Int. Journal of Economics and Management 16 (3): 271-284 (2022)

IJEM
International Journal of Economics and Management
Journal homepage: http://www.ijem.upm.edu.my

Monetary Policy Efficiency, Financial Market Development and Financial Stability in Developing Countries

CEP JANDI ANWAR[a*], INDRA SUHENDRA[a], RAH ADI FAHMI GINANJAR[a], EKA PURWANDA[b] and LILIS NUR KHOLISHOH[c]

[a]*Department of Economics and Development Studies, University of Sultan Ageng Tirtayasa, Indonesia*
[b]*STIE STEMBI, Bandung Business School, Indonesia*
[c]*Master of Economics Study Program, University of Sultan Ageng Tirtayasa, Indonesia*

ABSTRACT

This study evaluated the impact of monetary policy efficiency (MPE) and financial market development (FMD) on financial stability using the credit gap as a proxy. New datasets were constructed for the MPE of 63 developing economies from 1990:Q1 to 2021:Q4. The panel homogeneity assumption was verified using the Chow and Roy-Zellner tests, and the findings showed that the model was not homogenous. Thus, the pooled mean group (PMG) estimator was used. The empirical results revealed that MPE and FMD significantly impacted the credit gap. The effects of MPE and FMD on financial stability were as substitutes. Since the sample was divided into two groups: high and low-middle-income nations, the conclusion was robust, and the negative connection between the variables remained. In addition, a dynamic panel estimation was also applied, which found significant effects of MPE and FMD on the credit gap.

JEL Classification: E52, E58, G15

Keywords: Monetary Policy Efficiency; Financial Market Development; Credit Gap; Poolability Tests; Pooled Mean Group Estimation

Article history:
Received: 5 June 2022
Accepted: 30 November 2022

[*] Corresponding author: Email: cepjandianwar@untirta.ac.id
DOI: http://doi.org/10.47836/ijeam.16.3.01
© International Journal of Economics and Management. ISSN 1823-836X. e-ISSN 2600-9390.

INTRODUCTION

Monetary policy is critical to a central bank's objectives regarding macroeconomic stability, including; price maintenance and protecting the financial system (Blot et al., 2015; Suhendra and Anwar, 2022). A central bank influences the real economy by controlling monetary policy instruments, such as; the money supply and policy rate. Such implemented policies immediately impact financial markets, such as those for corporate bonds and stocks. According to Cloyne and Hürtgen (2016), Bernanke (2020), and Coibion et al. (2022), there are three challenges in conducting monetary policy. The first challenge entails an evaluation of economic conditions during which a policy has an impact, typically lasting 18 to 24 months. The second challenge is the difficulty in estimating and anticipating inflationary pressures, while the third issue facing central banks in industrialised nations is the financial system's brittleness as it undergoes reform and a general decrease in leverage. The above challenges create doubt on how appropriate monetary policy settings should be conducted to achieve macroeconomic stability. Moreover, conducting policies becomes more challenging since policymakers need to evaluate their central bank's actions. It has been stated that monetary policy should be used as a primary tool for achieving macroeconomic goals to appease instabilities, which will increase monetary policy efficiency (MPE).

Many studies have discussed the implications of monetary policy on macroeconomic performance, while only a small proportion has analysed the effect of MPE (Nair and Anand, 2020). MPE refers to the power of monetary policy to affect the real economy to achieve its goals. Meanwhile, inefficiency is the degree to which performance deviates from the aim (inflation-output variability frontier). Efficiency is a strategy to reduce losses arising from applying monetary policy. Comparing the actual policy with the efficiency limit is one way to assess the efficiency of the central bank's policy (Purwanda and Rochana, 2017). MPE is considered efficient when it results in low output and fewer inflation fluctuations. Bastian & Setterfield (2015) stated that low and steady inflation fostered long-term output growth.

Meanwhile, high fluctuations in inflation cause social losses, which is a model called the loss function. Efficiency is an optimal policy measure to limit output growth so that inflation is not too high, stabilising growth. An optimal policy is a macroeconomic principle that produces a minimal loss function. Therefore, more stable inflation and growth, as well as a lesser deviation from the objective in both output and inflation, will benefit economic agents (Mahmendier et al., 2021).

The condition of the financial sectors in developing economies is a factor that influences MPE. According to Rubio and Carrasco-Gallego (2016), MPE depends on the extent of financial market development (FMD) because FMD is the expansion of a market participant's; size, effectiveness, stability, and financial system access. It refers to improvements in generating information about investment possibilities and capital allocation, monitoring companies and implementing; corporate governance, trading, diversification, risk management, mobilising and collecting savings, as well as facilitating the exchange of goods and services (Muhammad et al., 2016; Dutta and Meierrieks, 2021). This finance function influences; savings, investment decisions, and technological innovation, leading to economic growth.

FMD comprises enhancements to financial system operations, such as; pooling of savings, allocating money to productive ventures, monitoring those investments, risk diversification, and the interchange of commodities and services (Islam et al., 2021). Furthermore, FMD eliminates; informational asymmetries and financial limitations and increases risk sharing (Aluko and Opoku, 2022). It can improve financial systems' ability to absorb shocks and reduce cycle amplification. Additionally, Li et al. (2019) claimed that the development of financial markets in developing countries was rapid, and thus, there was a need to integrate their economies into international financial structures and markets. This urgency has emerged from the need to fund expansion and growth programs with international capital because domestic capital sources are typically limited and slow to generate. Therefore, FMD raises economic costs in the form of increased financial fragility due to the inefficiency and underdeveloped banking sectors of developing countries (Donaubauer et al., 2020).

The role of central banks as monetary authorities has changed significantly since the 2007-2008 global financial crisis (GFC). Due to the interdependence between monetary and financial system stability, central banks now function as controllers of financial system stability (Juhro et al., 2022). The effect of MPE and FMD on stability in developing countries has varied. This difference can be explained; first by the variety that reflects the various qualities of central banks in achieving their monetary policy objectives, as well as variations in the structure of macroeconomic variables. Secondly, there are varying FMD levels since they involve improving the financial system's; quantity, quality, and efficiency (Shaohua et al., 2021). Buch et al. (2019) and Bu et al. (2021) stated that a more developed financial market system leads to more efficient monetary policy. This situation means that FMD can help explain the differences in outcomes that may occur between countries with varying levels of financial system stability (Naceur et al., 2019). This outcome has consequences for stability because product innovations have risks that impact global and national financial systems (Brem et al., 2020). Therefore, it can be said that MPE and FMD greatly impact financial stability.

This study has investigated the link between; monetary policy, FMD, and stabilisation in the financial market. Previous studies have examined the effect of monetary policy on financial stability. However, none of them has assessed the effect of MPE on financial stability. This paper also investigates the interaction effect between MPE and FMD on financial stability. We suppose there is a substitute effect of MPE and FMD on financial stability. While MPE increases financial stability but the FMD decreases it. However, the interaction effect between MPE and FMD on financial stability is unrevealed. The main motivation for this study was to fill the gaps by providing empirical evidence on the partial and interaction effects of MPE and FMD on financial stability.

This approach in this study was different from existing literature as it used five perspectives. First, a new dataset for MPE was constructed for 63 developing countries, and the data were used in this empirical study. Second, the Chow and Roy-Zellner tests were used to validate the homogeneous parameter hypothesis of pooled least squares estimation following the approach of Anwar (2022). Third, the pooled mean group (PMG) estimator was applied to solve heterogeneity problems in the panel data. Pesaran et al. (1999) concluded that PMG methods capture the dynamics and parameter heterogeneity. Fourth, depending on income level, the sample was divided into two groups to evaluate whether MPE and FMD had a better impact on financial stability. Lastly, the effect of MPE and FMD on financial stability was robust, where a dynamic panel estimation was performed, and a favourable correlation was observed.

The remainder of this study is organised as follows. Section 2 details the constructions, methodology and models used in the analysis. An exploration of the data set that was employed is included in Section 3. Section 4 offers a discussion of the empirical results. Finally, Section 5 provides the present study's conclusion and offers suggestions for further study.

LITERATURE REVIEW

Using data from 24 countries, Cecchetti and Krause (2002) were among the first to establish quantitative indicators of central bank efficiency and macroeconomic achievements. The inflation-output variability trade-off was used to quantify macroeconomic performance and MPE. A disadvantage of this study was that it did not consider changes in policy management and their impact on macroeconomic outcomes. Furthermore, the study's period (1991–1998) excluded major economic events, such as the global financial crisis (GFC) of 2007-2008. Based on a sample of 24 nations and two time periods (1983-1990 and 1991-1998), Cecchetti et al. (2006) developed a technique to assess how changes in monetary policy impacted macroeconomic performance.

Isakova (2008) examined MPE in 3 Central Asian countries: the Kyrgyz Republic, Kazakhstan, and Tajikistan. The vector autoregressive model was used to analyse the effect of MPE on macroeconomic performance. The results showed that MPE promoted macroeconomic stability, such as; inflation and growth. Samba and Mbassi (2016) examined the relationship between financial market development and MPE in the Central African Economic and Monetary Community (CEMAC) between 1986 and 2009. They found that financial deepening had a significant impact on increasing MPE.

Meanwhile, the main measure of FMD: domestic credit by banks to the private sector, did not positively impact the efficiency of monetary policy. De Mendonca and Nascimento (2020) assessed the influence of economic globalisation and financial openness on MPE in 42 countries between 1990 and 2014 using a dynamic panel data estimation. Their results showed economic openness and integration played crucial roles in promoting higher efficiency in monetary policy.

Balcilar et al. (2022) used a quantile vector autoregression (QVAR) model to examine the MPE of 5 Asian countries (Japan, China, India, South Korea, and Hong Kong). The empirical findings corroborated the credit channel hypothesis for all samples, showing that central banks need not be concerned about a fall in MPE in high or low economic uncertainty conditions. Batuo et al. (2018) examined the link between FMD and financial instability in 41 African nations from 1985 to 2010. The analysis used the dynamic panel data model. The results concluded that FMD increased financial instability.

Previous studies, such as Thaker et al. (2013), and Akilo and Oni (2015), have examined the relationship between monetary policy and financial market stability. Thaker et al. (2013) used quarterly data from 1991 to 2011 and analysed the impact of macroeconomic factors on Malaysia's credit gap using a vector error-correction model (VECM) estimation. It was concluded that; the GDP, interest rates, and inflation contributed favourably to the credit gap. Akinlo and Oni (2015) used an error correction model estimation to investigate the key variables affecting the credit gap in Nigeria between 1980 and 2010. Their results showed that money supply and inflation were statistically significant determinants of the credit gap. Meanwhile, the credit gap was negatively associated with economic growth and interest rates.

DATA AND METHODOLOGY

Data

The credit gap was used as a proxy for financial stability, as suggested by Alessi and Detken (2018) and Suhendra and Anwar (2021), who stated that the rapid expansion of credit was an indication of an imminent financial crisis. The credit gap is calculated as the difference between the total amount of credit and its long-term trend by applying the Hodrick-Prescott (HP) filter. This study's first main explanatory variable was MPE, calculated using the Chechetti et al. (2006) approach. Furthermore, new datasets were constructed and used for 63 developing economies. Another primary explanatory variable was FMD. This study used the broad-based FMD measure developed by the IMF to account for all potential fluctuations in the financial system, adding a new dimension to previous literature. The FMD index of the IMF considers three factors related to financial institutions and markets: efficiency, access, and depth (Svirydzenka, 2016).

Central banks set interest rates to carry out their stance on monetary policy, and the datasets were obtained from the International Financial Statistics (IFS) of the International Monetary Fund (IMF). Higher interest rates lead to reduced demand for bank credit. The next control variable is inflation. This study followed Stepanyan and Guo (2011) regarding the effect of inflation on the credit gap. Inflation is expressed as a percentage change in the consumer price index over the previous year's equivalent period. The priori sign of inflation on the credit gap was positive, which suggested that inflation hindered financial stability because it increased uncertainty. This discrepancy between actual and potential output is known as the output gap. Therefore, the gap was computed as the percentage divergence between actual and potential outputs.

Table 1 Variable Definitions

Variable Name	Abbreviation	Type	Measurement	Sources	Unit of Measurement
Credit Gap	CG	Dependent	The gap between the actual and the potential credit to GDP	Authors' calculation	Per cent
Monetary Policy Efficiency	MPE	Independent	Calculated by the inflation variation and the optimal output variation	Authors' calculation	Per cent
Financial Market Development	FMD	Independent	Index of depth, access, efficiency, and stability of financial systems	The World Bank (World Development Indicator)	Per cent of GDP
Interest Rate	IR	Independent	Central bank interest rate	The World Bank (World Development Indicator)	Per cent
Inflation	INF	Independent	The change in the current consumer price index	The World Bank (World Development Indicator)	Per cent
Output Gap	OG	Independent	The gap between the actual and the potential GDP	Authors' calculation	Per cent

Table 2 Descriptive Statistic

Variable	Mean	Std Dev.	Min.	Max.
Credit Gap	-4.0998	14.942	-37.600	13.200
Monetary Policy Efficiency Index	8.1759	3.3702	3.7500	17.620
Financial Market Development	0.1472	0.1263	0.0000	0.3398
Interest Rate	4.9717	1.9563	-5.3200	7.9564
Inflation	6.0549	3.5249	-0.5957	16.366
Output Gap	41.954	5.1273	36.001	57.261

Econometrics Methodology

The models employed an econometric technique known as panel data regression. Macroeconomic variables, such as; interest rate, inflation, and the output gap, that impact financial stability were incorporated when assessing the effects of MPE and FMD on the credit gap. The models employed in this study are as follows:

$$CG_{it} = \alpha_0 + \alpha_1 MPE_{it} + \alpha_2 IR_{it} + \alpha_3 Inf_{it} + \alpha_4 OG_{it} + \varepsilon_{it} \quad (1)$$
$$CG_{it} = \alpha_0 + \alpha_1 FMD_{it} + \alpha_2 IR_{it} + \alpha_3 Inf_{it} + \alpha_4 OG_{it} + \varepsilon_{it} \quad (2)$$
$$CGi_t = \alpha_0 + \alpha_1 MPE_{it} + \alpha_2 FMD_{it} + \alpha_3 IR_{it} + \alpha_4 Inf_{it} + \alpha_5 OG_{it} + \varepsilon_{it} \quad (3)$$
$$CG_{it} = \alpha_0 + \alpha_1 MPE_{it} + \alpha_2 FMD_{it} + \alpha_3 [MPE_{it} * FMD]_{it} + \alpha_4 IR_{it} + \alpha_5 Inf_{it} + \alpha_6 OG_{it} + \varepsilon_{it} \quad (4)$$

Simple ordinary least squares (OLS) regressions were used with quarterly data throughout 1997–2008 to examine the effects of MPE and FMD on the credit gap. Furthermore, the interest rate, inflation, and output gap were used as control variables because they affect bank credit as determinants of financial stability. Model (1) shows the effect of MPE on the credit gap, while Model (2) reveals the effect of FMD on the credit gap. In Model (3), both effects of MPE and FMD on the credit gap were regressed. An interaction between MPE and FMD was included in Model (4). It was expected that MPE would negatively influence the credit gap while FMD would positively impact it. We hypothesize that MPE and FMD have a substitution impact on credit gap. Furthermore, we suppose that the interaction effect of MPE and FMD has a negative effect on credit gap.

The poolability test was used to determine whether the equation's parameter varied from nation to nation. A pooled least squares model represented a behavioural equation with the same parameters in time and across groups. On the other hand, the unconstrained model exhibited the same behaviour but with varied parameters over time and between groups (Baltagi, 2008). For each cross-section, the unrestricted model was:

$$y_i = Z_i \delta_i + u_i \; i = 1,2, \dots, N \quad (5)$$

where $y_i' = (y_{i1}, \dots, y_{iT}), Z_i = [iT, X_i]$ and $X_i \; is \; T \; x \; K.$ $\delta_i' \; is \; 1 \; x \; (K+1),$ and u_i is $Tx1.$ δ_t' is the change depending on the specific equation being used. The constrained model can be described as follows:

$$y = Z\delta + u \quad (6)$$

where $Z' = (Z_1', Z_2', \dots, Z_{N'}'), u' = (u_1', u_2', \dots, Z_{u'}').$

The poolability test's null hypothesis was:

$$H_0\text{: } \delta_i = \delta \text{ against } H_1\text{: } \delta_i \neq \delta \quad (7)$$

When the pooling least squares estimator was employed, it was not poolable because the assumption of homogeneity was not held. Therefore, it was decided to use the pooled mean group (PMG) estimator developed by Pesaran et al. (1999). Using an Autoregressive Distributive Lag structure (ARDL) and estimating the ARDL approach as an Error Correction Model, Pesaran et al. (1999) created the PMG estimation. Such an estimation covered both the long and short-run effects. Every cross-section may have intercepts, short-run coefficients, and error variances allowed by the PMG estimator, but long-run coefficients are always subject to the same restriction. Furthermore, the PMG model was based on the ARDL approach ($p,q,q,\dots,q$).

$$y_{it} = \sum_{j=1}^{p} \lambda_{ij}\, y_{i,t-1} + \sum_{j=0}^{q} \delta'_{ij}\, \boldsymbol{x}_{i,t-j} + \mu_i + \varepsilon_{it} \tag{8}$$

Following Pesaran et al. (1999), a dynamic heterogeneous panel was estimated based on the ARDL approach (p_i, q_i, k_i, l_i, m_i) model.

$$\Delta y_{it} = \phi_i\, \boldsymbol{y}_{i,t-1} + \boldsymbol{x}_i \beta_i + \sum_{j=1}^{p-1} \lambda^{*}_{ij}\, \Delta\, y_{i,t-j} + \sum_{j=1}^{q-1} \delta^{*}_{ij}\, \Delta\, \boldsymbol{x}_{i,t-j} + \mu_i + \varepsilon_{it} \tag{9}$$

Thus, Eq (1) becomes:

$$CG_{it} = \alpha_i + \sum_{j=1}^{p_i} \beta_{ij}\, CG_{i,t-1} + \sum_{j=0}^{q_i} \delta_{ij}\, MPE_{i,t-j} + \sum_{j=0}^{k_i} \theta_{ij}\, IR_{i,t-j} + \sum_{j=0}^{l_i} \varphi_{ij}\, INF_{i,t-j} + \sum_{j=0}^{m_i} \partial_{ij}\, OG_{i,t-j} + \varepsilon_{it} \tag{10}$$

$$\begin{aligned}\Delta CG_{it} = {} & \phi_i \left(CG_{i,t-1} - \alpha^{*}_i - \delta^{*}_i\, MPE_{it} + \theta^{*}_i \boldsymbol{X}_{it}\right) + \sum_{j=1}^{p_{i-1}} \beta^{**}_{ij}\, \Delta CG_{i,t-j} + \sum_{j=0}^{q_{i-1}} \delta^{**}_{ij}\, \Delta MPE_{i,t-j} \\ & + \sum_{j=0}^{k_{i-1}} \theta^{**}_{ij}\, \Delta \boldsymbol{X}_{i,t-j} + \varepsilon_{it}\end{aligned} \tag{11}$$

where Eq (10) is the long-run equation and Eq (11) is the short-run equation of PMG estimator.

Dynamic panel data was used to show that the effect of MPE and FMD on the credit gap was robust. Furthermore, Arellano and Bond's (1991) First Difference GMM (FD-GMM) estimation was used to account for potential endogeneity.

$$Y_{i,t} - Y_{i,t-1} = \gamma\left(Y_{i,t-1} - Y_{i,t-2}\right) + \beta\left(X_{i,t} - X_{i,t-1}\right) + \left(\varepsilon_{i,t} - \varepsilon_{i,t-1}\right) \tag{12}$$

EMPIRICAL RESULTS

Pooled Least Squares Estimation

The pooled least square estimation was used to estimate four models based on Equation (1-4).

Table 3 Pooled Least Squares Estimation

Variable	Model 1	Model 2	Model 3	Model 4
MPE	-0.2665 (0.1675)		-0.3043 (0.1690)	0.3973 (0.3185)
FMD		0.3709 (0.2562)	0.4328 (0.2585)	0.3006 (0.0302)
MPE*FMD				-0.5938 (0.4125)
IR	0.0110 (0.0133)	0.0079 (0.0131)	0.0127 (0.0134)	0.0076 (0.0134)
INF	-0.0004** (0.0002)	-0.0004** (0.0002)	-0.0004** (0.0002)	-0.0004** (0.0002)
OG	1.0482 (1.1387)	0.9905 (1.1399)	0.9504 (1.1400)	1.1617 (1.1391)
Constant	0.0337 (0.0754)	-0.1432* (0.0755)	-0.0517 (0.0910)	-0.5734*** (0.1429)
No. of Cross-sections	63	63	63	63

Firstly, the four models were estimated in Equation (1-4) by running a POLS estimation. The results showed that the effects of MPE and FD on the credit gap were insignificant. Furthermore, the effect of FMD on the credit gap was positive but insignificant in Models 2 – 4, while the interaction effects of MPE and FD on the credit gap were negative and insignificant. These findings showed that MPE and FMD did not explain the credit gap in developing countries, assuming a homogeneity coefficient between countries. According to Anwar (2022), the insignificant effect of the explanatory variables on the dependent variables might be caused by inappropriate econometric estimation. Therefore, the assumption of the POLS estimation needed to be checked.

Poolability Tests

Under the presumptions of homoskedasticity and normally distributed errors, this study conducted a poolability test, as presented in Table 4. The Chow test was performed on Models 1 through 4, and the results showed that the probability for each group is 0.000. Hence, the null hypothesis was rejected. Secondly, the Roy-Zellner test for Equation (1) - (4) was conducted, with a p-value of 0.0000 for each test. Based on the findings, the hypothesis of slope homogeneity was rejected. Therefore, it was concluded that the panel data could not be pooled in terms of the cross-section.

Table 4 Poolability Test

Variable	Model 1	Model 2	Model 3	Model 4
Chow Test	8.41***	7.26***	7.92***	6.31***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
	[248,7626]	[248,7626]	[310,7563]	[310,7563]
Roy-Zellner Test	443.28***	415.74***	563.61***	521.48ww2***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
	[248]	[248]	[310]	[310]
No of Cross-Sections	63	63	63	63
No of Observations	7,812	7,812	7,812	7,812

Notes: *** denotes significance at the 1% level. Figures in parentheses are p-values.

Result of Pooled Mean Group Estimation

The pooled mean group estimation was performed since it was determined to solve the heterogeneity problem in the panel data, and the results are reported in Table 5. The findings revealed that the Akaike Info Criterion (AIC) was used to select the best lag lengths for each variable in the PMG estimate, where the optimal lag of the ARDL model indicated (1,1,1,1,1). The error correction term (ECT) was statistically significant with a negative sign, indicating that any short-run deviation would adjust and move back to the long-run equilibrium path. This negative and significant coefficient denoted that the explanatory factors in the model tended to converge in the long run when the credit gap was subject to a shock and adjusted to the long-run equilibrium. The findings of this study showed that the short-run disequilibrium would be corrected quarterly by 2.5% to 10.4%, and the PMG estimator reached a long-run equilibrium in about two years.

The long-run coefficients showed that MPE negatively and significantly affected the credit gap. Therefore, a more efficient monetary policy would generate better stability in the financial system. This finding was consistent with Cecchetti et al. (2006), Isakova (2008) and Balcilar et al. (2022). It was found that in the long term, MPE had a negative and significant effect on the credit gap. These findings provided additional support for the contention that financial stability and monetary policy are mutually reinforcing in the long run, which was consistent with the work of Cecchetti and Krause (2002), Billi and Vredin (2014), and Nair and Anand (2020). However, this result was inconsistent with Criste and Lupu (2014), who found no significant relationship between monetary policy and financial stability. They stated that macroprudential policies were more appropriate for limiting financial risks than monetary policies. Their finding was in line with the short-run result of this study that there was no significant effect of MPE on the credit gap. This outcome is because monetary policy affects production and output in the short run (Azad and Serletis, 2021; Goshit, 2022).

The results found a contrasting effect of MPE and FMD on financial stability, which supported its substitution. This outcome implies that a more efficient monetary policy with a less developed financial institution would be more stable in the market system in developing countries. This result was in line with Samba and Mbassi (2016) and Karim et al. (2021), who stated that the effect of MPE and FMD on financial stability was a substitute. However, these findings contradicted Ma and Lin (2016), who found a complementary effect of MPE and FMD on financial stability.

Table 5 Pool Mean Group Estimation

Variable	Model 1	Model 2	Model 3	Model 4
Long-run coefficients				
MPE	-1.9298*** (0.3861)		-1.8179*** (0.3462)	-1.9619*** (0.5104)
FMD		2.7574** (1.2987)	2.1578** (1.0637)	2.2096*** (0.9631)
MPE*FMD				-7.4261*** (1.0268)
IR	1.6524*** (0.4273)	-0.0164 (0.0294)	0.0061 (0.0313)	0.0287 (0.0335)
INFLATION	-1.2321*** (0.1746)	-0.0006** (0.0003)	-0.0008** (0.0003)	-0.0006** (0.0003)
OUTPUT GAP	-4.0638 (8.6722)	5.1423*** (1.4229)	3.9449*** (1.3882)	6.6398*** (1.3989)
Short-run coefficients				
ECT_{t-1}	-0.0247*** (0.0039)	-0.1039*** (0.0054)	-0.0985*** (0.0051)	-0.0952*** (0.0045)
Δ(MPE)	-237.8810 (154.6078)		-222.8698 (162.4961)	-211.4121 (167.9613)
Δ(FMD)		22.2614*** (5.4718)	-28.3170 (50.6886)	-15.9981 (15.5236)
Δ(MPE*FMD)				-36.7881 (31.4021)
Δ(IR)	0.0927 (0.0917)	-0.3097* (0.1827)	-0.3135* (0.1839)	-0.3808 (0.2386)
Δ(INFLATION)	-0.1006** (0.0486)	-0.0407 (0.0276)	0.5756 (0.6359)	0.4986 (0.5594)
Δ(OUTPUT GAP)	-1.2719 (5.7835)	-5.6184 (4.3049)	33.2682 (41.0894)	31.0873 (36.2448)

Notes: *** and ** denote the significance at the 1% and 5% levels, respectively. Figures in parentheses are standard errors.

The interaction coefficient between MPE and FMD reported in Model (4) indicated that the interaction term was statistically significant and adversely influenced financial stability. The negative coefficient estimates implied that MPE and FMD are substitutes for reducing financial stability. Therefore, when FMD is low, improving MPE has a bigger impact and vice-versa. This finding was in line with the above result to support the existence of the substitution effect of MPE and FMD on financial stability in developing economies.

The interest rate was found to have a significant positive effect on the credit gap. This outcome meant that a higher rate would lead to more financial instability. The fact that the interest rate serves as a benchmark for commercial banks when setting loan rates explains why it favours the credit gap. Therefore, the credit interest rate also increases when the central bank rate rises. The commercial bank is compelled to expand the amount of credit it offers since its profits are rising. This outcome is consistent with the earlier study of Kim and Mehrotra (2018).

On the other hand, the influence of inflation on the credit gap was negative and significant. This outcome meant that higher inflation generated a lower credit gap. This result supported a previous study by Sethi et al. (2020). Monetary policymakers have agreed that instability in the monetary system is reflected in inflation. Therefore, the credit supply will decline when inflation rises, narrowing the credit gap. Sethi et al. (2020) stated that when interest rates are high, consumers and businesses will not take long-term credit, reducing nominal credit. This study found that the output gap positively influenced the credit gap. This result supported a prior study by Shingjergji and Hyseni (2015). Increasing the output gap indicates that the economy is expanding, leading to a rise in loans. Consequently, there would be a rise in investment, leading to a greater need for more capital from banks and an increase in lending and the credit gap.

Split Sample

In this section, Models (1) – (4) were re-estimated for split samples and divided into two groups: low-middle and high-middle-income countries. The split sample was based on the world bank's country classification by income. Table 6 presents the influence of MPE and FMD on the credit gap when the sample countries were divided into the two groups. It was found that MPE negatively affected the credit gap for both groups, where the magnitude was greater in the high than in the low-middle-income nations. This result implied that the influence of MPE on the credit gap is more prominent in the high-middle income group. This finding was in line with Alpanda and Zubairy (2019) and Karim et al. (2021), who found that MPE was the main factor in reducing the credit gap in high-income countries. Furthermore, MPE has increased the overall stability of the financial markets of developing countries, with the effect being greater in high-middle-income nations. This outcome reflects that governments in these countries conduct more efficient monetary policy and resilience, which reduces instability in the financial market.

Table 6 Pooled Mean Group Estimation (Split Sample)

	Model 1		Model 2		Model 3		Model 4	
Variable	Low Middle Income	High Middle Income	Low Middle Income	High Middle Income	Low Middle Income	High Middle Income	Low Middle Income	High Middle Income
Long-run coefficients								
MPE	-1.2367***	-3.1609***			-1.1521***	-2.3627***	-1.2941**	-3.2363***
	(0.3995)	(0.7032)			(0.4020)	(0.6465)	(0.6523)	(1.1966)
FMD			1.0025**	3.0904**	2.7044**	1.1566**	2.6461**	1.3033**
			(0.4821)	(1.4001)	(1.3662)	(0.4880)	(1.2539)	(0.5366)
MPE*FMD							-0.4314***	-3.6555**
							(0.1878)	(1.2083)
IR	-0.0445	0.0532	-0.0516	0.0030	-0.0377	0.0136	-0.0147	0.0816*
	(0.0403)	(0.0403)	(0.0403)	(0.0300)	(0.0407)	(0.0309)	(0.0436)	(0.0470)
INFLATION	-0.0044**	-0.0004	-0.0046**	-0.0001	-0.0049**	-0.0002	-0.0047**	-0.0004
	(0.0018)	(0.0003)	(0.0018)	(0.0003)	(0.0020)	(0.0003)	(0.0019)	(0.0003)
OUTPUT GAP	0.8782	10.4866***	2.7443	12.0461***	0.2843	12.0266***	0.5431	13.4923***
	(1.6725)	(2.3782)	(1.6371)	(2.4554)	(1.6623)	(2.3971)	(1.6462)	(1.9039)
Short-run coefficients								
ECT_{t-1}	-0.0991***	-0.1126***	-0.1025***	-0.1092***	-0.1002***	-0.0975***	-0.0972***	-0.0968***
	(0.0069)	(0.0107)	(0.0068)	(0.0110)	(0.0068)	(0.0079)	(0.0074)	(0.0072)
Δ(MPE)	-3.7815	3.0587			-3.2688	-5.8589	-0.4387	-2.8186
	(2.7528)	(2.1022)			(2.3223)	(4.2595)	(24.2362)	(2.1894)
Δ(FMD)			12.5111**	15.5268***	12.9156**	9.3362	13.8578**	8.9271
			(4.6962)	(4.5441)	(4.5402)	(13.1350)	(6.2846)	(8.1207)
Δ(MPE*FMD)							-7.4643**	-9.3936**
							(3.5392)	(4.1832)
Δ(IR)	-0.3459	-0.2144	-0.3357	-0.2718	-0.3465	-0.2693	-0.4475	-0.2599
	(0.2725)	(0.1905)	(0.2670)	(0.2636)	(0.2715)	(0.2089)	(0.3653)	(0.1973)
Δ(INFLATION)	-0.0398*	-0.0457	-0.0232	-0.0734	-0.0297	-0.0154	-0.0263	-0.0125
	(0.0238)	(0.0605)	(0.0213)	(0.2636)	(0.0222)	(0.0164)	(0.0237)	(0.0137)
Δ(OUTPUT GAP)	-3.4317	-2.0617	-5.4319**	-1.9415	-4.4578*	4.2305	-1.6522	3.6433
	(2.4581)	(8.2520)	(2.1279)	(1.9069)	(2.3883)	(6.8097)	(3.0503)	(4.2664)

Notes: *** and ** denote the significance at the 1% and 5% levels, respectively. Figures in parentheses are standard errors.

As shown in Table 6, the effect of FMD on the credit gap was positive and significant. This result implied that higher development led to more credit gaps. However, the magnitude of the effect of FMD on the credit gap was bigger in high-middle-income countries because their financial market development is more advanced. The higher level of FMD also resulted in a greater role in market dynamics, which has increased risk because high-middle-income nations integrate deeply into the global financial system. Therefore, increasing vulnerability in the market. The findings of this study supported the results of Bist (2018).

The interaction effect between MPE and FMD led to a reduced credit gap with a higher magnitude in high-middle-income countries. The interaction effect between MPE and FMD led to a reduced credit gap. This outcome meant an increase in the interaction of efficient monetary policy and FMD significantly stabilised the financial market. The interaction effect was higher in high-middle-income countries than in low-middle-income countries. This outcome was because governments can manage MPE and FMD to reduce risks in the financial market.

Robustness Test

A robustness assessment was provided regarding the impacts of MPE and FMD on the credit gap in this section using instrumental variable (IV) estimates. Arellano and Bond's (1991) First Difference GMM (FD-GMM) estimator was used to account for potential endogeneity. In the first difference equation, the MPE was instrumented using lagged data since it was considered endogenous. The control variables were considered exogenous since their levels were measured.

The empirical results of the Arellano-Bond FD-GMM estimation are presented in Table 7. The first-order autocorrelation [AR(1)] was significant. In contrast, the second-order autocorrelation [AR(2)] failed to reject the null hypothesis. Therefore, the FD-GMM estimation was consistent. The Sargan test was used to confirm the reliability of the instrumental variables set. The absence of a correlation between the instruments and the residuals was the Sargan test's null hypothesis. The test did not reject the null hypothesis. Hence, the FD-GMM estimator was valid when the AR(1), AR(2), and Sargan tests showed that FD-GMM satisfied the panel IV model requirements.

Table 7 demonstrates that MPE significantly reduced the credit gap, while FMD had a positive effect. Furthermore, the interaction between MPE and FMD significantly negatively affected the credit gap. These findings supported the primary estimation of the present study, which was made using a PMG estimation for both the full and split samples. The findings implied that MPE was a key factor in reducing financial instability in developing countries.

Table 7 Panel GMM Estimation (Full Sample)

Variable	Model 1	Model 2	Model 3	Model 4
Credit Gap (-1)	0.9313***	0.9309***	0.9300***	0.9287***
	(0.0024)	(0.0024)	(0.0025)	(0.0024)
MPE	-0.8162***		-0.8121***	-0.0256***
	(0.0841)		(0.0840)	(0.0062)
FMD		0.9455***	0.9260***	2.4669***
		(0.1982)	(0.1981)	(0.3222)
MPE*FMD				-3.3007***
				(0.5447)
IR	-0.0145**	-0.0146**	-0.0057	-0.0049
	(0.0059)	(0.0062)	(0.0062)	(0.0062)
Inflation	-0.0010***	-00011***	-0.0010***	-0.0010***
	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Output Gap	0.7905**	0.6849**	0.5876*	0.8634***
	(0.3058)	(0.3087)	(0.3086)	(0.3117)
AR (1) (p-value)	0.0000	0.0000	0.0000	0.0000
AR (2) (p-value)	0.7712	0.7638	0.7682	0.7738
Sargan Test (p-value)	0.6863	0.9970	0.6951	0.7081
No. of Cross-sections	63	63	63	63
No. of Observations	6,906	6.906	6.906	6,906

Notes: *** and ** denote the significance at the 1% and 5% levels, respectively. Figures in parentheses are standard errors.

Table 8 Panel SYS-GMM Estimation (Full Sample)

Variable	Model 1	Model 2	Model 3	Model 4
Credit Gap (-1)	0.1650***	0.1841***	0.1799***	0.1815***
	(0.0034)	(0.0074)	(0.0072)	(0.0056)
MPE	-1.0415***		-0.8494***	-0.6674***
	(0.2939)		(0.0840)	(0.2009)
FMD		2.1253***	2.5359***	2.8538***
		(0.3008)	(0.4540)	(0.4130)
MPE*FMD				-0.9170***
				(0.1006)
IR	0.0358***	0.0393***	0.0481	0.0482
	(0.0031)	(0.0062)	(0.0051)	(0.0064)
Inflation	0.0003***	00004***	0.0003***	0.0002***
	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Output Gap	-5.0627***	-6.1514***	-6.0594***	-5.9008***
	(0.3058)	(0.4132)	(0.4767)	(0.4619)
AR (1) (p-value)	0.0032	0.0031	0.0031	0.0030
AR (2) (p-value)	0.2712	0.2271	0.265	0.2245
Sargan Test (p-value)	1.0000	1.0000	1.0000	1.0000
No. of Cross-sections	63	63	63	63
No. of Observations	6,906	6.906	6.906	6,906

Notes: *** and ** denote the significance at the 1% and 5% levels, respectively. Figures in parentheses are standard errors.

Blundell and Bond (1998) stated the importance of utilising initial conditions in generating efficient estimators of the dynamic panel data model. They developed the System-GMM Estimation. The System-GMM estimator solved the problem of weak instruments in the FD-GMM estimator. The results of the System-GMM estimation are in Table 8. This study found that the credit gap's lag coefficient was smaller than the FD-GMM estimation. This result meant that the System-GMM estimator was more efficient than the FD-GMM estimator. This study found a similar result for the effect of MPE and FD on financial stability. The effect of MPE on the credit gap was negative and significant, while financial development had a positive and significant effect on it. The interaction between MPE and FD negatively and significantly affected the credit gap.

CONCLUSION

This study investigated the interdependence between MPE, FMD, and financial stability with two significant findings. The first showed that the effects of MPE and FMD on financial stability were heterogeneous across the sampled countries. Furthermore, MPE increased financial stability, whereas FMD caused a decrease. These results were consistent with the findings of previous studies. Secondly, it has been found that MPE and FMD are substitutes for each other to boost financial stability because both variables have opposite sign coefficients. When one is lower, the marginal effect of strengthening the other on financial stability is larger.

The results of this study have significant implications for future studies and policymaking. Firstly, improving MPE will result in increased financial stability, indicating that policies can be implemented, leading to gains in the presence of limited FMD. Secondly, promoting MPE leads to greater advantages to increase financial stability in low-middle income nations. This outcome implies that governments have a significant motivation to implement MPE. The results emphasised the need to account for the heterogeneity of the dependent variable's impacts across countries when investigating the effects of MPE and FMD on financial stability. Further studies should consider other financial stability indicators, such as; dummy financial crisis and asset price volatility.

REFERENCES

Akinlo, A. E. and Oni, I. O., 2015. Determinants of bank credit growth in Nigeria 1980-2010. *European Journal of sustainable development*, *4*(1), pp. 23-23.

Alessi, L. and Detken, C., 2018. Identifying excessive credit growth and leverage. *Journal of Financial Stability*, *35*, pp. 215-225.

Alpanda, S. and Zubairy, S., 2019. Household debt overhang and transmission of monetary policy. *Journal of Money, Credit and Banking*, *51*(5), pp. 1265-1307.

Aluko, O. A. and Opoku, E. E. O., 2022. The financial development impact of financial globalization revisited: A focus on OECD countries. *International Economics*, *169*, pp. 13-29.

Anwar, C. J., 2022. Heterogeneity Effect of Central Bank Independence on Inflation in Developing Countries. *Global Journal of Emerging Market Economies*, p. 09749101221082049.

Arellano, M. and Bond, S., 1991. Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. *The review of economic studies*, *58*(2), pp. 277-297.

Azad, N. F. and Serletis, A., 2021. Spillovers of US monetary policy uncertainty on inflation targeting emerging economies. *Emerging Markets Review*, p. 100875.

Balcilar, M., Ozdemir, Z. A., Ozdemir, H., Aygun, G. and Wohar, M. E., 2022. Effectiveness of monetary policy under the high and low economic uncertainty states: evidence from the major Asian economies. *Empirical Economics*, pp. 1-29.

Baltagi, B. H., 2008. *Econometric analysis of panel data*, Vol. 4. Chichester: John Wiley & Sons.

Bastian, E. F. and Setterfield, M., 2015. A simple analytical model of the adverse real effects of inflation. *Journal of Post Keynesian Economics*, *38*(4), pp. 637-665.

Batuo, M., Mlambo, K. and Asongu, S., 2018. Linkages between financial development, financial instability, financial liberalisation and economic growth in Africa. *Research in International Business and Finance*, *45*, pp. 168-179.

Bernanke, B. S., 2020. The new tools of monetary policy. *American Economic Review*, *110*(4), pp. 943-83.

Billi, R. M. and Vredin, A., 2014. Monetary policy and financial stability–a simple story. *Sveriges Riksbank Economic Review*, p. 2.

Bist, J. P., 2018. Financial development and economic growth: Evidence from a panel of 16 African and non-African low-income countries. *Cogent Economics & Finance*, *6*(1), p. 1449780.

Blot, C., Creel, J., Hubert, P., Labondance, F. and Saraceno, F., 2015. Assessing the link between price and financial stability. *Journal of Financial Stability*, *16*, pp. 71-88.

Blundell, R. and Bond, S., 1998. Initial conditions and moment restrictions in dynamic panel data models. *Journal of Econometrics*, *87*(1), pp. 115-143.

Brem, A., Nylund, P. and Viardot, E., 2020. The impact of the 2008 financial crisis on innovation: A dominant design perspective. *Journal of Business Research*, *110*, pp. 360-369.

Bu, C., Rogers, J. and Wu, W., 2021. A unified measure of Fed monetary policy shocks. *Journal of Monetary Economics*, *118*, pp. 331-349.

Buch, C. M., Bussiere, M., Goldberg, L. and Hills, R., 2019. The international transmission of monetary policy. *Journal of International Money and Finance*, *91*, pp. 29-48.

Cecchetti, S. G. and Krause, S., 2002. Central bank structure, policy efficiency, and macroeconomic performance: exploring empirical relationships. *Review-Federal Reserve Bank of Saint Louis*, *84*(4), pp. 47-60.

Cecchetti, S. G., Flores-Lagunes, A. and Krause, S., 2006. Has monetary policy become more efficient? A cross-country analysis. *The Economic Journal*, *116*(511), pp. 408-433.

Cloyne, J. and Hürtgen, P., 2016. The macroeconomic effects of monetary policy: a new measure for the United Kingdom. *American Economic Journal: Macroeconomics*, *8*(4), pp. 75-102.

Coibion, O., Gorodnichenko, Y. and Weber, M., 2022. Monetary policy communications and their effects on household inflation expectations. *Journal of Political Economy*, *130*(6), pp. 000-000.

Criste, A. and Lupu, I., 2014. The central bank policy between the price stability objective and promoting financial stability. *Procedia Economics and Finance*, *8*, pp. 219-225.

de Mendonca, H. F. and Nascimento, N. C., 2020. Monetary policy efficiency and macroeconomic stability: Do financial openness and economic globalization matter?. *The North American Journal of Economics and Finance*, *51*, p. 100870.

Dhiman, R., 2018. Identifying the key indicators of financial stability and financial development: a review of financial service sector. *Asian Journal of Management Science and Applications*, *3*(4), pp. 302-320.

Donaubauer, J., Neumayer, E. and Nunnenkamp, P., 2020. Financial market development in host and source countries and their effects on bilateral foreign direct investment. *The World Economy*, *43*(3), pp. 534-556.

Dutta, N. and Meierrieks, D., 2021. Financial development and entrepreneurship. *International Review of Economics & Finance*, *73*, pp. 114-126.

Goshit, G. G., Jelilov, G., Iorember, P. T., Celik, B. and Davd-Wayas, O. M., 2022. Asymmetric effects of monetary policy shocks on output growth in Nigeria: Evidence from nonlinear ARDL and Hatemi-J causality tests. *Journal of Public Affairs*, *22*(2), p. e2449.

Isakova, A., 2008. Monetary policy efficiency in the economies of Central Asia. *Czech Journal of Economics and Finance*, *58*(11-12), pp. 525-553.

Islam, M. A., Hossain, M. N., Khan, M. A., Hasan, M. R. and Hassan, M. R., 2021. Financial development and foreign direct investment nexus: A systematic review of literature. *International Journal of Research in Business and Social Science (2147-4478)*, *10*(4), pp. 226-238.

Juhro, S. M., Narayan, P. K. and Iyke, B. N., 2022. Understanding monetary and fiscal policy rule interactions in Indonesia. *Applied Economics*, pp. 1-19.

Karim, Z. A., Basa, D. E. K. and Karim, B. A., 2021. The relationship between financial development and effectiveness of monetary policy: New evidence from ASEAN-3 countries. *Journal of Financial Economic Policy*.

Kim, S. and Mehrotra, A., 2018. Effects of monetary and macroprudential policies: Evidence from four inflation targeting economies. *Journal of Money, Credit and Banking*, *50*(5), pp. 967-992. https://doi.org/10.1111/jmcb.12495

Li, C., Pervaiz, K., Asif Khan, M., Ur Rehman, F. and Oláh, J., 2019. On the asymmetries of sovereign credit rating announcements and financial market development in the European region. *Sustainability*, *11*(23), p. 6636.

Ma, Y. and Lin, X., 2016. Financial development and the effectiveness of monetary policy. *Journal of Banking & Finance*, *68*, pp. 1-11.

Malmendier, U., Nagel, S. and Yan, Z., 2021. The making of hawks and doves. *Journal of Monetary Economics*, *117*, pp. 19-42.

Muhammad, N., Islam, A. R. M. and Marashdeh, H. A., 2016. Financial development and economic growth: an empirical evidence from the GCC countries using static and dynamic panel data. *Journal of Economics and Finance*, *40*(4), pp. 773-791.

Naceur, S. B., Candelon, B. and Lajaunie, Q., 2019. Taming financial development to reduce crises. *Emerging Markets Review*, *40*, p. 100618.

Nair, A. R. and Anand, B., 2020. Monetary policy and financial stability: should central bank lean against the wind? *Central Bank Review*, *20*(3), pp. 133-142.

Pesaran, M. H., Shin, Y. and Smith, R. P., 1999. Pooled mean group estimation of dynamic heterogeneous panels. *Journal of the American Statistical Association*, *94*(446), pp. 621-634.

Purwanda, E. and Rochana, S. H., 2017. Measurement of the efficiency of monetary policy. *Economic Journal of Emerging Markets*, *9*(2), p. 138.

Rubio, M. and Carrasco-Gallego, J. A., 2016. The new financial regulation in Basel III and monetary policy: A macroprudential approach. *Journal of Financial Stability*, *26*, pp. 294-305.

Samba, M. and Mbassi, C., 2016. Does Financial Development Spur Macroeconomic Policy Efficiency in the Cemac Countries? An Empirical Evaluation. *Business and Economics Journal*, *7*(2), pp. 1-7.

Sethi, D. and Acharya, D., 2020. Monetary Policy and Financial Stability: The Role of Inflation Targeting. *Australian Economic Review*, *53*(1), pp. 50-75.

Shaohua, Z., Yahya, F., Pham, H. and Waqas, M., 2021. Do transparency and anti-monopoly policies matter for financial development? Evidence from a panel ARDL-PMG approach. *Journal of Applied Economics*, *24*(1), pp. 1-16.

Shingjergji, A. and Hyseni, M., 2015. The impact of macroeconomic and banking factors on credit growth in the Albanian banking system. *European Journal of Economics and Business Studies*, *1*(2), pp. 113-120.

Stepanyan, V. and Guo, K., 2011. *Determinants of bank credit in emerging market economies*. International Monetary Fund.

Suhendra, I. and Anwar, C. J., 2021. The Role of Central Bank Rate on Credit Gap in Indonesia: A Smooth Transition Regression Approach. *The Journal of Asian Finance, Economics, and Business*, *8*(1), pp. 833-840.

Suhendra, I. and Anwar, C. J., 2022. The response of asset prices to monetary policy shock in Indonesia: A structural VAR approach. *Banks and Bank Systems*, *17*(1), pp. 104-114.

Svirydzenka, K., 2016. *Introducing a new broad-based index of financial development*. International Monetary Fund.

Thaker, H. M. T., Ee, T. S., Sin, C. F. and Man, W. H., 2013. The Macroeconomic Determinants of Bank Credit in Malaysia: An Analysis Via The Error Correction Model (ECM. *Skyline Business Journal*, *9*(1).

APPENDIX

Table A1 List of Countries

No	Country	Category	
		Low Middle Income	High Middle Income
1	Algeria	√	
2	Argentina		√
3	Bangladesh	√	
4	Belize	√	
5	Benin	√	
6	Bolivia	√	
7	Botswana		√
8	Brazil		√
9	Cameroon	√	
10	China		√
11	Colombia		√
12	Comoros	√	
13	Congo Rep	√	
14	Costa Rica	√	
15	Cote D'Ivoire	√	
16	Dominican Rep		√
17	Ecuador		√
18	Egypt	√	
19	El Salvador	√	
20	Eswatini	√	
21	Fiji		√
22	Gabon		√
23	Georgia		√
24	Ghana	√	
25	Guatemala		√
26	Guyana		√
27	Haiti	√	
28	Honduras	√	
29	India	√	
30	Indonesia	√	
31	Jamaica		√
32	Kenya	√	
33	Lao PDR	√	
34	Lesotho	√	
35	Malaysia		√
36	Mauritania	√	
37	Mauritius		√
38	Mexico		√
39	Mongolia	√	
40	Morocco	√	
41	Myanmar	√	
42	Namibia		√
43	Nepal	√	
44	Nicaragua	√	
45	Nigeria	√	
46	Pakistan	√	
47	Panama		√
48	Papua New Guinea	√	
49	Paraguay		√
50	Peru		√
51	Philippines	√	
52	Samoa	√	
53	Senegal	√	
54	Solomon Island	√	
55	South Africa		√
56	Sri Lanka	√	
57	Suriname		√
58	Thailand		√
59	Tunisia	√	
60	Turkey		√
61	Vanuatu	√	
62	Vietnam	√	
63	Zambia	√	