European Economic Letters
ISSN 2323-5233
Vol 14, Issue 4 (2024)
http://eelet.org.uk

An Empirical Evaluation of the Growth of Shadow Banking and its Effect on Emerging Market Economies' Financial Stability using Panel Data

Vibha Bhandari
Assistant Professor
College of Economics and Business Administration,
University of Technology and Applied Sciences,
Nizwa, PC 611, Sultanate of Oman
Vibha.bhandari@utas.edu.om

Vikram Mohite
Assistant Professor
College of Economics and Business Administration,
University of Technology and Applied Sciences,
Nizwa, PC 611, Sultanate of Oman.
Vikram.mohite@utas.edu.om

ABSTRACT
This study aims to understand the growth of shadow banking in emerging market economies that experienced significant macroeconomic changes post-financial crisis of 2008. The current research attempts to investigate the impact of the development of shadow banking on financial stability. Panel data regressions are applied to eleven emerging market economies, considering economic growth and asset returns as proxies for financial stability. The results from 2010 to 2018 indicate that the impact of growth in shadow banking is prominent on asset returns compared to economic growth. As market-based funding is expected to operate parallel to traditional banks, shadow banking activities will contribute to expanding and facilitating investment and market liquidity, a finding that has direct relevance and applicability.

Keywords*: Shadow Banking, Emerging Market Economies, Asset Returns, Gross Domestic Product, Panel Data*

JEL Classifications: *C33, E44, G20, G23, G28, O16, O17, O50*

1. Introduction

Well-developed and regulated financial markets have led to growth in the economic performance of the countries. The financial market institutions and instruments have met the varied needs of individuals, investors, and corporations while working within the regulatory framework. Banks, an essential constituent of this system, have been instrumental in meeting credit and investment needs and implementing monetary policy (Bhandari & Mohite, 2020). Banks have been instrumental in meeting credit requirements, but some social groups still need access to the formal financial system (Molyneux, 2007). As such, these people are financially excluded due to many reasons, viz (i) geographical, i.e., non-existence of branches in an area, (ii) access exclusion, i.e., restricted access because of bank's risk assessment process, (iii) condition exclusion i.e., condition related to products failing to meet needs, (iv) price exclusion i.e., charges associated with products or services are very high (v) market exclusion, i.e., strategic exclusion of markets, and (vi) self- exclusion i.e., some section of the population refuse to approach banks, believing that their request would be turned down (Anderloni & Carluccio, 2007) (Dasgupta, 2009). The limited reach of banks has led to the growth of financial intermediaries, which are not banks per se but function like banks. These financial intermediaries are popularly known as shadow banks.

The term "shadow bank" was devised by economist Paul McCulley in 2007 (McCulley, 2007). The Financial Stability Board (FSB) has defined shadow banking[1] as a financial intermediation system involving entities and activities outside the regular banking system (Financial Stability Board, 2011). They are named so because they function as shadows of actual banking activities. Contrary to popular belief that these institutions carry out money laundering and illegal activities, they lend money for personal and investment purposes and remain outside the regulatory framework. Unlike conventional regulated banks, unregulated shadow banks fund themselves with uninsured short-term funding, which may or may not be backstopped by liquidity lines from real banks (McCulley, 2009). Not bound legally, these institutions cater to unmet requirements of the economy under terms and conditions that are less stringent than those of conventional

banks. Central Banks do not directly supervise shadow banks, so they lack central banking facilities. This exclusion makes them vulnerable to financial crises and less equipped to handle the aftermath of such crises (Arora & Zhang, 2019). It was witnessed in 2008 when the shadow banks recklessly approved loans to the United States housing sector and later could not recover from indiscriminate lending. This led to a contagion effect, which triggered the global financial crisis, resulting in the downfall of several businesses.

The rest of the paper is organized as follows. *Section 2* discusses the background literature. *Section 3* will discuss the methodology part on descriptive analysis of growth in shadow banking in emerging market economies, a description of the qualitative methodology adopted, and discussions on empirical findings. The summary of outcomes and conclusions are presented in the final *Section 4*, wherein policy implications and future research areas are also discussed.

2. Literature Review

The concept of shadow banking was introduced by McCulley (2007) at the Jackson Hole Symposium. Since then, the idea of shadow banking has been persistent in the academic literature. There has been substantial research in this field, theoretical and empirical. The current study envisages staggering the literature in three strands to identify the key factors that led to the development of shadow banking. Firstly, the literature identifies the demand for safe and liquid assets as a critical factor for developing shadow banking. Greenwood, Hanson, and Stein (2015) and Pozsar (2011) link the demand for private money to meet the investment needs of institutional cash investors, whose total balances significantly exceed the (inelastic) supply of short-term government debt and insured deposits (see Turner, 2012). Gorton, Lewellen, and Metrick (2012) observe that the demand for safe assets as a ratio to GDP appears historically stable and has always been met by a blend of public and private instruments. Gennaioli, Shleifer, and Vishny (2012a, 2012b) show that banks respond to a demand for privately secured assets by trenching cash flows, portfolio diversification, and residual risk retention, in the process, get exposed to extreme adverse events.

[1]The FSB report 2018 replaced shadow banking with Non-Banking Financial Intermediaries (NBFIs)

It was further revealed that imperfect regulatory information might lead to partial indemnity of the banks and siphoning of funds to the shadow sector, which may cater to the needs of particular borrowers like Small and Medium Enterprises and unique lenders like retail depositors (Farhi & Tirole, 2021). The second aspect of shadow banking literature emphasizes market failures in securitization. Pozsar (2008) and Pozsar (2010) map the flows and contractual links supporting securitization, identifying "puts" to large financial institutions. Stein (2010) and Gorton and Metrick (2012) focus on the fragility of the short-term funding that supports securitization. Adrian and Shin (2010) and Shin (2009) show that securitization allowed financial institutions to exercise control using repo funding. Acharya, Schnabl, and Suarez (2012) highlight problems of regulatory arbitrage in the financial crisis 2008, which resulted in the concentration of banks on increased securitization, less dispersion of financial risk, and capital requirement reduction.

The third aspect of the literature analyses the importance of shadow banks in supporting collateral-based operations in the financial system. Shadow banking provides innovative and better avenues for lenders to borrow money and diversify their portfolios through greater risk-sharing capacity. This can be achieved by re-hypothecation of collateral-based assets. This role of shadow banks in the global financial system is articulated by Singh and Aitken (2010) and Singh (2011). Their study focussed on the movement of pledgable collaterals received by large banks and their associated churning factor. Muley (2015) points out that collateral intermediation chains can take two general forms—the first type involves the value of pledgeable collateral. Hence, the borrowing amount is limited by the face value of the original debt contract (i.e., securitization). The second form enables collateral borrowing of an amount greater than the face value of the debt backed by that collateral (i.e., re-hypothecation) (Muley, 2015). Shadow banks can involve an extensive transformation of risk characteristics through complex structuring. In this regard, credit enhancement associated with the pooling and trenching of risk and implicit guarantees is significant (Adrian, 2017). Fragile shadow banks increase their market share and reduce their underwriting costs by taking advantage of favorable regulatory spill-over shocks. This leads to a less elastic credit supply from fragile shadow banks in response to demand shocks, which can destabilize the economies and thus require immediate attention and intervention (Shan, 2022).

Shadow banks not only play a vital role in all countries, irrespective of their level of development, but they are also globally interconnected. Using a global vector auto-regressive model and data for twelve countries, Ozgur (2023)

showed that global interconnections of shadow banking exist and are statistically associated with funding conditions in international money and capital markets. These statistical associations exist between shadow bank assets, long- and short-term interest rates, equity prices in countries, and risk premiums and their spread in U.S markets.

Shadow banking has been evolving globally in different countries. Depending on the economic status of the countries, shadow banking assumed varied roles and provided much-needed support in the form of financial assets. For developed economies, shadow banking is unique and different from emerging market economies. In the U.S., shadow banking is driven by capital and reserve requirement arbitrage and information costs in the long run and economic outlook, deposit regulation, event risk, and risk premium in the short run (Duca, 2016). It was also discovered that when banks with less capital are required to reduce their loan retention capacities, non-banking intermediaries with fragile liabilities step in to finance high capital requirements in the U.S. (Irani et al., 2021). In EU countries with developed financial systems, higher demand from institutional investors encourages the expansion of shadow banking (Apostoaie & Bilan, 2020). Growth in shadow banking is determined by the assets of banks and insurance corporations, the spread of interest rates, and regulatory quality. A robust link between shadow banking and insurance corporations was also discovered (Petkovski et al., 2023). Shadow banks are involved in short-term intermediation, asset management, and long-term investing (Landau et al., 2019).

In emerging market economies, shadow banking has been advantageous in terms of extending banking services, investment opportunities, and knowledge of how to access capital from the unbanked (Ilesanmi & Tewari, 2019). In the Netherlands, during the financial crisis, vulnerability was observed, which led to the spread of a parallel system and remained unnoticed by the regulators (Broos et al., 2012). In a few emerging economies, wealthy and influential individuals used shadow banking activities to generate extraordinary returns through risk credit extensions (Michael, 2014). In South Africa, though shadow banking has benefitted the economy by extending the source of credit and investment, it has created risks for the economy due to a lack of transparency in management and regulations (Ilesanmi & Tewari, 2019). Nevertheless, the advent of a parallel financial intermediation structure has been good in all economies. This parallel intermediation has met the dynamic requirements in emerging and developing economies. In China, it has been revealed that the development of shadow banks is influenced by the growth of the economy and the scale of expansion of social financing (Jun & Mei, 2017). Besides China, India witnessed a rise in shadow banking; however, unlike advanced economies, the cause was traced to financial exclusion, which was common in both these emerging economies (Arora & Zhang, 2019). Moreover, unlike advanced economies, lending in underbanked and unbanked areas in emerging economies has significantly been substituted by shadow banking institutions (Acharya et al., 2013) (Ghose et al., 2012). Shadow banks act as both a substitute and complement to traditional banking and are driven by high institutional demand and lower restrictions on bank activities (Isayev & Bektas, 2023) The emergence of shadow banking in underdeveloped economies is an indicator of economic maturity which allows efficient allocation of financial resources and hinders the perceived irregularity in funding (Mbaye, 2016).

Emerging market economies are playing a prominent role in today's world. Their financial requirements to fuel and maintain their growth are immense. However, the conventional financial system in these countries is not appropriately equipped to match their developmental requirements, thus giving rise to shadow banks. Research has explored the reasons for growth in shadow banks or the cause and impact of shadow banking for specific countries. There is a dearth of research on shadow banking for groups of countries in general and for emerging market economies. This research, in its current form, shall endeavor to shim the identified research gap and strive to fulfill the following research objectives:

i. Study of growth in shadow banking systems in emerging market economies.
ii. Assess the impact of the progress of shadow banking on economic growth and investments in emerging market economies.

3. Methodology

Currently, the system of shadow banking includes aggregates from the Monitoring Universe of Non-Banking Financial Intermediaries (MUNFI) as identified by the Financial Stability Board (FSB). MUNFI comprises institutions that are not central banks or banks or public financial institutions. It includes insurance corporations, pension funds, other financial institutions (OFIs), and financial auxiliaries (Financial Stability Board, 2014). To assess business models, activities, and associated bank-like risks of Non-Banking Financial Intermediaries (NBFIs), the FSB classifies the relevant entity types into five economic functions (EFs)[2]. A brief overview of EF classification is shown in the following table: 1.

Table 1: Classification of EFs

EF	Definition	Entities
EF1	Collective investment vehicles that are susceptible to runs	Fixed income funds, hedge funds, real estate funds, fund of funds, mixed funds, pooled funds, and other funds
EF2	Financial entities that are dependent on short-term funding to support lending activities	Finance companies, leasing companies, real estate credit companies, consumer credit companies, factoring companies, non-bank credit card issuers
EF3	Market intermediaries that are dependent on short-term funding	Broker, dealers, and securities finance companies
EF4	Entities that facilitate credit intermediation	Financial guarantee insurers, mutual guarantee societies, mortgage guarantee insurers, insurance corporations, loan guarantee co-ops
EF5	Entities engaged in security-based credit intermediation	Asset-backed and structured finance vehicles

Source: Assessment of shadow banking activities, risks, and the adequacy of post-crisis policy tools to address financial stability concerns (FSB, 2017) and Shadow Banking and Market finance (IMF, 2018)

The operations for NBFIs are on the rise in terms of value and assets held, leading to an increased contribution to the development of the global economy. According to the FSB Report for 2019, total global financial assets increased by 1.4% in 2018, primarily driven by banks. Bank assets increased by 2.8% over this period, while the assets of insurance corporations and pension funds remained unchanged. Despite having a share of 48.5% of total global financial assets, aggregate MUNFI assets declined in absolute terms and stood at 183.7 USD trillion in 2018. This descent in aggregate MUNFI assets was observed for the first time since 2008 and was attributed to a decrease in the assets of OFIs. The decline in the assets of OFIs was caused by volatility in stock markets and associated outflows of OFIs towards the end of 2018 (Financial Stability Board, 2020). NBFIs have worked alongside regulatory frameworks in both advanced and emerging market economies[3]. The FSB classifies nineteen economies as advanced and eleven as emerging market economies,[4] as shown in Table 2.

Table 2: Classification of economies as advanced and emerging market economies

Advanced economies		**Emerging market economies**
Australia	Korea	Argentina
Belgium	Luxembourg	Brazil
Canada	Netherlands	Chile
Cayman Islands	Singapore	China
Euro area	Spain	India
France	Switzerland	Indonesia
Germany	United Kingdom	Mexico
Hong Kong	United States	Russia
Ireland	Italy	Saudi Arabia
Japan		South Africa
		Turkey

Source: Global Monitoring Report on Non-Bank Financial Intermediation 2019 (FSB, 2020)

3.1 Growth of Shadow Banking in Emerging Market Economies

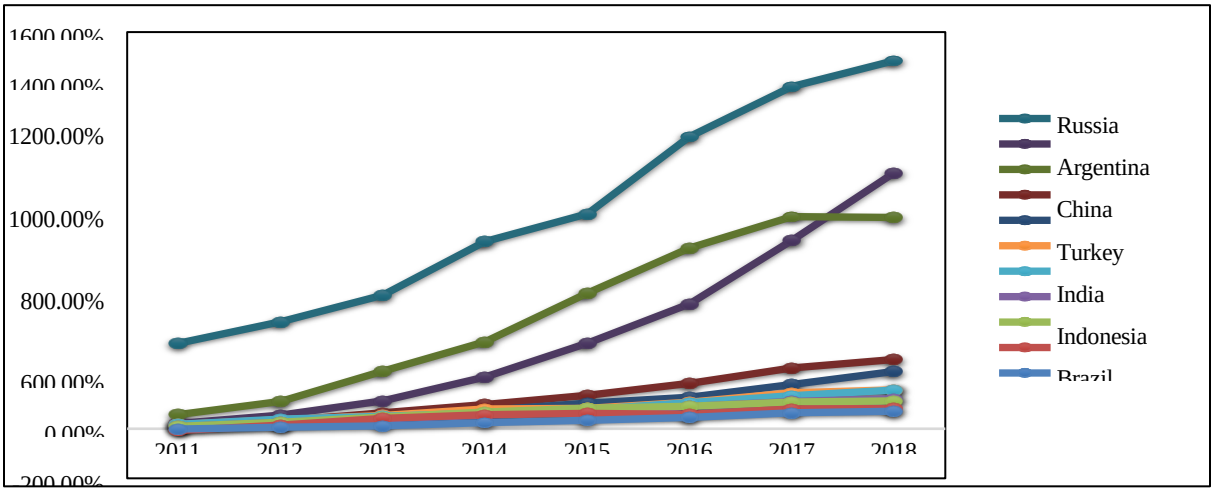
Emerging market economies exhibit rapid progress in economic development and adopt policies for the liberalization of free markets (Arnold & Quelch, 1998). In this process, MUNFIs have played a vital role in financing the market's unmet needs in these economies. This has led to a surge in liquidity and an increase in the value of overall financial

European Economic Letters
ISSN 2323-5233
Vol 14, Issue 4 (2024)
http://eelet.org.uk

assets. Since the past decade, the total financial asset value of MUNFIs in emerging economies has undergone an unprecedented appreciation, as displayed in Figure 1.

[2] Besides these 5 EFs, there is unallocated classification which includes assets of entities that are assessed to be involved in shadow banking activities, but which cannot be assigned to a specific economic function

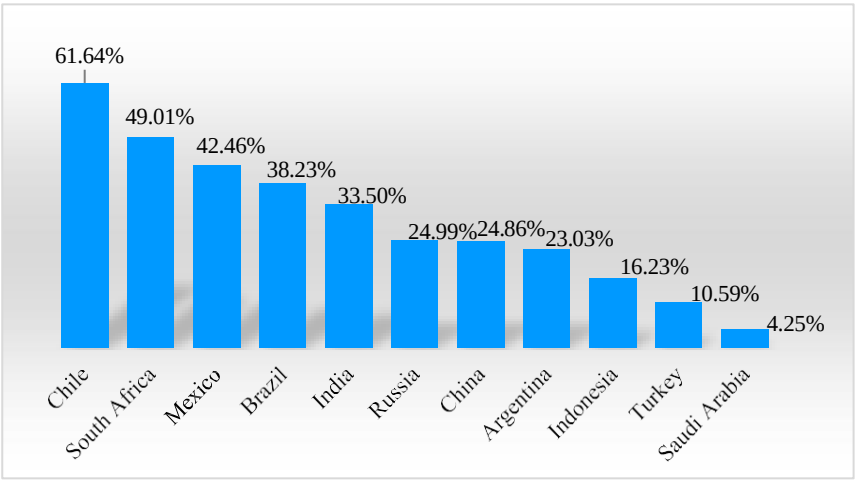
Figure 1: Percentage Change in MUNFI assets in 2018



Source: Global Monitoring Report on Non-Bank Financial Intermediation 2019 (FSB, 2020)

As observed from the above figure, the Russian economy has witnessed an extraordinary increase (1484.76%) in the financial asset value of MUNFI, followed by Argentina (1032.61%). China, too, witnessed a consistent rise in the value of MUNFI assets till 2017; however, a nominal decline was observed in 2018. All other emerging market economies have shown triple-digit growth except for Chile and Saudi Arabia. The value of MUNFI assets in Chile exceeds the value of assets of regulated financial institutions, while in South Africa, their value is almost at par with that of regulated institutions. Except for Indonesia, Turkey, and Saudi Arabia, MUNFI constitutes more than 20% of the financial system. The details of MUNFI's financial asset value in the total financial system in these economies in 2018 can be gauged from Figure 2.

Figure 2: Percentage of MUNFI in the total financial system

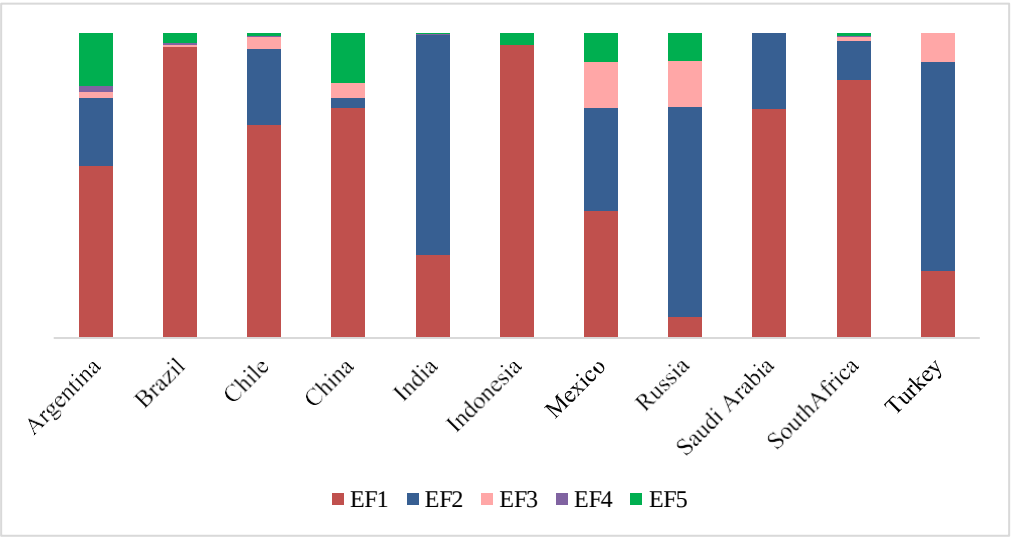


Source: Global Monitoring Report on Non-Bank Financial Intermediation 2019 (FSB, 2020)

[3] For the current study, emerging market economies and emerging economies are synonymously used.
[4] Belong to 21+Euro Area (EA) Group classification of FSB

Concerning the EF classification of MUNFIs, China's asset value stands at the maximum, followed by Brazil and India. All the shadow banking intermediaries in these countries fall under the approved EF classification of FSB, except for South Africa, where some intermediaries are classified as unallocated. It is seen from Figure 3 that China has no intermediaries listed as EF4, and Indonesia has no intermediaries classified as EF2, EF3, or EF4. Saudi Arabia has EF1 and EF2, while Turkish intermediaries are classified as EF1, EF2, and EF3. The details of these economies for the EF classification are shown in Figure 3.

Figure 3: Narrow classification of MUNFI (in USD trillions)



Source: Global Monitoring Report on Non-Bank Financial Intermediation 2019 (FSB, 2020)

3.2 Impact of Shadow Banking on Economic Growth and Investment in Emerging Market Economies

The lack of regulation for shadow banking has resulted in insufficient data, making statistical and empirical assessment difficult (Jun & Mei, 2017). Through extensive surveys, literature depicts varied effects on monetary policy concerning different economic conditions and liquidity scenarios; the significance of shadow banking in this dynamic economic environment is incontestable. Emerging market economies are exhibiting rapid economic development and adopting suitable policies. In this process, non-banking financial intermediation has been instrumental. Hence, it would be interesting to study the impact of development in shadow banking on economic growth and asset returns in emerging economies.

Panel data regression has been applied considering shadow banking as an independent variable and asset returns and GDP as dependent variables for country *j* for time *t*. With Ordinary Least Square (OLS) estimators, the impact of the growth of shadow banking is tested on economic growth asset returns. With cross-sectional data from eleven emerging market economies and a nine-year time frame, applying panel data analysis is appropriate. MUNFI - a broader measure adopted by the FSB to capture non-banking financial intermediation is taken as a proxy for shadow banking in this study. The fixed effects model is applied since the correlation between the unobserved and observed variables cannot be excluded (Allison, 2009). A panel regression equation takes the following forms:

$$logGDP_{jt} = \alpha\, logMUNFI_{jt-1} + \psi j + \mu_{jt} \qquad \text{(Model 1)}$$

$$logAP_{jt} = \beta\, logMUNFI_{jt-1} + \varphi j + \varepsilon_{jt} \qquad \text{(Model 2)}$$

Where,
MUNFI$_{jt}$ is the observation of the independent variable (MUNFI) in both the models for cross-sectional country j in year t,
GDP$_{jt}$ is a 1 × k vector of the dependent variable (GDP) observed for country j in year t,
AP$_{jt}$ is a 1 × k vector of the dependent variable (Asset Prices) observed for country j in year t,
α and β is a $k \times 1$ vector of parameters,
ε_{jt} and μ_{jt} are error or disturbance terms specific to country j in year t.

4. Discussion

As a fixed effect is applied, the error term is further disintegrated with ψ_j and φ_j as country-specific and time- invariant components. Though issues diminishing the statistical robustness of results will be considered, attaining efficiency due to a short time series is expected to be challenging. Hence, it can be inferred that the probable results would be indicative and helpful in better understanding the relationship between variables.

Table 3: Fixed-effects Estimation using Model 1

Log GDP (Dependent)	Coefficient	Standard Error	P-value
Constant	27.9025	0.0727316	0.0001***
MUNFI	0.1536	0.0564799	0.0065***
Within R-squared	0.498708		

Fixed effects using 99 observations, including 11 cross-sectional units, time-series length = 9, Dependent variable: LGDP
Robust (HAC) standard errors
*** 1% level of significance

Here, entity demeaned OLS function is applied; therefore, no dummy coefficient is reported. The estimation of Model 1 of regression can be stated as follows –

$$\hat{L}GDP = 0.1536\,(MUNFI) + \ Country\ Fixed\ Effects$$

The estimated coefficient of 0.1536 is positive and significant. This implies that for every one-dollar increase in MUNFI, the average GDP increases by $0.1536. This shows that shadow banking has a relatively significant impact on emerging market economies' GDP change. The value of R-squared is 0.4987, which signifies that nearly 50% of GDP variations are explained by shadow banking growth. This indicates that parallel liquidity generated by shadow banking in these economies significantly contributes to economic growth. In this model, the country-specific fixed effect eliminates the possibility of bias in the estimated coefficient. However, there may still be unobserved variables that may vary over time and cause bias.

Table 4: Fixed-effects Estimation using Model 2

Log AP (Dependent)	Coefficient	Standard Error	P-value
Constant	9.77984	0.2780	0.0001***
MUNFI	0.54949	0.2159	0.0109**
Within R-squared	0.351		

Fixed effects, using 99 observations, including 11 cross-sectional units, time-series length = 9, Dependent

variable: LAP,
Robust (HAC) standard errors,
*** 1% level of significance, **5% level of significance.

In model 2, entity demeaned OLS function is applied; consequently, no dummy coefficient is reported. The estimation of regression in model 2 can be stated as follows:

$$\hat{LAP} = 0.5494\ (MUNFI) + \ Country\ Fixed\ Effects$$

Model 2 attempts to regress the impact of change in shadow banking on asset prices in the economy. The prominent stock market index has been considered a proxy for asset prices. As the stock market index is sensitive to macro and micro factors affecting the economy, it is the most effective proxy for capturing the movement in asset prices in the economy.

The OLS estimation in model 2 reveals that for every one-dollar increase in MUNFI, asset prices increase by an average of $0.5494. This shows that shadow banking has a relatively significant impact on the change in asset prices of emerging market economies. The value of the R-squared is 0.351, which signifies that nearly 35% of variations in asset prices are explained by growth in shadow banking.

Table 5: Robustness of Estimation

Test	Null Hypothesis: H0	Model 1 (Test statistics)	Model 2 (Test statistics)
Joint Test	No variation in population	7.40161***	6.47777***
Robust test for differing group intercepts	The groups have a common intercept	2552.93***	275.87***
Test for normality of residual	Error is normally distributed	1.56293	53.5096
Wooldridge test for autocorrelation in panel data	No first-order autocorrelation	58.425***	3.61192*
Wald test for heteroscedasticity	Units have a common error variance	54589.5***	11599.8***

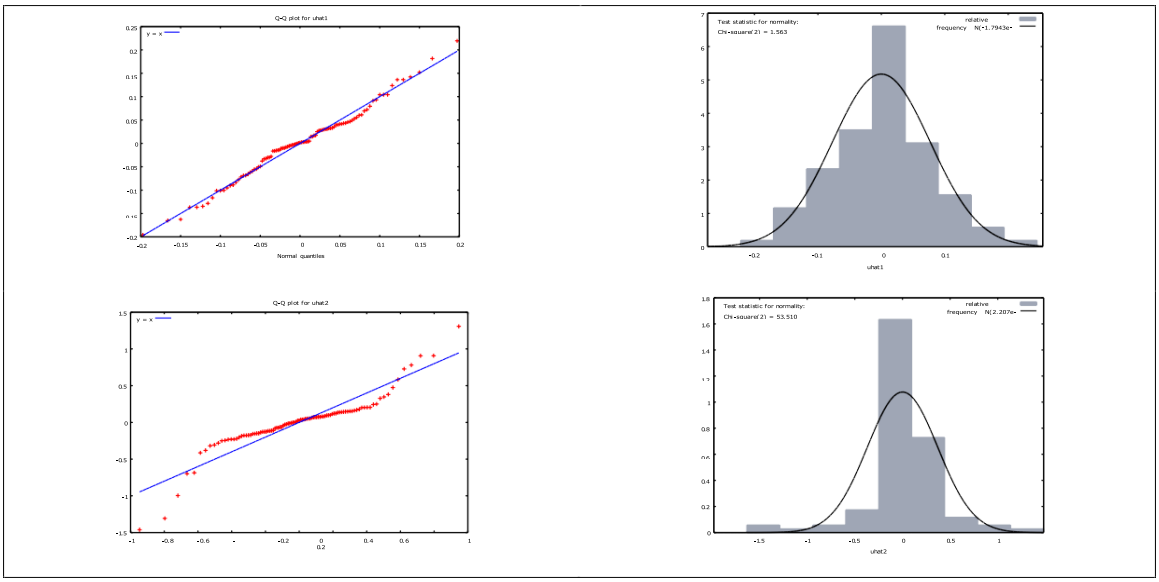
*** 1% level of significance, **5% significance level, *10% significance level.

A joint test of regressors is conducted to assess the probability of variation in the data set. The results indicate that both models' null hypothesis of no variation in the population is rejected as the test statistics derived are statistically significant. This rules out variation in the population from where the data is obtained. The second test was conducted to examine the robustness of the inter-group intercepts. Here, the null hypothesis that all countries have common intercepts or have similar country-specific factors is rejected. Hence, it can be inferred that countries have differing specific factors. The Wooldridge autocorrelation test rejects the hypothesis of autocorrelation. This indicates the absence of serial correlation in the idiosyncratic error term in the panel-data model. Wald's test of heteroscedasticity is also rejected; as different error variances exist among other countries. Finally, the test for normality of residual reveals that the error terms derived for both models are not normally distributed.

European Economic Letters
ISSN 2323-5233
Vol 14, Issue 4 (2024)
http://eelet.org.uk

The following diagrams provide a detailed graphical understanding of the regression estimates, valid values, and the distribution of error terms derived from the estimation process:

Figure 4: Graphical representation of models



5. Conclusion

The study reveals the growth and development of shadow banking, which caters to the unbanked and under- banked needs in emerging market economies. Past empirical studies exhibited that the expansion of shadow banking was substantial, especially during and after the financial crisis of 2008. The subprime crisis triggered stringent banking regulations, resulting in liquidity pressure and increasing shadow banking activities in emerging and advanced economies.

The present study ascertains that shadow banking has positively and significantly impacted economic growth and asset returns in emerging market economies. It also discovers that the impact of growth in shadow banking is prominent on asset returns compared to the impact on economic growth. In the future, shadow banking will witness an unprecedented rise, especially in emerging market economies, as investors will search for safe and liquid options to park their investments. Consequently, the expansion of liquidity in the market will generate multiple options for borrowers and thus contribute to a surge in asset prices, depicting a sizable impact on asset returns.

In emerging market economies, the growth of shadow banking has significantly influenced many macroeconomic variables, including GDP and asset prices. With suitable and sizable data, more profound and impact-oriented cross-sectional country-specific studies can be conducted encompassing different economic variables of interest influencing the spread of shadow banking. Such studies will help policymakers evaluate the reasons for the growth of shadow banking and adopt suitable policy initiatives.

In the future, as market-based funding will operate parallel to traditional bank funding, shadow banking activities are likely to expand. The dynamic nature of shadow banking makes it challenging to assess and regulate specific drivers contributing to market risk. Consequently, a significant challenge for policymakers will be to bring shadow banking activities within the regulatory framework. Central banks and governments need to bring shadow banking into the ambit of futuristic prudential norms and henceforth provide a safety net for downside risk.

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