

# The Synchronization or Duality of the Business and Financial Cycles in Small Dependent Economies: Empirical Lessons from Lesotho

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**Abstract:** The aim of this paper is to identify the synchronization between business and financial cycles in Lesotho. When business and financial cycles are in sync, monetary policy and macro-prudential policy conduct are complementary; however, when the cycles are out of sync, the two policies conflict. This study investigates the synchronization between business and financial cycles. Therefore, this study seeks to address the key research question: Are business and financial cycles synchronized in Lesotho? Real GDP growth rates and credit-to-GDP gaps are employed to extract business and financial cycles, respectively. The data engaged spans from 1976 to 2019, and in an effort to estimate the synchronization level, the concordance index was employed. The findings suggest that business and financial cycles in Lesotho are not synchronized consequently; the key recommendation is that the Central Bank of Lesotho should adopt macro-prudential policy to reinforce application of monetary policy. The Financial Stability Committee should be established within the Central Bank of Lesotho, which complements the Monetary Policy Committee by focusing on financial stability while preserving the independence of monetary policy in maintaining price stability.

**Keywords:** Business Cycles, Financial Cycles, Synchronization, Concordance Index

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## 1. Introduction

Financial crises affect all economies – small and large – regardless of their income levels or poverty profiles. Even though they do not discriminate between countries, their scale of impact and causes differ from country to country. Regardless of the anatomy of a crisis, the literature identifies the following common features: galloping and unsustainable asset prices, excessive credit booms or unsustainable debt burdens, systemic risk build-up, and constant chase, where regulation and supervision always lag behind financial innovation (Calomiris, 2009; Gorton, 2009; and Claessens et al., 2012). Unlike other crises, the global financial crisis (GFC) has generated interest among researchers to investigate the nexus between financial and business cycles. This interest stems from the fact that, prior to the GFC, central banks believed that interest rates were an effective instrument for achieving both monetary and financial stability. However, this belief was challenged by the GFC, which is suspected to be partly a consequence of an overly accommodative monetary policy that fueled excessive credit growth and private sector over-indebtedness. Consequently, there is a need to understand the relationship between business and financial cycles.

On the one hand, prior to the GFC, the literature on business cycle analysis was already vast and could be traced back to the pioneering work of Burns and Mitchell (1946). In contrast, research on the anatomy of the financial cycle and its relationship with the business cycle remain scarce. However, the interaction between the financial and real sectors has become important in the post-GFC era. This trend was driven by the realization that interest rates are not a universal tool in the stabilization of both the financial and real sectors of the economy. Trichet (2010) highlighted the limitation of monetary policy during the global financial crisis by pointing out that conventional tools lost their effectiveness in the policy transmission mechanism during the crisis. This observation suggests that even though monetary policy may be an effective tool for attaining monetary stability, it tends to be a blunt instrument for achieving financial stability. Therefore, a different set of policy toolkits is necessary to complement monetary policy in order to achieve both monetary and financial stability.

With full recognition of the need for an additional policy toolkit to complement orthodox monetary policy tools, the Central Bank of Lesotho decided to establish a financial stability unit in 2014. Among other functions, this unit is responsible for carrying out financial stability surveillance with a view to recommending appropriate policy action (Central Bank of Lesotho, 2016). However, no study has been undertaken to establish the empirical relationship between the financial and business cycles in Lesotho to determine the suitability of macro-prudential policy. This study seeks to fill this research lacuna by investigating the following question: Are the business and financial cycles synchronized in Lesotho? This question is important because if the two cycles are synchronized, monetary policy tools may be sufficient to achieve the dual objective of monetary and financial stability. However, if there are episodes of divergence between the two –

cycle duality, it would underscore the need for a macroprudential policy for complementary purposes.

## **2. Literature Review**

### **2.1 The definition of key concepts**

#### **2.1.1 Understanding the business Cycles**

The business cycle can be explained as fluctuations in macroeconomic variables along a long-term growth trend; these fluctuations do not necessarily follow a cyclical pattern or trend. Lucas (1981) proposed that aggregate economic variables tend to exhibit periodic fluctuations along their long-term growth trends. Studies of business cycles can be traced back to the early nineties; Burns and Mitchell (1946) are credited for pioneering the study of economic fluctuations. They defined business cycles as fluctuations in aggregate economic activity; a cycle should consist of an expansion followed by contraction and revivals that merge into the expansion phase of the next cycle. They further argued that the duration of business cycles varied from one to ten or twelve years. However, the duration of modern business cycles may vary depending on the classification of the economy, that is, whether it is a developed, emerging, or developing economy.

Esping (2017) explains that at the beginning of the 20th-century, business cycles were regarded as natural and unavoidable. This was a myopic analysis, as it did not consider other key variables, such as government interventions and macroeconomic shocks. Keynes in the 1930s introduced a more robust analysis by arguing that fluctuations in business cycles were a result of fluctuations in aggregate demand; as a result, fiscal policy would be an appropriate tool in confronting recessions. However, in the 1970s, a recession due to oil price shocks was experienced. This defied Keynes' assertion and saw the emergence of real business cycles (RBC), which considered fluctuations to be a result of large cyclically volatile shocks to productivity (King and Rebelo, 2000). The implication of RBC models is that observed aggregate output movements represent the time-varying Pareto optimum (Romer, 2012), thus stabilization policies were unwarranted, thus limiting the RBC model. The New Keynesian model improved on the classical Keynesian analysis by appreciating the rigidity of prices and wages, consequently allowing monetary and fiscal policy engagement in the stabilization of the economy.

A business cycle consists of two clearly identifiable phases: the expansion phase, which gives rise to a peak portraying an economic boom and the contraction phase leading to the trough (lowest point of the cycle), indicating a recession. Nikolaevich (2017) posits that as the economy expands through growth in real terms of indicators of economic growth, such as employment, aggregate demand, and personal income, this is measured from the trough (bottom) of the previous cycle to the peak (upper turning point) of the current cycle. Therefore, a recession was measured from the peak to the trough of the current cycle. During this period, the economy contracts, aggregate demand declines sharply, and unemployment gallops as the economy enters a recession. Caruana

(2012) argued that recessions are a result of unsustainable output growth during the preceding boom and poor allocation of resources during the same period.

### 2.1.2 Understanding the financial Cycles

Many scholars, including Borio (2012), Billio and Petronevich (2017), and Shuler et al. (2015), argue that no consensus on the definition of financial cycles has been reached. Even so, Borio (2012:2) defines the financial cycle as “...self-reinforcing interactions between perceptions of value and risk, attitudes toward risk and financing constraints, which translate into booms followed by busts” Fluctuations in credit, housing prices, and equity are common indicators employed in the financial cycle analysis. Prior 2007/8 business cycle studies were dominant; however, the global financial crisis stimulated renewed interest in financial cycle research. This brought to the forefront the fact that monetary policy and fiscal policy were inadequate tools in addressing calamities in both the real and financial sectors; hence, there is a need to adopt macro-prudential tools to deal with the anomalies in the financial sector, while monetary policy remains focused on its primary mandate of maintaining price stability.

Credit boom-bust has been associated with financial crises, as crises in various periods have been preceded by a bust in credit and house prices. Borio and Drehmann (2009) posit that risks to the financial system build up during financial booms; similarly, Borio (2012) found statistical evidence suggesting that financial booms not only precede busts but also cause them. Aikman et al. (2015) and Laeven and Valencia (2013) support this by postulating that systematic bank crises internationally have been preceded by credit booms, while Mendoza and Terrones (2008) argue that not all credit booms result in financial crises, even though most emerging market crises are associated with credit booms.

Borio (2012) presented five stylized features of the financial cycle. First, the financial cycle is best presented in terms of fluctuations in credit and property prices. This does not exclude other financial indicators as measures; however, the covariation between credit and property prices at low frequencies presents a better advantage over other indicators. A range of other studies have exclusively utilized credit as a measure, including Ramirez (2013) and Aikman et al. (2015). Second, financial cycles tend to have a lower frequency relative to business cycles. Third, financial cycle peaks are mostly associated with banking crises, and Boissay et al. (2013) claim that systematic bank crises occur at the height of credit extension booms. Fourth, it is relatively practical to measure the build-up of possible financial crises with accuracy; the indicators of financial crises are based on the gaps in the credit-to-GDP ratio and property prices from historic norms (Borio and Drehmann (2009)). Finally, the amplitude and length of financial cycles depend on different regimes, and financial liberalization eliminates restrictions on credit availability; hence, the length and amplitude of the cycle will differ from those of the period prior to liberalization.

## **2.2 Measurement of business and financial cycles**

### **2.2.1 The choice of appropriate indicators**

The real GDP growth rate is the single best indicator used to measure business cycles. This is because real GDP encompasses the entire economic activity of the country while accounting for the effects of inflation; hence, its growth rate is indicative of the country's economic growth trajectory. There are several indicators for financial cycles that can be used as measures, including aggregate data on credit volume, credit-to-GDP ratio, assets, and equity price index. Similarly, the Basel Committee on Banking Supervision (2010) argued that the credit-to-GDP ratio has several advantages over other measures and hence recommends it as a proxy for extracting financial cycles. First, the credit-to-GDP ratio tends to increase smoothly above the trend before serious financial system mishaps; as a result, it has the ability to act as a lead indicator of financial system collapse. Second, even though deviations of assets and equity prices from their trend may help in the build-up phase, the deviations tend to narrow ahead of the actual emergence of the crisis. The Committee further argued that the credit-to-GDP ratio is the best performing of all ranges of proxies in extracting financial cycles.

### **2.2.2. Techniques for defining the two cycles**

Three main measurement approaches have gained prominence in the literature on financial and business cycles. These approaches have been used in the analysis of both the financial and real cycles. They are the classical turning point analysis, frequency bandpass filters, and model-based approaches. Spectral analysis is another measurement approach that is not widely used relative to other methods. This subsection presents an overview of these measurement techniques and highlights their key strengths and limitations.

### **2.2.3 Turning Point Analysis**

This measurement method is based on the definition of business cycles by Burns and Mitchell (1946) and focuses on changes in economic activity. A complete cycle consists of an upturn and a downturn, which identifies peaks and troughs in a cycle by identifying the local maxima (peak) and local minima (trough). Bry and Boschan (1971) developed a computerized algorithm for monthly data, which was later modified by Harding and Pagan (2002) to be compatible with quarterly data. A key advantage of using the classical turning point analysis is that the identified turning points are still robust even after the inclusion of new data, while the inclusion of additional data on other methodologies affects the estimated trend; hence, the cycle is also affected (Claessens et al, 2011). Nikolaevich (2017) argues that the principal limitation of this model is that it accounts only for the length of time when growth (contractions) occurs, but ignores the magnitude of such.

#### 2.2.4 Frequency-Based Filters

This approach focuses on the growth cycle of economic variables by decomposing the series into trend and cyclical components. Several filters have been used extensively in the literature, including the Hodrick-Prescott (HP) filter (1997), Christiano-Fitzgerald (CF) (2003), and Baxter-King (BK) (1999) bandpass filters. According to Skare and Stjepanovic (2015), the HP filter minimizes the quadratic form to determine the trend component in a given series. Kucerova (2017) indicates that the advantage of the HP filter lies in its ability to forecast crises a few years earlier by observing the gap between the indicator and its trend. Nevertheless, Skare and Stjepanovic (2015) acknowledge the limitation of HP in producing spurious economic cycles when the data are non-stationary.

The Baxter-King filter eliminates deterministic quadratic trends, thus producing stationary series that are integrated of order two and below. Another important advantage is that the results do not depend on the sample size (Skare & Stjepanovic, 2015). Estrella (2007) advocates that the Christiano-Fitzgerald filter is closely similar to the Baxter-King filter, with the major difference being that the CF is asymptotically ideal such that it approaches the ideal filter as the sample size approaches infinity in any direction. The general limitation of these filters is their reliance on a pre-specified frequency level, which poses a risk of obtaining spurious cycles (Runstler and Vlekke (2016)).

#### 2.2.5 Model-based Approach

Another measurement approach in financial cycles is the unobserved component time series model, which was developed by Harvey (1989). This approach requires the application of the Kalman filter to unobserved components to extract cycles through the decomposition of a series into a long-term trend and a short- or medium-term cycle. Galati et al. (2016) indicated several advantages of this approach over turning points and bandpass filters. First, it does not impose ad hoc parameters on the filter; rather, the parameters are derived by estimating an unobserved component model with a maximum likelihood method. Second, because the filter is based on the model, it provides the opportunity for diagnostic testing of the fit and validity, thus improving the accuracy of the estimates. Third, it does not require predetermined frequency bands but rather estimates the frequency, and it can handle non-normal data with ease, which is essential in dealing with financial data. Thompson and van Vuuren (2016) noted a major limitation of the Kalman filter as the requirement of a considerable number of data points to distinguish the coherent pattern from the noisy signal.

#### 2.2.3 Spectral Analysis

Spectral analysis is another approach for measuring financial and business cycles. Scharnagl and Mandler (2015) posit that spectral analysis decomposes a time series into a set of cycles with

specific periods and estimates the role of these cycles in the variance of the series, which allows the co-movement of different time series to be analyzed at different frequencies. Fourier analysis is the standard form of the spectral analysis. The main disadvantage of Fourier analysis is that it depends on stationary time-series data, while most macroeconomic variables are non-stationary, and all information from the time-domain representation is lost during the operation (Masset, 2008). Wavelet analysis, another type of spectral analysis, provides an alternative to Fourier analysis.

### **2.3 The nexus between business and financial cycles**

Portes (2014) underlines the objective of macro-prudential policy to limit the systematic risk of the financial sector and to increase the resilience of the financial cycle. The latter can further be defined as making it prudent for banks to lend even during periods of financial distress, thus protecting the banking sector from the financial cycle. Understanding the relationship between business and financial cycles is crucial for determining the central bank's objectives. Farrell and Kemp (2020) articulate "Financial cycles provide a broad perspective on the evolution of risks to financial stability, and therefore provide a useful monitoring tool for policymakers who are required to set macro-prudential policies" when business and financial cycles are synchronized, the central bank can regulate both price stability and financial stability through the use of monetary policy. However, in the event that business and financial cycles diverge, a central bank with monetary policy as the sole tool in its policy toolbox faces a policy dilemma and has to implement the policy based on what it prioritizes at that point, either price or financial stability. The importance of macro-prudential policy becomes apparent in this scenario, as the central bank can complement monetary policy instruments in periods when the financial and real cycles diverge.

The ideal number of policy instruments used by the central bank is influenced by the number of policy objectives (Tinbergen, 1952). An inflation-targeting central bank may find it adequate to use interest rates as its key monetary policy implementation instrument. Nevertheless, a central bank that pursues the twin objectives of price and financial stability requires several instruments in its toolbox to stabilize both the business and financial cycles. This is particularly necessitated by situations in which the business and financial cycles diverge, which may call for the employment of different policy instruments. A straight-jacket application of interest rates may prove disastrous in this situation. For example, consider a situation in which there is an economic downturn with inflation below the target. This situation may call for a decrease in interest rates to stimulate aggregate demand. However, if such a downturn occurs simultaneously with an unsustainable growth in credit to certain sectors of the economy, then a single policy instrument – the interest rate – may achieve price stability but would fail to attain financial stability. Therefore, the adjustment in interest rates needs to be supplemented by macro-prudential tools to reign in unsustainable credit. This broader toolkit enables the central bank to attain both monetary and financial stability.

Table 1 illustrates the possible episodes during which monetary and macro-prudential policies may be complementing, independent, or conflicting.

**Table 1: Likely Instances of Conflicts between Monetary and Macro-Prudential Policies**

	<b>Inflation above target</b>	<b>Inflation close to target</b>	<b>Inflation below target</b>
Financial exuberance (boom)	Complementary	Independent	Conflicting
No imbalance	Independent	Independent	Independent
Financial deflation (bust)	Conflicting	Independent	Complementary

Source: Beau, Clerc and Mojon(2012)

It is necessary for a macroprudential policy committee (MPC) to be created with a specific mandate on financial stability, as much as the Monetary Policy Committee (MPC) would remain focused on monetary stability. The macro-prudential policy aims to determine the probable risk build-up in the financial system and limit its impact on the economy; hence, the key objective of the financial stability committee is to maintain financial stability. Beau, Clerc, and Mojon (2012) articulate that macro-prudential policy application should not interfere with the independence of monetary policy. Second, they suggest that macro-prudential policy objectives should be communicated clearly. They further insinuate that in circumstances where both policies are temporarily in conflict, a reasonable balance should be considered after considering the trade-off between short-term costs of financial stability and long-term costs of price stability.

Cagliarimi and Price (2017) proposed that monetary policy affects credit growth and asset prices by adjusting interest rates. Hence, a central bank with interest rates as the only instrument in its toolkit faces a policy conundrum in situations where there is a conflict between monetary and macro-prudential policies. This conundrum can be disentangled if monetary policy is supplemented by macro-prudential policy as an independent tool to contain the build-up of risk in the financial system and ensure financial stability. When both the business and financial cycles are in sync, monetary policy and macro-prudential policy conduct should be complementary; however, when the cycles are out of sync, the two policies conflict (Cagliarimi and Price,2017).

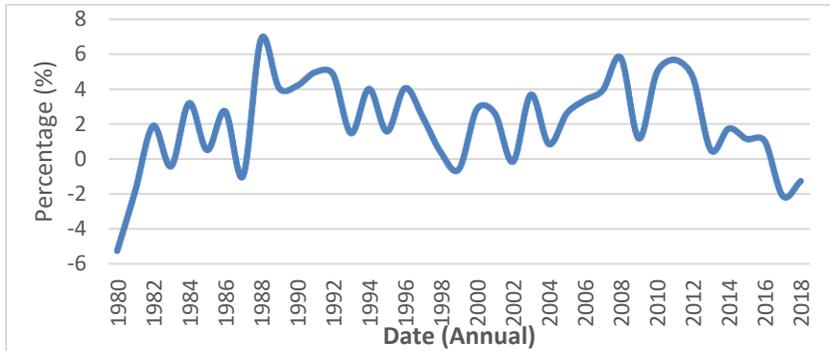
### 3. Recent Economic and Financial developments in Lesotho

#### 3.1 GDP per Capita Growth Rate

Figure 1 depicts the GDP per capita growth trajectory of Lesotho from 1980. Negative growth rates were observed in 1987 and 1999; it is worth noting that these particular periods follow episodes of political and social unrest that shook Lesotho. In 1986 Lesotho experienced a military coup while in 1998 political instability resulted in looting and lawlessness; suffice to say economic activity suffered immensely. Furthermore, the 2008 global financial crisis negatively affected GDP per

capita growth rate, as in 2009, very little growth was realized; nevertheless, recovery was quick, as in 2010 GDP per capita recorded a 5% growth rate. Nonetheless, the highest growth rate (6.9%) was observed in 1988. Since 2013, the GDP per capita growth rate has been steadily declining owing to the poor performance of all sectors of the economy. The political dynamics further aggravated the economic contractions; from 2012 to 2016, Lesotho witnessed three general elections, which is a clear indication of political unrest.

**Figure 1: GDP per Capita Growth Rate - 1980 - 2018**

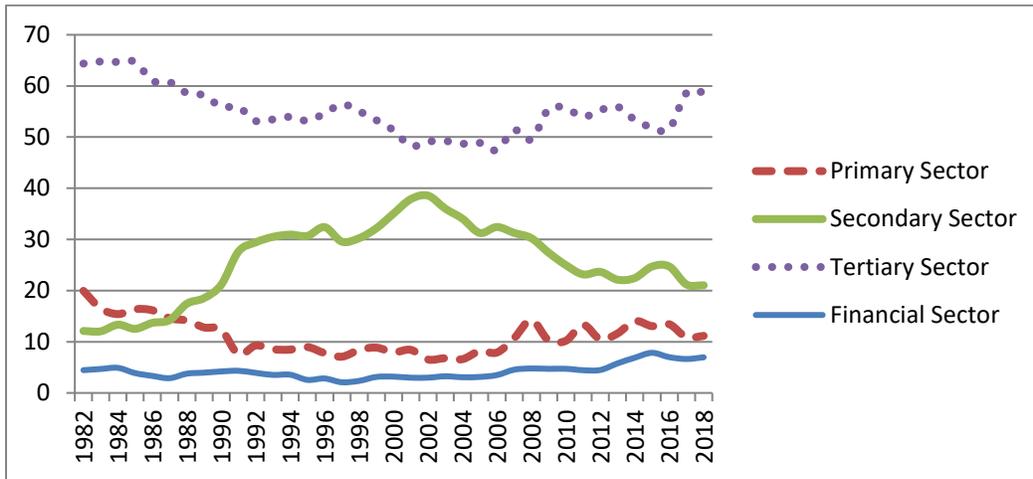


Source: World Development Indicators Database of the World Bank.

### 3.2 Major Sectoral and Financial Sector Contribution

Figure 2 illustrates trends in the percentage of contributions to GDP by the major sectors and financial sector for the period 1982 - 2018. Since 1982, the contribution of the tertiary sector has been declining continuously, from about 65% in 1982 to less than 50% beginning in 2000. In 2007, its contribution began to increase moderately. The financial sector's contribution remained almost constant for the entire period, averaging 4%. Nevertheless, it is imperative to note that since 2007, there has been a slight increase. The primary sector contribution has been on a downward spiral, while the secondary sector has been expanding. This is due to the increased performance of the manufacturing sector, while the agricultural sector has been neglected in favor of the lucrative manufacturing sector. However, the reopening of mines coupled with the closure of textile firms has seen an increase in primary sector contributions, while the secondary sector has recorded significant contractions. In essence, the tertiary sector remains the main contributor to GDP, followed by the secondary sector, even though the gap between the primary and secondary sectors has been significantly narrowing. The financial sector contribution has improved with performance above average in recent years, a feature indicating increased financial development and inclusion.

Figure 2: Major Sectoral and Financial Sector Contribution – 1982 – 2018

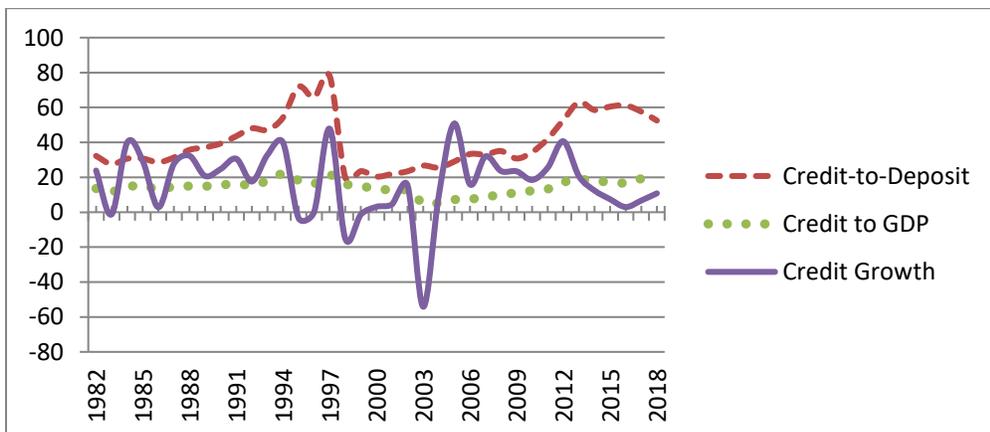


Source: Central Bank of Lesotho

### 3.3 Financial Deepening

To analyze the level of financial deepening in Lesotho, this study examines the behavior of the credit-to-GDP ratio, credit-to-deposit ratio, and credit growth. The credit-to-deposit ratio shows the degree to which banks are willing to advance funds relative to the deposit they have garnered. The credit-to-GDP ratio is an indicator of banks' contribution to private sector-led economic growth, while annual credit growth indicates the year-to-year performance of credit advances by banks. Figure 3 presents the indicators for the period from 1982 to 2018. Motelle (2014) argues that credit to the private sector is a relatively superior measure in assessing financial development to credit extended to the government because the government may borrow to finance short-term objectives in an effort to increase political popularity.

Figure 3: Financial Deepening in Lesotho – 1982-2018



Source: Authors' Computations

The credit-to-deposit ratio enjoyed stable growth from 1982 to 1996. The credit-to-GDP ratio is relatively steady during the same period. Since 1997, private sector credit extension to economic growth in Lesotho has been declining; nevertheless, mild increments have been realized since 2009. Credit growth has been inconsistent throughout the period; the greatest slump occurred in 2002–2003, with a decline of 54%. However, credit extension recovery was swiftly realized with a peak observed in 2005, which can be attributed to the opening of the Lesotho Post Bank<sup>1</sup>. Credit growth decelerated slightly during the 2008 global financial crisis. The recovery was short-lived as an increment was observed from 2010 to 2012, but from 2013, credit extension has been on a persistent downward trend. Low credit demand due to sluggish economic activity has been blamed for the recent decline in credit extension.

## **4. Methods**

### **4.1 Indicators of the business and financial cycles**

The real GDP growth rate was used to extract the business cycle. This is an appropriate indicator because GDP encompasses the entire economic activity of the country, and its growth rate is indicative of the country's economic growth. The use of the real GDP growth rate ensures that the effects of inflation are accounted for. The credit-to-GDP ratio is used to extract the financial cycle. There are other indicators that can be utilized for the same purpose, because the Basel Committee on Banking Supervision (2010) argued that the credit-to-GDP ratio has several advantages over other measures of financial cycles and hence recommends it as a proxy for extracting financial cycles. First, the credit-to-GDP ratio tends to increase smoothly above the trend before serious financial system mishaps; as a result, it has the ability to act as a lead indicator of financial system collapse. Second, even though deviations of assets and equity prices from their trend may help in the build-up phase, the deviations tend to narrow ahead of the actual emergence of the crisis. The Committee further argued that the credit-to-GDP ratio is the best performing of all ranges of proxies in extracting financial cycles.

### **4.2 Description of variables and data sources**

This study employs annual data from 1976 to 2019 on real GDP growth rates and the credit-to-GDP ratio. Table 2 provides a description of the variables. The credit-to-GDP ratio is used to derive the credit-to-GDP gap. This is the deviation of the credit-to-GDP ratio from its long-term trend. This can be obtained after subjecting the credit-to-GDP ratio series to an HP filter. The GDP growth rate was used to calculate the output gap by applying an HP filter. Data were sourced from the World Development Indicators Database of the World Bank.

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<sup>1</sup> Lesotho Postbank was incorporated in 2004 and became functional in 2005. Its primary mandate was to provide access to banking services to the unbanked and under-banked population, in particular, the rural population in an effort of improving financial inclusion.

Table 2. Description of Variables

Variable List	Description	Source
GDP growth rate	This is the annual GDP growth rate of Lesotho from 1976 -2019	World Bank Data Portal
Credit to GDP ratio	This is the domestic credit to the private sector by banks as a percentage of GDP from 1976 - 2019	World Bank Data Portal

Source: Author

### 4.3 Measuring the degree of business and financial cycle synchronization

#### 4.3.1 Using the Concordance Index

To test for synchronization between business and financial cycles, this study uses the concordance index developed by Harding and Pagan (2002) and is defined as

$$CI_{xy} = \frac{1}{T} \sum_{t=1}^T [C_t^x \cdot C_t^y + (1-C_t^x) \cdot (1-C_t^y)] \quad (1)$$

Where:

$C_t^x = 1$ , if Business Cycle is in recession phase at time  $t$ , 0 if in expansion phase at  $t$

$C_t^y = 1$ , if Financial Cycle is in downturn phase at time  $t$ , 0 if in upturn phase at  $t$

The concordance index measures the fraction of time the business and financial cycles are in the same phase and assumes values between 0 and 1. A higher percentage of  $CI$  indicated a high level of synchronization between the cycles. If the index is unity, it indicates perfect pro-cyclicality, and if it is  $CI = 0$  it implies that the two series are countercyclical (Claessens et al., 2010).

## 5. Findings and Discussions

### 5.1 Descriptive statistical analysis

Table 3 presents the descriptive analysis of the business and financial cycles. The descriptive analysis provides a summary of the data based on the number of observations, mean, standard deviation, and minimum and maximum values. The total number of observations for both the variables was 44. The mean business cycle was 8.76, while the mean financial cycle was 6.87. This implies that, on average, GDP growth has been above its long-term trend, while the financial cycles' mean implies that the credit-to-GDP gap on average has been negative in Lesotho. This further suggests that credit extension in Lesotho is very low relative to economic activity.

**Table 3: Descriptive Statistics**

Variable	Obs.	Mean	Std. Dev.	Min	Max
Business Cycle	44	8.76	3.244	-9.462	10.118
Financial Cycle	44	-6.87	4.304	-9.560	8.820

Source: Authors' Calculation

## 5.2 Structural break test results

Lesotho witnessed several political, social, and economic uprisings during the period under review. These include the 1986 military coup, the 1998 political instability, and the closure of the LADB coupled with the merger between Standard and Lesotho banks. These scenarios may affect the trajectory of the key macroeconomic variables. It is therefore fundamental to test for the possibility of the presence of structural breaks within the data to eliminate the possibility of spurious results.

**Table 4: Bai-Perron test results**

Sequential F-statistic determined breaks: 0			
Break Test	F-statistic	Scaled F-statistic	Critical Value**
0 vs. 1	1.768684	1.768684	8.58

\* Significant at a level of 0.05.

\*\* Bai-Perron (Econometric Journal, 2003) critical values.

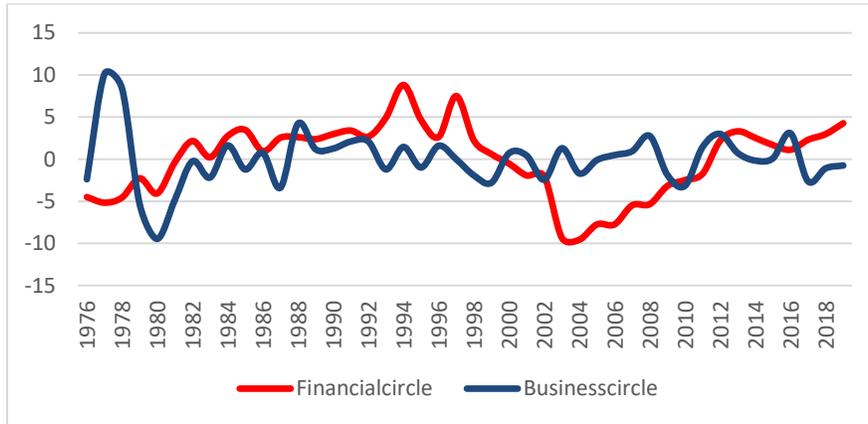
As a result, the Bai-Perron (1998) structural break test for multiple breaks was conducted to determine if the episodes of regime changes had long-run impacts on the data. Table 4 presents the results of the Bai-Perron test. The results indicate the absence of structural breaks in the data. This implies that the political, economic, and social changes that occurred in Lesotho had minimal impact on the long-term behavior of the key variables of the study.

## 5.3 Synchronization or duality of the financial and business cycles

### 5.3.1 Evidence from rolling correlation analysis

Figure 4 shows the movement of the credit/GDP gap along with the annual GDP growth rates cyclical components. This is a merger of the figures of business and financial cycles. The main purpose of figure 5.1 is to provide a graphical description of the relationship between financial cycles and business cycles, and to provide graphical evidence of whether the cycles are synchronized or diverge before employing econometric analysis to test the level of synchronization.

*Figure 4: Business and Financial Cycle*

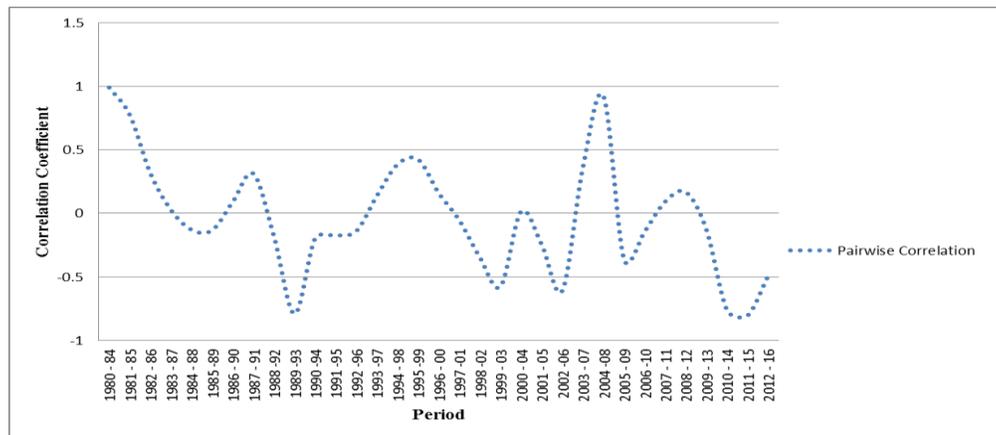


Source: Authors Computation

The financial cycle in Lesotho is longer and has a higher amplitude than the business cycle. This is consistent with the findings of several studies (Claessens et al, (2010), Farrell and Kemp, (2020) and Borio, (2012)). During the period between 1979 and 1992, the cycles converged; however, they seem to have diverged since then. I build up to the global financial crisis of 2008, the business cycle was performing above its long-term trend, while the financial cycle hit its trough. As the crises hit, the business cycle decelerated, while at the same time, credit build-up intensified. Furthermore, in 2012, the business cycle decelerated, while the financial cycle accelerated. Figure 4 depicts that the business and financial cycles are not synchronized in Lesotho; it is essential to determine the level of divergence and whether a macroprudential policy is needed to complement the monetary policy in Lesotho.

The correlation coefficient measures the strength and direction of the linear relationship between two variables. Figure 5 illustrates the pair wise correlation between business and financial cycles. The correlation coefficient is estimated progressively over five years, from 1980-84 to to-2012-16. The correlation coefficient assumes values in the range of 1 to -1; a value closer to unity denotes a strong positive relationship, while a value closer to -1 indicates a strong negative relationship. A value closer to zero indicates a weak linear relationship between the variables. During-1980-84, business and financial cycles had a strong positive relationship with a correlation coefficient of 0.99. Nevertheless, subsequent periods saw weakening of the relationship, with some periods showing a negative correlation. In summary, during the period under study, the linear relationship between business and financial cycles in Lesotho was weak and mostly negative.

Figure 5: Progressive Pairwise Correlation



Source: Authors computations

### 5.2.1 Evidence from concordance index

The key objective of this study is to investigate whether the business and financial cycles in Lesotho are synchronized. Financial cycles were extracted by subjecting the credit-to-GDP ratio to the HP filter, while business cycles were extracted from real GDP growth. The credit/GDP ratio provides a broad perspective on the evolution of the build-up of excessive credit in the financial system; hence, it can serve as an early warning indicator of financial system stress. This is crucial for policymakers who are required to implement macro-prudential policies.

A central bank with monetary policy as the sole instrument in its policy toolbox employs interest rates to stabilize prices in the economy. In the likely situations where the business and financial cycles diverge – a situation that requires different policy instruments to address, a straight-jacket application of interest rates may prove disastrous in this case. For example, a situation in which there is an economic downturn, which may call for an increase in money supply to fuel aggregate demand through a decrease in interest rates, which occurs simultaneously with an unsustainable growth in credit to certain sectors that may require a reduction in interest rates, may give rise to a policy dilemma. As a result, central banks with twin objectives of price stability and financial stability can fare well in such scenarios through the simultaneous application of macro-prudential and monetary policies.

The key findings of this study reveal a low level of synchronization between business and financial cycles in Lesotho. The concordance coefficient of 0.28 indicates that the cycles are moving in the same phase for 28% of the time. This is inconsistent with the results reported in the literature (Karfakis (2013), Akar, (2016) and Claessens et al, (2010)).

## 6. Conclusion

Based on these findings, the article recommends the adoption of a macro-prudential policy by the central bank of Lesotho. This will complement monetary policy in the likely scenario when business and financial cycles diverge. The build-up of credit within different sectors of the economy should be regularly monitored, and macro-prudential policy instruments can, therefore, be engaged in a scenario in which excessive credit risk is experienced. As the central bank adopts the twin objective of price and financial stability, monetary policy can be utilized to stabilize prices, while macro-prudential policy is employed to stabilize the financial system.

We further advocate the establishment of the Financial Stability Committee within the Central Bank of Lesotho. The committee's core function should ensure financial stability in Lesotho, with macro-prudential policy instruments as its tools. The committee composition should be based on the Bank of England build-up of Financial Stability Committee as described by Beau, Clarc, and Mojon (2012); however; it should be tailored in a specific fashion to suit Lesotho's economic environment. The governor should be the default chairman of the financial stability committee to ensure that macro-prudential policy application does not threaten the independence and core objective of monetary policy, which is price stability.

The key limitation of this study is that it did not include equity and property prices in the analysis of the relationship between business and financial cycles. This was mainly caused by a lack of data on the variables indicated in Lesotho. However, with the introduction and functioning of the MSX, even though it is still in its infancy, it is possible that data on equity prices will be available soon. Therefore, future research can be directed to the inclusion of equity and property data to determine if that will have a significant bearing on the long-run relationship between business and financial cycles in Lesotho.

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## Appendix

### Appendix 1A

#### Turning Point Analysis

In order to extract the business and financial cycles, the turning points of individual variables were identified. This will indicate the peaks and troughs of the cycle hence the recessions and expansions can be determined as well. The variables should then be subjected to a certain filter to determine the turning points; Shi and Shen (2017) argue that there are only two methodologies which can be used. Firstly, turning point analysis method which was proposed by Bry and Boschan (1971) and further improved to analyze quarterly data by Harding and Pagan (2002) and labeled as BBQ method. The main idea behind turning point analysis is to determine the local maxima and local minima of a cycle hence determining the peaks and troughs. Claessens et al (2010:10) posit; "The advantage of turning points identified by using the classical methodology is that they are robust to the inclusion of newly available data: in other methodologies, the addition of new data can affect the estimated trend, and thus the identification of a growth cycle". The second method is the frequency based filter method which originates from Comin and Gertler (2006) study.

The paper used the BBQ algorithm by Hardan and Pagan (2002) to determine the peaks and troughs on financial and business cycles. This follows the works of Claessens et al (2010) and Shi and Shen (2017).

A peak for  $y_t$  which will be the local maxima occurs if at time  $t$ :

$$[(y_t - y_{t-2}) > 0, (y_t - y_{t-1}) > 0] \text{ And } [(y_{t+2} - y_t) < 0, (y_{t+1} - y_t) < 0],$$

It then follows that a cyclical trough which is a local minimum occurs if at time  $t$ :

$$[(y_t - y_{t-2}) < 0, (y_t - y_{t-1}) < 0] \text{ And } [(y_{t+2} - y_t) > 0, (y_{t+1} - y_t) > 0],$$

A complete cycle thus consists of two phases: the recession phase defined as the period between the peak to the next trough and the expansion phase defined as the period from the trough to the next peak.

### Turning Point Analysis Results

Turning point analysis helps to identify peaks and troughs of the business cycle by identification of local maxima and local minima. In business cycles, the period between the peak and the next trough is considered as the contraction period while the period between the trough and the next peak is the expansion period. While in financial cycle analysis, an expansion and contraction are defined as the period from the downturn to the upturn and vice versa. BBQ algorithm by Harding and Pagan (2002) helps in identifying periods of peaks and troughs.

We identified 3 peaks and 4 troughs for business cycles. The peaks occurred in 1988, 1996 and 2011 whilst the troughs occurred in 1980, 1993, 1999 and 2013. The results suggest that the Lesotho economy experienced the first boom in 1988 and the contraction period was between 1988 and 1993 when a recession was encountered. The economy entered the recovery phase thereafter, however, 1998 social and political unrest undermined economic activities consequentially economic growth was adversely impacted hence another contraction phase began. The results also suggest that the economy was in the expansion phase of the entire 2000's as the next peak was reached in 2011. This implies that the 2008 global financial crises did not present a severe shock to our economic growth trajectory.

The Lesotho financial cycle had 3 peaks and 3 troughs during 1976 - 2016 periods. Peaks are observed in 1985, 1994 and 2013 whilst the trough 1980, 1989 and 2004. The results indicate that the financial cycle hit the first bust in 1980; however, after the inception of the Central bank of Lesotho, an expansion was realized. The build-up of the boom went on till 1985 when it reached its peak and the contraction phase began till 1989. In 1986 a military coup occurred in Lesotho, subsequently financial institutions became reluctant to extend credit; as a result, the financial cycle entered a contraction phase. The financial cycle expansion which began in 2005 may be attributed to the functionality of Lesotho Postbank. Lesotho Postbank was incorporated in 2004 and started operations in 2005 with the aim of bridging the gap of financial service accessibility between the urban and rural population through provision of banking service to mainly to the unbanked and under-banked rural population.