# **CHAPTER 2: REVIEW OF LITERATURE**

## **Theoretical Framework**

Among the various ideas put forward by modern economic thought, monetary policy can be held as one that lowers the instability of economies by checking inflation and mitigating output variability, together with promoting financial stability. Classical models of monetary policy, represented by the Taylor Rule (Taylor, 1993), recommend interest rate adjustments following inflation and output deviations from their targets.

Basically, they assume that economic activities are a part of the formal economy, where monetary transmission mechanisms—mainly interest rates and credit channels and institutions—function properly. But, however, in most of the developing economies, including the economy of Nepal, a larger part of economic activities is affected in the informal sector, and thus conventional instruments of monetary policy aren't effective. It is believed within the classical school of monetary policy that, in square with the Quantity Theory of Money (Friedman, 1968), it merely means that increases in the money supply affect only nominal variables like inflation but not real ones in the long run—output or employment.

Keynesian economics deals with the effect of short-run monetary actions and holds that monetary policy affects aggregate demand, output, employment due to its influence on prices and wage rigidities (Keynes, 1936).

The above two classical approaches explain the basics of monetary policy, although they do not fully capture the complexities of an economy that has a larger informal sector. These ideas are based on the New Keynesian model; it incorporates market imperfectness, price stickiness, and rational expectations within it. It emphasizes the role of the central bank in stabilization against economic fluctuations (Clarida, Galí, & Gertler, 1999). The methodology tends to be an application of Dynamic Stochastic General Equilibrium (DSGE) models in analysing the effectiveness of monetary policy based on an assumption of high integration in formal finance and labour systems. Such models completely lose relevance in economies such as Nepal's, wherein most of the workforce works within the informal economy, as it weakens the monetary policy channel through its mechanism of interest rates and credit.

Monetary policy loses traction in large informal sector economies, more so where transactions are predominantly cash-based and there prevails an unregulated labour system that is not responsive to normal monetary tools. In the view of Loayza and Rigolini (2011), the lack of a formal financial linkage between formal and informal economies means that policy-based on interest rates is not effective.

The informal sector normally observes large amounts of employment during economic downswings, acting as a buffer against formal unemployment and, therefore, secondly undermining monetary policies that are used to stabilize an economy further.

This paper has adopted the optimal control theory Hamilton-Jacobi-Bellman (HJB) equation to make it face the toughest problems and derive the most of monetary policy in a dual labour market, for instance, in Nepal. Dynamic programming approaches by optimal control theory make it feasible to adjust intertemporality under uncertainty and more dynamic approach of policy design. Unlike static models of policy, the optimal control theory could adjust to changes in the economy, hence being in a position to allow monetary intervention that could respond to new information and structural composition. Optimal control theory will thus provide the principles for designing monetary policy rules in economies that have large informal sectors that stabilize inflation and output while considering dynamics in the informal sector.

According to Ospina (2021), inflation targeting and interest-rate policies are less effective in economies having huge informal sector-like structures. The other policy tools, such as monetary aggregate targeting or direct provision of liquidity to informal enterprises, could in fact help strengthen policy transmission, which under normal circumstances is weakened by informality (Agenor, 2020). The alternative strategies take into account the structural aspects of informality, seeking to involve both formal and informal economic agents in the design of appropriate policy for superior general policy performance.

In other words, the extent of the effectiveness of monetary policy in large informal economies would depend on how policymakers have integrated the dynamics of the informal sector. Monetary models that are classic neither capture this complexity in informality nor can they, therefore, work out data-driven policy responses adaptive through optimal control models. By blending theory and empirical research, the central banks' monetary policies are made more accurate to enhance macroeconomic stability and, at the same time, effectively address special challenges in informality.

## **Literature Review**

Monetary policy is a potent instrument for regulating inflation, production, and employment levels. Traditional theories, such as the Taylor Rule (Taylor, 1993), advocate for adjusting interest rates based on the extent of deviation in inflation and output from their target levels. These models presume that the economy operates seamlessly, with credit channels, bank lending, and interest rates functioning as designed. Numerous emerging nations, such as Nepal, exhibit significant economic activity inside the informal sector. This diminishes the efficacy of traditional monetary management techniques, as unauthorized activities typically evade formal financial institutions.

The classical viewpoint presented by the Quantity Theory of Money (Friedman, 1968) posits that alterations in the money supply primarily influence nominal variables, such as inflation, while real variables, including production and employment, remain constant over time. The comprehension of the correlation between money supply and inflation has largely relied on this hypothesis. Conversely, because to price and wage rigidity, Keynesian theory posits that monetary policy can substantially affect short-term aggregate demand, output, and employment (Keynes, 1936). While both models offer valuable insights, they are inadequate in economies characterized by substantial informal sectors, where conventional policy transmission mechanisms are less successful. Informal activities frequently depend on cash transactions and function outside conventional financial institutions, rendering tools such as credit accessibility and interest rate adjustments less effective (Loayza & Rigolini, 2011).

The New Keynesian framework highlights the central bank's function in stabilizing economic fluctuations through policy interventions, incorporating concepts such as market imperfections, price rigidity, and rational expectations (Clarida, Galí, & Gertler, 1999). Nonetheless, these models are often designed for economies with sophisticated labour and financial markets. In nations such as Nepal, where the informal sector is prevalent, these concepts are inadequate in addressing the challenges posed by informality. The informal sector, characterized by unregulated labour and financial transactions, frequently functions outside the formal banking system and is less susceptible to conventional monetary instruments such as interest rate fluctuations (Schneider & Enste, 2013). Consequently, traditional monetary policy instruments typically exhibit restricted efficacy in these situations.

Empirical research indicates that the implementation of monetary policy is impeded in the informal economy. Loayza (1996) posits that the informal economy accommodates labour that the formal sector is unable to provide in nations characterized by substantial informal sectors, hence serving as a buffer during economic downturns. This buffering effect, while offering stability, diminishes the efficacy of monetary policy, especially in managing inflation and stabilizing output. In these countries, central bank policies, such as alterations in interest rates, typically exert minimal influence on the informal sector, which generally does not participate in conventional credit markets (Medina & Schneider, 2018).

In light of these issues, optimal control theory provides a superior framework for formulating monetary policy in nations characterized by substantial informal sectors. Dynamic control models, particularly those employing the Hamilton-Jacobi-Bellman (HJB) equation, assist lawmakers in optimizing monetary policy decisions over time, taking into account the unpredictability and structural intricacies of an economy with a substantial informal sector (Caputo, 2005). Gomez Ospina (2021) employs optimal control theory to formulate a flexible financial strategy that considers the dynamics of the informal sector. This methodology enables legislators to adjust to fluctuations in the size and dynamics of the informal sector over time by integrating intertemporal decision-making with adaptive learning, therefore surpassing rigid legislative frameworks.

This study employs numerous key variables to evaluate the efficacy of monetary policy in light of the substantial informal sector in Nepal. These elements are selected for their significance in both the formal and informal sectors, as well as their impact on economic results.

The interest rate, a fundamental element of monetary policy, affects borrowing, investment, consumption, and the expenses associated with borrowing. The significance of its role in disseminating monetary policy is emphasized by Taylor (1993) and Clarida et al. (1999). The Nepal central bank adjusts interest rates to regulate inflation and economic activity. Schneider & Enste (2013) assert that economies with substantial informal sectors derive diminished advantages from interest rate fluctuations, as informal activities exhibit reduced responsiveness to alterations in the formal financial system.

A primary objective of monetary policy is the regulation of inflation. As emphasized by Mishkin (2015) and Taylor (1995), central banks employ inflation targeting to inform their decision-making processes. In Nepal, managing inflation is essential for economic stability, particularly as the informal sector, dependent on cash transactions, can exacerbate inflationary pressures in ways that conventional policy tools struggle to mitigate.

The output gap quantifies the disparity between actual and potential output, so demonstrating whether the economy operates at or beneath its capacity. Taylor (1995) posits that it serves as a crucial indicator for central banks altering their monetary policy stance. The informal sector's capacity to absorb labour during recessions renders the output gap crucial in Nepal for assessing the need for economic stimulus or moderation.

The ratio of currency in circulation to M1 acts as an indicator of the informal sector's size. It indicates the extent of economic activity occurring outside the conventional financial system. Medina and Schneider (2018) assert that unregulated economic activity characterized by cash transactions and insufficient oversight diminishes the efficacy of conventional monetary instruments. This ratio assesses Nepal's level of informality and its impact on the economy's response to monetary policies.

The analysis employs dummy variables for the 2045 BS (1986 AD) and 2072 BS (2015 AD) earthquakes to account for external shocks that substantially impact Nepal's economy. These catastrophic disasters damaged infrastructure, employment, and production, hence causing supply-side shocks that affected inflation, output, and the effectiveness of monetary policy. Cunningham (2008) and Agenor (2020) assert that such shocks may disrupt conventional monetary policy transmission channels, making it essential to account for these occurrences when evaluating policy efficacy.

The existence of a substantial informal sector in Nepal presents various challenges for financial policy. In such circumstances, traditional tools such as inflation targeting and interest rate adjustments demonstrate diminished efficacy, as informal activities frequently extend beyond official financial objectives.

## **Research Gap**

Although existing literature provides extensive theoretical frameworks for understanding the challenges presented by informal economy to monetary policy, there is a significant lack of empirical evidence regarding its optimization. Much of the research in this area, including the work by Schneider & Enste (2013) and Medina & Schneider (2018), focuses on the theoretical relationship between the informal economy and economic stability, but it doesn’t offer empirical models that can help policymakers on the real-world implications of these dynamics.

The studies in this area rely on simulation models and theoretical frameworks like the New Keynesian model or Dynamic Stochastic General Equilibrium (DSGE) models. While these models provide valuable insights into the relationship between monetary policy and economic variables, they often fail to incorporate real-world data to estimate key relationships that affect policy decisions. For instance, Loayza (1996) and Ospina (2021) have highlighted the challenges posed by the informal sector, but they do not offer empirical models that assess how the informal economy impacts inflation, output, or the transmission of monetary policy in practice.

A key gap in the literature is the absence of empirical studies that use real data to model the relationships between the informal sector and the central bank’s monetary policy tools, such as interest rates and money supply. In Nepal, for example, Adhikari & Raut (2024) have estimated the size of the informal economy, but there has been limited research on how this sector interacts with inflation and output in the context of the country’s monetary policy. Most studies fail to integrate empirical data with dynamic modelling approaches that could inform the optimization of monetary policy.

This study aims to fill this gap by using empirical data from 1975 to 2020 to estimate the Phillips curve through the regression model. The ARDL model is particularly well-suited for this purpose, as it allows for the estimation of both long-run and short-run relationships between inflation, output, and monetary policy in Nepal. Through this approach, the study will provide empirical evidence on how inflation and output are related, both in the presence of a formal sector and in light of the informal sector’s role in the economy.

In contrast to previous studies that rely on theoretical models and simulations, this research will use empirical evidence and simulate the optimal monetary policy path for Nepal. By deriving optimal monetary policy rules based on real data, the study will offer practical insights into how the Nepal Rastra Bank can adjust its interest rates and money supply to stabilize inflation and output while accounting for the informal sector's influence.

## **Summary of Review**

Data from the literature indicates that the informal economy acts as a buffer for the economy and an employer when the formal sector fails to do so. This lowers the rates of unemployment, but the transmission of monetary policy is curtailed. Informal activities are not very responsive to changes in interest rates, like the formal sector, so it becomes quite difficult for a central bank to bring about price stability or sustain economic growth.

Moreover, some research has indicated that inflation targeting or interest rate-based policies may not give effective results in economies with a large informal sector. This paves the way for other strategies in such contexts, including targeting monetary aggregates and providing direct liquidity via interventions targeted at informal enterprises that have been recommended to work as a remedy.

The relationship between informality and effectiveness of monetary policy in the informal economy has exhibited very pertinent impact to the policy outcome. The majority of traditional modelling approaches on monetary policy do not explicitly account for the dynamics that could be engendered by a large informal sector. This forms an empirical gap in the existing literature on the ways through which central banks can optimize their strategies for those environments.