

Does Institutional Quality matter to the Inflation Targeting-Financial Stability Nexus?

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Abstract

This study examines the quality institutions role played in the inflation targeting- financial stability nexus. A sample of 65 developed and developing countries, including 33 inflation-targeting countries (10 developed and 23 developing), and 32 non-inflation-targeting countries (12 developed and 20 developing), during the 1996 - 2020 period. Using Two Step GMM estimation, results show that inflation targeting stimulates financial stability. This positive relationship between inflation targeting and financial stability is proved, regardless of the inflation targeting regime in place; Soft or Full-Fledged. Results from institutional quality variables prove that inflation-targeting countries with poor institutional quality are financially vulnerable, and that for good institutional quality are able to promote financial stability.

JEL classification number: E4, E52, E58.

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1 Introduction

Origins of financial crises and the upheavals they created around the world have prompted monetary authorities to rethink their policies to maintain price stability, regardless of the success of macroeconomic policies undertaken to stabilize the economy during eventless periods. However, price stability appears insufficient for financial stability. Consequently, with the latest financial crisis in 2007-2008, a new controversy has emerged linking the financial sphere to monetary policy. In this regard, the notion of financial stability remains at the heart of the concerns of monetary authorities, as they worry about whether and how to react to financial turmoil. The academic literature indicates that monetary authorities face two main types of monetary policy conduct, those of discretionary and rule-based conduct. This distinction between such types of conduct led researchers to wonder about the ideal choice between a discretionary and an explicit rule-based policy (Ozan et al, 2017). Furthermore, to address the problems of inflationary bias, time inconsistency and non-ideal responses to economic distortions, it is adequate to use explicit rules. They are seen as solutions to guard against credibility of monetary authorities (Aaron & Yetman, 2018; Tas & Peker, 2017). In this regard, authors have assumed that a contingent rule is able to determine the role played by the monetary policy instrument. However, the rule policy is able to make monetary authorities able to remedy cyclical dysfunctions while ensuring optimal flexibility.

Against these proposals, inflation targeting, adopted first by New Zealand in 1990, can be considered one of these rules. Inflation targeting, as a new monetary policy, has gained momentum. It focuses on anchoring a more explicit and aggressive target variable, which tends to satisfy the fundamental objective of price stability. This monetary approach has spread to both developed and developing countries. Moreover, recently monetary authorities have reformulated concerns about macroeconomic and financial objectives. Hence, this new macroeconomic framework emphasizes, first, the importance of clear and adequate regulation against financial instability, and second, the broad relationship between financial and monetary stability. Accordingly, it is crucial to reassess the role of the Central Bank in terms of its primary objective, which is price stability, simultaneously with financial stability. It is true that banks are considered as the protectors of the economy, but they failed to support economic recovery. Therefore, this paper highlights the relationship between inflation targeting and financial stability, assessing the role of institutional quality in this relationship.

From a review of the literature, we assume that:

H1: Inflation targeting positively impact financial stability.

H2: Institutional quality positively stimulate the impact of inflation targeting on financial stability

The paper is divided into five sections. The second section develops the theoretical background of financial instability. We briefly discuss the explanatory theories of financial instability and place inflation targeting in that stream of research. Then, after reviewing theory of inflation targeting as presented by its founders Svensson (1997, 1999), Mishkin (2000), and Bernanke et al (1999), we present a range of monetary regimes. Moreover, we discuss the different policy underpinnings of inflation targeting, such as choice of price index, choice of target, and target range. Section 3 provides an overview of the literature on the relationship between inflation targeting, financial stability and institutional quality. Section 4 presents the main statistical and empirical results. Finally, section 5 concludes the article.

2 Theoretical Background

For the concept financial instability, two fundamental theories are highlighted, namely; the "Debt-Deflation" of Fisher (1933) or the trap of over-indebtedness through deflation, and the "financial instability hypothesis" of Minsky (1982), a revision of the first theory. According to Fisher's (1933) "Debt-Deflation", financial instability is described as follows: during a period of economic expansion, in order to invest more, economic agents increase their debts. This leads to an increase in prices, which in turn leads to a decrease in the present value of loans, as well as, it favors over-indebtedness. Moreover, in order to remedy their

debts, economic agents will sell a large quantity of their assets. This causes a decrease in asset prices, and an increase in the value of loans, making the volume of asset sales increase further. As a result, the debt deflation mechanism leads to a sharp decline in prices, which gives rise to a crisis followed by an economic recession. To conclude, Fisher (1933) states that there are two factors that explain financial instability via debt deflation; over-indebtedness of economic agents and an exacerbated fluctuations in prices. For Kindleberger (1978), although financial crises have different degrees and different effects on the economy, yet they have the same peculiarity, i. e, all these crises go through the same triggering process. In this regard, the triggering process of financial instability runs through three stages. The first stage is when economic agents make positive expectations, which leads to a transition from a recessionary phase to a phase of economic growth followed by excessive indebtedness and an exaggerated purchase of financial assets. This is likely to lead to an increase in asset prices. The second stage begins when economic agents are over-indebted and when their expectations are considered pessimistic. This leads to a decrease in asset prices, as economic agents tend to access liquidity even if this means they will suffer extreme losses in return. The third stage occurs when decrease in prices leads to deflation, which leads to an increase in the effective debts of economic agents, thus creating a financial crisis.

According to Minsky's (1982) "financial instability hypothesis", following an increase in interest rates, over-indebtedness of companies leads to financial instability. Minsky explains this outcome by dividing firms into three categories: "Hedge Finance", which designates firms that are hedged or not indebted, "Speculative Finance", or firms whose role is speculation, and finally "Ponzi Finance", which refers to firms that have to leverage debts in order to refinance their debts. Moreover, when interest rates increase, Speculative Finance and Ponzi Finance companies tend to worsen conditions, where these two categories of companies are forced to sell their assets on a massive scale, unfruitfully, in order to repay their debts and their interests. Such a choice leads to a fall in the prices of financial assets, which is considered a precursor of financial instability. Moreover, there are a variety of reasons explaining financial crises, the most important of which is market imperfections, as mentioned by Mishkin (1991). These imperfections appear in the form of information asymmetry between lenders and borrowers, that may lead to an interruption in the intermediation circuit and an imperfect allocation of financial resources, triggering hence financial instability. Thus, informational asymmetry has two forms: adverse selection and moral hazard. Adverse selection is a hidden type of risk, which relates to the choice of the right borrower by an uninformed lender. It is a kind of opportunism that comes before the contract is concluded, arising from the possession of information that is available only to one party. This results in the retention of a bad borrower at the expense of a good one. Moral hazard is a problem that arises after the signing of the contract and will occur when one of the contracting parties is unable to monitor the behavior of the other, which may impact sustainability of the project. In this regard, several factors may intensify informational asymmetry and thus lead to major financial crises. In addition to market imperfections, there are also factors like deterioration of banks' balance sheets, an increase in interest rates, increase in uncertainty of financial markets, and deterioration of the balance sheets of the non-financial sector. In addition, the financial system has a fundamental activity that is financial intermediation. Because of this role, the financial system faces a huge risk of financial instability. This phenomenon was presented by Diamond & Dybvig (1983) who show that, following a loss of confidence in financial institutions, the latter are faced with an unexpected massive withdrawal. Subsequently, financial intermediaries will agree to sell their assets even in an extreme loss situation. The results are an immoderate decrease in the prices of financial assets and a deterioration of the image of financial intermediaries. As a result, a panic situation for the financial system arises, hence a financial crisis. Given these theories explaining the factors causing financial instability, it is appropriate to conclude that the financial environment is changing. Therefore, it is crucial to consider that globalization, rapid deregulation, financial innovations, such as futures, options and swaps that can be used for speculative purposes, are likely to intensify financial risks.

3 Review of the literature

The economics literature suggests that there is a link between monetary policy and financial stability. First, the conventional view, also called the "divine coincidence principle", asserts that financial stability is guaranteed by monetary stability (Blanchard & Galí, 2007; Schwartz, 1995). In this regard, inflation targeting is considered an ideal strategy before, during and after financial crises, since these latter are caused by exogenous factors such as imperfect information in financial markets. Accordingly, the reaction of CBs to financial imbalances is undesirable, except when they manifest themselves as precursors of future inflation (Bernanke & Gertler, 2000; Svensson, 2010). Frappa & Mésonnier (2010) showed that inflation targeting is linked to an increase in the annual house prices in 17 industrialized countries between 1980 and 2007. Furthermore, Borio *et al.* (2003) used the "credibility paradox" and showed that when the bank establishes a credible commitment to inflation, this can lead the economy to financial vulnerability via the accumulation of financial imbalances. In other words, the higher the credibility of the CB's anti-inflationary commitment, the more inflation expectations move towards the monetary policy target. As a result, economic agents consider that achieving the CB's objective is assured, which provokes a high level of risk-taking behaviour. If the CB does not react quickly by raising its interest rates, asset prices will continue to rise, thus amplifying financial imbalances and the possibility of a future crisis. On the other hand, at the time of an increase in asset prices, the regulator bodies encounter difficulties in assessing the fundamental reasons behind these financial imbalances, and mainly determining how an increase in interest rates is able to affect aggregate output (Bean, 2009). In this regard, Borio & Zhu (2008), Dell'ariccia *et al.* (2017), Jiménez *et al.* (2014) advocated a perfect monetary policy, such as implementing an explicit financial stability objective (Issing, 2009; White, 2006), because risk-taking behavior negatively relates to interest rates prior to the onset of global financial crises. In this regard, Fazio *et al.* (2015) studied the relationship between inflation targeting and banking system stability. They examined a sample of 5500 banks from 70 countries and they controlled for a multitude of factors, such as legal origin. They proved that, for inflation-targeting countries, banking systems are stronger, even in the presence of systemically more important banks. These banks are less disrupted than non-target banks during instances of global liquidity shortages. However, their study did not consider the role of institutional quality, which was the focus of another stream of research.

For the link between institutional quality and inflation targeting, a number of authors have attempted to assess the ability to illuminate the debate on the impact of inflation targeting on financial stability. First, Kim & Mehrotra (2017) implicitly examined the role of institutional quality by determining whether monetary and macroprudential policy shocks alternatively explain their differentiated effects in Asian countries and Pacific CBs that have explicitly adopted financial stability objectives. Their results indicate a short-run trade-off between the objective of monetary and financial stability, although they found evidence indicating that macro prudential policy shocks allowed inflation to stabilize or monetary policy shocks promoted financial stability. Then, such a finding suggests that institutional quality may have an impact on financial stability, as the effectiveness of macroprudential policy reflects the robustness of the regulatory system, and therefore the quality of its institutions. Second, Fouejieu (2017) more explicitly examined the role of institutions in the relationship between inflation targeting and financial instability in emerging markets. In this regard, the author focused on a composite indicator of financial instability in terms of its systemic nature. Indeed, assessment of political stability, law and order, and CB independence was developed by the author, using dynamic and non-dynamic linear equations. The author, however, found no effects for political stability and CB independence. Political stability showed a negative index suggesting that a healthy political environment is able to lower financial instability. Third, Hove *et al.* (2017) examined several dimensions of institutional quality. They studied whether monetary, tax, and financial institutions are effective in achieving inflation targets in emerging economies, and they found that improving institutional quality reduces the probability of missing the inflation target. Nevertheless, monetary policy works best in countries with trustworthy institutions. In addition, Fazio *et al.* (2018) examined the effect of institutional quality on financial stability in inflation-targeting versus non-targeting countries. They used banking data from 66 countries between 1998 and 2014 to estimate nonlinear equations that relate multiple

measures of financial instability within the banking sector to a set of control variables, as well as interaction terms. Their results prove that there is an inverted U-shaped relationship between inflation targeting and financial stability, as stability is not significantly affected in countries with good institutional quality, while countries with average institutional quality seem to benefit from this policy. Furthermore, Minea *et al.* (2020) studied the relationship between institutional and macroeconomic reforms, ignoring the assumption that institutions are exogenous. Their study covered a sample of 53 developing countries over the 1984-2007 period. Taking into account the interaction between monetary regimes and endogenous institutions, they found that implementation of an inflation targeting policy is able to improve institutional quality. This finding was validated by an empirical analysis that used econometric methods to examine the macroeconomic performance of the inflation targeting regime. Indeed, although it is not a precondition for the implementation of an inflation targeting policy in developing countries, institutional quality improved significantly after the adoption of inflation targeting. In the same vein, a more recent study by Owoundi *et al.* (2021) examined how institutional quality affects the relationship between inflation targeting and financial stability in a sample of 63 countries over the 1990-2014 period. The main results indicate that inflation-targeting countries with poor institutional quality are less financially stable than non-targeting countries, and this is true only for emerging and developing countries with little or no macroprudential policies. When these policies are put in place, this effect is reversed or becomes negligible (zero), as soon as the quality of institutions is improved. Then, such findings call for an explicit mandate for CBs in the informant countries to simultaneously maintain inflation and financial stability through a moderate use of macroprudential instruments. The authors used a Principal Component Analysis (PCA). The choice of this technique bears on the fact that it is less restrictive than conventional econometric methods, and that PCA is a multivariate method that reduces the dimension of a set of qualitative data in order to synthesize the essential information into new variables called principal components. The latter are linear combinations of the initial variables. The weights are determined through eigenvectors that represent a correlation matrix or a covariance matrix. In this way, the components are independent of each other and each component represents a dimension of the observed phenomenon.

In order to simplify the interpretation of the index, the authors focused on "instability". This index is called the composite index of financial instability (CIFI), which has four sub-indicators given by the following equation:

$$CIFI_t = \sum_{i=1}^4 a_i X_{it} \quad (1)$$

Where ;

a_i is the weight of each financial indicator, X_{it} is the matrix of the four financial sub-indicators namely the Financial Development Index (FDI), Economic Vulnerability Index (EVI), Financial Strength Index (FSTI) and World Governance Index (WGI). To estimate CIFI, no need for a large number of variables as this mechanism causes serious difficulties in interpretation, since the number of sub-indicators increases. To study the relationship between inflation targeting, institutional quality and financial stability, the regression equation is as follows;

$$CIFI_{i,t} = \alpha IT_{i,t}^j + \beta INST_{i,t}^k + \theta X_{i,t} + \mu_i + \vartheta_t + \varepsilon_{i,t} \quad (2)$$

Where;

$CIFI_{i,t}$ is the composite index of financial instability in country i during period t , $IT_{i,t}^j$ is a dummy variable that takes one if the country targets inflation and zero otherwise. To properly study the impact of institutional quality, it is essential to define levels of institutional quality. Each proxy can be replaced by a nominal variable that has four categories and is defined by quartiles. The nominal variable is defined as follows;

$$Level_n = \begin{cases} \text{if } INST \leq q_1 \\ \text{if } q_1 < INST \leq q_2 \\ \text{if } q_2 < INST \leq q_3 \\ \text{if } INST > q_3 \end{cases} \quad (3)$$

Such a procedure helps to highlight the negative effects of inflation targeting on financial stability when institutional quality is poor. It develops the necessary analytical steps that would determine the extent to which institutional quality and macro prudential policies affect the relationship between inflation targeting and financial stability. Using parametric and non-parametric approaches, it was found that both emerging and developed countries have an interest in adopting this strategy to improve the quality of their institutions (Bordo & Siklos, 2014). As a result, inflation-targeting economies with poor institutional quality are financially less stable than non-targeters, and only this is true for emerging and developed countries, especially when macroprudential policies are not used much or not at all. Then, absence of macroprudential policies leads to increased negative effects for financial stability. This trend tends to disappear in developed countries, even when they do not implement macroprudential arrangements. If these policies are implemented in developed countries, the instability effect of inflation targeting works in the opposite direction or becomes non-existent as the quality of institutions evolves. According to the authors, the main feature that helps explain this finding is the fact that the CB is considered the only controlling entity in several emerging and developed countries (Barth et al, (2013). This prevents the emergence of financial stability effects, as poor institutional quality in these economies helps to increase the sensitivity of their supervisors to policy interventions. As a result, inflation targeting does not reduce uncertainty about price levels in the medium and long term, which negatively affects the financing of the real economy and the decisions of actors to borrow or lend.

Previous studies have used many econometric approaches, such as the Smooth Transition Autoregressive Model (STAR) of Kapetanios *et al.* (2006), and the Error Correction Model (ECM) of Balke & Fomby (1997). Moreover, these methods emphasize the long-run cointegration relationships between the variables under study (Hadhri, 2021). A large number of studies has validated the non-linearity of the CB reaction function, like in Martin & Milas (2013), and Taylor & Davradakis (2006). Similarly, Elsayed *et al.* (2022) apply in their study the nonlinear ARDL model suggested by Shin *et al.* (2014) in order to examine the nonlinear relationship between monetary policy and financial stability in the Gulf Cooperation Council (GCC) in the short and long run, using a new composite index of financial stability in order to control for financial fragilities and crises periods. Therefore, this study examines the monetary policy reaction functions for each of these GCC countries, Bahrain, Kuwait, Saudi Arabia and the United Arab Emirates, by applying the Nonlinear Autoregressive Distributed Lag (NARDL) model, using quarterly data during the 2006-Q4 - 2020-Q2 period. Unlike other econometric methods, this approach takes into account asymmetric effects in the short and long run, by incorporating positive and negative decompositions of the partial sum of independent variables. Furthermore, it is able to efficiently model relationships in small samples and/or between variables with distinct degrees of integration.

The NARDL model is written as follows;

$$r_t = \sum_{k=1}^p \varphi_k \Delta r_{t-k} + \sum_{k=0}^q (\vartheta_k^+ X_{t-k}^+ + \vartheta_k^- X_{t-k}^-) + v_t \quad (4)$$

With;

$x_t = [fsi_t]$ is defined so that $x_t = x_0 + x_t^+ + x_t^-$, φ_k represents the autoregressive coefficient, ϑ_k^+ and ϑ_k^- are lag coefficients distributed in an asymmetric way, v_t is the error term, and x_t is decomposed around a threshold equal to zero that helps distinguish between the effects of positive and negative shocks.

Performing the set of unit root tests (Augmented Dickey Fuller (ADF) and Phillips–Perron (PP), the results show that the response of the monetary authority to the deviation of inflation from its target value, the output gap, or change in the exchange rate, differs in magnitude, sign, and significance across the GCC countries. Furthermore, the results indicate that the response of monetary authorities appears to be significant for positive or negative shocks to financial stability. However, they respond differently in the short or long run. In this regard, for GCC countries, it makes sense to apply the augmented Taylor rule introducing financial stability as an additional objective of monetary policy. Nowadays, the subject of

inflation targeting and financial stability has been a highly debated topic, and it still remains so, given the amount of research conducted, and the battery of econometric techniques used.

4 Methodology

Our study examines a sample of 65 developed and developing countries, including 33 inflation-targeting countries (10 developed countries, 23 developing countries) and 32 non-targeting countries (12 developed countries, 20 developing countries). As a result, the study examined three panels: Panel A, which includes the entire sample; Panel B, which includes developed countries (inflation-targeting and non-targeting); and Panel C, which contains developing countries (inflation-targeting and non-targeting). The study period stretches from 1996 to 2020. The choice of this sample bears on the level of development of the countries, as well as the structural similarities that between them in each group (cultural proximity) as suggested by the conditional convergence hypothesis of the neoclassical growth theory. Appendix A.1 reports the date of adoption of the inflation targeting regime for each country, as well as the nature of the regime in place. Data are of annual frequency extracted from the official website of the World Bank; WDI (World Development Indicators) and WGI (Worldwide Governance Indicators), as well as Federal Reserve Economic Data.

The above-mentioned variables are estimated via the following econometric model:

$$FS_{i,t} = \alpha_0 + \alpha_1 IT_{i,t} + \alpha_2 IQ_{i,t} + \alpha_3 X_{i,t} + \varepsilon_{i,t} \quad (5)$$

With:

FS: Financial Stability, which represents the dependent variable. The non-performing loans (*NPL*) ratio and *Z*-scores are used as proxies for financial stability.

IT: a dummy variable that takes 1 when an inflation targeting policy is implemented, 0 otherwise.

IQ: Institutional quality, which is based on figures taken from the World Bank's Global Governance Indicators (WGI) prepared by Kaufmann *et al.* (2011) and is shown in Table 1. It is measured by the indicators of Control of corruption (CC), Government effectiveness (GE), Political stability and absence of violence/terrorism (PSAVT), Regulatory quality (RQ), Rule of law (RL) and Voice and accountability (VA).

X: control variables which represents Gross Domestic Product (GDP), Trade Openness (TO), Financial Development (FD), Financial Openness (FO) and Foreign Direct Investments (FDI).

ε_t : Error term.

A description of the data on the dependent variable, independent variables and control variables is given in Appendix A.2 Our model presented above will be estimated using dynamic panel data. Then, our econometric technique used is the GMM- Two Step (Generalized Moment Method). This technique was developed by Arrelano & Bond (1991), and Arrelano & Bover (1995).

5 Data analysis, results and discussion

5.1 Descriptive Analysis

Table 1. below reports the *Z*-score, the *NPL* the institutional quality variables statistics for the entire sample, showing fairly low means, minimum, maximum and standard deviation. These results show all the indicators of the financial stability and quality of institutions are centrally placed. Moreover, while most of the variables have at least 1,200 available observations, the number of available observations for the *NPL* measure of financial stability is quite problematic, with 984 available observations.

Table 1: Descriptive statistics

Variables	Obs	Mean	Std.Dev	Min	Max
Z-score	1294	1.096008	.2963905	-.8835118	1.985338
NPL	984	0.10	0.20	0.00	1.10
CC	1,430	1.713498	.2908016	-.2966652	2
GE	1,430	1.766974	.2380322	.3809066	2
RL	1,429	1.708821	.3251584	-.3283796	2
RQ	1,429	1.764437	.2586936	-.3180634	2
PSAVT	1,430	1.596323	.3801801	-.3242825	2
VA	1,430	1.73615	.2611424	.6716204	2

Source : The author

5.2 The Results

The results in Table 2. show that the coefficient of inflation targeting (IT) is negative and significant at the 1% and 5% levels, in three out of six regressions. However, this coefficient appears to be positive and significant at the 5% level in only one regression. Indeed, for panel A, the IT coefficient is negative and significant for both the Z-score and NPL variables. These results are mixed, which may result from the heterogeneity of the sample. Furthermore, for the developed countries (Panel B), the IT coefficient is positive and significant in terms of Z-score, but negative and significant in the presence of NPL. This proves that inflation targeting stimulates financial stability and dampens instability. This is true for the Z-score and for NPL respectively. We can conclude that a certain level of development is required in order to achieve financial stability. For developing countries (Panel C), the IT coefficient is negative but not significant for both the Z-score and NPL. Then, for developing countries inflation targeting has no effect on financial stability/instability. This finding reveals that inflation targeting comes with an increase in financial stability. In other words, inflation targeting positively affects financial stability, which confirms Schwartz's (1995) hypothesis that there is a positive correlation between price stability and financial stability. This finding challenges the "credibility paradox" highlighted by several authors; Borio *et al.* (2003), Berger & Kießmer (2013), Alpanda & Honig (2014).

Furthermore, the "credibility paradox" is a concept that was introduced by Borio *et al.* (2003), which emphasizes that price stability is detrimental to financial stability. The author states that "controlling inflation may contribute to changes in the dynamics of the system that may conceal the risks to which the economy is exposed". As a result, Borio *et al.* (2003) indicates that a fairly low and stable inflation over time, triggered by a credible monetary policy, leads to an exaggerated sense of security and shapes the behavior of agents. In conclusion, our results corroborate those of Fazio *et al.* (2015), Blanchard & Galí (2007); Schwartz (1995), who found that inflation targeting ensures financial stability (positive link between inflation targeting and financial stability). Then, there is no trade-off between inflation targeting and financial stability, disclaiming the assumption that inflation targeting contributes to financial fragility.

Nevertheless, our results are inconsistent with those of Umar & Wen (2020), Fazio *et al.* (2018), who validated a negative relationship between inflation targeting and financial stability. For the control variables, it should be noted that the coefficient of the GDP variable is positive and significant at the 1% level, in a single regression. This means that GDP growth rate stimulates financial stability.

As for the TO variable, its coefficient is negative and significant at the 1% level, only in one regression, and it is positive and significant at the 5% level in the last regression. Then, trade openness negatively affects financial stability in developed countries, while it positively impacts it in developing countries. The FD variable has a negative and significant coefficient at the 5% level, in two out of six regressions. Moreover, this coefficient is positive and significant at the 1% level in a single regression. This finding shows that in developing countries, financial development has a negative effect on financial stability. However, this effect becomes positive in developed countries. Finally, the coefficient of the FDI variable is negative and significant at the 1% and 10% levels in three regressions. This proves that net inflows of investments may heighten financial instability.

Table 2: Z-score and NPL Estimation Results according to the adopted definition of financial stability

	Panel A		Panel B		Panel C	
	Z-score	NPL	Z-score	NPL	Z-score	NPL
Lag FS	0.720*** (0.0810)	-2.053*** (0.659)	1.016*** (0.0530)	-0.833** (0.361)	0.593*** (0.0551)	-1.337*** (0.451)
IT	-0.0700*** (0.0233)	-1.125** (0.572)	0.0726** (0.0321)	-0.951** (0.466)	-0.0285 (0.0244)	-0.710 (0.442)
GDP	0.0127 (0.0102)	0.0114 (0.0337)	0.0590*** (0.0103)	0.0673 (0.0936)	0.0112 (0.0109)	-0.0190 (0.113)
TO	0.0422 (0.142)	0.764 (0.703)	-0.567*** (0.182)	0.798 (0.824)	-0.104 (0.137)	2.186** (0.962)
FD	-0.0162 (0.0477)	-1.259** (0.576)	0.127*** (0.0401)	2.614 (1.714)	0.0346 (0.0741)	-1.201** (0.597)
FDI	-0.0111 (0.0150)	-0.0154 (0.0749)	-0.0822*** (0.0218)	-0.392*** (0.0988)	-0.0338* (0.0204)	0.277 (0.359)
FO	0.0342 (0.0424)	0.812 (0.636)	-	-	0.0496 (0.0339)	0.398 (0.276)
Constant	0.272 (0.251)	3.649* (2.094)	0.750** (0.336)	-4.784 (3.381)	0.588** (0.239)	0.0184 (1.542)

***, **, * Significance at 1, 5, and 10%, respectively

In Table 2, the results for Panel A are mixed and the results for Panel C are insignificant. This finding allowed us to subdivide our sample according to the nature of the inflation targeting regime, namely; Soft & Full-Fledged. Then, we retained only inflation targeting countries. Indeed, the results in Table 3² show that for panel A, the IT coefficient is positive and significant at the 1% level, in both regimes (Soft & Full-Fledged). Similarly, for panel C the IT coefficient is positive and significant at the 1% level, both in the Soft and Full-Fledged regimes. The results for these two panels are consistent, which allows us to conclude that inflation targeting stimulates financial stability. In other words, there is a positive relationship between inflation targeting and financial stability regardless of the inflation targeting regime. This finding confirms those of Fazio, Tabak & Cajueiro (2015), on the other hand, it invalidates the results of Fazio *et al.* (2018) among others, who indicate that inflation targeting negatively affects financial stability.

² Note that Panel B has been removed from Table. 8 because of inconclusive results.

Table 3: Z-score estimation results according to the inflation targeting regime

Panel Regime	Panel A		Panel C	
	Soft	Full-Fledged	Soft	Full-Fledged
Lag FS	-0.00137 (0.00413)	0.240** (0.0960)	-0.00154 (0.00423)	0.255** (0.112)
IT	1.002*** (0.00656)	0.689*** (0.0820)	0.994*** (0.00461)	0.601*** (0.0833)
GDP	0.000716 (0.00157)	0.0153 (0.0214)	-0.00361 (0.00772)	0.0329 (0.0298)
TO	0.0176 (0.0747)	0.361 (0.337)	0.0479 (0.125)	-0.719 (0.446)
FD	0.00556 (0.0183)	0.450** (0.225)	0.0212 (0.0232)	0.657*** (0.220)
FDI	6.79e-05 (0.00201)	-0.0441 (0.0311)	0.00135 (0.00381)	-0.127*** (0.0367)
FO	-0.00199 (0.0156)	-0.367** (0.187)	-0.0104 (0.0181)	0.0716 (0.0792)
Constant	-0.0381 (0.134)	-1.155* (0.661)	-0.103 (0.212)	0.331 (0.829)

***, **, * Significance at 1, 5, and 10%, respectively

The results in Table 4³ show that, for panel A the IT coefficient is positive and significant at the 1% level in all regressions. On the other hand, the variables CC and RL have negative and significant coefficients at the 5% level. This means that corruption control and rule of law negatively affect financial stability. However, the coefficient of QR is positive and significant at the 1% level. Then, regulatory quality has a positive effect on financial stability. The coefficient on GE is negative but not significant. The coefficients of the variables PSAVT and VA are positive but not significant. This allows us to point out that government effectiveness, political stability and absence of violence/terrorism, as well as, voice and accountability have no effect on financial stability.

For Panel C, the IT coefficient is positive and significant at the 1% level in all regressions. The variables CC, LR and PSAVT have negative coefficients and are significant at the 1% and 5% levels, respectively. Accordingly, control of corruption, rule of law, political stability and absence of violence/terrorism have a negative effect on financial stability. The coefficient of QR is positive and significant at the 1% level. Such a finding indicates that regulatory quality positively affects financial stability. In addition, the coefficients of the GE and VA variables are negative and positive respectively but not significant. Bearing on these results, we can conclude that inflation targeting comes with an increase in financial stability. More importantly, most indicators of institutional quality are significant. For example, control of corruption, rule of law, and political stability and absence of violence/terrorism reduce financial stability. In other words, these indicators drive financial instability. Nevertheless, regulatory quality increases financial stability, with a highly significant coefficient, for both panels A and C. We can assume that this finding can be explained by poor institutional quality. Then, countries with poor institutional quality are financially vulnerable. Our results are consistent with those of Fazio *et al.* 2018), and Owoundi *et al.* (2021).

³ Note that Panel B has been removed from Table. 9 because of inconclusive results.

Table 4: Z-score estimation results according to the quality of institutions under the Full-Fledged regime

	Panel A						Panel C					
Lag FS	0.0790* (0.0455)	0.0198 (0.0410)	0.0736*** (0.0245)	0.138*** (0.0378)	0.0243 (0.0596)	-0.00474 (0.0561)	0.0406 (0.0990)	0.000816 (0.0498)	0.0413 (0.0719)	0.0381 (0.0477)	0.0194 (0.0428)	-0.0763 (0.161)
IT	0.681 (0.04)	0.664 (0.03)	0.634* (0.03)	0.743** (0.045)	0.654* (0.03)	0.700*** (0.0369)	0.648 (0.09)	0.701** (0.076)	0.707** (0.103)	0.682* (0.07)	0.584* (0.13)	0.786*** (0.124)
CC	-0.230** (0.101)	-	-	-	-	-	-0.406*** (0.132)	-	-	-	-	-
GE	-	-0.159 (0.0994)	-	-	-	-	-	-0.145 (0.314)	-	-	-	-
RL	-	-	-0.178** (0.0857)	-	-	-	-	-	-0.351** (0.152)	-	-	-
RQ	-	-	-	1.249*** (0.202)	-	-	-	-	-	1.001*** (0.384)	-	-
PSAVT	-	-	-	-	0.0339 (0.0536)	-	-	-	-	-	-0.301** (0.132)	-
VA	-	-	-	-	-	0.0911 (0.119)	-	-	-	-	-	0.231 (0.460)
GDP	0.0152 (0.00948)	0.00224 (0.00662)	0.0105** (0.00533)	-0.00323 (0.00490)	0.0101* (0.00538)	0.0101* (.00603)	0.00773 (0.0129)	0.00433 (0.0104)	0.0746** (0.0357)	0.0449 (0.0526)	0.0621*** (0.0168)	0.0225 (0.117)
TO	0.30 (0.15)	0.08 (0.13)	0.18 (0.11)	0.126 (0.096)	0.10 (0.14)	0.0958 (0.132)	0.1 (0.40)	-0.202 (0.301)	0.502 (0.365)	-0.10 (0.23)	-0.025 (0.34)	0.551 (1.089)
FD	0.484*** (0.0890)	0.418*** (0.0756)	0.481*** (0.0575)	0.00997 (0.0545)	0.409*** (0.0796)	0.370*** (0.0697)	0.591*** (0.148)	0.494*** (0.169)	0.494*** (0.208)	0.350** (0.157)	0.907*** (0.248)	0.245 (0.299)
FDI	-0.068 (0.01)	-0.044 (0.01)	-0.061 (0.01)	-0.0489 (0.017)	-0.036 (0.01)	-0.0427*** (0.0180)	-0.076 (0.01)	-0.0725 (0.023)	-0.0695 (0.034)	-0.040 (0.03)	-0.013 (0.03)	-0.0150 (0.0366)
FO	-0.120*** (0.0384)	-0.0988*** (0.0319)	-0.0931*** (0.0336)	-0.121*** (0.0391)	-0.108*** (0.0285)	-0.0760** (0.0315)	-0.123* (0.0729)	-0.0438 (0.0799)	-0.260** (0.109)	-0.133*** (0.0464)	-0.387*** (0.113)	-0.194** (0.0910)
Constant	-0.691 (0.22)	-0.2 (0.20)	-0.519 (0.16)	-2.379* (0.403)	-0.623 (0.20)	-0.660*** (0.211)	-0.2 (0.77)	0.145 (0.554)	-0.787 (0.329)	-1.860 (0.66)	-0.42 (0.52)	-1.466 (2.098)

In Table 5, we introduced a new variable called the Composite Index of Institutional Quality (CIIQ) that includes six indicators of institutional quality. For panel A, the coefficient of CIIQ is negative but not significant. This may be due to the heterogeneity of the sample, since it contains both developed and developing countries. For Panel B, the coefficient of this index appears positive and significant at the 5% level. This indicates that the composite index of institutional quality has a positive and significant effect on financial stability. This proves that in developed countries, institutional quality promotes financial stability. For Panel C, the coefficient of CIIQ is negative and significant at the 10% level. This means that, in developing countries, institutional quality negatively affects financial stability. Then, institutional quality is detrimental to financial stability. This allows us to conclude that good institutional quality is able to boost financial stability, while poor institutional quality is able to hinder financial stability. In other words, countries with poor institutional quality are less financially stable than those with good institutional quality. Our finding is consistent with that of Owoundi *et al.* (2021).

Table 5: Z-score Estimation results according to the composite index of institutional quality

	Panel A	Panel B	Panel C
Lag FS	0.592*** (0.204)	0.801*** (0.0652)	0.573*** (0.0780)
IT	-0.161 (0.140)	0.0605 (0.0858)	0.0452 (0.0368)
CIIQ	-0.999 (0.837)	1.720** (0.747)	-0.269* (0.153)
GDP	-0.445* (0.264)	0.0654* (0.0381)	0.0228 (0.0388)
TO	-0.623 (1.040)	0.377*** (0.133)	0.174 (0.159)
FD	-0.439 (0.319)	-0.952*** (0.175)	0.0209 (0.0921)
FDI	-0.0395 (0.207)	-0.0331** (0.0141)	-0.0184 (0.0220)
FO	0.417** (0.210)		0.0437 (0.0425)
Cste	4.011* (2.120)	-1.765 (1.268)	0.508* (0.297)

***, **, * Significance at 1, 5, and 10%, respectively

To resume, as per our two main results, (1) targeters with poor institutions are less financially stable than non-targeters. (2) Institutional quality determines the financial instability outcome of inflation targeting. These findings are in line with those of several authors namely Owoundi *et al.* (2021), Fazio & Cajueiro (2015), Blanchard & Galí (2007), and Schwartz (1995).

6 Conclusion

The main objective of a Central Bank is to ensure price stability. Therefore, the Central Bank's mission is to control money supply in order to avoid inflation. To this end, an inflation targeting strategy is essential to achieve this aim. Given the evolution of the economic context and a growing financial liberalization, it has become clear that the role of the Central Bank is not only limited to maintaining price stability, but also it should ensure financial stability. Therefore, financial stability is considered the second most important objective for a central bank.

Our study examined a sample of 65 developed and developing countries, including 33 inflation-targeting countries (10 developed and 23 developing), and 32 non-inflation-targeting countries (12 developed and 20 developing), during the 1996 - 2020 period. Moreover, our sample is split into three panels; Panel A, which contains the entire sample, Panel B, which includes only developed countries (inflation targeters and non-targeters), and Panel C, which includes all developing countries (inflation targeters and non-targeters). We also included the adoption dates of inflation targeting for each country, as well as the nature of the regime in place (Soft or Full-Fledged). Moreover, we defined a set of variables of interest and control and their sources. Then, our model was estimated using the dynamic panel data model, GMM- Two Step. The first result we found is that inflation targeting stimulates financial stability. Hence, there is a positive relationship between inflation targeting and financial stability. This finding has been supported by several authors (Owoundi *et al.* (2021), Fazio & Cajueiro, (2015), Blanchard & Galí, (2007); Schwartz, (1995)) and rejected by others; Umar & Wen (2020) , Fazio *et al.* (2018), who indicate that an inflation targeting regime negatively affects financial stability. In other words, inflation targeting stimulates financial instability. A second result validates a positive relationship between inflation targeting and financial stability, regardless of the inflation targeting regime in place; Soft or Full-Fledged. In order to determine the role of institutional quality in the relationship between inflation targeting and financial stability, we additionally introduced six indicators of institutional quality. The results prove that countries with poor institutional quality are financially vulnerable. Finally, we introduced a composite index of institutional quality that includes all six indicators. The results indicate that good institutional quality is able to promote financial stability. However, poor institutional quality is able to undermine it. Therefore, countries with poor institutional quality are less financially stable than those with good institutional quality.

In terms of policy implications, our study reveals that in Developing Countries with poor institutions and minimal or no macroprudential policies, targeters tend to show lower financial stability compared to non-targeters. However, as these macroprudential policies are introduced, the situation reverses or diminishes as institutional quality improves. Consequently, our study calls for central banks in such countries to actively engage in both inflation control and financial stability, using a judicious approach armed with macroprudential instruments.

Appendices

Appendix A.1. Dates of adoption of the inflation targeting regime

Targeting Countries	Dates		Non- Targeting Countries
Developing Countries			
	Soft IT	Full Fledged IT	
			Algeria
South Africa	2000	2000	Angola
Albania	2009	2009	Argentina
Armenia	2006	2006	Bulgaria
Brazil	1999	1999	China
Chile	1991	2000	Ivory Coast
Colombia	2000	2000	Egypt
Russian Federation	2014	2014	Ecuador
Ghana	2003	2007	India
Guatemala	2005	2006	Malaysia
Hungary	2001	2002	Morocco
Indonesia	2005	2006	Nigeria
Israel	1992	1997	Pakistan
Mexico	1999	2001	Dominican Republic
Peru	2002	2002	Salvador
Philippines	2002	2002	Senegal
Poland	1999	1999	Singapore
Republic of Korea	1998	1998	Tunisia
Czech Republic	1998	1998	Uruguay
Romania	2005	2006	Venezuela
Serbia	2006	2006	Germany
Slovakia	2005	2005	Austria
Thailand	2000	2000	Belgium
Türkiye	2006	2006	Denmark
Developed Countries			France
Australia	1993	1995	Greece
Canada	1991	1992	Ireland
Spain	1995	1995	Italy
Finland	1993	1994	Japan
Iceland	2001	2001	The Netherlands
Norway	2001	2001	Portugal
New Zealand	1990	1990	USA
United Kingdom	1993	1993	
Sweden	1993	1995	
Swiss	2000	2000	

Source: Hammond (2012), Minea & Tapsoba (2014), Schmidt-Hebbel & Carrasco (2016), Jahan (2017), Bundick & Smith (2018).

Appendix A.2. Variable definitions and sources

Variables	Definitions	Sources
IT	Dummy variable whose value equals 1 when the inflation targeting policy is implemented, 0 otherwise.	Hammond (2012)
Soft IT	Dummy variable whose value equals 1 when the soft inflation targeting policy is implemented, 0 otherwise.	Hammond (2012)
Full Fledged IT	Dummy variable whose value equals 1 when Full Fledged inflation targeting policy is implemented, 0 otherwise.	Hammond (2012)
NPL	Loans in which the borrower is in default and hasn't made any scheduled payments of principal or interest for a certain period of time. In banking, commercial loans are considered nonperforming if the borrower is 90 days past due.	WDI (2022)
Z-score	It captures the probability of default of a country's banking system. Z-score compares the buffer of a country's banking system (capitalization and returns) with the volatility of those returns. It is estimated as $(ROA + (\text{equity}/\text{assets}))/\text{sd}(ROA)$; $\text{sd}(ROA)$ is the standard deviation of ROA.	Federal Reserve Economic Data (2022)
CC	Control of corruption; The extent to which public power is used for private gain, counting on small and large forms of corruption, as well as the management of the State by elites and private interests	WGI (2022)
RL	Rule of law; The extent to which agents trust and accept the rules of society, including the quality of contract enforcement and property rights, the police, and the courts, as well as the probability of crime and violence.	WGI (2022)
RQ	Regulatory quality; The government's ability to provide strong policies and regulations that enable and promote the development of the private sector.	WGI (2022)
GE	Government effectiveness; The quality of public services, the capacity of the public function and its independence from political pressures; and the quality of policy formulation	WGI (2022)
PSAVT	Political stability and absence of violence/terrorism; The probability that the government will be damaged by unconstitutional or violent affairs, including terrorism.	WGI (2022)
VA	Voice and accountability; The extent to which citizens participate in the selection of their government, freedom of expression, freedom of association and freedom of the press	WGI (2022)
GDP	The growth rate of real GDP per capita (annual%).	WDI (2022)
TO	Sum of exports and imports of goods and services (% of GDP).	WDI (2022)
FD	Domestic credit to the private sector granted by banks (% of GDP).	WDI (2022)
FO	Index of the degree of openness of a country's capital account based on the dummy variables that codify the table of restrictions on cross-border financial transactions reported in the IMF's Annual Report on Foreign Exchange Arrangements and Restrictions (AREAER).	(Chinn & Ito, 2019)
FDI	Net investment inflows to acquire a sustainable stake in the management of a company operating in an economy other than that of the investor (% of GDP).	WDI (2022)
CIIQ	Composite index of institutional quality, which includes the six indicators of the quality of institutions calculated by the PCA method.	Author's calculation

Source: Author

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