tella, 1999).

Furthermore, trade liberalization increases the opportunities for corruption, while extensive trade liberalization leads to a decrease in opportunities for corruption. However, data shows that trade openness declined from 30.9 to 27.6 between 2014 and 2015, while the scale of the shadow economy grew from 24.2 to 30.1. Finally, empirical findings indicate that, in the case of Pakistan, trade openness hurts the scale of the shadow economy. One of the literature's most important and complicated problems has been assessing the relationship between IE and GDP in recent decades.

The correlation between the informal sector and official growth can be positive and negative (Lv, 2020). the negative association of the informal economy with economic growth comes from unfair market competition. Informal activities create unfair competition and interfere negatively with market allocation,

and this inefficient allocation slows down economic growth. In addition, a positive GDP shock has a statistically significant positive effect on the scale of the shadow economy. In Pakistan's economy, however, GDP is positively related to the size of the shadow economy. Therefore, Pakistan is a developing country, and Pakistan's economy is a growing economy. When there is an increase in people's per capita income, they have opportunities to invest in the ever-increasing economy.

4.4. Panel Data Estimation

This test was used to select panel data models between fixed effect and random effect models. Therefore, the Hausman test has the Null hypothesis and the alternative hypothesis. The Null hypothesis is that the Random effect model is appropriate for panel estimation. At the same time, the alternative hypothesis suggests that the fixed effect model is best for panel regression. The Hausman test's probability value is less than 0.05, which rejects the Null hypothesis and accepts an alternative hypothesis that shows that the fixed effect model is best for panel estimation.

Table 5: Results of Fixed Effect Model

Variables	Coefficient	Standard E	P-value
Constant	1.4728	.0481	0.000
UN	.3533	.0677	0.000
II	.1652	.0579	0.006
TO	-.0038	.0006	0.000
Inflation	.0024	.0016	0.143
Within R-square		0.4992	
F-statistic		184.36 (0.0000)	

In the case of panel data analysis, the dependent variable is shadow economy, while the independent variables are UN, II, TO, and inflation. The result shows that unemployment is positively related to the size of the shadow economy. One percent increase in the unemployment rate will lead to an increase of 1.4728 in the size of the shadow economy. Therefore, unemployment is positively and significantly related to the size of the shadow economy. Furthermore, the institutional index is positively associated with the size of the shadow economy means that an increase in the size of the institutional quality will lead to an increase in the size of the shadow economy. In the subcontinent, the situation is similar as we have seen in the case of Pakistan. However, this is a novelty in the existing literature.

Furthermore, trade openness is negatively related to the size of the shadow economy. Therefore, the results are similar as we have seen in the case of Pakistan. The reason behind the similar results both in Pakistan and in the case of the Subcontinent is the existence of similar situations all over the subcontinent.

6. CONCLUSION AND POLICY IMPLICATIONS

The underground economy (UE) offers an atmosphere where economic agents can avoid government restrictions and inspection. As a result, a massive underground economy (UE) has severe consequences. As a result, this research aims to see how institutional efficiency relates to the Underground Economy (UE) scale. The main aim of this model is to inform policymakers about how the scale of the shadow economy is influenced by institutional efficiency (SE). This study's research question is whether or not institutional efficiency affects the scale of the Underground Economy (UE).

The findings of this study, which looked at the relationship between unemployment and the underground economy (UE), show that unemployment is positively associated with the scale of the underground economy (IE). However, this result is consistent with the existing literature. A high degree of unemployment enables individuals to express their interests to participate in the underground economy.

However, there are many reasons behind the positive link between unemployment and the size of the underground economy (IE). Some of the reasons are low employment opportunities, slow process appointments, the mismatch between actual and demanded labor force because the rate of employment creation is lower than the population rate, and lack of proper planning to improve the employment generation process. Therefore, to reduce the size of the shadow economy, the government should enhance the job creation process and try to minimize the mismatch between the actual and demanded labor force by controlling the population rate. Alongside the government, the private sector should play an essential role in reducing the size of the underground economy by getting themselves registered with revenue collection authority and generating employment for workers as much as they can cause. Through this collective effort, the size of the underground economy may reduce over time.

Acknowledgment

The authors acknowledge the comments made by the reviewers and members of the editorial board on the earlier version of this manuscript.

Funding Source:

The author(s) received no specific funding for this work.

Conflict of Interests:

The authors have declared that no competing interests exist.

REFERENCES

- Ades, A., & Di Tella, R. (1999). Rents, competition, and corruption. *American Economic Review*, 89(4), 982-993.
- Adriana, D. (2014). Revisiting the relationship between unemployment rates and the shadow economy. A Toda-Yamamoto approach for the case of Romania. *Procedia Economics and Finance*, 10, 227-236.
- Ali, A., & Hussain, A. (2021). How Does Institutional Quality Relate to the Size of the Informal Economy in the Case of Pakistan?
- Ali, M., Kiani, A. K., & Raza, K. (2021). Impact Evaluation of Agriculture Technology Adoption: A Primary Data Analysis. *Pakistan Journal of Humanities and Social Sciences*, 9(3), 328-339.
- Atesagaoglu, O. E., Elgin, C., & Oztunali, O. (2017). TFP growth in Turkey revisited: The effect of the informal sector. *Central Bank Review*, 17(1), 11-17.
- Bahmani-Oskooee, M., & Bohl, M. T. (2000). German monetary unification and the stability of the German M3 money demand function. *Economics Letters*, 66(2), 203-208.
- Bajada, C. (2002). How Reliable are the Estimates of the Underground Economy? *Economics Bulletin*, 3(14), 1-11.
- Bajada, C., & Schneider, F. (2005). The shadow economies of the Asia-Pacific. *Pacific Economic Review*, 10(3), 379-401.
- Bental, B., Ben-Zion, U., & Wenig, A. (1985). *Macroeconomic Policy and the Shadow Economy. The Economics of the SE* (179-193).
- Bodla, M. A., & Afza, T. (1997). Status and prospects of the informal sector of Pakistan. *Pakistan Economic and Social Review*, 153-182.
- Buehn, A., & Farzanegan, M. R. (2013). Impact of education on the shadow economy: Institutions matter. *Economics Bulletin*, 33(3), 2052-2063.
- Byiers, B., Krätke, F., Jayawardena, P., Rodriguez Takeuchi, L., & Wijesinha, A. (2015). Manufacturing progress? Employment creation in Sri Lanka. Overseas Development Institute Case Study Report: Employment. <https://www.ODI.org/publications/9313-manufacturing-progress-employment-creation-Sri-Lanka>.

- Castells, M., & Portes, A. (1989). World underneath: The origins, dynamics, and effects of the informal economy. *The informal economy: Studies in advanced and less developed countries*, 12.
- Dell'Anno, R., & Solomon, O. H. (2008). Shadow economy and unemployment rate in the USA: Is there a structural relationship? An empirical analysis. *Applied Economics*, 40(19), 2537-2555.
- Elgin, C., & Sezgin, M. B. (2017). Sectoral estimates of informality: A new method and application for the Turkish economy. *The Developing Economies*, 55(4), 261-289.
- Giles, D. E., Tedds, L. M., & Werkneh, G. (2002). The Canadian underground and measured economies: Granger causality results. *Applied Economics*, 34(18), 2347-2352.
- Hall, R. E. (1979). A theory of the natural unemployment rate and the duration of employment. *Journal of Monetary Economics*, 5(2), 153-169.
- Huchet-Bourdon, M., Le Mouël, C., & Vijil, M. (2018). The relationship between trade openness and economic growth: Some new insights on the openness measurement issue. *The World Economy*, 41(1), 59-76.
- Loayza, N. V., Oviedo, A. M., & Servén, L. (2005). The Impact of Regulation on Growth and Informality-Cross-Country Evidence, *The World Bank*, 1(1).
- Lv, Z. (2020). Does tourism affect the informal sector? *Annals of Tourism Research*, 80(C), 102816.
- Majeed, M. T. (2014). Corruption and trade. *Journal of Economic Integration*, 759-782.
- Maloney, W. F. (2004). Informality revisited. *World Development*, 32(7), 1159-1178.
- Medina, L., & Schneider, M. F. (2018). *Shadow Economies around the World: What did we Learn over the Last 20 Years?* International Monetary Fund.
- Mughal, K., Schneider, F. (2018). *Shadow Economy in Pakistan: Its Size and Interaction with Official Economy*. MPRA paper no 87087. <https://mpra.ub.uni-muenchen.de/87087/>
- Muqtada, M. (2003). *Macroeconomic Stability, Growth and Employment: Issues and Considerations beyond the Washington Consensus* (No. 48). International Labour Office. https://www.ilo.org/employment/Whatwedo/Publications/WCMS_142397/lang--en/index.htm
- Rostow, W. W. 1960. The five stages of growth: A summary. *The stages of economic growth: A non-communist manifesto*. pp. 4-16. Cambridge, Massachusetts: Cambridge University Press.
- Saracoglu, S. (2015). The linkages between formal and informal sectors: A segmented labor markets analysis (Preliminary version; comments welcome).
- Schneider, F. (2005). Shadow economies around the world: what do we really know? *European Journal of Political Economy*, 21(3), 598-642.
- Schneider, F., & Enste, D. (2000). Shadow Economies: Size, Causes, and Consequences, *Journal of Economic Literature*. 38, 77-114.
- Schneider, F., & Klinglmaier, R. (2004). *Shadow Economies around the World: What do we Know?* Center for economic studies and Ifo Institute for economic research (no. 1167).
- Tran, T. K. P. (2021). Unemployment and shadow economy in ASEAN countries. *The Journal of Asian Finance, Economics, and Business*, 8(11), 41-46.