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Democracy and Banking Stability: Is the Relationship U-Shaped?

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Abstract
This study addresses the impact of democracy on the stability of the banking system for a sample of 114 countries over the period 2000–2017. Our findings offer strong evidence for a U-shaped relationship between democracy and banking stability. Results also show that the way democratic institutions impact banking stability is highly dependent on their ability to implement effective anti-corruption policies. Controlling for countries' income levels reveals that not all high-income countries are necessarily enjoying the positive effects of democracy on banking stability.

Keywords Democracy · Banking crisis · SGMM · Nonlinearity

JEL: O17 · P48 · D73 · H12 · G33

Introduction

The literature dealing with the finance-growth nexus emphasized the role of the banking system in promoting economic growth (Demirguc-Kunt & Levine, 2001). The stability of the banking system is therefore considered as a main prerequisite for any sustainable growth strategy (Fernández et al., 2016).

Since the subprime crisis, an increasing attention has been paid to financial stability by policy makers and scholars. This renewed interest stems mainly from the huge economic damage caused by recurrent episodes of financial instability, particularly those affecting the banking system. As evidenced by the recent literature, the soundness of the banking system does not depend only on economic and financial factors but also on institutional factors (Barth et al., 2007; Huang & Wei, 2006). The term

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"institutional framework" includes a variety of concepts which are closely related and frequently used interchangeably despite their great differences. Corruption and governance, for instance, are fundamentally different but closely tied concepts, in that bad governance fosters corruption and corruption undermines good governance (Blackburn & Forgues-Puccio, 2009).

Institutional variables and their potential economic impacts have been widely discussed in the literature Ben Ali, 2022; Ben Ali and Siddy Diallo, 2022; Swaleheen et al., 2019; Saha and Ben Ali, 2017; Ben Ali and Sassi, 2016). Democracy has been recognized as a major influencer on different economic sides (Ben Ali, 2020). In a recent paper, Colagrossi et al. (2020) have shown that democratic countries grow more rapidly than non-democratic ones. Their study supported the idea that democracy has a positive and direct effect on economic growth, although the democracy-growth nexus might not be homogeneous across regions, countries, and time-periods. Based on a meta-analysis including 188 studies, they concluded that the effect of democracy on growth is about one-third of the comparable human capital effect. In a different setting, Mathonnat and Minea (2019) investigated the impact of democracy on growth volatility. Using a large panel of 140 countries over the period 1997–2007, they reported that all government forms contribute to decreased growth volatility in a comparable way. Their results revealed also that proportional electoral systems outperform majoritarian and mixed electoral systems. Their findings reflect the vital role of a more inclusive political decision-making process and a limited separation of power between the central government and the local authorities. Overall, they argued that different levels of democracy are not neutral for growth volatility and for countries' development paths.

Democracy can also produce an indirect effect on economic growth through various channels, such as innovation and human capital. Although there is no consensus on the democracy-innovation nexus (Gao et al., 2017), several studies have pointed out a clear positive connection between democracy and innovation on the one hand (Ober, 2008) and between innovation and specific economic policies on the other hand (Lundvall & Borrás, 2005; Miettinen, 2013). From a closely related perspective, Zuazu (2019) showed the existence of a technologically conditioned effect of democracy. Based on a panel of 61 manufacturing industries from 72 countries over the 1990–2010 period, the author proved that democracy contributes to move industries closer to the World Technology Frontier. As regard human capital, Dahlum and Knutse (2017) showed that democracies typically provide better access to education than autocracies, even if there is no systematic evidence that they offer a higher quality of education. In a panel setting, Wigley and Akkoyunlu-Wigley (2017) detected a negative link between democracy and mortality of children under five for 167 countries over the 1961–2011 period. They explained such findings by the fact that democratic governments have both better incentives and greater ability to reduce child mortality among the poor compared to their autocratic counterparts. Some recent studies go even further, concluding that democracy can help to address serious environmental challenges. Using the quantile regression technique and data from 19 emerging countries covering the 1997–2010 period, Lv (2018) showed that above a certain income level, democracy contributes strongly to reduce CO_2 emissions. Similarly, Mollicka et al. (2020) detected a positive relationship between democracy and natural resources rents. They also provided evidence that an increase in natural

resources requires a participative decision-making process. Based on these results, they argued that democracy helps to exploit rents more transparently and that diversifying income sources should help to promote democracy in oil-rich countries.

From a financial perspective, institutional development is likely to exert a first-order effect on the stability of the banking system. It has been clearly demonstrated that bad and defective institutions can affect the stability of the banking system, mainly by fueling the non-performing loans and deteriorating the banks' balance sheets. For example, it has been shown that corruption may undermine efficient allocation of capital by denying credit access to borrowers who lack bank connections, forcing them to reject viable projects (Beck et al., 2005). On the other hand, borrowers with such connections enjoy easier access to funding despite exhibiting higher default rates than non-connected ones (La Porta et al., 2003). In the same vein, La Porta et al. (1997) argued that corrupted institutions can impede banks from extending credit, while sound institutions promote the efficiency of the lending activity by improving contract enforcement. Park (2012) argued that corruption can impact the banking system in several ways. Firms may bribe officials to bypass the loan review process in order to secure lending, or to be granted a forbearance advantage. As a result, this will lead to a misallocation of funds from good to bad projects, which typically ends up with a higher volume of non-performing loans (NPLs). Although the negative impact of corruption on the banking system is widely recognized, some studies pointed out that corruption does not translate systematically into nonperforming loans. As argued by Park (2012), even borrowers with good projects may bribe bankers in order to save time and overcome burdensome bureaucratic constraints. Mauro (1995) refers to the "speed money" argument.

A large body of literature has shown that an improved legal framework also contributes to enhance banks' soundness. For a sample of 129 countries over a 25-year period, Djankovet al. (2007) pointed out that strengthening the legal protection of creditors reduces the level of NPLs. Similarly, Barth et al. (2009) showed that strong legal systems induce more competition among banks and reduce corruption. Based on a 100-country panel setting, Goel and Hasan (2011) showed that higher corruption is associated with higher levels of NPLs, confirming that when institutions are weak, the probability of occurrence of banking crisis increases (Fernández & González, 2005).

As far as democracy is concerned, the existing literature reveals that democratic countries provide a higher level of funding, particularly through stock markets (Yang, 2011). This is mainly due to institutional features such as political competition and checks and balances. Ashraf (2017) argued that sound institutions may enhance banking stability by limiting information asymmetries between banks and borrowers. Recent studies have shown that democracy may enhance the efficiency of banking institutions by promoting banking competition. Using a large panel of 617 banks over the period 1994–2016, Agoraki et al. (2020) reported that democratic countries with better regulatory frameworks were more successful in enhancing banking competition. Moreover, their results revealed that the democracy-competition nexus is rather U-shaped in the sense that a certain democratic threshold is required to enhance competition among banks. In a similar setting, Lavezzolo (2020) has recently shown that the political regime matters for banks' interest margins, with financial intermediation

generating low interest margins in autocratic regimes due to an inherent credibility problem and a lack of oversight. Further results indicate that higher interest income impacts positively the size of banks in democratic countries, while the opposite is true in autocratic regimes. Democracy may also determine the way governments should respond to banking crisis. In this respect, Rosas (2006) showed that bailouts are less likely to take place in democracies then in autocracies, because governments in democratic regimes are less prone to rescue private banks at the expense of tax payers. Democracy should therefore enhance banking stability by limiting hazard moral and pushing banks to avoid excessive risk-taking. However, opposite conclusions have been put forward by Ashraf (2017). Based on a sample of banks from 98 countries, he found that democratic regimes fuel moral hazard by generating expectations of government bailouts.

Despite their obvious benefits, democratic regimes are often associated with an intensification of financial crises. Reinhart and Rogoff (2009) reported about 700 country-years of banking crises since 1800. When inspecting their historical analysis, the first impression that can be drawn is that financial crisis erupted mainly in democratic countries. One can recall that the great depression in the 1930s affected one of the most prominent democracies in the world, while some other relatively autocratic countries such as Japan and the Soviet Union were largely spared from damage. Similarly, the recent 2008 subprime crisis affected democratic countries such as the USA and the Euro zone, while China as an autocratic regime emerged unscathed. In the same vein, Lipscy (2018) argued that democratic countries were the most affected by financial crisis. In addition, he asserted that transition towards more democracy was often accompanied by an intensification of financial instability. As an example, the democratic experience that took place in Japan after the World War I led to serious financial turbulences and banking crisis. Similarly, the democratic transition induced financial instability in countries such as South Korea, Ecuador, Argentina, and Turkey. Such adverse effects of democracy may be imputed to the fact that democratic practices put additional constraints on the executive authority through the protection of liberties and fair elections. Although these practices bring recognized benefits, they may also make it difficult for leaders to implement effective policies to curb speculative excesses to ensure financial stability. Frequent elections and executive turnover can favor short-term speculative strategies rather than policies focusing on long-term economic performance. Moreover, democratic countries tend to favor financial liberalization and trade openness, and are therefore highly exposed to the spillover effects during turmoil periods.

Another body of literature investigated the causality running from financial and banking crisis to democracy. In this respect, Davies (2010) argued that financial crisis are putting governments in front of important economic challenges, which may lead young democracies backwards to authoritarianism, but may also put pressure on autocratic regimes and translate into democratic transitions. Based on a 150-year survey, Chwieroth and Walter (2017) concluded that banking crisis reshaped democracies and exacerbated the punishment of incumbent governments by electors. Other recent studies by Diamond et al. (2016) and Foa and Mounk (2016) confirmed that democratic institutions have been seriously undermined by the frequent financial turmoil episodes. Oppositely, Kouevi-Gath et al. (2021) showed that banking crisis

may contribute to improve democracy for a sample of 129 countries over the period 1975–2020. Such a result may be explained by the fact that crisis offer an opportunity to contest autocratic regimes and to move towards a higher degree of democracy. A similar conclusion has been drawn by a Acemoglu and Robinson (2001).

The above-mentioned results suggest that the debate relative to the impact of democracy on banking stability is still inconclusive and can be deepened by providing new empirical evidence. We also notice that previous studies dealing with the impact of institutions on banking stability, focused mainly on control of corruption and the legal framework, and gave little attention to democracy. The literature review also reveals that democracy may produce indirect effects on banking stability through various channels. Moreover, the nexus between democracy and banking stability seem to be non-linear and bi-directional. Such reverse causality may lead to an endogeneity problem. This paper tries to fill an important gap in the literature by addressing empirically these several issues. To that end, we assess the impact of democracy on banking stability for a large sample composed of 114 developing and developed countries. The sample period (2000–2017) includes several episodes of financial turmoil such as the subprime crisis and the European debt crisis. This could help us to gain more insight into the impact of democratic institutions on the stability of the banking system. Moreover, we investigate the involved transmission channels and emphasize the importance of control of corruption in shaping the impact of democracy on banking stability. We also highlight the existence of a nonlinear relationship between democracy and banking stability by introducing a quadratic term in the model. Non-linearity is confirmed by comparing the results for countries ranging beyond the detected threshold and those performing below that critical value. Finally, we rely on the System GMM (SGMM) method which controls for endogeneity.

The rest of this paper is organized as follows. "Model, Methodology, and Data Description" presents the model, the data, and the estimation methodology. "Results and Discussion" summarizes and discusses the main results. "Conclusion and Policy Implications" concludes and suggests some policy implications.

Model, Methodology, and Data Description

The main objective of this study is to assess the impact of democracy on the stability of the banking for a sample of 114 countries over the period 2000–2017.[1] We also intend to check the non-linearity of this relationship and to identify potential transmission channels, namely, control of corruption. Our estimation strategy involves therefore three steps. First, we estimate the following model defined by Eq. (1):

$$BZscore_{it} = \alpha_0 + \alpha_i + \alpha_t + \delta X_{it} + \beta Z_{it} + \gamma_1 COC_{it} + \gamma_2 DEM_{it} + \varepsilon_{it} \quad (1)$$

[1] The list of the countries considered in our sample is presented in Table 11 in the appendix.

where α_i and α_t represent individual and time fixed effects and ε_{it} is the idiosyncratic error term. In a second step, we assess the existence of a non-linear relationship between democracy and banking stability. To that end, we introduce a quadratic term in the model:

$$BZ\text{score}_{it} = \alpha_0 + \alpha_i + \alpha_t + \delta X_{it} + \beta Z_{it} + \gamma_1 COC_{it} + \gamma_2 DEM_{it} + \gamma_3 DEM_{it}^2 + \varepsilon_{it} \quad (2)$$

The advantage of addressing non-linearity by introducing a quadratic term in the model is threefold. First, it allows to capture the shape of the relationship (U-shaped or inverted U-shaped). Secondly, it determines the threshold value endogenously through the first-order condition. Finally, it allows to compare the effects produced by all the explanatory variables across the different regimes, while other methods (like the panel threshold regression) report only the impact of the transition variable from one regime to another. Confirming the robustness of the obtained results requires simply to re-estimate the model for the two different regimes and to check that the transition variable produces different effects on the dependent variable from one regime to another.

Finally, we investigate a possible transmission channel involving control of corruption by introducing an interaction term in the model:

$$BZ\text{score}_{it} = \alpha_0 + \alpha_i + \alpha_t + \delta X_{it} + \beta Z_{it} + \gamma_1 COC_{it} + \gamma_2 DEM_{it} + \gamma_3 DEM_{it} \times COC_{it} + \varepsilon_{it} \quad (3)$$

Banking stability is proxied by the Z score of the banking system (BZ score), defined as the sum of the return on assets and equity to assets ratios divided by the standard deviation of banking returns. Equity and returns represent a buffer to absorb potential losses incurred by the banking system. So the higher the Z score, the more resilient is the banking system to financial shocks. As evidenced by various studies (Ben Ali, 2020, Ben Ali et al. 2018; Ben Khediri et al., 2010; Bretschger et al., 2012), banking stability is driven by a number of bank-specific (X) and macroeconomic (Z) control variables. Following this literature, we consider the net interest margin (*NIM*) to gauge the banks' lending activities, the cost to income ratio (*CIR*) to assess cost-efficiency, and the return on asset ratio (*ROA*) to control for banking profitability. The cost to income ratio is expected to produce a negative effect on banking stability, while the net interest margin and banking profitability are expected to enhance the resiliency of the banking system. We also control for the degree of concentration in the banking system (*CONC*), measured by the market shares of the three biggest banks (Cubillas & Suarez, 2013; Ben Khediri et al., 2010). According to the concentration-stability hypothesis, market power boosts banking profits and highly concentrated banking systems are therefore sounder (Beck et al., 2006). Oppositely, a second set of empirical studies argued that big banks are more risk-taking and could therefore accumulate higher volumes of non-performing loans, which exacerbates banking fragility (Davies & Tracey, 2014; Uhde & Heimeshoff, 2009). At the macrolevel we retain two control variables: the inflation rate (*Inflation*) measured by the variation rate of the consumer price index and the growth rate (*Growth*) defined as the percentage increase in real GDP. On the one hand, growth should promote banking stability, as periods of high economic growth are associated

with larger volumes of credit and higher banking profits. On the other hand, high growth periods could lead to excessive lending, which deteriorates the banking system's asset quality and translates into higher probability of default. Inflation can produce both negative and positive effects on banking stability, depending on the degree to which banks' managers are able to anticipate inflation and to adjust the operating costs (Athanasoglou et al., 2008).

As mentioned previously, a major objective of this study is to assess the joint effect of democracy and corruption on banking stability. Various proxies have been developed to reflect these dimensions of the institutional framework. We opt for the indicators developed by Kaufmann et al. (2011) for two main reasons. First, they rely on a wide variety of sources and surveys and reflect with a high degree of precision both institutional dimensions. Secondly, they exhibit higher time variability compared to other indicators and are therefore more suitable for panel data models. The control of corruption index (COC) ranges from −2.5 to 2.5. Lower values denote highly corrupted countries, while high values are associated with clean countries. The voice and accountability index (VAA) reflects the transparency of the electoral process, the accountability of public officials, and the freedom of association and expression. Higher values on this index are associated with higher democratic standards.

Variables related to the banking system were extracted from Laeven and Valencia (2018) and the Bankscope and Orbis Bank Focus databases. The macroeconomic variables were extracted from the World Bank Development Indicators database, while variables relative to the institutional framework were drawn from the World Governance Indicators database.

Panel data models allow to control for country unobservable characteristics by introducing individual effects into the model. Time effects should reflect the impact of the global business cycle on each banking system. However, applying the *within* or the *FGLS* estimators relative to the fixed and random effects models may lead to biased results, as our model is exposed to multiple sources of endogeneity. As reported in the literature review, various studies confirmed that causality is also running from banking stability to democracy. In addition, a large body of literature showed that banking stability is one of the main determinants of economic growth (Levine, 1997, 2005). Banking stability is also expected to impact the performance of the whole banking system (ROA and NIM), as periods of high instability are usually associated with poor banking performance. Accordingly, we suspect the existence of various bi-directional relationships between the *BZ* score and the independent variables. Moreover, variables relative to the institutional framework are prone to measurement errors (Satyanath & Subramanian, 2004). The difference GMM estimator developed by Arellano and Bond (1991) overcomes the bias induced by reverse causality and measurement errors. Their approach consists to estimate the differenced model using second and further lags of the dependent variable as instruments. In fact, if the original errors are independent, then those of the differenced equation should exhibit first order correlation but no second-order correlation. Consequently, second and higher lags are valid instruments. Therefore, in addition to the Sargan-Hansen over-identification test, attesting the validity of the instruments

requires testing for second-order autocorrelation.[2] If second-order autocorrelation is detected, then second lags are no longer valid instruments.

Arellano and Bover (1995) and Blundell and Bond (1998) pointed out that the difference GMM estimator performs poorly in finite samples, especially when the dependent variable is highly persistent. In this case, the lagged levels are poor instruments for the first differenced variables. They extended the Arellano and Bond approach by estimating a system including both the level and the differenced equations, while using lagged levels and lagged differences as instruments. The system GMM estimator (SGMM) outperforms the Arellano and Bond estimator for samples with a large number of individuals and limited periods. However, the proliferation of instruments weakens the Sargan-Hansen over-identification test and may over-fit endogenous variables. Following Roodman (2008), it is strongly recommended to limit the lag length of the instruments. Robustness checks should also include testing the sensitivity of the results to a reduction in the number of instruments.

The descriptive statistics are summarized in Table 1. The mean *BZ* score is quite high over the sample period. We notice an important gap between the mean and the minimum values, which suggests that the *BZ* score distribution is skewed to the left. This idea is corroborated by the frequency graph (Fig. 1). This shows that banking systems experienced periods of high instability during the sample period. High volatility was probably fueled by destabilizing events such as the subprime crisis, the European debt crisis, and more recently the exit of the UK from the European Union.

Statistics relative to the institutional framework show moderate mean values and high standard errors for both the voice and accountability and the control of corruption indexes. This implies that the sample countries exhibit great disparities in terms of institutional development. To shed some light on the determinants of banking stability, we examined the *BZ* score mean values according to voice and accountability, control of corruption, and countries' income levels; however, no clear patterns emerged from the bi-variate statistics reported in Table 2.

Correlation coefficients reported in Table 3 show that the *BZ* score is positively and significantly correlated with banking profitability (ROA) and economic growth, while the cost to income ratio, the concentration index, and the inflation rate are negatively correlated with the *BZ* score. For the institutional development indicators, voice and accountability is negatively and significantly correlated with the *BZ* score. Correlation between the control of corruption index and the *BZ* s core is positive but non-significant. Finally, we notice a strong positive and significant correlation between voice and accountability and control of corruption (0.782). Figure 2 and Table 4 confirm that higher levels of voice and accountability are associated with higher levels of control of corruption. Such a high correlation may lead to a multicollinearity problem. Variance inflation factors should be examined to check if both variables can be introduced in the same equation.

[2] Arellano and Bond (1991) developed specific tests for first and second order autocorrelation.

Table 1 Full sample, two-way fixed effects, and SGMM estimation

	Two-way fixed effects			**SGMM**		
Variables	Linear specification	Nonlinear specification	Transmission channel	Linear specification	Nonlinear specification	Transmission channel
$LnBZscore_{t-1}$	-	-	-	0.377***	0.347***	0.347***
				(0.00621)	(0.0038)	(0.0035)
ROA	0.040***	0.040***	0.039***	0.0407***	0.0453***	0.0460***
	(0.005)	(0.005)	(0.005)	(0.00173)	(0.00121)	(0.00086)
NIM	0.041***	0.040***	0.041***	0.0238***	0.0220***	0.0227***
	(0.005)	(0.005)	(0.005)	(0.00199)	(0.00163)	(0.00133)
CIR	−0.003***	−0.003***	−0.003***	−0.00545***	−0.00487***	−0.0049***
	(0.001)	(0.001)	(0.001)	(0.000360)	(0.00026)	(0.00027)
CONC	−0.0014**	−0.001**	−0.001**	−0.00171***	−0.00229***	−0.00278***
	(0.0006)	(0.0006)	(0.0007)	(0.000535)	(0.00031)	(0.00029)
Growth	0.012***	0.012***	0.012***	−0.00120*	−0.00187***	−0.00213***
	(0.003)	(0.003)	(0.003)	(0.000673)	(0.00043)	(0.00041)
Inflation	−0.0007	−0.0006	−0.0006	0.000213**	0.00019***	0.00027***
	(0.0006)	(0.0005)	(0.0005)	(8.69e −05)	(5.91e −05)	(4.84e −05)
COC	0.028	0.012	0.024	0.0721***	0.0935***	0.0864***
	(0.035)	(0.033)	(0.034)	(0.0128)	(0.0078)	(0.0096)
VAA	−0.019	0.051	0.007	0.0337*	−0.0354***	−0.0236**
	(0.032)	(0.053)	(0.036)	(0.0199)	(0.0104)	(0.0120)
VAA^2	-	0.099**	-	-	0.0189**	-
		(0.042)			(0.0089)	
VAA´COC	-	-	0.081*	-	-	0.0202***
			(0.042)			(0.0076)
Constant	2.448***	2.360***	2.394***	1.810***	1.874***	1.905***
	(0.094)	(0.109)	(0.105)	(0.0420)	(0.0287)	(0.0262)

Table 1 (continued)

Variables	Two-way fixed effects			SGMM		
	Linear specification	Nonlinear specification	Transmission channel	Linear specification	Nonlinear specification	Transmission channel
R^2	0.865	0.865	0.865	-	-	-
Obs	2019	2019	2019	2017	2017	2017
Nb of count	114	114	114	114	114	114
AR(2) *p* value				0.7867	0.6278	0.6316
Sargan *p* value				0.4621	0.6318	0.8932

Robust standard errors in parentheses

*$p < 0.1$; **$p < 0.05$; ***$p < 0.01$

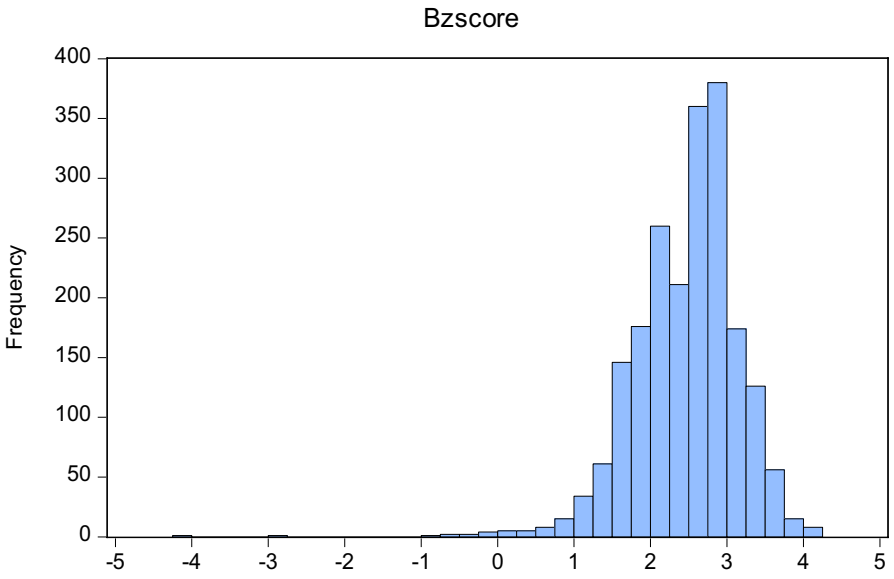

Fig. 1 The *BZ* score distribution

Results and Discussion

Results provided by the system GMM method are summarized in Table 5. All three estimated models include time dummies. We also reported results relative to the fixed-effects *within* estimator (columns 1 to 3) as a benchmark. A significant difference between the two sets of results offers evidence for an endogeneity problem. Interpretations are based exclusively on the two-step SGMM estimator which controls for endogeneity and cross-country heteroscedasticity. Variance inflation factors reported in Table 6 confirm that the high correlation level between voice and accountability and control of corruption does not raise any multicollinearity problem. For each set of estimations, we reported the p-values relative to the Sargan-Hansen test and the Arellano and Bond second-order autocorrelation test to confirm the validity of the instruments. The number of instruments is limited to a maximum of three lags in order to avoid potential bias induced by instruments proliferation. We have also checked that results are robust to a variation in the number of instruments.

We first consider control variables relative to the banking system. In accordance with the empirical literature, estimation results show that profitability enhances banking stability. The return on asset ratio (ROA) and the net interest margin (NIM) both produce a positive and significant effect on the *BZ* score. The ROA reflects the ability of banks to generate income from their total assets, while the NIM assesses revenues generated solely by the financial intermediation activity. As expected, the coefficient associated with the cost to income ratio (CIR) is negative and significant, which suggests that improving banking stability requires better cost management. Finally, the results reveal that market power reduces banking stability. In highly concentrated banking systems, big banks are more likely to engage in risky strategies,

Table 2 Banking stability and democracy, corruption, and democracy levels

Variables	VAA below threshold	VAA above threshold	Low COC	Moderate COC	High COC
$LnBZscore_{t-1}$	0.259***	0.531***	0.280***	0.528***	0.536***
	(0.00629)	(0.0104)	(0.0187)	(0.0218)	(0.0291)
ROA	0.0476***	0.0313***	0.0500***	0.130***	0.0333***
	(0.00426)	(0.00612)	(0.00565)	(0.00859)	(0.00330)
NIM	0.0218***	−0.0122**	0.0148***	0.0287**	−0.0119***
	(0.00152)	(0.00609)	(0.00272)	(0.0132)	(0.00313)
CIR	−0.00899***	0.00137	−0.00988***	−0.00368***	0.00358***
	(0.000673)	(0.000902)	(0.00142)	(0.00102)	(0.000731)
CONC	−0.00214***	−0.0153***	−0.00280***	0.00268***	−0.0165***
	(0.000391)	(0.00195)	(0.000874)	(0.00101)	(0.00130)
Growth	0.000599	−0.00623***	0.000557	−0.00779***	−0.00548***
	(0.000623)	(0.00136)	(0.000738)	(0.00164)	(0.00179)
Inflation	0.000275***	0.000372**	8.98e−05	0.000452**	0.00129***
	(7.65e−05)	(0.000150)	(8.79e−05)	(0.000183)	(0.000281)
COC	0.0236	0.00815	0.0289	0.0579***	−0.0544
	(0.0169)	(0.0382)	(0.0327)	(0.0158)	(0.0427)
VAA	−0.00245	0.555***	0.0221	0.108***	0.245***
	(0.0177)	(0.0945)	(0.0259)	(0.0365)	(0.0336)
Constant	2.288***	1.448***	2.381***	0.857***	1.974***
	(0.0503)	(0.154)	(0.141)	(0.124)	(0.215)
Obs	1439	578	1180	334	503
Nb of countries	89	37	77	33	35
AR(2) *p* value	0.1477	0.4597	0.3658	0.3741	0.6428
Sargan *p* value	0.3781	0.5749	0.2640	0.7741	0.6023

Robust standard errors in parentheses

*$p<0.1$; **$p<0.05$; ***$p<0.01$

which increase the default probability of the whole banking system (Davies & Tracey, 2014). Moreover, Anolli et al. (2015) suggest that very large banks may experience diseconomies of scale which impact negatively their profitability.

As regard macroeconomic variables, economic growth proves to have a negative and significant effect on banking stability. A similar result was highlighted by Beck et al.

Table 3 Causality tests

		Low income	Low middle income	High middle income	High income	All
COC does not Granger cause VAA	*F*. Stat	0.26575	0.47569	0.80597	4.73701	2.45281
	p value	0.7669	0.6218	0.4473	0.0090	0.0863
VAA does not Granger cause COC	*F*. Stat	4.03064	3.14125	7.27842	9.59124	16.4086
	p value	0.0191	0.0444	0.0008	0.0000	0.0000

(2013) for a sample of 75 countries observed over the period 2000–2010. In this respect, they asserted that loose credit standards applied during high growth periods lead to more nonperforming loans. Excessive lending during boom periods causes the banking system's asset quality to deteriorate and leads to higher default probability. On the other hand, the system GMM results show that the inflation rate contributes significantly to enhance banking stability. Similar results were obtained by Tan and Floros (2012) for the Chinese banking system and by Jiang et al. (2003) for Hong Kong banks. Perry (1992) argued that high inflation is often associated with high interest rates and high banking revenues. Moreover, the impact of inflation on banking profitability depends on the capacity of banks to manage average interest rates during periods of high inflation. If banks are able to quickly adjust their lending rates, then banking revenues will grow faster than banking costs, which would enhance the banks' performance.

Results relative to the institutional framework are consistent with the theoretical expectations. The coefficient associated with the control of corruption index (COC) is positive and highly significant, which confirms that corruption is a major source of banking instability. Park (2012) argues that corruption fosters the implementation of networks between firms and bankers. Firms involved in these networks enjoy easier access to credit, whereas funding is often denied to small firms without bank connections. Loans vitiated by such irregularities are often characterized by high default rates. In this way, corruption contributes seriously to destabilizing the banking system by fueling the nonperforming loans ratio. Another strand of the literature highlighted the indirect effect of corruption on banking stability. According to Mauro (1995) and Park (2012), distortions generated by corruption deteriorate both the quantity and the quality of private investment, which in turn reduces the growth prospects and hampers banking stability.

Finally, the voice and accountability index produces a positive and significant effect on the *BZ* score. Democracy may contribute to enhance banking stability through various channels. Firstly, democratic regimes favor transparency and access to information, which should improve the allocational efficiency of the banking system. Indeed, reducing information asymmetries allows banks to channel funds to the most profitable projects. As a result, we should expect a sharp decrease in nonperforming loans and a net increase in banking stability. Also, democracy should help to promote financial stability by favoring the implementation of a legal framework protecting investors' rights (Djankov et al., 2007). Levine (1998) highlighted the impact of the legal framework on the effective functioning of the banking system. On the other hand, free elections give people the opportunity to select decision-makers who are willing to implement sound policies aiming to promote financial development and economic growth. Accountability should force policy-makers to fulfill their engagements once elected (Quinn & Wooley, 2001). Furthermore, in democratic regimes, freedom of expression and accountability of public officials are particularly efficient anti-corruption tools. In that way they contribute not only to promote financial stability but to enhance the overall economic performance of countries riddled with corruption.

The foregoing analysis suggests that a simple democratic transition may not be sufficient to ensure financial stability. To achieve this objective, democracy must be translated into effective institutions, sound policies, higher governance standards, and effective anti-corruption strategies. If these conditions are not met, democracy may lead to

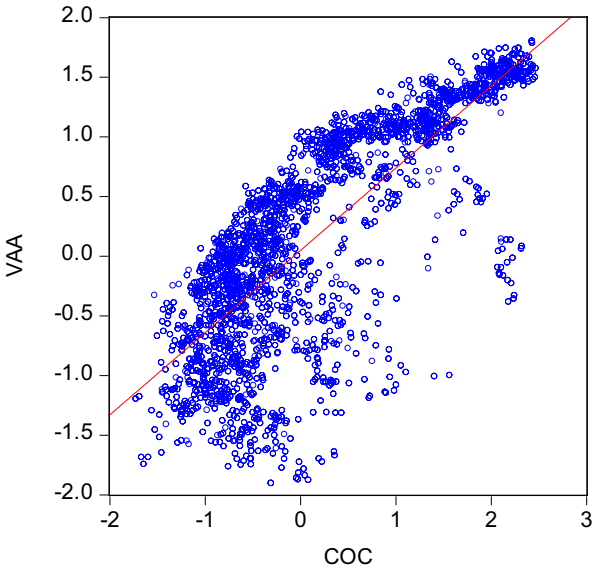

Fig. 2 The democracy-corruption nexus

the opposite outcomes. We tried to investigate this point in two different ways. We first considered that a country has to reach a certain level of institutional development in order to enjoy the economic benefits of democracy. In the early stages of the democratic transmission, we do not expect any significant effect on financial stability. This implies the existence of a threshold above which democratic institutions are strong enough to implement sound policies and good governance practices. Accordingly, the relationship between the voice and accountability index and the *BZ* score is expected to be nonlinear. To that end, we introduced a quadratic term (VAA^2) in Eq. (1). The SGMM results are reported in the fifth column of Table 5. The coefficient associated with the quadratic term (VAA^2) is positive and significant at the 5% level, while voice and accountability (VAA) produces a negative and significant effect on the *BZ* score. These results offer strong evidence for a U-shaped relationship between voice and accountability and the *BZ* score: democracy hinders banking stability up to a certain level above which the relationship between the two variables turns to be positive.

Secondly, we considered the nexus between voice and accountability and control of corruption. As argued by Park (2012), tackling corruption should boost banking stability. Consequently, democracy can help to accomplish this objective by fostering control of corruption. To investigate this transmission channel, we introduced the following interaction term into the model: "VAA × COC." The results reported in column 6 show that the coefficient associated with the interaction term is positive and significant. This finding supports the idea that democracy enhances banking stability by stepping up control of corruption. Moreover, we notice that when the interaction term is introduced into the model, the impact of voice and accountability on the *Z* score proves to be non-significant. Such a result indicates that the positive impact of democracy on banking stability is mainly driven by its impact on corruption.

Table 4 Banking stability and democracy, and income level subsamples

Variables	Low income	Low middle income	High middle income	High income	High income and high COC	High income and low COC
$LnBZscore_{t-1}$	0.434	0.902***	0.471***	0.408***	0.611***	−0.102
	(0.385)	(0.136)	(0.0358)	(0.0101)	(0.0167)	(0.115)
ROA	0.109***	0.0144***	0.0332***	0.0524***	0.0402***	0.475***
	(0.0235)	(0.00288)	(0.00342)	(0.00208)	(0.00310)	(0.0229)
NIM	−0.00770	0.0150**	0.0138***	0.00560*	−0.00432	−0.0120
	(0.0109)	(0.00676)	(0.00308)	(0.00325)	(0.00583)	(0.0182)
CIR	−0.00116	−0.00285**	−0.00915***	0.000252	−8.78e−05	−0.00480
	(0.00197)	(0.00111)	(0.00137)	(0.000342)	(0.000496)	(0.0106)
CONC	−0.00129	0.000190	−0.00214***	−0.00568***	−0.00719***	0.00450
	(0.00183)	(0.000432)	(0.000725)	(0.000929)	(0.00136)	(0.00939)
Growth	0.00146	0.00439***	0.000707	−0.00584***	−0.00405***	0.0171***
	(0.00380)	(0.00140)	(0.000984)	(0.000898)	(0.00113)	(0.00599)
Inflation	0.000817***	0.000136	−4.38e−05	0.000915***	0.000670***	0.00380***
	(0.000234)	(0.000259)	(0.000130)	(0.000227)	(0.000200)	(0.00122)
COC	−0.429	0.132	0.0596	−0.00577	0.119***	0.120
	(0.781)	(0.122)	(0.116)	(0.0109)	(0.0172)	(0.303)
VAA	−0.269	−0.0966	0.0354	−0.0739***	0.0411**	−0.357
	(0.460)	(0.0735)	(0.0298)	(0.0195)	(0.0206)	(0.409)
Constant	0.891	0.339	1.848***	1.876***	1.288***	2.496**
	(0.622)	(0.409)	(0.180)	(0.0671)	(0.0852)	(1.087)
Observations	241	411	504	861	753	108
Nb of count	14	23	28	49	48	15
AR(2) *p* value	0.7143	0.9539	0.4772	0.6565	0.8722	0.4263
Sargan *p* value	0.9999	0.9997	0.9991	0.7352	0.3095	0.9999

Robust standard errors in parentheses

*$p<0.1$; **$p<0.05$; ***$p<0.01$

Table 5 Voice and accountability and control of corruption by income level

Income group	1	2	3	4	All
Mean VAA	−0.532659	−0.414711	−0.246113	0.864503	0.162052
Mean COC	−0.733128	−0.656374	−0.370361	1.128451	0.171611

To check the robustness of the above-mentioned results, we re-estimated the model while dividing the full sample according to critical values of voice and accountability and control of corruption. To confirm the U-shaped relationship between democracy and banking stability, we computed the threshold above which we should detect a positive relationship between these two variables. According to the results reported in Table 5, the nonlinear relationship is described by the following equation: $BZ\ \text{score} = 0.0189 \times \text{VAA}^2 - 0.0354 \times \text{VAA}$.

The threshold can be easily deduced from the first order condition:

$$\frac{\partial BZscore}{\partial VAA} = 2 \times 0.0189 \times VAA - 0.0354 = 0 \Rightarrow VAA^* = \frac{0.0354}{2 \times 0.0189} = 0.936$$

Consequently, we considered two subsamples including countries whose VAA indexes are respectively below and above this threshold. Results relative to each subsample are presented in columns 1 and 2 of Table 7. We notice that the voice and accountability index produces a highly positive and significant effect on banking stability only above the threshold. For countries characterized by low levels of voice and accountability, the coefficient associated with this index is negative and non-significant. These results confirm the nonlinearity of the relationship between the VAA index and the *BZ* score.

Previous results suggest that control of corruption is one of the main transmission channels through which democracy affects banking stability. To confirm these findings, we divided the full sample into three groups of countries: low control of corruption countries, moderate control of corruption countries, and high control of corruption countries. The first subsample includes countries whose control of corruption index is below the mean value of the full sample ($\text{COC} < 0.171$). The second subsample is relative to the countries with the COC index ranging between the mean value and the 75th percentile ($0.171 < \text{COC} < 0.95$). The remaining countries are considered as exhibiting high levels of control of corruption ($\text{COC} > 0.95$) and are classified in the third subsample. Estimation results relative to these three groups of countries are summarized in columns 3 to 5 of Table 7. For countries characterized by poor control of corruption, the coefficient associated with voice and accountability (0.022) is low and statistically non-significant. This coefficient is much higher (0.108) and significant at the 1% level for the second subsample. Finally, countries with good control of corruption are those enjoying the strongest effect of voice and accountability on banking stability (0.245). These results prove that the effect of democracy on banking stability is highly dependent on the level of control of corruption. To offer further support to these findings, we conducted panel causality tests between voice and accountability and control of corruption. Results reported in Table 8 show clearly that causality runs only from the voice and accountability index

to the control of corruption index. To sum up, we can assert that democracy fosters control of corruption which in turn leads to higher stability of the banking system.

In a last set of estimations, we focus on the moderator effect of the country's income level. A growing literature argues that high income is often associated with sound democratic institutions (Acemogluet al., 2008; Heid et al., 2012). Moreover, high-income countries are endowed with higher absorptive capacities and should enjoy larger economic benefits from democracy. Relying on the World Bank classification, we split the sample into four groups, composed respectively of low-income countries, low middle-income countries, high middle-income countries, and high-income countries. Estimation results reported in Table 9 reveal that for the first three groups, democracy does not produce any significant effect on banking stability. Such findings may be attributed to the low levels of democracy and control of corruption within these groups. Statistics reported in Table 10 show that all three groups have negative mean values for the VAA and the COC indexes. Such findings are in line with our previous results, which proved that democracy must exceed a certain threshold to generate the expected economic outcomes. Surprisingly, the effect of voice and accountability on the *BZ* score is negative and significant for high-income countries. This result may be explained by the fact that many of these countries rely on natural resources rents and are characterized by a deteriorated institutional framework. Following this idea, we classified high-income countries according to the control of corruption index: the first group includes high-income countries pursuing active anti-corruption policies (COC > 0.171), while the second group is composed of countries with high corruption levels (COC < 0.171). Results reported in columns 4 and 5 of Table 9 confirm that voice and accountability contributes significantly to promote banking stability only in high-income countries that are actively fighting corruption. The coefficient associated with voice and accountability is negative and statistically non-significant in high-income countries tolerating high levels of corruption.

Conclusion and Policy Implications

Democracy has been shown to be beneficial for economic performance and is generally associated with higher standards of living. However, little work has been done on its impact on the stability of the banking system. This research aims to fill this gap by considering a large sample of countries observed over the period 2000–2017. We use the System GMM method to assess the effect of democracy on banking stability. We also try to highlight the nonlinearity of this relationship and to identify its main transmission channels.

Four main conclusions can be drawn from this study. Firstly, democracy, proxied by the voice and accountability index, contributes to promote banking stability. A similar result is obtained for the control of corruption index, which produces a positive and significant impact on the *Z* score of the banking system. Secondly, the results offer strong evidence for a U-shaped relationship between democracy and banking stability. Democracy must exceed a certain threshold to spur banking stability. Below this threshold, democratic institutions are not strong enough to impose sound policies, higher governance standards, and effective anti-corruption strategies. Thirdly, control of corruption proves to be an important transmission channel for the effect

of democracy on banking stability. Consequently, the way democratic institutions impact banking stability is highly dependent on their ability to implement effective anti-corruption policies. Finally, high-income countries are not necessarily those enjoying the most important positive effects of democracy. Many of these countries are reliant on natural resources and have not yet succeeded to establish an efficient institutional framework. However, high-income countries implementing active anti-corruption policies are those taking advantage from their democratic institutions.

Important recommendations can be drawn from these results. First, policies aiming to increase banking competition should help to promote the stability of the banking sector. Furthermore, mild institutional reforms cannot enhance banking stability. Countries need to implement deep transformations of their institutional framework to obtain the expected economic outcomes. The democratic process must reach a point where democratic institutions are strong enough to implement sound policies. Finally, governments should engage in active anticorruption policies to foster the impact of democracy on overall economic performance and on banking stability in particular.

Appendix

Table 6 Descriptive statistics

	Ln *Z* score	**ROA**	**NIM**	**CIR**	**CONC**	**Growth**	**Inflation**	**COC**	**VAA**
Mean	2.464	1.240	4.407	55.948	67.026	3.855	5.550	0.171	0.162
Max	4.113	65.837	23.167	218.087	100.00	34.466	324.996	2.469	1.800
Min	−4.092	−24.181	0.009	19.895	17.163	−21.594	−8.237	−1.722	−1.907
Std. Dev	0.682	2.321	2.816	14.088	19.053	3.949	11.392	1.036	0.914
Obs	2051	2052	2052	2051	2025	2051	2047	2052	2052

Table 7 *Z* score mean values and bi-variate analysis

Voice and accountability						
VAA	[−2, −1)	[−1, 0)	[0, 1)	[1, 2)	All	-
Mean	2.416937	2.532089	2.471773	2.392571	2.464338	-
Std. Dev	0.594498	0.625310	0.686154	0.776165	0.682532	-
Control of corruption						
COC	[−2, −1)	[−1, 0)	[0, 1)	[1, 2)	[2, 3)	All
Mean	2.348233	2.485146	2.475382	2.432312	2.501125	2.464338
Std. Dev	0.451977	0.664681	0.693596	0.747013	0.800987	0.682532
Income group						
Group	**1**	**2**	**3**	**4**	**All**	**-**
Mean	2.409373	2.570062	2.417269	2.457305	2.464338	**-**
Std. Dev	0.454872	0.624461	0.630801	0.779940	0.682532	**-**

Table 8 Correlation matrix

	Ln *Z* score	ROA	NIM	CIR	CONC	Growth	Inflation	COC	VAA
Ln *Z* score	1.000								
ROA	0.155***	1.000							
NIM	−0.044**	0.266***	1.000						
CIR	−0.091***	−0.190***	0.107***	1.000					
CONC	−0.039*	0.074***	−0.045**	−0.083***	1.000				
Growth	0.075***	0.225***	0.146***	−0.158***	−0.034	1.000			
Inflation	−0.112***	0.009	0.286***	0.021	−0.005	0.060***	1.000		
COC	0.011	−0.108***	−0.590***	−0.021	0.190***	−0.185***	−0.246***	1.000	
VAA	−0.070***	−0.119***	−0.401***	0.210***	0.058***	−0.242***	−0.223***	0.782***	1.000

Table 9 Voice accountability and control of corruption

Control of corruption					
	[−2, −1)	[−1, 0)	[0, 1)	[1, 2)	All
Mean COC	−0.609256	−0.523130	0.097913	1.535785	0.171611
Std. Dev. COC	0.573789	0.599004	0.646562	0.576568	1.036888

Table 10 Variance inflation factor

Variable	Linear specification	Nonlinear specification	Transmission channel
ROA	1.333630	1.333464	1.355277
NIM	1.283552	1.300299	1.283163
CIR	1.404925	1.420467	1.406462
CONC	1.153981	1.193087	1.181525
Growth	1.165280	1.250211	1.172905
Inflation	1.111397	1.111985	1.110960
COC	1.321588	1.327155	1.453860
VAA	1.191975	5.757077	1.716786
VAA^2	-	5.587127	-
VAA × COC	-	-	1.905798

Table 11 List of countries

Albania	Chile	Ghana	Latvia	Norway	Switzerland
Algeria	China	Greece	Lithuania	Oman	Thailand
Angola	Colombia	Guatemala	Luxembourg	Pakistan	Togo
Armenia	Costa Rica	Guyana	Macao	Panama	Trinidad and Tobago
Australia	Croatia	Haiti	Madagascar	Paraguay	Tunisia
Austria	Cyprus	Honduras	Malawi	Peru	Turkey
Azerbaijan	Czech Republic	Hong Kong	Malaysia	Philippines	Uganda
Bahamas	Côte d'Ivoire	Hungary	Mali	Poland	Ukraine
Bahrain	Denmark	Iceland	Malta	Portugal	United Kingdom
Bangladesh	Dominican Republic	India	Mauritania	Qatar	United States
Barbados	Ecuador	Indonesia	Mauritius	Romania	Uruguay
Belarus	Egypt, Arab Rep	Ireland	Mexico	Russia	Vietnam
Belgium	El Salvador	Israel	Moldova	Saudi Arabia	Yemen, Rep
Benin	Estonia	Italy	Morocco	Senegal	Zambia
Bolivia	Ethiopia	Japan	Nepal	Serbia	
Botswana	Finland	Jordan	Netherlands	Singapore	
Brazil	France	Kazakhstan	New Zealand	Slovak Republic	
Bulgaria	Gabon	Kenya	Nicaragua	Slovenia	
Burkina Faso	Georgia	Korea, Rep	Niger	Spain	
Burundi	Germany	Kuwait	Nigeria	Sweden	

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