AUS | American University of Sharjah

SCHOOL OF BUSINESS ADMINISTRATION WORKING PAPER SERIES

SBAWPS: 03/11/2019

Corruption, Lending and Bank Performance

Bana Abuzayed
Mouldi Ben Ammar
Philip Molyneux
Nedal Al-Fayoumi

Working Paper 03/11/2019

School of Business Administration
Working Paper Series (SBA WPS)

Corruption, Lending and Bank Performance

Bana Abuzayed, Mouldi Ben Ammar, Philip Molyneux, Nedal Al-Fayoumi

Abstract

This paper uses a sample of 7235 banks from160 countries between 2000 and 2016 to investigate the link between corruption, lending and bank performance. It considers both country- and bank-level corruption. The study finds that while corruption increases bank lending, it has an adverse impact on bank profits and risks (credit, solvency and distance to default). Corporate lending is found to be most influenced by corruption. Bank-level corruption influences bank performance in both developed and developing countries whereas country-level corruption has a lesser effect on lending in developing countries. The study also finds that greater bank competition, market concentration and improved regulatory environments reduce the effect of corruption on bank lending and performance. Policy makers should focus on enhancing regulatory rules and institutions in order to deal with the adverse impact of corruption on bank performance.

JEL Classification:
G20, G21, D73
Key Words:
Corruption, Bank Lending Corruption, Loan Growth, Bank Performance.

P.O. Box 26666
Sharjah, United Arab Emirates
E-mail: sbawps@aus.edu

Corruption, Lending and Bank Performance

Bana Abuzayed
Mouldi Ben Ammar
Philip Molyneux
Nedal Al-Fayoumi

Abstract

This paper uses a sample of 7235 banks from160 countries between 2000 and 2016 to investigate the link between corruption, lending and bank performance. It considers both country- and bank-level corruption. The study finds that while corruption increases bank lending, it has an adverse impact on bank profits and risks (credit, solvency and distance to default). Corporate lending is found to be most influenced by corruption. Bank-level corruption influences bank performance in both developed and developing countries whereas country-level corruption has a lesser effect on lending in developing countries. The study also finds that greater bank competition, market concentration and improved regulatory environments reduce the effect of corruption on bank lending and performance. Policy makers should focus on enhancing regulatory rules and institutions in order to deal with the adverse impact of corruption on bank performance.

JEL Classification:

G20, G21, D73

Key Words:

Corruption, Bank Lending Corruption, Loan Growth, Bank Performance.

DRAFT

[1] Department of Finance and Economics, College of Business and Economics, Qatar University, Qatar
[2] College of Business Administration, University of Sharjah, UAE
Email: pmolyneux@sharjah.ac.ae
Tel :+(971) 6 5050500

1- Introduction

Corruption is a widespread social, political and economic phenomenon. Generally, it represents the abuse of delegated public power for private benefits. It can appear as a form of bribery and extortion, collusion, cronyism, fraud and other similar activities (Chen et al., 2015). Corruption can adversely influence economic development by affecting: entrepreneurs' investment incentives; the composition of government expenditure; accumulation of human capital; inflows of foreign direct investment; and the effectiveness of international aid. Ultimately it can lead to a less efficient financial system (Cooray and Schneider, 2018; Toader et al., 2018 and Lonescu and Caloian, 2016).

For banks and their lending behavior, corruption can have mixed effects. One strand of literature finds that it puts ‘sand in the wheels’ of economic activity and in the context of banking leads to a misallocation of loanable funds from satisfactory loans with a low probability of default to bad projects that mostly end up as non-performing. (Beck et al., 2005, Detragiache et al., 2008; Park, 2012; and Chen et al., 2015). Firms that pay higher bribes are also more likely to obtain credits they least likely can repay[3] . Paying bribes enables both beneficiary firms and banks to avoid the regular loan review processes or to gain regulatory leniency. The resulting bad loans are ultimately expected to reduce bank performance and increase risk.

Another (somewhat more limited) strand of literature advances the opposing view noting that corruption ’grease the wheels’ of economic activity. This only holds in cases where governance structures and institutional arrangements are weak (Aidt 2009; Méon and Sekkat 2005). If inefficient bureaucracy is by-passed by paying bribes the process of obtaining legal and other processes can be speeded-up (Shleifer and Vishny 1993). As such, corruption can act as an ‘escape hatch’ in the presence of weak institutions. Chen et al., (2013) find strong empirical evidence that bribery, rather than firm performance, determines the extent to which private firms access bank credit in China. They argue that bribery enables an economic outcome whereby firms with better economic performance are awarded larger loans, and these firms pay more in terms of bribes. They conclude that the commercial principles in bank lending can be consistent with the weak Chinese institutional framework.

On balance, the literature on corruption and bank lending seems to favor the view that the former puts ‘sand in the wheels’ of banks likely hampering loan quality and growth (Lardy, 1998) and adversely affecting bank performance (Jeon et al., 2014). This paper seeks to extend the established literature on several dimensions. First, we collect information on a sample of 7,235 banks based in 160 countries over 2000 to 2016 to investigate the interplay of corruption and bank lending on bank performance (measured as profitability ROA, as well as various risk measures - non-performing loans NPL, Z-score and distance-to-default DD). Second, we examine how the influence of loan growth varies according to total loans as well as different types of loans (corporate, mortgage and consumer) and consider different loan growth scenarios (percentage change in loan, abnormal loan growth and external growth). Third, we also extend the previous literature by recognizing the effects of a variety of external factors such as bank type, regulatory

[3] See Mauro (1995), Levine (1998, 1999), Djankov et al., (2007), Park (2012) and Akins et al., (2016).

quality, competition and market structure in our analysis. Fourth, the study considers the expected non-linear effect of loan growth on bank performance to investigate how banks respond to extreme levels of loan growth. Fifth, the study runs a number of robustness checks examining the effect of corruption on loan growth and bank performance considering the level of country economic development. Finally, in all analyses, the study examines two types of corruption (country and bank lending corruption).

We generally find that loan growth increases with country level corruption and nonlinearly affects bank performance. Less than excessive lending, improves bank performance (increase returns and reduces risk). However, country- and bank-level corruption can hamper performance and mitigate the benefits of higher loan growth. Bank and country-level corruption affects lending differently relative to a country's level of economic development. Bank-level corruption influences bank performance in both developed and developing countries. Country-level corruption has less effect on banks in developing countries. The reason could be that banks in developing countries have managed to incorporate corrupt practices into their normal ways of working so it is considered a standard feature of business activity and so has only limited influence on performance. We also find that corporate lending is most influenced by corruption. The study finds that greater bank competition, market concentration and improved regulatory environments reduce the influence of corruption on bank lending and performance

The remaining sections in this paper are organized as follows: Section 2 review the previous studies. Section 3 summarizes the data and methodology. Section 4 explains the empirical results finally section 5 concludes.

2. Literature review

2.1 Corruption and performance

Study of the consequences of corruption has a long history in economics and most of this literature links high levels of corruption to reduced economic growth (Mauro, 1997). Corruption is viewed as representing a large obstacle to financial and economic development (Wilhelm, 2002) through the negative influence it has on national saving rates and encouraging capital flight (Swaleheen, 2008). This feeds through into financial instability and reduced investment (IMF, 2016). The World Economic Forum's 2016 Global Risk Report ranked the failure of national governments (including their ability to tackle corruption) as the sixth highest global risk. In addition, the aforementioned report notes that corruption appears to trouble economies at all stages of economic development and is becoming a bigger problem in the developed world.

Generally, corruption arises from the "abuse of public office for private gain" and may extend to "prevent the lawmaking process itself" IMF (2016). Corruption can adversely affect lending to the poor and non-influential people (Barth et al., 2006) and discourage banks from extending credit overall (Weill et al., 2009). La Porta et al's, (1997) seminal work was the first to highlight the importance of legal institutions and good governance in protecting banks in the case of loan default, where loan contracts could be enforced. With less corrupt legal institutions, a bank can smoothly force repayments, grab collateral or proceed to some legal actions that apply an influence on its lending behavior to enforce claims against defaulting borrowers. Improved legal protection also for loan holders can increase the level of lending (Levine, 1998; 1999 and Djankov et al., 2007; and Qian and Strahan, 2007).

Corruption take place in banks when senior managers / executives (or even loan officers) receive bribes to grant loans that otherwise would unlikely be granted. The traditional view is that corrupt bank officials do not maximize social welfare, instead they maximize their own private benefits consistent with the ‘‘political/regulatory capture view’’[4]. Lien (1990) finds that bribery can cause resource allocation inefficiency. Firms that pay bribes face: higher time and capital costs (Kaufman and Wei, 1999); a lower potential to maintain quality (Paunov, 2016); and become less involved in monitoring company investment (Chen et al., 2015). Consequently, corruption increases credit risk as loan portfolio quality deteriorates (Goel and Hasan 2011; and Park 2012). Chen et al., (2015) examine the effect of corruption on 1200 banks across 35 emerging economies during the period 2000 to 2012. They find evidence of "sand in the wheels" view in which banks increase their risk tolerance in countries with higher levels of corruption.

As mentioned earlier, there is another strand of literature that advances an opposing view noting that corruption helps 'grease the wheels' of economic activity. In countries where institutions and governance structures are weak, corruption may help by-pass bureaucratic processes and lead to more efficient loan-contracting therefore aiding economic development (Aidt 2009; Méon and Sekkat 2005; Shleifer and Vishny 1993). An interesting study by Chen et al., (2013) find such evidence where bribery, rather than firm performance, determines the extent to which Chinese private firms access bank credit. They note that companies with better economic performance tend to granted larger loans and these pay more in terms of bribes. On balance, however, there is stronger evidence on the 'sand in the wheels' compared to the 'grease the wheels' viewpoint.

Jiang et al., (2018) propose the protection against risk hypothesis to explain the effect of corruption on loan growth. Under this hypothesis banks in countries where bribing bank officials is common, lending policies will be tightened because lenders have greater pre-contracting expectations that corruption at the bank official level will increase costs. This encourages policy makers to tighten lending conditions and strengthen institutional factors resulting in lower loan growth.

Previous literature also finds various institutional factors that help mitigate banking sector corruption. For instance: improved bank supervisory policies; higher transparency and information sharing about borrowers; and heightened media reporting on bribery cases can help to mitigate corruption. Barry et al (2016) test whether bank-lending corruption is influenced by bank regulatory environments and the country level of economic development. They find that a stronger supervisory regime and a higher quality of external audits, limits bank lending corruption for family-owned and other types of banks. Akins et al., (2016), examine the effect of regulating timely loan-loss recognition on lending corruption using a large set of World Bank individual banking data for 44 countries. They find that greater transparency and more timely recognition of loan-losses tends to reduce the influence of corruption. In addition, Imam and Kpodar (2015) find

[4] For more details about this view see Beck et al., (2006)

that the quality of institutions is linked positively to economic development, suggesting that weaker institutions and (therefore greater corruption) have the opposite effect.

2.2 Bank lending and performance

Bank lending and credit market development can have a positive influence on economic development. Endogenous growth theory assumes a positive influence of financial deepening and loan growth on economic activity over the long-run (Bencivenga and Smith 1991). Although various studies confirm this influence , such as Bekaert et al., (2002) and Mishkin (2001), other studies show that credit booms generally end poorly and are followed by adverse economic performance (Baron and Xiong, 2017). Earlier work by Keeley (1990) on bank lending behavior over the business cycle notes that periods of rapid loan growth tend to precede periods of high loan-losses. Bikker and Metzemakers (2005) examine the relationship between loan-loss provisions of banks in OECD countries over 1991-2001 and find a negative link between GDP growth and loan-loss provisioning. They also find a positive relationship between provisioning levels and lending growth.

Various explanations have appeared in the literature to explain the link between loan growth and loan-losses. First, some studies emphasize variations in bank credit policies and procedures as the main reason for loan-losses. As noted by Demsetz et al (1997) variations in credit policies may cause agency problems. For instance, when management compensation is tied to target return-on-equity this may encourage higher risk-return activities promoting more rapid loan growth. Second, tougher competition in the financial system may motivate bank managers to sacrifice loan quality to compensate for declining profitability. Lower loan quality likely increases future non-performing loans but promotes spontaneous short term loan growth. Third, since managers are judged relative to their peers, herding behavior may exist (Ragan, 1994). This may help explain why bank managers decide to finance negative NPV projects with high probability of default during credit expansion periods. Borio (2009) and Allesi and Detken (2011), for instance, find that loan growth is a leading indicator of a financial crisis and Igan and Pinheiro (2011) show that during moderate growth periods well-capitalized banks tend to expand credit more than their weaker counterparts, however in boom period's credit growth becomes less dependent on bank soundness. An extensive literature has emerged looking at the build-up to financial crises and the impact of (negative) credit shocks, this is too numerous to cover here, for more detailed insight see Bernanke (2018) and Mian and Sufi (2014, 2018).

While there is substantial evidence about the impact of abnormal credit growth on financial stability from a macro perspective there is less evidence from a micro standpoint. Sinkey and Greenwald (1991) look at US bank data during the period 1984-1987 and find a significant positive link between credit growth and bank loan-losses. They suggest that banks suffer from institutional memory loss, forgetting that in the past rapid growth feeds through into future credit losses. This is in-line with Guttentag and Herring's (1986) disaster myopia hypothesis. Berger and Udell (2003) examine the pro-cyclicality of bank lending in the US from 1980 to 2000. They find evidence (as expected) that loan-losses peak when banks have more relaxed credit standards. Fahlenbrach et al., (2018) use data for 223 US banks over 1973 to 2014 to look at the link between stock price performance and bank credit growth. They find banks that experience loan growth in the top quartile of their sample (over a three-year period) have stock that is significantly outperformed by banks with loan growth in the bottom growth quartile. After high growth periods, however, the banks tend to experience lower profitability and higher loan-loss reserves. These findings are consistent with the view that banks, as well as investors, become over optimistic of lending performance in high growth periods. Salas and Saurina (2002) find that loan growth of saving banks in Spain is positively and significantly associated with loan-losses 3-4 years ahead. Hess et al., (2009) examine data from 32 Australian banks during the period 1980-2005 and find that high loan growth translate into larger credit losses with a lag of two to four years. Foos et al., (2010) use information from 16 major countries and 16,000 banks over 1997 and 2007 to test the relationship between abnormal loan growth, assets risk, profitability and solvency. They confirm that loan growth is a major driver of bank risk. In particular, they find loan growth reduces capital strength and increases loan-loss provisioning over the subsequent three years. Vithessonthi (2016) examine the link between bank credit growth and non-performing loans for a sample of 82 publicly listed commercial banks in Japan over 1993 and 2013 and finds that the relationship between credit growth and non-performing loans varies before and after the global financial crisis (GFC) of 2007. The link was positive prior to the GFC and then becomes negative thereafter. More evidence of low loan growth as a result of the GFC is presented by Merilainen (2016) who show that credit growth was affected negatively by the 2008–2009 financial crisis and the subsequent euro sovereign debt crisis.

So far, we have mainly covered the literature linking bank credit behavior to bank performance in advanced economies. There are a number of studies that examine similar relationships for banks operating in emerging economies. Tamirisa and Igan (2007) analyze the risks associated with rapid credit expansion for 217 commercial banks operating in new European member states. They find that high credit growth results in more risky banks and lower capitalized banks grow fastest. Amador et al., (2013) examine Colombia with a sample of 42 banks and 22 financial corporations over 1990 to 2011. Like in the aforementioned study, they find that abnormal growth leads to greater risks. Another study by Erdinc (2010) uses data from 30 Bulgarian banks over the period 1999 to 2008. Again, they find that rapid credit growth results in increased non-performing loans and a weakened solvency position.

Based on the above, the relationship between loan-growth and bank stability is clear. Studies that look at credit build-up from a macro- and microeconomic perspective suggest that rapid credit growth generally results in weakened bank performance in terms of higher loan-losses and an erosion of capital strength. The aim of this paper is to see whether this relationship holds for an extensive number of banks based in 160 countries between 2000 and 2016 and whether corruption has any mitigating influence.

3. Model specification, variables and data sample

3.1. Model specification

In order to investigate whether corruption has any mitigating impact on bank lending and performance we estimate a series of panel models using three groups of variables: bank performance measures, loan growth estimations, and measures of corruption. In addition, we also include a broad set of variables to control for bank- and industry-specific effects as well as for various macroeconomic factors. Specifically, we investigate whether corruption influences loan growth (model 1) and also whether loan growth or corruption (and their interaction) influence bank performance (model 2):

$$LG_{it} = \alpha_0 + \gamma LG_{i,t-1} + \eta COR_{it} + \delta X_{it} + \mu_i + \varepsilon_{it} \qquad (1)$$

Where LG_{it} denotes bank loan growth for bank i at time t; COR_{it} is the country i corruption indicator (bank loan official and country indicators) at time t. $X_{i,t}$ is a vector of bank-level control variables for bank i at time t and select measures of industry and macroeconomic variables that affect bank performance. μ_i is bank fixed effects, $\varepsilon_{i,t}$ is the residuals that are assumed to be independent for each i over all t.

$$\begin{aligned} y_{it} &= \alpha_0 + \beta_1 LG_{it} \times COR_{it} \\ &+ \gamma LG_{it} + \theta LG_{it}^2 + \eta COR_{it} + \lambda\, y_{i,t-1} + \delta' X_{it} \\ &+ \mu_i + \varepsilon_{i,t} \end{aligned} \qquad (2)$$

Where $y_{i,t}$ is the performance measure for bank i at time t, $y_{i,t-1}$ denotes performance for bank i in period $t - 1$ (capturing the persistence of the dependent variable). We also consider the possibility of a nonlinear relationship between loan growth and bank performance by including the squared-term LG_{it}^2.

Positive and significant values of coefficient η in model (1) indicate higher lending in countries that are more corrupt. In other words, this finding would support the "grease the wheels" hypothesis; corruption may enhance the chance of giving loans and motivate bank officials to lend in order to reap personal benefits. γ in equation (2) measures the effect of higher loan growth on bank performance. η, in equation (2), indicates the direct effect of corruption on bank performance. If loan growth increases (decreases) bank performance in more corrupt banking system, the coefficient β_1 in equation (1) should be positive (negative) and statistically significant. Therefore, a significant coefficient of β_1 in equation (2) indicates the moderating effect of country and bank-level corruption on the loan growth / bank performance linkage. If corruption weakens (strengthens) in the country, a positive (negative) effect of credit growth on bank performance would be expected highlighting the grease- (sand-) in-the-wheels hypothesis. We expect a positive (negative) association between loan growth (corruption) and bank performance. To summarize, the effect of loan growth on bank performance is provided by the coefficient γ; the effect of corruption on bank performance is indicated by the coefficient η; and the interaction effect of corruption and loan growth on bank performance is tested through coefficient β_1.

This study further decomposes total loan growth (LG) into four types, namely, mortgage (MLG), consumer (CLG), corporate (CORLG), and other loan growth (OLG). So:

$$y_{it} = \alpha_0 + \sum_{j=1}^{4} \beta_j (LG_{jit}) \times COR_t$$
$$+ \sum_{j=1}^{4} \gamma LG_{it} + \eta COR_t + \lambda\, y_{i,t-1} + \delta' X_{it} \quad (3)$$
$$+ \mu_i + \varepsilon_{i,t}$$

Where β_j indicates the effect of each type of loan growth has on bank performance with varying levels of corruption.

Our model set-up includes a number of control variables. We include banking system variables (bank competition, concentration), policy variables (Bank regulation) as well as for different business models (Islamic or conventional). We suggest that banks faced with high competition or a concentrated market structure operating in a country with strong regulatory quality should be able to, at least partially reduce the negative effects of corruption when loans are growing (Fue et al., 2014; La Porta et al., 1999),

$$y_{it} = \alpha_0 + \beta_1 LG_{it} \times COR_{it} \times Factor_{jt}$$
$$+ \gamma LG_{it} + \eta COR_t + \lambda\, y_{i,t-1} + \delta' X_{it} \quad (4)$$
$$+ \mu_i + \varepsilon_{i,t}$$

In equation 4 we introduce a triple interaction term between loan growth, corruption, and various other factors. The idea for this test follows from the premise that if there were still unobserved forces biasing our estimates in equation (3), these would be more potent in countries where banking systems are relatively more concentrated, competitive, regulated and focus on Islamic or conventional banking. In this case, the coefficient on the triple interaction term would be statistically and economically significant. Essentially, this is a placebo test that seeks to confirm or reject the findings derived from Equation 3.

3.2. Variable construction and description

The following explains the rationale for the choice of variables used in the above models. All variables are listed in Table 1 and explained as follows:

3.2.1 Loan growth

In-line with the established literature (Foos et al., 2010; and Niu, 2016), loan growth is simply calculated as the percentage change for bank *i* total customer loans from the year *t-1* to year *t*. The data are collected from the Bankscope database. In particular, a measure of total customer loans includes credits to consumers, mortgages, corporates and other loans (inter-bank lending is not included) (Foos et al., 2010). Marcucci and Quagliariello, (2009) and Bonfim, (2009) argue that the impact of bank's loan growth depends on the relative growth rate compared to competitors. As such, we extend our analysis to include two more measures. First, abnormal loan growth rate (ALG) is defined as the difference between bank i's loan growth rate and the median loan growth rates for all banks in the same country and year. This adjustment allows for comparison between banks as well as controlling for country-specific economic and competitive effects. To distinguish between the effects of each type of loan growth we further decompose total loan growth into four types, namely, consumer, mortgage, corporate and other loans.[5]

We also follow Foos et al., (2010) and extend our analysis by distinguishing between internal and external growth (ELG). We assume that a bank may expand beyond internal (or organic) growth as it may grow via takeover or merger. To deal with this we construct a variable that takes the value of 1 if bank i's total equity increases by more than 30% (corresponding to the 95% percent of the equity growth rate distribution). Otherwise, the value of the external growth variable is 0. The assumption is that a bank's equity is unlikely to grow by more than 30% from retained earnings over a year so any large increase is indicative of acquisition or merger activity.

Table 1 shows the aggregate annual loan growth of 7.3%, close to what has been reported in previous studies (see for example Deli and Hasan, 2017, who report 8% loan growth for a sample of 125 countries). Average loan growth rates for the various type of credit are as follows: mortgages (7.7%), consumers (8.3%), corporates (3.7%) and others (10.6%). Among the specifically defined loan types, consumer loans have the highest average growth and are also the most variable.

3.2.2 Bank performance

We use several accounting and market-based measures to assess bank performance (profitability and risk). We measure profitability for each bank using the return on assets computed as the ratio of net income to total assets (ROA). ROA is recommended by previous literature (Saghi-Zedek 2016) in examining bank profitability (compared to return-on-equity, ROE) as it is less susceptible to bias due to leverage.

The Z-scores of individual banks in each country is also used as a performance indicator. The Z-score measures the number of standard deviations that a bank's return on assets can decrease in a single period before it becomes insolvent. Thus, a higher Z-score indicates a lower probability of insolvency (Bertay et al., 2013). Following Boyd and Graham (1986) Z-score is calculated as:

$$Z_{it} = \frac{(ROA_{it} + E / A_{it})}{\sigma_{ROAit}}$$

Where ROA is the return on assets, E / A_{it} is the shareholders' equity divided by total assets, σ_{ROAit} is the standard deviation of the return on assets estimated using a three-year window. Because the Z-score is usually highly skewed, we follow Dima et al., (2014) and rescale the Z-score in order to display a zero mean and unit variance. We apply the natural logarithm to (1+ Z-score) to smooth higher values (Beck et al., 2013). 1+ Z-score is used in place of using only Z-scores to avoid the truncation of the Z-score at zero. We will denote ln (1+ Z-score) as the Z-score

[5] Loans extended to public officials and government have been excluded due to limited data.

in the latter part of the paper for brevity. Before calculating the Z-score for each bank, outliers of $ROA_{i,t}$ and $EA_{i,t}$ for values above the 95th percentile and below the 5^{th} percentile of the sample distribution were removed. We also employ another indicator of banks' accounting based credit risk, namely, Non-Performing Loans (NPL) measured as the fraction total impaired loans to net loans (Goretti and Souto, 2013 and Ahamed and Mallick 2017).

Although the ROA, Z-score, and NPL are widely used measures of profitability and risk in the literature, they still rely on backward looking accounting values and suffer from possible earnings management. As such, any analysis of bank performance should be complemented (where possible) with market-based measures.

To estimate a market-based performance variable we consider bank market value and volatility. We estimate bank volatility using Merton's (1974) Probability of Default (PD) model. A country's banking system PD is a weighted average of the PD of a country's individual banks. This model is widely used in the finance literature (see Duffie et al., 2007, Fue et al., 2014, Kabir et al., 2015 and Abuzayed et al., 2018). The distance to default (DD) measure assumes that equity holders are residual claimers. They can claim their invested value after meeting all banks' debt obligations. The main assumption of the model is that equity is a call option on the assets of a bank. The strike price equals the face value of the liabilities at time *T*. If the value of the assets is more than the face value of debt, equity holders will decide to exercise their option. In contrast, if the call option is out of the money and expires; this will mean the company will be bankrupt. The below is used to approximate PD:

$$PD = N\left(-\frac{\ln\left(\frac{V_A}{D}\right) + \left(r - \left(\frac{\sigma_A^2}{2}\right)\right)T}{\sigma_A \sqrt{T}} \right)$$

Where, P is the probability of bankruptcy, N ( ) is the cumulative normal density function, V_A is the value of assets, D is total debt, r is the expected return and σ_A is assets volatility. *T* is the time of expiration assumed as one year; *r* is the expected return calculated using the bank return over the previous period. Following Baharath and Shumway (2008) and Fue et al., (2014) negative expected returns are replaced by the country risk free rate. The standard deviation of assets is the weighted average of the standard deviation of debt and equity estimated using the below equation:

$$\sigma_D = 0.05 + 0.25 * \sigma_E$$
$$\sigma_E = \sigma_{rt} * \sqrt{N}$$

Where, σ_E is the standard deviation of daily stock returns and *N* is the average number of trading days in the year. The larger the DD the greater is the distance of a bank from the default point and the lower is the probability of default.

All accounting data are collected from Bankscope whereas market prices are from Bloomberg. It is worth noting that while previous literature argues that DD provides a better predictor of the probability of default than the Z-score (Gropp et al., 2006) both measures assess solvency risk.

They both link volatility in returns to default. Table 1 reports the descriptive statistics for both the accounting and market performance measures. While Z-score varies between 31 and zero for risky banks its average value is 7[6]. This value indicates that, on average, profits have to fall seven times their standard deviation to eat up all bank equity. The average DD for all banks in the sample is around three[7]. DD of three indicates that default within a year on average is a three standard deviation event, assuming that the variation of the market value of assets follows a recent historical value and using the current market value of assets as a starting point. DD values vary from -0.5 to 17 with a high standard deviation of 4.48. It is worth noting that a negative or zero value of DD does not mean that the bank has failed at this point. Instead, it signals that the bank needs to liquidate assets in order to repay any short-term debt expected to be covered within a year. This will increase the likelihood of bank failure unless asset values improve. The mean (median) values for ROA are 0.8% (0.30%) with a standard deviation of 1.2.[8]

3.2.3 Corruption

Corruption is measured using both country – and bank-level indicators. We use two measures as corrupt institutions outside the banking sector may encourage or direct banks to lend to non-credit worthy customers even though bankers themselves maybe relatively incorrupt (Chen et al., 2015). Country level corruption is derived from the Transparency International Corruption Perception Index (CPI), a frequently employed measure in the literature (Mo, 2001, Adit 2009, and Chen et al., 2015). The CPI indicates public sector corruption levels based on a scale from 0 (highly corrupt) to 10 (very clean)[9]. Following Park (2012), we use 10 minus the CPI so that higher values reflect more country level corruption:

$$CI = 10 - CPI$$

Lambsdorff (2008), however, suggests that the CPI should not be employed for year-to-year corruption comparisons since a country's CPI value may change from year-to-year because of relatively minor changes in the way in which Transparency International constructs their data. As such it is suggested that an adjusted CPI is used that indicates relative corruption:

$$MCPI_{i,t} = \frac{CI_{j,t}}{\sum_{j=1}^{n} CI_{j,n} \Big/ n}$$

[6] Previous studies tend to report lower values of Z-score for emerging markets (Chen et al., 2015, for 35 emerging markets finds an average Z-score of 3.2 and Lee et al., 2014 report a value of 4.4 for a sample of 29 Asian Pacific countries). However, Forssbæcka and Shehzad (2011) report a Z-score of 10 for a sample of European banks. These findings generally support the view that emerging markets face, on average, greater solvency risks.

[7] This is a close DD value to what is found in the previous literature. See for example Elchler and Sobaski (2012) who found DD to be around 4 in European banking.

[8] ROA values are slightly lower than the profitability figures found for Asian Pacific banking (0.99%) but similar to that for Australian banks (0.80%), see Lee et al., (2014).

[9] Recently Transparency International uses a scale of 0 to 100, with 0 indicating high levels of corruption and 100 low levels.

CPI at the country *j* in year *t* is divided by the mean of CPI indices across all countries for each year that we denote as the adjusted-CI (MCPI). To recall, our analysis focuses on 160 countries and 117,666 bank country year sample. Table 1 shows that the MCPI values vary from 2.6 (for UK, the least corrupt country) to 8.6 (for Venezuela, the most corrupt).

For an alternative indicator of corruption, we also follow Kaufmann et al., (2010) and from the World Bank's Worldwide Governance Indicators (WGI) use its sub-index of Control of Corruption (COC).[10]. The index value ranges from −2.5 to 2.5. A higher value in COC indicates less corruption. COC for the sample of countries is on average 1.16 with the lowest value (most corrupt) of -0.74 reported for Venezuela and the least corrupt country (again) being the UK with a value of 2.02. [11].

In order to consider a bank-level corruption we use a measure of bank lending corruption collected from the World Business Environment Survey (WBES) - a survey conducted by the World Bank in 1999 on 10,032 firms from 81 countries on managers' perception of actors that ease or restrain firms' performance and growth. The survey includes questions on the extent to which corruption in bank lending represents an obstacle to firms. Following Beck et al., (2006), the level of bank lending corruption is measured with a variable taking values from 1 to 4, depending on the answer provided by sample firms in each country to the following question: ''Is the corruption of bank officials an obstacle for the operation and growth of your business?''. An answer of 1 indicates no obstacle, 2 a minor obstacle, 3 a moderate obstacle, and 4 a major obstacle. Firms responding to the survey are anonymous which minimizes the response bias expected due to firms concerns about indicating being engaged in bribery with bank officials. WBES covers 81 countries but for our analyses, we only consider 59 where we have related bank specific variables. Table 1 shows that WBES indicates that the UK (low score of 1.16) has the least corrupt banks with Egypt reporting the highest level of lending corruption (score of 2 overall).

3.2.4. Control variables and other factors

Following the established literature (see Lee et al., 2016; Zaghi-Zedek et al., 2016 and Abuzayed et al., 2018 among others) we control for a set of bank-specific, industry and macroeconomic determinants of bank performance so as to isolate the effect of loan growth and corruption. In particular, the bank-specific variables we include are: size ($SIZE_{i,t}$), measured as the log value of each banks total assets in each year; capital strength ($ETA_{i,t}$), total equity to total assets; bank liquidity ($DTA_{j,t}$) measured as deposits to total assets, and bank efficiency ($CIR_{i,t}$) the cost-income ratio for bank *i* in each year *t*.

In addition, we also include an assets diversity factor (AD) to capture variation in bank credit strategies across countries. Here we use the breakdown of bank assets into loans and other earning assets and create the following diversity index:

---

[10] This index uses an unobserved components model instead of the average of the results of various surveys. See Kaufmann et al., (2010) for more details about the methodology used to calculate the index.

[11] Data for102 countries are only available in the World Bank data set for COC, therefore the sample is reduced when COC is used as a corruption indicator.

$$AD = 1 - \left| \frac{NL_{itj} - OEA_{itj}}{TEA_{itj}} \right|$$

Where NL_{itj} is bank *i* net loans at time *t* in country *j*. OEA_{itj} is the other earning assets which includes securities and investments and other earning assets except loans. TEA_{itj} is total earning assets – simply the sum of net loans and other earning assets. Asset diversity takes a value of between 0 and 1 in which 1 designates full diversification and 0 a fully loan concentrated bank. The study also controls for macroeconomic factors including growth in GDP per capita and inflation (INF), as banks located in faster growing countries and more stable monetary environments are expected to have improved performance. As our sample also includes both Islamic and conventional banks we include a dummy variable to reflect the two different bank types (BT) – this takes the value of one if the bank is Islamic and zero otherwise. In addition, we also control for banking market competition using the Lerner Index (BS). BS for each banking system in each year is collected from the Financial Development and Structure Dataset following the methodology of Demirgüç-Kunt and Martínez Pería (2010) and calculated by Beck et al., (2016)[12]. Higher values of the Lerner Index indicate less bank competition. Additionally, we include bank concentration (CON) variable measured as assets of three largest banks as a share of assets of all commercial banks in a country. According to the structure conduct performance hypothesis (SCP), more concentrated banking system with few banks leads to higher prices and greater profit levels (Bain, 1951), which may encourages banks to take more risk. Also the regulatory environment is expected to influence bank performance as this can enforce stronger governance and other rules (Stigler, 1971). Following Barry et al., (2015) we construct an index that reflects the strength of supervisory regime drawn from the World Bank's 2003 Bank Regulation and Supervision Database. The estimated index value ranges from zero to ten, and covers areas linked to capital stringency and powers to intervene in and resolve troubled banks. The responses to ten (yes/no) type survey questions are coded to take the value of one and zero for each response respectively[13]. The higher the value for the supervisory regime the stronger the regulatory environment (REG). All descriptive statistics for the abovementioned control variables are in Table 1.

---

[12] Beck et al (2016) defines the Lerner Index (LI) as "the difference between output prices and marginal costs (relative to prices). Prices are calculated as total bank revenue over assets, whereas marginal costs are obtained from an estimated translog cost function with respect to output". See http://www.worldbank.org/en/publication/gfdr/data/global-financial-development-database for more details about the calculations of the index.

[13] (1) Does the supervisory agency have the right to meet with external auditors to discuss their report without the approval of the bank? (2) Are auditors required by law to communicate directly to the supervisory agency any presumed involvement of bank directors or senior managers in illicit activities, fraud, or insider abuse? (3) Can supervisors take legal action against external auditors for negligence? (4) Can the supervisory authority force a bank to change its internal organizational structure? (5) Are off-balance sheet items disclosed to supervisors? (6) Can the supervisory agency order the bank's directors or management to constitute provisions to cover actual or potential losses? (7) Can the supervisory agency suspend directors' decision to distribute: (a) Dividends? (b) Bonuses? (c) Management fees? (8) Can the supervisory agency legally declare – such that this declaration supersedes the rights of bank shareholders – that a bank is insolvent? (9) Does the Banking Law give authority to the supervisory agency to intervene that is, suspend some or all ownership rights in a problem bank? And (10) Regarding bank restructuring and reorganization, can the supervisory agency or any other government agency do the following: (a) Supersede shareholder rights? (b) Remove and replace management? (c) Remove and replace directors? A higher value indicates wider and stronger authority for bank supervisors

Table 1 about here

3.3. Data

This study analyze yearly balance sheet and income statement data collected from Bankscope for a maximum of 11,350 banks from 190 countries over the period 2000–2016. The data we start with for all countries and years comprise 192,950 annual observations from 11,350 banks. However, we restrict the initial sample to banks for which we have detailed information on variables for at least three years of observations. This removes 69,955 observations (some 4,115 banks) because at least one of our key variables (loan growth, corruption, any of the performance measures) are missing. The total number of countries remaining were 160.

As already noted, our distance-to-default measure requires market values. In this case, we can only use listed banks and here the sample sizes falls to 976 banks (there are 6,259 non-listed banks in our sample). We also moderate the impact of outliers by winsorizing the main financial variables at the 5% and 95% levels.

Table 2 displays the number of banks in our final dataset and compares the sample composition to the total number of banks in each region included in Bankscope. Our sample banks cover no less than 60% of total banking assets per region in most cases. Our sample is an unbalanced panel, with some banks entering the sample after 2000 and others dropping out before 2016.

Table 2 about here

4.1 Results

In this section, we first examine the effect of corruption on bank lending behavior. Next, we examine the effect of corruption on bank performance using a number of accounting and market measures of performance. We measure corruption using two levels of corruption, country and bank-lending corruption, in order to analyze whether banks that operate in more corrupt systems are less able to reap any potential performance benefits from loan growth. We also distinguish between various types of loan growth (consumer, corporate, mortgage and other) to see if these have a differential influence on our performance measures. To estimate our models (see section 3), we use Dynamic Panel GMM estimation techniques to control for possible estimation bias caused by residual autocorrelation in addition to dealing with various endogeneity issues (Greene, 2008; and Dima, 2014). We use the Arellano and Bover (1995) / Blundell and Bond (1998) set-up which propose a two-step system GMM that uses moment conditions in which lagged differences are instruments for the level equation.

4.1. Loan growth, corruption and bank performance: baseline results

As discussed above, the literature highlights that corruption can influence bank lending behavior and rapid loan growth can have an adverse impact on bank performance (by reducing profits and increasing risk), although more moderate growth can feed through into improved performance. As a first check we test the effect of different levels of corruption on bank lending and loan growth.

Then, we assess the effect of loan growth on bank performance regardless of the corruption level to examine if banks worldwide benefit, in performance terms, from higher loan growth. Table 3- and Table 4 list the results.

Table 3 summarizes the results of the effect of corruption on loan growth in two panels. Each panel uses one indicator of loan growth (percentage change in loan growth, panel A, and abnormal loan growth, panel B). In each panel, model 1 (see above section) has been estimated using three corruption measures reported in three columns (control of corruption, corruption perception index and bank lending corruption). All results support the view that higher corruption and lower control of corruption can increase bank lending growth. This result is consistent with Jiang et al., (2018) and Toader et al., (2018) in which lower corruption is found to moderate loan growth and higher corruption made loan terms more favorable to lenders.

Table 4 on the other hand, summarizes the results of applying equation 2. It shows the effect of loan growth on bank performance, namely, ROA (panel A), NPL (panel B), Z-score (panel C) and DD (panel D). In each panel, five models are estimated. Results reported in column 1 of each panel reveal that bank lending affects performance, irrespective of the level of corruption. When ROA is the dependent variable our results confirm that more lending increases profitability. However, a non-linear relationship between loan growth and bank profitability is found to exist as the squared loan growth term LG^2 is significant and the opposite sign to LG. This suggests that at higher levels of growth the positive influence of loan growth on bank performance reverses. This non -linear relationship is supported by the loan growth non-performing loans relationship (Fahlenbrach et al., 2016)[14]. When banks aggressively increase their lending they experience increases in non-performing loans. This is found in the significant positive LG^2 coefficient in panel B model 1. At a higher level of loan growth banks witness greater non-performing loans. Table 1 in Appendix A reports the likelihood ratio test and results for the threshold analysis confirming the non-linear relationship between bank performance and credit growth.

We also find that both credit and solvency risk measures (NPL and Z-score) are linked to loan growth. Again, a non-linear effect is found so for modest levels of credit growth risks appear to fall but higher rates feed through into greater credit and solvency risk. The non-linear relationship is consistent with Baron and Xiong (2017) and Fahlenbrach et al., (2016) who find that banks that grow quickly extend loans that perform worse than the loans of other banks. This is explained by factors linked to: ‘disaster myopia’ (Guttentag and Herring, 1986) and banks neglecting tail risk (Gennaioli et al., 2012); extrapolative expectations (Barberis et al., 1998); and this-time-is-different thinking (Reinhart and Rogoff 2009).

When we consider our market measure of bank performance our findings, however, differ. In Table 4 panel D, loan growth increase the probability of market default (DD) - a significant negative effect is found in all of the models. The non-linear effect of loan growth, in contrast, suggest that default risks abate when credit growth becomes rapid. This result is (to some extent) consistent with the previous literature (Fahlenbrach et al., 2016).

[14] Karagiannis, and Kvedaras (2019) find a nonlinear effect of bank credit on economic growth.

Control variables mostly enter the models significantly. Large banks are shown to be less profitable (Table 4 panel A), and witness higher non-performing loans (Table 4 panel B). Size does not seem to be linked to Z-score but for the market measures, bigger banks face lower default risk. (Table 4 panel D). Higher capitalized banks (ETA) also are more profitable and seem to be less risky (for most measures). Bank efficiency (CIR) is inversely linked to profits and liquidity (DTA). Asset diversity (AD) positively affects bank profitability and reduces non-performing loans, loan-losses and solvency risk (higher Z-score), but it increases the probability of default (lower DD) (see Table 4 panel D). This result is in-line with Abuzayed et al., (2018) who conclude that less than sufficient levels of diversification can increase bank risks.

From the baseline model, it is shown that growth in GDP per capita has no effect on profitability and it appears to be positively linked to credit risk (NPL) and bank solvency (Z-score), but inversely linked to the distance to default. Higher inflation also seem to have no impact on bank profits but feeds through into higher credit risks but more solvent banks (higher Z-score and DD).

4.2. Corruption, loan growth, and bank performance

In this part, we also examine the effect of corruption and its interaction with loan growth on bank performance. Table 4 reports the results in columns 2 to 5. First, we estimate the individual effect of corruption on different measures of bank performance (see column 2). As noted before, we use more than one measure of corruption, the country level modified corruption index (MCPI) is shown in models 2 and 3, and bank - lending corruption (BLC) is reported in 4 and 5 from panels A to D.

Bank-lending corruption negatively and significantly affect banks' return on assets. It also has a larger adverse impact on bank profits compared to country-level corruption. The direct impact of lending corruption that is linked to illegal payments to bank officials has a bigger impact compared to broader indirect country wide institutional corruption. However, both types of corruption significantly increase the level of non-performing loans, loan-losses and (mainly) boost bank risks. Overall, these findings support the "sand-in-the wheels" hypothesis (Beck, 2006) in which greater corruption leads to poorer bank performance.

Interaction variables are introduced to the model and the results are reported in Table 4, columns 3 and 5 in all panels. These variables show the joint effect between each of the corruption measures and loan growth. Results confirm the significant effect of corruption on loan growth and bank performance. This holds in almost all the regressions for both country and bank lending corruption measures. When the joint effect between loan growth and corruption are considered, a significant influence on performance exists. The interaction variable enters all models in an opposite sign relative to the single effect of loan growth indicating the reversal effect of loan growth on bank performance, in countries with higher corruption or when bank officials are more corrupted. Our results are supported by Jensen and Meckling, (1976); Groenendijk, (1997) and Jiang et al.'s, (2018) agency cost argument. When corruption is high, the surrounding environment will motivate bank officials to accept bribes increasing their own benefits, but more likely sacrifice the bank's owners and investors' interests. Higher loan growth in more corrupt countries, with bank officials more likely to accept bribes results in poorer bank performance. In other words, the results reveal that corruption prevent banks from benefiting from more lending (negative link to ROA, panel A) due to heightened non-performing loans (positive NPL, panel B). Though the lower loan quality appears to increase bank insolvency (negative link to Z- score, panel C) and a higher probability of default (negative DD, panel D).

4.3. Loan types, corruption and bank performance

In this section, we examine model 4 that assesses the effect of different loan types' growth on bank performance. Table 5 reports the results for equation 3 in two panels. Panel A shows the effects of each loan type growth on bank performance separately and panel B adds the interaction effects to the model in which each type of loan growth is multiplied by the two measures of corruption: MCPI (columns 1 to 3) and BLC (columns 4 to 6)[15]. Looking at panel A, among all loan types, corporate loans are found to have a positive impact on bank profits (positive and significant CORLG coefficients in the ROA model) and also reduce credit and solvency risk (negative and positive CORLG coefficient in NPL and Z-score, respectively). This result suggests that bank managers should not underestimate the risks of mortgage and consumer lending at the expense of corporate credits. For most of the model estimates, corruption has a negative influence on bank profits and generally raises bank risk. If one looks at mortgage and consumer lending growth these seem to reduce profits and boost risk. When the interaction variables are introduced (see Table 5 panel B), these have a significant and opposite sign with the counterparty variables. This means that corruption reduces the benefits of corporate lending. While bank profitability increases with greater corporate loan growth, in more corrupt countries, corporate lending growth has a lesser effect on bank profitability (see table 5 row 3, 7 and column 1 of panel B) and also increases solvency risk (see Z-score in columns 3 and the same row in panel B). On the other hand, mortgage and consumer loan growth reduces profitability (ROA) and increase insolvency (Z-score). However, when the interaction variable between corruption and each loan type is introduced into the models this has a significant effect and strengthens the negative influence of consumer and mortgage loan growth on performance.

4.4. Robustness Checks

In this part, we further analyze additional variables that may influence the effect of corruption in mitigating possible benefits of lending growth. We consider four types of variables covering bank business model (bank type, BT, Islamic or conventional), banking system features (competition, BS, concentration, CON) and a supervisory regulation variable (bank regulation, BR). For this purpose, we augment equation (4) by interacting each factor with each corruption measure and the loan growth variable. To save space, we only present the results obtained using the most significant models (ROA, NPL and Z-score). All results are reported in Table 6 in two panels A (MCPI) and B (BLC).

We consider whether different business models, Islamic or conventional, are impacted by corruption. In column 1 in Table 6, the coefficients on the triple interaction term confirms that

---

[15] COC results have not been reported due to space limitations but they are similar to those using MCPI. Results available from the authors on request.

corruption has less effect on loan growth performance for Islamic banks relative to conventional banks. It could be that the religious features of Islamic banks mitigate the adverse impact of corruption. Competition (concentration) in banking systems is expected to restrict (boost) corruption (Barth et al., 2007), and this should feed through into improved (worsened) bank performance. Table 6 shows the results for concentration CON (column 3) and competition BS (column 4). In the majority of cases, CON negatively affects bank profitability, increase non-performing loans, and reduces the Z-score (see LG*MCPI*CON variable in panel A and see LG*BLC*CON variable in panel B). In contrast, greater competition reduces the effect of corruption on bank performance (see LG*MCPI*BC row in panel A and LG*BLC*BC variables in panel B from Table 6). Hence, competition may play a mitigating role in controlling for the effects of corruption on banks while more concentrated banking systems do the opposite. It is likely that the costs of coordinating corrupt activities are lower in a concentrated system as there are fewer banks through which to coordinate such behavior.

As the aforementioned relationships may vary for banks operating in countries at different stages of development, first, we re-estimate model1 testing for the effect of corruption on loan growth in developed and developing countries (results are reported in Appendix Tables A-2 and A-3). We also report results using two measures of loan growth shown in panel A (annual percentage growth in loans) and panel B (abnormal loan growth). While country level corruption (corruption perception index) is found to increase bank lending growth in both sets of countries (see columns 1 to 3 in panels A and B), bank-lending corruption is found to affect banks in developed and developing countries differently. Bank lending corruption increase loan growth in developing countries, but negatively affect lending growth in developed countries.

In addition, Tables 7 and 8 report the results applying Equation 2 using sub samples of developed and developing countries. Results in Table 7 show that country level corruption (see column 1) has no effect on bank performance, bank-lending corruption (see column 3) reduces bank profitability. This result is consistent with the protection against corruption risk hypothesis (Jiang et al., 2018). Under this hypothesis banks in countries where bribing bank officials is common, lending policies will be tightened because senior bank managers know that such activity will incur substantial costs. It also encourages policy makers to tighten lending conditions and to look to ways to strengthen institutional arrangements – all this feeds through into lower loan growth. It is worth noting that lending corruption can be managed by banks, however country corruption is beyond their control. All types of corruption increase bank risks. However, the interaction effect is different in each sample. For developed countries, corruption interacted with loan growth generally increases risks (although results are non-consistent in all models).

The results for developing countries in Table 8 show that country level corruption (see columns 1 and 2 for each dependent performance panel) has no impact on profitability or on (most) of our risk measures. Although, rapid loan growth reduces profits and generally increases risks. Country corruption by itself or interacted with loan growth has no impact on profits or risks. This is a surprising finding, it could be that banks in developing countries have managed to incorporate corrupt practices at the country level in their normal ways of working so it is considered a standard feature of business activity and is factored into their main operational procedures[16]. This conclusion is not consistent with previous literature that finds that firm performance in developing

[16] We also cross-check our overall findings using a different corruption indicator, the control of corruption (COC) results, not reported due to space limitation, but hold the same.

and transition economies are affected negatively by corruption (Donadelli and Persha 2014 and Wieneke and Gries, 2011).

However, when bank lending corruption is introduced to the model (see Table 8 column 3 and 4) we show how this reduces profitability and increases bank risks. We also control for the effect of the global financial crisis. The result are consistent with Olson and Zoubi (2016) as we find that the crises negatively affects bank performance. In developed countries (Table 7), the crisis reduced bank profits (ROA) and increased risks (NPL and Z-score). However, no significant effect is found for developing countries apart from an increase in loan-losses post-crisis.

For a further robustness check, other loan growth and corruption measures are used. In Table A-4, we also replace the previous annual loan growth measure with abnormal loan growth (when loan growth is greater than median loan growth in the country) and external growth (Table A-5) (when high growth is linked to mergers and/or acquisitions). When growth exceeds system median levels banks achieve higher profitability and they also manage to reduce risk. In contrast, when an interaction effects between external and abnormal growth and corruption are introduced an inverse effect is found. More loan growth brings about higher loan -losses, non-performing loans and extra solvency risk in more corrupt countries. Corruption is found to play a significant role in magnifying the effect of external financing on bank performance. Our findings also suggest that banks in more corrupt countries are exposed to additional risk when growth is financed externally. However, this extra risk is not matched with greater profitability.

4. Conclusion

Using a large bank level dataset from 160 countries and comprising 7,235 banks between 2000 and 2016 we find a nonlinear relationship between loan growth and bank performance (from both a return and risk perspective). When bank managers become overoptimistic in growing their loan portfolios, profitability falls and risks associated with lower quality loans increases. Corruption is found to put 'sand-in the wheel' in terms of bank performance. The higher country-level and bank loan officer corruption, the poorer bank performance. Banks operating in more regulated, competitive and less concentrated systems perform better when growing their loan portfolios (and are less adversely affected by corruption). Islamic banks, compared with their conventional counterparts are also found to be less influenced by corruption.

When we investigate these relationships for developed and developing banking systems we find that the latter are less affected by country level corruption. We suggest that it could be that banks in developing countries have managed to incorporate corrupt practices in their normal ways of working so it is considered a standard feature of business activity and is factored into their main operational procedures so has limited overall influence on performance.

Bank-level corruption, on the other hand, shows varying effects for countries at stages of economic development. Banks in developing countries appear to extend more credit when loan official corruption exists yet this is not found to be the case for developed countries. Bank risks (credit and solvency) for both sets of countries are affected negatively by lending corruption. This result supports the view bank loan officer corruption is more harmful to banks than country-level corruption.

Our findings have important policy implications. As corruption can hamper bank performance and mitigate the benefits of additional lending serious attention should be given for reducing corruption at both the country and bank-level - and particularly in the latter for developing countries.

Table 1
Summary of variable definitions and descriptive statistics

Variable (Acronym)	Description	Sources	Mean	S. Dev	Median	Min	Max
	Bank Performance						
ROA	Bank return-on-assets measured as net income after tax divided by total bank assets	Bank Scope	0.008	0.012	0.008	-0.0513	0.047
Z-score	Natural logarithm of one plus the sum of return-on-assets and the equity-to-assets ratios of bank *i* at year *t* divided by the standard deviation of return-on-assets for the same bank. A higher score indicates a lower bank insolvency risk, or alternatively speaking, a higher degree of financial stability.	Bank Scope and authors' own calculation	7.900	0.083	5.100	0.000	31.700
Non-Performing Loans NPL	Measured as total impaired loans to net loans	Bank Scope and authors' own Calculations	0.024	0.030	0.012	0.001	0.118
Distance to Default DD	The possibility of bankruptcy using Merton's (1974) estimation. Where bank equity is viewed as a call option on the assets of a bank.	Bloomberg, Bank Scope and authors' calculations.	2.984	4.484	1.206	-0.457	17.090
	Loan Growth						
Annual growth Rate LG	Percentage change in the amount of bank i's total customer loans from the year t-1 to year t.	Bank Scope and authors' own calculation	0.073	0.123	0.053	-0.116	0.391
Abnormal loan growth rate ALG	Defined as the difference between bank *i*'s loan growth rate and the median loan growth rate of all banks in the same country and year. This approach permits to control for the macroeconomic and competitive conditions in each country and year when calculating loan growth.	Bank Scope and authors' own calculation	0.019	0.123	0.000	-0.170	0.336
External loan Growth ELG	A variable that takes the value of 1 if bank i's total equity increases by more than 30.0%, which represents the 95%-quantile of the equity growth rate distribution. Zero Otherwise.	Bank Scope and authors' own calculation	0.054	0.14	0.037	-0.25	0.57
Mortgage Loan Growth MLG	Percentage change in the amount of bank i's mortgage loans from the year t-1 to year t	Bank Scope and authors' own calculation	0.077	0.155	0.048	-0.152	0.485
Consumer Loan Growth CLG	Percentage change in the amount of bank i's consumer loans from the year t-1 to year t	Bank Scope and authors' own calculation	0.083	0.253	0.045	-0.314	0.717

Corporate Loan Growth CORLG	Percentage change in the amount of bank i's corporate loans from the year t-1 to year t	Bank Scope and authors' own calculation	0.037	0.186	0.008	-0.256	0.523
Other Loans Growth OLG	Percentage change in the amount of bank i's loans other than mortgage, consumer and corporate from the year t-1 to year t	Bank Scope and authors' own calculation	0.106	0.269	0.057	-0.299	0.831
	Corruption						
Corruption Index CI	Transparency International's Corruption Perception Index score indicates the perceived level of prevailing country-level corruption on a scale of 0–10, with a higher score suggesting greater economic and political integrity.	Transparency international, corruption perception index	6.602	1.780	7.300	2.600	8.600
Adjusted corruption MCPI	Is an index constructed as CIj,t / (Average(CIj,t)). It is interpreted as the corruption index of country j in year t relative to the average index of all countries in that year. A higher score implies the country is relatively more corrupt than a typical country.	Corruption perception Index	0.978	0.506	0.758	0.422	2.140
Control of Corruption COC	The Control of Corruption sub-index in the World Bank's Worldwide Governance Indicators (WGI). The original index ranges from −2.5 to 2.5 with a higher value suggesting lower corruption. We use 0 deducted by this index and so the measure increases with the severity of corruption.	World Bank's WGI and authors' own calculation	1.157	0.803	1.342	-0.741	2.023
Bank Lending Corruption BLC	Is the corruption of bank officials and takes a value from 1-4, no obstacle (1), a minor obstacle (2), a moderate obstacle (3) or a major obstacle (4). Beck (2006) and Barry et al., (2015)	World Business Environment Survey (WBES)	1.515	0.181	1.505	1.158	1.989
	Control Variables						
Banks Specific							
Bank Size SIZE	The logarithm of total bank assets	Bankscope	5.358	0.666	5.226	4.436	7.054
Capitalization ETA	The equity-to-total assets ratio	Bankscope	0.154	0.136	0.110	0.041	0.611
Bank efficiency CIR	Cost-income ratio	Bankscope	0.690	0.151	0.677	0.431	1.014
Liquidity ratio DTA	Deposits-to-total assets	Bankscope and authors' own calculation	0.921	0.403	0.859	0.305	2.010

Bank Type *BT*	A dummy variable for each bank type capturing specialization effects. This variable takes the value of one if the bank is Islamic and zero otherwise.	Bankscope and authors' own calculation	0.985	0.120	1.000	0.000	1.000
Assets Diversity *AD*	1 − |(net loans− other earning assets)/total earning assets|, where other earning assets include securities and investments, and total earning assets include net loans, securities, and investments	Bankscope and authors' own calculation	0.618	0.268	0.676	-0.033	0.959
	Industry and Macroeconomic						
Bank Competition *BS*	A measure of banking system competition using the Lerner index It is defined as the difference between output prices and marginal costs (relative to prices). Prices are calculated as total bank revenue over assets, whereas marginal costs are obtained from an estimated translog cost function with respect to output. Higher values of the Lerner index indicate less bank competition. Lerner Index estimations follow the methodology described in Demirgüç-Kunt and Martínez Pería (2010). Calculated from underlying bank-by-bank data from Bankscope.	Financial Development and Structure Dataset	142.600	58.690	170.200	25.920	197.700
Bank Concentration *CON*	Assets of three largest banks as a share of assets of all commercial banks in a country.	Financial Development and Structure Dataset	44.520	20.440	35.410	23.080	88.610
GDP Growth *GDP*	Country Real GDP per capita	World Economic Indicators	2.202	2.072	2.426	-2.776	6.590
Inflation *INF*	Percentage change in the Consumer Price Index	World Economic Indicators	2.613	2.219	2.270	-0.356	8.991
Supervisory Strength *REG*	Dummy variable that takes the value of one for a country if the index Supervisory Strength is greater than the cross-country median, and zero other wise	Bank regulation and supervision database (The World Bank 2003)	0.694	0.461	1.000	0.000	1.000

Table 2: Sample Banks

Country	Total	Listed		Unlisted		#	%	AVG	AVG
		Islamic	*Con*	*Islamic*	*Con*	BS		CPI	LG
Developing Economies*									
Africa	209	3	25	2	179	336	0.622	2.109	8.522
Asia	555	10	116	5	424	870	0.637	2.394	8.147
Latin America and Caribbean	535	2	57	5	471	827	0.646	2.411	7.263
Economies in Transition :									
South Eastern Europe	35	0	3	0	32	50	0.700	1.636	10.662
Common wealth of Independent State of Georgia	243	0	15	1	227	569	0.427	1.712	7.508
Developed Economies									
Europe	1658	12	224	16	1406	2417	0.581	4.321	7.955
Other Countries	4000	19	292	30	3659	6281	0.636	4.197	6.795
Total	7235	46	732	59	6398	11350	0.637		

Source: Authors' own calculations

* Classified as economic development by region**.** Includes countries in the economies in transition. Regional classification is provided by the World Bank Global Financial Development database.

Con is conventional Banks. **#BS** is the number of banks in the Bank scope database**.** ***%*** is the fraction of banks covered in data set. **AVG CPI** is the average corruption perception Index. **AVG LG** is the average loan growth.

Table 3
Corruption and Loan Growth

Variables	Panel A LG			Panel B ALG		
Model	**1**	**2**	**3**	**1**	**2**	**3**
COC	-0.08***			-0.19***		
MCPI		0.18***			0.23***	
BLC			8.69***			5.88***
SIZE	0.14***	-0.08***	-0.04***	0.08*	-0.09***	-0.03***
ETA	-2.70***	-1.10***	-0.48***	-3.89***	-1.41***	-0.13
CIR	0.24***	-2.43***	0.16***	-1.47***	-2.67***	0.20***
DTA	1.23***	0.35***	0.33***	1.57***	0.36**	0.57***
AD	0.67***	0.98***	-0.88***	1.39***	1.43***	-1.57***
GDP	0.19***	0.18***	0.10***	0.27***	0.24***	0.10***
INF	0.00	-0.03**	-0.01**	-0.02	-0.05*	-0.04***
crisis	0.59***	0.71***	0.25***	0.88***	0.93***	0.15
Constant	-2.36***	0.98***	-12.88***	-1.45	0.77	-8.53**
Observations	22,192	25,800	23,827	22,200	25,809	23,836
Number of id	5,580	5,703	4,848	5,583	5,706	4,851
Hansen Test (p-value)	0.415	0.262	0.384	0.436	0.854	0.156
AR2 test (p-value)	0.593	0.432	0.438	0.587	0.498	0.205

This Table reports the results of the following equation:

$$LG_{it} = \alpha_0 + \eta COR_{it} + \delta X_{it} + \mu_i + \varepsilon_{it}$$

LG is loan growth**;** **ALG** is the Abnormal loan growth; **COC** is control of corruption, **MCPI** is the modified corruption perception index; **BLC** is bank corruption index; **ETA** is equity to total assets ratio; **CIR** is the cost to income ratio; **DTA** is the deposit to total assets. **AD** is the assets diversification, **GDP** gross domestic products, **INF** is the inflation ratio. Results are stated in two panels A and B. Each paned reports the results using one loan growth measure.
In each panel, three models are estimated and results are reported in columns numbered 1 to 3. Column (1) examined the effect of control of corruption COC on loan growth. Column (2& 3) test the effect of country **MCPI** and bank level corruption, respectively. In each model, sets of bank specific and macroeconomic variable are added (see Table 1 for variable definitions).
This Table also reports the post estimation results of the second order residual autocorrelation (serial correlation) AR (2) under the null of no serial correlation. Hansen J-test of over-identification is under the null that all instruments are valid. Standard errors are values between parentheses. *Significant at 10%., **Significant at 5%., ***Significant at 1%.

Table 4
Loan Growth, Corruption and Bank Performance

Performance Measure	**Panel A ROA**					**Panel B NPL**				
Model	**1**	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**
LG	0.031***	0.037***	0.040***	0.046***	0.278***	-0.296***	-0.307***	-0.280***	-0.320***	-1.521**
LG^2	-0.180***	-0.214***	-0.041***	-0.171**	-0.032***	0.713***	0.770***	1.544***	0.677***	0.341***
SIZE	-2.098***	-1.837***	-1.450***	-1.389***	-2.075***	1.495	-1.164	2.187**	20.771***	6.919***
ETA	0.127***	0.106***	0.049**	0.263***	0.011	-0.626***	-0.475***	-0.303***	-0.188*	-0.924***
CIR	-0.077***	-0.071***	-0.070***	-0.120***	-0.073***	0.077*	0.050	0.111**	0.181***	0.187***
DTA	-0.033***	-0.025***	-0.018***	0.021*	-0.022***	0.123***	0.057***	0.069***	0.067**	0.234***
AD	0.040***	0.033***	0.038***	0.039***	0.049***	-0.124***	-0.124***	-0.084***	-0.034	-0.211***
GDP	-0.016	0.005	-0.005	-0.047**	-0.026*	0.221**	0.151*	0.164*	0.103	0.367**
INF	0.009	-0.006	0.007	0.073***	0.029*	0.232**	0.013	-0.015	-0.129	0.471***
MCPI		-0.001					0.048***			
LG*MCPI			-0.020***					0.148*		
BLC				-0.433***					8.015***	
LG*BLC					-0.168**					0.880*
Constant	0.168***	0.150***	0.123***	0.815***	0.161***	-0.070	0.101	-0.149*	-10.951***	-0.463***
Observations	27,075	25,746	25,746	23,787	23,787	21,334	21,334	19,663	19,663	22,502
Number of id	5,694	5,686	5,686	4,836	4,836	4,490	4,490	3,783	3,783	4,502
Hansen Test (p-value)	0.430	0.234	0.388	0.386	0.486	0.498	0.295	0.161	0.093	0.680
AR2 test (p-value)	0.333	0.088	0.186	0.083	0.134	0.176	0.178	0.274	0.134	0.349

Table 4, Continue.

Performance Measure	Panel C Z-score					Panel D DD				
Model	**1**	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**
LG	0.483***	0.232***	0.867***	0.487***	5.764***	-0.117**	-0.162***	-0.103*	-0.140**	-0.130**
LG²	-1.265***	-0.614***	-0.981***	-1.208***	-0.027	0.416**	0.590***	0.615***	0.520***	0.524***
SIZE	0.999	3.885	0.543	-2.460	-2.684	-0.793***	-0.633***	-0.641***	-0.843***	-0.824***
ETA	-3.371***	-1.135***	-2.880***	-3.248***	-2.292***	-0.002	0.022***	0.021**	0.010	0.008
CIR	-0.679***	-0.565***	-0.714***	-0.690***	-0.921***	-0.001	-0.004	-0.005	-0.013*	-0.012*
DTA	0.285***	0.098***	0.257***	0.240***	0.040	0.001	-0.001	-0.001	0.002	0.002
AD	0.912***	0.502***	0.739***	0.711***	1.062***	-0.003	-0.006**	-0.006**	-0.010***	-0.010***
GDP	-0.955***	-0.192	-0.639**	-0.784***	-1.185***	-0.071	0.070*	0.072*	0.109**	0.035
INF	0.483***	0.232***	0.867***	0.487***	5.764***	0.464**	0.027	0.036	0.009	-0.033
MCPI		0.029					-0.007***			
LG*MCPI			-0.577***					-0.066***		
BLC				-0.118***					-0.014***	
LG*BLC					-3.786***					-0.007
Constant	0.738**	0.478**	0.698***	0.732***	1.150***	0.076***	0.080***	0.075***	0.116***	0.095***
Observations	24,412	23,325	23,325	21,528	21,528	1,861	1,772	1,772	1,404	1,404
Number of id	5,454	5,442	5,442	4,636	4,636	520	518	518	389	389
Hansen Test (p-value)	0.239	0.300	0.359	0.127	0.268	0.302	0.446	0.416	0.190	0.194
AR2 test (p-value)	0.166	0.170	0.073	0.068	0.170	0.198	0.129	0.112	0.178	0.07

See Table 1 for variables definition

This table reports the results of the following equation:

$$y_{it} = \alpha_0 + \beta_1 LG_{it} \times COR_{it} \times Factor_{jt}$$
$$+ \sum_{j=1}^{5} \gamma LG_{jit} + \eta COR_t + \lambda\, y_{i,t-1} + \delta' X_{it}$$
$$+ \varphi' Country + \theta' Year + \mu_i + \varepsilon_{i,t}$$

Results are stated in five panels A to E. Each paned reports the results using one performance measure.

Five models have been estimated using accounting and market based performance measures, ROA, NPL, Z-score and LL and DD. In each panel, five models are estimated and results are reported in columns numbered 1 to 5. Column (1) examined the effect of Loan Growth LG and LG². Model 2 and 4 in column (2& 4) test the effect of country and bank level corruption, respectively. Models 3 and 5 show the interaction effect between the two levels of corruption and loan growth to display the intermediate effect of corruption on the relationship between loan growth and bank performance. In each model, sets of bank specific and macroeconomic variable are added.

Variable definitions: ROA assesses individual bank profitability, NPL, is the Non-performing loans measured as totally impaired loans to net loans, Z-score assesses the number of standard deviations that a bank's return has to fall to erode a bank's capital, LL is the measure of bank loss estimates as the proportion of loan loss provisions established in the year *t* relative to total customer loans in year t – 1. DD is the distance-to-default measures the number of standard deviations the log value of total assets to total debt needs to deviate from its mean before the firm defaults. MCPI is the modified score based on a constructed index to measure the corruption of country j in year t relative to the median index of all countries in that year, with a higher score suggesting a higher economic and political integrity. BLC is the corruption of bank officials takes a value from 1-4. Size is bank size measured by the natural logarithm of total assets; ETA is the equity-to-total assets ratio, CIR is the cost income ratio, DTA is the deposits to total assets, AD is the assets diversity measured as 1 − |(net loans− other earning assets)/total earning securities and investments, and total earning assets include net loans, securities, and investments. GDP is the percentage annual growth in gross domestic product, INF is the country annual inflation rate. This Table also reports the post estimation results of the second order residual autocorrelation (serial correlation) AR (2) under the null of no serial correlation. Hansen J-test of over-identification is under the null that all instruments are valid. Standard errors are values between parentheses. *Significant at 10%., **Significant at 5%., ***Significant at 1%

Table 5: Loan Types, Corruption and Bank Performance

Performance Measure	ROA	NPL	Z-score	DD	ROA	NPL	Z-score	DDN
Panel A								
Corruption measure		MCPI				BLC		
	1	2	3	4	1	2	3	4
MLG	-0.015***	0.059***	-0.065***	-0.019	-0.012***	0.069***	-0.113***	-0.000
CLG	-0.013***	0.068***	-0.048***	-0.013	-0.010***	0.072***	-0.094***	-0.021*
CORLG	0.072***	-0.402***	0.263***	0.093*	0.059***	-0.436***	0.568***	0.128**
OLG	-0.006***	0.027***	-0.025***	-0.010*	-0.005***	0.028***	-0.050***	-0.013*
COR	-0.007**	-0.001	-0.192***	-0.013***	-0.033**	0.025***	-0.985***	-0.011
Constant	0.034***	-0.069***	0.230***	0.050***	0.077***	-0.039***	-1.214***	0.065***
Control variable	YES	YES	YES	YES	YES	YES	YES	YES
Observations	19,263	18,098	3,394	932	18,225	17,048	16,623	729
Number of id	3,537	3,481	17,623	257	3,069	3,021	2,956	184
Hansen Test (p-value)	0.554	0.077	0.190	0.155	0.219	0.256	0.498	0.127
AR2 test (p-value)	0.902	0.770	0.765	0.343	0.513	0.668	0.832	0.619
Panel B								
Corruption measure		MCPI				BLC		
	1	2	3	4	1	2	3	4
MLG	-0.031***	-0.024**	-0.536***	-0.143	-0.237***	-2.747***	1.033***	1.289**
CLG	-0.019***	-0.019***	-0.281***	-0.071	-0.161***	-1.058***	0.434***	0.402*
CORLG	0.104***	0.046	1.840***	0.347	0.863***	7.676***	3.353***	-3.053**
OLG	-0.011***	-0.015***	-0.229***	-0.020	-0.087***	-1.080***	0.495***	0.246
MLG*COR	0.035***	0.012	0.617***	0.147	0.155***	1.812***	-0.689***	-0.833**
CLG*COR	0.020***	0.013*	0.293***	0.061	0.104***	0.688***	-0.283**	-0.268*
CORLG*COR	-0.112***	-0.057	-2.035***	-0.282	-0.564***	5.080***	-2.219***	-2.003**
OLG*COR	0.013***	0.006	0.262***	-0.001	0.058***	0.716***	-0.330***	-0.171*
Constant	0.022***	-0.033***	0.088***	0.028	0.008***	-0.034***	0.158***	0.111**
Control variable	YES	YES	YES	YES	YES	YES	YES	YES
Observations	19,263	18,098	17,623	932	34,156	17,048	16,623	729
Number of id	3,537	3,481	3,394	257	3,518	3,021	2,956	184
Hansen Test (p-value)	0.409	0.116	0.503	0.543	0.395	0.587	0.566	0.534
AR2 test (p-value)	0.873	0.085	0.956	0.275	0.484	0.991	0.869	0.462

This Table reports the results of loans decomposition using the following equation

$$y_{it} = \alpha_0 + \sum_{j=1}^{5} \beta_j (LG_{jit}) \times COR_t$$
$$+ \sum_{j=1}^{5} \gamma LG_{jit} + \eta COR_t + \lambda\, y_{i,t-1} + \delta' X_{it}$$
$$+ \varphi' Country + \theta' Year + \mu_i + \varepsilon_{i,t}$$

MLG is mortgage loans, CLG is consumer loan growth, CORLG is the corporate loan growth, OLG is the other loan growth. Results are reported in two panels A and B. Where panel A shows the results of each loan type growth effect on bank performance, panel B shows the interaction effect between loan growth and corruption on bank performance. Two corruption estimations have been used: BLC bank lending corruption and MCPI the modified country corruption perception index MLG is the mortgage loan growth, CLG is the consumer loan growth, CLG is the corporate loan growth, CORLG is the corporate loan growth and OLG is the other loan growth. Five models have been estimated using accounting and market based performance measures, ROA, NPL, Z-score and LL and DD and results are reported in columns numbered 1 to 5. In each model, sets of bank specific and macroeconomic variable are added. See Table 1 and Table 3 for variables definitions. . This Table also reports the post

Table 6: Loan Growth, Corruption and Bank Performance: Factors Effect

Performance Measure	ROA				NPL				Z-score			
Panel A	MCPI				MCPI				MCPI			
Model	1	2	3	4	1	2	3	4	1	2	3	4
LG	0.125***	0.166***	0.101***	0.650***	-1.467***	-1.147***	-0.851***	-3.513***	1.801***	2.308***	0.315***	1.407***
LG*MCPI*BT	-0.119***				1.367***				-1.798***			
LG*MCPI*REG		-0.177***				1.185***				-2.563***		
LG*MCPI*CON			-0.002***				0.014***				-0.006***	
LG*MCPI*BS				-0.005***				0.024***				-0.010***
Size	0.000	-0.004***	0.001***	-0.005***	0.002*	0.033***	-0.003**	0.033***	0.013***	-0.044***	0.003**	-0.012***
CIR	-0.015***	-0.013***	-0.015***	-0.017***	0.020***	0.011***	0.020***	0.041***	-0.058***	-0.041***	-0.073***	-0.082***
ETA	0.001***	-0.007***	0.002***	-0.016***	-0.035***	0.048***	-0.029***	0.091***	0.079***	-0.045***	0.007	-0.040***
DTA	-0.001***	-0.001***	-0.001***	-0.001**	0.020***	0.013***	0.017***	0.009***	-0.028***	-0.028***	-0.010***	-0.006***
Inflation	0.074***	0.065***	0.030***	-0.044***	-0.689***	-0.328***	-0.145***	0.274***	0.761***	0.567***	-0.059*	-0.226***
GDP	0.027***	0.005	0.025***	0.057***	0.030	0.107***	0.033	-0.192***	0.109***	-0.093	0.269***	0.347***
Constant	0.016***	0.035***	0.011***	0.047***	0.022**	-0.146***	0.038***	-0.185***	0.031***	0.322***	0.118***	0.209***
Observations	25,750	25,750	20,960	20,894	21,337	21,337	17,203	17,137	23,325	23,325	20,552	20,489
Number of id	5,688	5,688	5,251	5,198	4,491	4,491	4,117	4,066	5,442	5,442	5,083	5,031
Hansen Test (p-value)	0.415	0.335	0.330	0.107	0.294	0.582	0.592	0.170	0.059	0.411	0.149	0.147
AR2 test (p-value)	0.200	0.176	0.078	0.275	0.306	0.102	0.098	0.178	0.207	0.086	0.293	0.545
Panel B	BLC				BLC				BLC			
Model	1	2	3	4	1	2	3	4	1	2	3	4
LG	0.681***	0.310***	0.082***	0.013	-3.694***	-1.464***	-1.165***	-2.064***	8.914***	5.040***	-0.259***	2.704***
LG*BLC*BT	-0.445***				2.388***				-5.839***			
LG*MCPI*REG		-0.194***				0.893***				-3.186***		
LG*MCPI*CON			-0.001***				0.017***				0.004***	
LG*MCPI*BS				-0.000				0.007***				-0.010***
Size	-0.002***	-0.007***	0.000***	-0.001***	0.015***	0.040***	-0.007***	0.037***	-0.013***	-0.104***	-0.006***	-0.042***
CIR	-0.013***	-0.010***	-0.013***	-0.014***	0.022***	0.006**	0.015***	0.027***	-0.061***	-0.030***	-0.080***	-0.084***
ETA	-0.005***	-0.027***	0.001	-0.003***	0.032***	0.127***	-0.025***	0.132***	-0.042***	-0.404***	-0.038***	-0.191***
DTA	0.001***	0.003***	0.000***	0.001***	0.005***	-0.005***	0.008***	-0.001	-0.002	0.032***	0.003***	0.008***
Inflation	0.043***	0.008**	0.002	0.012***	-0.125***	0.046**	0.135***	0.305***	0.290***	-0.134**	-0.046*	-0.492***
GDP	0.076***	0.003	0.024***	0.044***	-0.281***	0.044*	0.116***	-0.236***	0.793***	-0.083	0.531***	0.608***
Constant	0.023***	0.051***	0.014***	0.021***	-0.067***	-0.193***	0.053***	-0.205***	0.165***	0.625***	0.159***	0.363***
Observations	22,469	22,469	19,637	19,604	18,505	18,505	16,022	15,986	20,438	20,438	19,252	19,223
Number of id	4,831	4,831	4,715	4,696	3,773	3,773	3,653	3,634	4,622	4,622	4,560	4,543
Hansen Test (p-value)	0.187	0.227	0.177	0.102	0.575	0.495	0.109	0.220	0.429	0.284	0.286	0.116
AR2 test (p-value)	0.144	0.247	0.095	0.636	0.682	0.371	0.385	0.228	0.159	0.104	0.294	0.514

estimation results of the second order residual autocorrelation (serial correlation) AR (2) under the null of no serial correlation. Hansen J-test of over-identification is under the null that all instruments are valid. Standard errors are values between parentheses. *Significant at 10%., **Significant at 5%., ***Significant at 1%

This Table reports the results of the below model   A triple interaction term between loan growth, corruption, and extra factors are examined. Four Factors are introduced to the model. BT is the banks type dummy variable

$$y_{it} = \alpha_0 + \beta_1 LG_{it} \times COR_{it} \times Factor_{jt} + \sum_{j=1}^{5} \gamma LG_{jit} + \eta COR_t + \lambda\, y_{i,t-1} + \delta' X_{it} + \mu_i + \varepsilon_{i,t}$$

that takes the value of one when the bank is Islamic bank and zero for conventional banks,, REG is a regulatory environment factor measures the regulatory environment in a country, CON is the banks concentration factor and BS is bank competition. See Table 1 and Table 3 for variables definitions. . This Table also reports the post estimation results of the second order residual autocorrelation (serial correlation) AR (2) under the null of no serial correlation. Hansen J-test of over-identification is under the null that all instruments are valid. Standard errors are values between parentheses. *Significant at 10%., **Significant at 5%., ***Significant at 10%

Table 7: Loan Growth, Corruption and Bank Performance – Developed Countries

Performance Measure	ROA				NPL			
Model	**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
LG	0.059***	0.068**	0.041***	0.730***	-0.363***	-0.827***	-0.416***	-3.005***
LG^2	-0.155***	-0.045**	-0.170***	-0.037***	0.883***	0.992***	1.077***	0.796***
SIZE	-0.358***	-0.065	-0.072***	-0.019***	1.738	3.093*	-0.008	-0.065***
ETA	-0.017***	-0.013***	-0.109***	0.075***	0.112	0.193***	0.322*	-0.009
CIR	-0.109**	-0.006	-0.024***	-0.061***	1.030***	1.441***	0.003	-0.110***
DTA	0.009	0.000	-0.039***	-0.030***	-0.175***	-0.169***	-0.074**	-0.062**
AD	0.000	0.007	0.036***	0.045***	-0.070*	-0.034	-0.026	0.020
GDP	0.021*	0.026**	0.025	0.013	-0.106	-0.300*	0.059	-0.257*
Inflation	-0.025	-0.007	-0.002	0.011	-0.236*	0.353	0.114	0.132*
Crisis	-0.004***	-0.002*	0.001	0.002**	0.022**	0.018*	0.010	0.006
MCPI	0.001				0.103**			
LG*MCPI		-0.069*				0.545**		
BLC			-1.011***				0.100**	
LG*BLC				-0.475***				1.796***
Constant	0.045***	0.014*	1.941***	0.144***	-0.134	-0.272*	0.127	0.506***
Observations	21,632	21,632	21,375	21,375	18,809	18,809	17,720	17,720
Number of id	4,499	4,499	3,980	3,980	3,638	3,638	3,121	3,121
Hansen Test (p-value)	0.290	0.580	0.104	0.103	0.086	0.384	0.526	0.317
AR2 test (p-value)	0.139	0.181	0.155	0.093	0.205	0.102	0.460	0.413

Table 7: Continued.

Performance Measure	Z-score				DD			
Model	**1**	**2**	3	4	1	2	3	4
LG	0.578***	1.342***	0.936***	4.809**	-0.005	-0.160	0.191*	1.420*
LG^2	-1.377***	-5.928***	-6.108***	-3.430***	0.153	0.064	-0.549*	-0.685*
SIZE	-9.064	0.078***	-0.041	-0.003	0.017	0.017	0.001	-0.012
ETA	-0.510***	0.104***	-0.258**	0.133	-0.252	-0.226	-0.266	0.013
CIR	-3.626***	0.102***	0.057**	-0.003	0.173*	0.179**	0.105	0.016
DTA	0.270**	0.007	0.069***	-0.097**	0.064	0.057	0.157	0.025
AD	0.116	0.010	-0.051**	0.067***	0.006	-0.178	-0.130	-0.105
GDP	-0.369	0.004	2.775***	1.183***	-0.338	-0.276	0.736	0.607
Inflation	0.783**	0.585***	-0.518**	-0.615***	-0.110	0.053	-0.217	0.056
Crisis	-0.036*	-0.027*	0.073***	0.038***	0.043	-0.160	0.046	0.063
MCPI	-0.384***				-0.005			
LG*MCPI		-0.345***				0.196		
BLC			-2.111***				-0.075*	
LG*BLC				-2.636*				-0.799*
Constant	1.290**	-0.399**	3.414***	0.135***	-0.215	0.255	0.023	0.121
Observations	20,821	20,821	19,576	19,576	1,287	1,287	1,042	1,042
Number of id	4,434	4,434	3,835	3,835	360	360	272	272
Hansen Test (p-value)	0.430	0.533	0.365	0.390	0.694	0.578	0.627	0.144
AR2 test (p-value)	0.162	0.120	0.140	0.227	0.610	0.117	0.106	0.102

This table reports the results of the following equation using only developed countries data set:

$$y_{it} = \alpha_0 + \beta_1 LG_{it} \times COR_{it} \times Factor_{jt}$$
$$+ \sum_{j=1}^{5} \gamma LG_{jit} + \eta COR_t + \lambda\ y_{i,t-1} + \delta' X_{it}$$
$$+ \varphi' Country + \theta' Year + \mu_i + \varepsilon_{i,t}$$

Results are stated in five panels A to E. Each paned reports the results using one performance measure.

Five models have been estimated using accounting and market based performance measures, ROA, NPL, Z-score and LL and DD. In each panel, five models are estimated and results are reported in columns numbered 1 to 5. Column (1) examined the effect of Loan Growth LG and LG^2. Model 2 and 4 in column (2& 4) test the effect of country and bank level corruption, respectively. Models 3 and

5 show the interaction effect between the two levels of corruption and loan growth to display the intermediate effect of corruption on the relationship between loan growth and bank performance. In each model, sets of bank specific and macroeconomic variable are added. Variable definitions: ROA assesses individual bank profitability, NPL, is the Non-performing loans measured as totally impaired loans to net loans, Z-score assesses the number of standard deviations that a bank's return has to fall to erode a bank's capital, LL is the measure of bank loss estimates as the proportion of loan loss provisions established in the year *t* relative to total customer loans in year t – 1. DD is the distance-to-default measures the number of standard deviations the log value of total assets to total debt needs to deviate from its mean before the firm defaults. MCPI is the modified score based on a constructed index to measure the corruption of country j in year t relative to the median index of all countries in that year, with a higher score suggesting a higher economic and political integrity. BLC is the corruption of bank officials takes a value from 1-4. Size is bank size measured by the natural logarithm of total assets; ETA is the equity-to-total assets ratio, CIR is the cost income ratio, DTA is the deposits to total assets, AD is the assets diversity measured as 1 − |(net loans− other earning assets)/total earning securities and investments, and total earning assets include net loans, securities, and investments. GDP is the percentage annual growth in gross domestic product, INF is the country annual inflation rate. This Table also reports the post estimation results of the second order residual autocorrelation (serial correlation) AR (2) under the null of no serial correlation. Hansen J-test of over-identification is under the null that all instruments are valid. Standard errors are values between parentheses. *Significant at 10%., **Significant at 5%., ***Significant at 1%

Table 8: Loan Growth, Corruption and Bank Performance – Developing Countries

Performance Measure	ROA				NPL			
Model	1	2	3	4	1	2	3	4
LG	0.038***	0.022**	0.044***	0.086***	1.146***	1.291***	-0.293***	-0.991***
LG^2	-0.102***	-0.073***	-0.113***	-0.111***	-3.151***	-3.162***	0.706***	0.714***
size	-0.225	-0.080	-0.004**	-0.003***	-1.872***	-1.848***	0.018	0.010
ETA	-0.011	-0.012***	-0.020	-0.006**	-0.020	-0.015	0.035	0.002
CIR	-0.003**	0.007	-0.022*	-0.020	-0.016	-0.019	0.042	0.029
DTA	0.000	-0.006	0.001	-0.001	-0.036	-0.004	-0.014*	-0.010
AD	0.014**	0.012**	0.012***	0.011***	0.026**	0.026***	-0.007	0.034
GDP	0.056	-0.012*	0.063*	0.041	-2.361**	-0.195**	0.389***	0.497***
Inflation	0.042	-0.003	0.027	0.031	-1.458*	-0.307***	0.671***	0.565**
Crisis	-0.002	-0.001	0.002	-0.002	-0235*	0.039*	0.007	0.076
MCPI	-0.001				-0.006			
LG*MCPI		0.004				-0.083		
BLC			-0.004***				0.144**	
LG*BLC				-0.026***				0.403**
Constant	0.019	0.018**	0.048**	0.032**	0.212***	0.199***	-0.385	-0.098
Observations	3,098	3,098	2,412	2,412	2,502	2,502	1,943	1,943
Number of id	1,081	1,081	856	856	1,007	1,007	662	662
Hansen Test (p-value)	0.140	0.144	0.251	0.286	0.525	0.549	0.414	0.472
AR2 test (p-value)	0.722	0.481	0.777	0.355	0.305	0.414	0.366	0.333

Table 8: Continued

Performance Measure	Z-score				DD			
Model	1	2	3	4	1	2	3	4
LG	-0.488***	-0.479***	1.013***	2.135**	0.377**	0.343**	0.273*	0.929**
LG^2	1.237***	1.274***	-2.894***	-1.334**	-0.846**	-0.723*	-0.638*	-0.318**
size	1.063***	0.973***	-0.021***	-0.117***	-0.041	-0.155	0.001	0.004
ETA	0.005*	-0.006	-0.034**	-1.421***	0.049***	0.043**	0.013	0.034**
CIR	-0.008	0.008**	-0.049**	-0.086***	0.064***	0.053***	0.044**	0.027***
DTA	0.003	0.002	0.021**	0.064***	-0.000	0.003	0.017**	0.014**
AD	-0.030	-0.002	0.035***	0.119***	-0.021***	-0.023***	-0.037***	-0.037***
GDP	-0.049	-0.019	0.436*	-0.208	-0.275***	-0.219***	0.774**	0.137
Inflation	-0.065	-0.021	-0.269***	-0.565***	-0.252***	-0.171**	0.188	-0.056
Crisis	-0.002	-0.000	0.084***	-0.014	-0.013	-0.006	0.081**	0.030
MCPI	0.010				0.014			
LG*MCPI		-0.013				-0.007		
			-0.293***				-0.219**	
				-0.959*				-0.428**
Constant	-0.757	-0.011	0.707***	1.014***	-0.017	-0.337	0.331*	-0.029
Observations	2,525	2,525	1,948	1,948	485	485	362	362
Number of id	852	852	799	799	158	158	117	117
Hansen Test (p-value)	0.355	0.380	0.251	0.286	0.494	0.436	0.284	0.168
AR2 test (p-value)	0.242	0.337	0.777	0.602	0.703	0.723	0.608	0.581

This table reports the results of the following equation using only developed countries data set:

$$y_{it} = \alpha_0 + \beta_1 LG_{it} \times COR_{it} \times Factor_{jt}$$
$$+ \sum_{j=1}^{5} \gamma LG_{jit} + \eta COR_t + \lambda \ y_{i,t-1} + \delta' X_{it}$$
$$+ \varphi' Country + \theta' Year + \mu_i + \varepsilon_{i,t}$$

Results are stated in five panels A to E. Each paned reports the results using one performance measure.

Five models have been estimated using accounting and market based performance measures, ROA, NPL, Z-score and LL and DD. In each panel, five models are estimated and results are reported in columns numbered 1 to 5. Column (1) examined the effect of Loan Growth LG and LG^2. Model 2 and 4 in column (2& 4) test the effect of country and bank level corruption, respectively. Models 3 and 5 show the interaction effect between the two levels of corruption and loan growth to display the intermediate effect of corruption on the relationship between loan growth and bank performance. In each model, sets of bank specific and macroeconomic variable are added. Variable definitions: ROA assesses individual bank profitability, NPL, is the Non-performing loans measured as totally impaired loans to net loans, Z-score assesses the number of standard deviations that a bank's return has to fall to erode a bank's capital, LL is the measure of bank loss estimates as the proportion of loan loss provisions established in the year *t* relative to total customer loans in year t – 1. DD is the distance-to-default measures the number of standard deviations the log value of total assets to total debt needs to deviate from its mean before the firm defaults. MCPI is the modified score based on a constructed index to measure the corruption of country j in year t relative to the median index of all countries in that year, with a higher score suggesting a higher economic and political integrity. BLC is the corruption of bank officials takes a value from 1-4. Size is bank size measured by the natural logarithm of total assets; ETA is the equity-to-total assets ratio, CIR is the cost income ratio, DTA is the deposits to total assets, AD is the assets diversity measured as 1 − |(net loans− other earning assets)/total earning securities and investments, and total earning assets include net loans, securities, and investments. GDP is the percentage annual growth in gross domestic product, INF is the country annual inflation rate. This Table also reports the post estimation results of the second order residual autocorrelation (serial correlation) AR (2) under the null of no serial correlation. Hansen J-test of over-identification is under the null that all instruments are valid. Standard errors are values between parentheses. *Significant at 10%., **Significant at 5%., ***Significant at 10%

Appendix A

Likelihood-Ratio Test

The test statistic of the likelihood-ratio test is LR = -2(L1 - L0), LR is approximately chi 2 distributed with d_0- d_1 degrees of freedom, where d_0 and d_1 are the model degrees of freedom associated with the full and constrained models, respectively. To conduct the test, both the unrestricted and the restricted models must be fit using the maximum likelihood method.

In our study, the likelihood-ratio test (LRT) to test how the model with the extra squared term compares to the linear-only nested model.

H_0: Linear relationship between loan growth and stability measures

H_1: Non-linear relationship between loan growth and stability measures

Table A-1: Non-linear Test and Estimate Threshold

Dependent Variable	Z-score	NPL	ROA	DD
- LR chi2	925.810	2807.210	1126.76	5.96
-LR- P-value	0.000	0.000	0.000	0.014
-Threshold	0.130	0.214	0.167	0.105

We would conclude that the model that includes the linear + squared terms fits significantly better than the model containing only the linear term (i.e. the non-linear relationship fits better).

Table A-2: Loan Growth and Corruption: Evidence from Developing Countries

Variables	Panel A LG			Panel B ALG		
Model	1	2	3	1	2	3
COC	-0.45**			-1.14**		
MCPI		0.04**			0.02**	
BLC			0.11***			0.09**
SIZE	0.11***	-0.02	0.12***	0.21***	0.02***	0.10***
ETA	0.29***	0.30***	0.29***	0.67***	0.04***	0.35**
CIR	-0.07***	-0.98***	-0.06***	-0.06***	-0.09***	-0.06***
DTA	-0.09**	-0.19	0.14***	-0.22**	0.00	0.04
AD	0.01	-0.32**	-0.52***	0.04*	-0.02**	-0.52**
GDP	0.00	0.00*	-0.01**	0.00	-0.00*	0.00
INF	-0.02**	0.00	0.04**	-0.07**	0.00**	0.04*
crisis	-0.08***	-0.11***	-0.21	-0.12***	-0.06***	0.04
Constant	-0.49***	1.03**	-0.81***	-1.15***	-0.08***	-0.74**
Observations	1,967	3,113	2,421	1,968	3,114	2,422
Number of id	1,037	1,087	860	1,038	1,088	861
Hansen Test (p-value)	0.413	0.570	0.790	0.355	0.246	0.294
AR2 test (p-value)	0.217	0.519	0.753	0.287	0.314	0.752

Table A-3: Loan Growth and Corruption: Evidence from Developed Countries

Variables	Panel A LG			Panel B ALG		
Model	1	2	3	1	2	3
COC	-0.24***			-0.43***		
MCPI		0.42***			0.57***	
BLC			-0.36***			-0.42***
SIZE	0.18***	0.04	-0.02**	0.27***	0.14***	0.05***
ETA	-3.73***	-2.65***	0.05***	-6.95***	-3.75***	0.02
CIR	0.23***	-1.75***	0.06***	-1.05**	-1.38***	0.06***
DTA	1.63***	1.17***	0.37***	2.61***	1.45***	0.06
AD	0.23	0.39**	-0.90***	1.40***	1.11***	-0.10
GDP	0.16***	0.17***	0.04***	0.28***	0.26***	0.13***
INF	-0.01	-0.06***	-0.02***	-0.01	-0.06**	0.01
crisis	0.43***	0.55***	0.03	0.90***	0.93***	0.37***
Constant	-2.23***	-0.48	0.79***	-3.04**	-2.20***	0.07
Observations	20,225	22,687	21,406	20,232	22,695	21,414
Number of id	4,543	4,616	3,988	4,545	4,618	3,990
Hansen Test (p-value)	0.659	0.476	0.111	0.336	0.164	0.131
AR2 test (p-value)	0.392	0.513	0.383	0.270	0.407	0.455

Table A-4: Performance, Abnormal Loan Growth and Control of Corruption: Full Sample

Performance Measure	ROA		NPL		Z-score		DD	
Model	1	2	1	2	1	2	1	2
ALG	3.679***	0.039***	-0.051***	-0.247***	0.278***	0.348***	0.123***	0.071*
size	-0.123***	-0.034**	0.983***	-0.242***	0.979***	0.261***	-0.665***	-0.002
ETA	-0.463***	-0.253*	0.013***	-0.209	0.080***	-2.342***	0.023***	-0.097***
CIR	-1.430***	-0.087***	0.037***	0.098*	-0.058***	-0.620***	0.020***	0.024***
DTA	-0.135***	0.009	0.005***	-0.078*	-0.038***	0.190**	-0.002	0.078***
AD	0.278***	0.040***	-0.000	-0.037	0.033***	-0.220**	-0.007***	-0.038***
GDP	-1.536***	-0.085	-0.032***	0.279	-0.162***	-0.666	-0.003	0.062
Inflation	3.416***	0.066*	-0.006	-0.127	0.951***	-0.407	-0.018	0.056
Crisis	-0.309***	-0.002	0.004***	0.013	-0.030***	-0.067***	0.013***	0.006
MCPI	-0.073***		0.002***		-0.142***		-0.007***	
BLC		-0.437***		8.850***		-3.739**		-0.016***
Constant	2.493***	0.915***	-0.061***	-11.963***	0.179***	5.052**	0.066***	0.015
Observations	25,756	23,796	21,337	19,666	23,329	21,532	1,773	1,405
Number of id	5,689	4,839	4,490	3,783	5,443	4,637	518	389
Hansen Test (p-value)	0.215	0.273	0.103	0.483	0.121	0.180	0.370	0.278
AR2 test (p-value)	0.343	0.085	0.780	0.514	0.521	0.253	0.076	0.236

Table A-5: External Loan Growth, Abnormal Loan Growth and Country Level Corruption

	ROA			Z-score			NPL			DD		
Model	1	2	3	1	2	3	1	2	3	1	2	3
ALG-LG	2.47***	2.46***	0.103***	0.58***	0.12*	-1.211***	-0.29***	-0.51***	0.298**	0.08***	0.06***	0.137**
ELG*ALG	-2.11***	-2.23***	-0.693***	-1.09***	-0.86***	1.331***	0.23***	0.45***	-1.362***	-0.07**	-0.07*	-0.192**
ELG*ALG*MCPI		0.15*			0.93***			-0.02***			0.02*	
MCPI	-0.22***	-0.22***		-0.19***	-0.02***		0.01***	0.01**		-0.01***	-0.01***	
ELG*ALG*BLC			0.429***			-0.154*			0.715***			0.037*
BLC			-0.043***			0.141*			-0.727***			-0.018***
size	-0.06***	-0.06***	-0.002***	1.40***	-0.24***	0.017***	1.11***	1.22***	0.001	-0.67***	-0.68***	-0.025***
ETA	-0.42***	-0.42***	-0.007***	0.18***	0.01	0.070***	0.02***	0.03***	0.007	0.02***	0.03***	-0.026
CIR	-1.58***	-1.58***	-0.013***	-0.05***	-0.08***	0.019***	0.03***	0.03***	-0.072***	0.01*	0.01*	-0.186*
DTA	-0.04***	-0.04***	-0.002***	-0.05***	-0.02***	0.007***	0.01***	0.01***	-0.011***	-0.00	-0.00	-0.007
AD	0.15***	0.15***	0.004***	0.03***	0.02***	-0.004*	-0.00***	-0.01***	0.012***	-0.01***	-0.01***	-0.011***
GDP	-0.83***	-0.83***	0.016	0.29***	0.14***	0.810***	-0.01	0.01	0.776***	0.02	0.02	-0.022
Inflation	0.08***	0.08***	0.053***	-0.29	-0.08**	-0.225**	0.01	0.01	0.822***	0.03	0.03	0.006
Crisis	-0.29***	-0.28***	-0.003***	-0.02***	-0.01***	0.080***	0.01***	0.01***	-0.022***	0.01***	0.01***	0.017***
Constant	2.29***	2.30***	0.091***	0.20***	0.18***	-0.321***	-0.07***	-0.07***	1.200***	0.08***	0.08***	0.355**
Observations	25,756	25,756	23,796	23,329	23,329	19,666	21,337	21,337	21,532	1,773	1,773	1,405
Number of id	5,689	5,689	4,839	5,443	5,443	3,783	4,490	4,490	4,637	518	518	389
Hansen Test (p-value)	0.110	0.153	0.323	0.336	0.409	0.663	0.344	0.251	0.290	0.333	0.155	0.469
AR2 test (p-value)	0.107	0.109	0.211	0.117	0.425	0.410	0.161	0.175	0.116	0.136	0.154	0.187

References

Abuzayed, B., Al-Fayoumi, A., and Molyneux, P., "Diversification and bank stability in the GCC", *Journal of International Financial Markets, Institutions and Money*, 57:17-43.

Acemoglu, D., and Verdier, T., (2000), "The choice between market failures and corruption", *American Economic Review*, 90 (1): 194-211.

Ahamed, M., and Mallick, S., (2017), "Does regulatory forbearance matter for bank stability? Evidence from creditors' perspective", Journal of Financial Stability 28 (1): 163–180.

Aidt, T., (2009), "Corruption, institutions, and economic development", *Oxford Review of Economic Policy*, 25 (2): 271-291.

Akins, B., Dou, Y., and Ng, J., (2017), "Corruption in bank lending: The role of timely loan loss recognition", *Journal of Accounting and Economics*, 63: Issues 2–3, 454-478.

Alessi, L. and Detken, C., (2011), "Quasi real time early warning indicators for costly asset price boom/bust cycles: A role for global liquidity", *European Journal of Political Economy*, 27(3): 520–533.

Amador, J. Gómez-Gonzále, S., and Pabón, A., (2013), "Loans Growth and Banks' Risk: New Evidence, Borradores de Economía, No. 763, Banco de la República, Colombia, 26 pages.

Arellano, M., and Bover, O., (1995), "Another look at the instrumental variable estimation of error-components models, *Journal of Econometrics,* 68: 29-51.

Bain, J., (1951), "The relation of profit rate to industry concentration: American manufacturing, 1936– 1940", *Quarterly Journal of Economics*, 65: 293–324

Barberis, N., Shleifer, A., and Vishny, R., (1998), "A model of investor sentiment", *Journal of Financial Economics*, 49: 307-343.

Baron, M., and Xiong, W., (2017), "Credit expansion and neglected crash risk", *The Quarterly Journal of Economics*, 132 (2): 713–764.

Barry, T., and Lepetit, L., and Strobel, F., (2016), "Bank ownership structure, lending corruption and the regulatory environment, *Journal of Comparative Economics*, vol. 44, no. 3, pp. 732–751.

Barth, J., Lin, C., Lin, P., and Song, F., (2007), "Corruption in bank lending to firms: Do competition and information sharing matter?" (CPPS Working Papers Series no.188). Retrieved from Lingnan University website: http://commons.ln.edu.hk/cppswp/115

Batabyal, A.,Yoo., S., (2007), "Corruption, bribery, and wait times in the public allocation of goods in developing

Beck, T., Demirguc-Kunt, A., and Maksimovic, V., (2005), "Financial and legal constraints to growth: Does firm size matter?" *Journal of Finance*, 60(1): 137–177

Bekaert, G., Harvey, C., and Lundblad, C., (2002), "Does financial liberalization spur growth?" paper presented at the joint conference between the World Bank and George Washington University on Financial Globalization: A Blessing or A Curse? held on May 30-31, 2002, in Washington DC.

Bencivenga, V., and Smith, B., (1991), "Financial intermediation and endogenous growth", *The Review of Economic Studies*, 58: 195-209.

Berger, A., and Undel, G., (2003), "The institutional memory hypothesis and the procyclicality of bank lending behavior", BIS Working Papers No 125.

Bernanke, B., (2018), "The real effects of the financial crisis, Brookings papers on Economic Activity, *BPEA Conference Drafts*.

Berry, W., Golder, M., and Milton, D., (2012), “Improving tests of theory positing interaction”, *Journal of Politics*, 74 (2012), pp. 653-671.
Bertay, A., Demirg¸Á-Kunt, A., Huizinga, H., (2013), “Do we need big banks? Evidence on performance, strategy and market discipline”, *Journal of Financial Intermediation*, 22: 532
Betton, S., Espen Eckbo, B., and Thorburn, K., (2008), “Corporate takeovers, in B. Espen Eckbo (ed.), *Handbook of Corporate Finance: Empirical Corporate Finance, Volume 2, Ch15, 291-430*, Elsevier/North-Holland, Amsterdam.
Bharath, S., and Shumway, T., (2008), “Forecasting Default with the Merton Distance to Default Model”, *The Review of Financial Studies*, 21 (3): 1339–1369.
Bikker, J., and Metzemakers, P., (2005), “Bank provisioning behaviour and procyclicality” *Journal of International Financial Markets, Institutions and Money*, 15 (2): 141-157
Blagojević, S., and Damijan, J., “The impact of corruption and ownership on the performance of firms”, *Central and Eastern Europe, Post-Communist Economies*, 25: (2): 133-158.
Blundell, R., and Bond, S., (1998), “Initial conditions and moment restrictions in dynamic panel data models”, *Journal of Econometrics,* 87: 115-143.
Bonfim, D., (2009), “Credit risk drivers: Evaluating the contribution of firm level information and of macroeconomic dynamics”, *Journal of Banking & Finance*, 33(2)” 281-299.
Borio, C and Drehmann., M., (2009), “Assessing the risk of banking crises – revisited”, *BIS Quarterly Review*, March: 29–46.
Borio, C., and Zhu, H., (2012), “Capital regulation, risk-taking and monetary policy: A missing link in the transmission mechanism?”, *Journal of Financial Stability*, 8 (4): 236-251.
Cecchetti, S, and E Kharroubi (2012): “Reassessing the impact of finance on growth”, BIS Working Papers, no 381.
Chen, Y., Liu, M., and Su, J., (2013), “Greasing the wheels of bank lending: Evidence from private firms in china”, *Journal of Banking and Finance*, 37(7): 2533- 2545.
Chen,Y., Dou, S., Rhee, C., Truong, M., (2015),“ International culture and corporate cash holdings around the world”, Journal of Banking and Finance., 50:1-18.
Clark, J., and, Riis, C., (2000), “Allocation efficiency in a competitive bribery game”, *Journal of Economic Behavior & Organization*, 42 (1): 109-124.
Cooray, A., and Schneider, F., (2018), “Does corruption throw sand into or grease the wheels of financial sector development?” *Public Choice, 177(1-2):* 111–133.
Delis, M., Kouretas, G., (2011), “Interest rates and bank risk-taking”, *Journal of Banking and Finance*, 35 (4): 840-855.
Dell' Ariccia, G., Laeven, L., and Suarez, G., (2013), “Bank Leverage and Monetary Policy's Risk-Taking Channel: Evidence from the United States” , IMF working paper.
Demirgüç-Kunt, A., and Martinez Peria, M., (2010), “A Framework for analyzing competition in the banking sector: An Application to the case of Jordan”, World Bank Policy Research Working Paper No. 5499. Available at SSRN: https://ssrn.com/abstract=1726248.
Demsetz, R., Saidenberg, M., Strahan, P., E., (1997), “Agency problems and risk taking at banks FRB of New York Staff Report No. 29. Available at SSRN: https://ssrn.com/abstract=943507 or http://dx.doi.org/10.2139/ssrn.943507
Detragiache, E., Tressel, T., Gupta, P., (2008), “Foreign banks in poor countries: theory and evidence”. *Journal of Finance*, 63: 2123–2160
Dima, B., Dinca, M., and Cristi, S., (2014), “Financial nexus: efficiency and soundness in banking and capital markets”, *Journal of International Money and Finance*, 49: 145-161

Djankov, S., McLiesh, C., and Shleifer, A., (2007), "Private Credit in 129 Countries" , *Journal of Financial Economics*, 84(2): 299–329.

Djankova, S., McLiesha , C., and Shleiferb, A., (2007), " Private credit in 129 countries" , Journal of Financial Economics 84: 299–329

Donadelli, M. and Persha, L. (2014), "Understanding emerging market equity risk premia: industries, governance and macroeconomic policy uncertainty, *Research in International Business and Finance*", 30(2): 284–309.

Duffie, D., Saita, L., & Wang, K. (2007), "Multi-period corporate default prediction with stochastic covariates", *Journal of Financial Economics*, 83: 635–665.

Erdinç, D., (2010), "Does a credit boom increase bank fragility? Transitional challenges in Bulgarian banking, 1999-2008", *Eastern European Economics*, 48 (3): 68-87.

Fahlenbrach, R., Prilmeier, R., and Stulz, R., (2016), "Why does fast loan growth predict poor performance for banks?", NBER working paper No. 22089.

Fahlenbrach, R., Prilmeier, R., and Stulz, R., (2018), "Why Does Fast Loan Growth Predict Poor Performance for Banks?", *The Review of Financial Studies*, 31(3):1014-1063.

Foos, D., Norden, L., and Weber, M., (2010), "Loan growth and riskiness of banks", *Journal of Banking & Finance*, 34 (12): 2929-2940.

Fue, X., Lin, P., and Molyneux P., (2014), "Bank competition and financial stability in Asia Pacific", *Journal of Banking & Finance*, 38: 64-77.

Gennaioli, N., Shleifer, A., and Vishny, R., (2012), "Neglected risks, financial innovation and financial fragility", *Journal of Financial Economics*, 104(3): 452-468.

Goel, R., and Iftekhar H., (2011), "Economy-wide corruption and bad loans in banking: international evidence", *Applied Financial Economics*, 21(7): 455-461.

Goretti, M., Souto, M., (2013), "Macro-Financial implications of corporate (de)leveraging in the Euro area periphery", International Monetary Fund.

Gropp, R., Vesala, J. M., and Vulpes, G., (2006), "Equity and bond market signals as leading indicators of bank fragility", *Journal of Money, Credit and Banking*, 38(2):399–428.

Hess K., Grimes A., Holmes, M., (2009), "Credit losses in Australasian banking", "Economic Research", 85(270):331–43.

Igan, D., and Pinheiro. (2011), "Credit growth and bank soundness: fast and furious? "IMF Working Paper11/278.

Imam, P., and Kpodar, K., "Is Islamic banking good for growth? IMF Working Paper No. 15/81. Available at SSRN: https://ssrn.com/abstract=2609646

Jeon, B., Wu, J., Chen, M., and Wang, R., (2014), "Corruption and bank risk-taking: Evidence from Emerging economies", Available at SSRN: 2433068.

Jiang, L., Ng, J., and Wang, C., (2018), "Lending corruption and bank loan contracting: cross country evidence", working paper. Available at: https://ssrn.com/abstract=3292740

John H., Boyd and Stanley G., (1986), "Risk, regulation, and bank holding company expansion into nonbanking", *Quarterly Review, Federal Reserve Bank of Minneapolis*, 10 (2): 2-17.

Jordà, O., Schularick, M., and Taylor, A., (2013), "When credit bites back", *Journal of Money, Credit and Banking,* 45: 3-28.

Jorda, O., Schularick, M., and Tylor, A., (2013), "When credit bites Back: leverage, business cycles, and crises", *Journal of Money, Credit and Banking*, 45 (2):1-28.

Kabir, M., Worthington, A., and Gupta, R., (2015), "Comparative credit risk in Islamic and conventional bank", *Pacific-Basin Finance Journal*, 34: 327-353.

Kaufmann, D., and Wei, S., (1999), “Does "Grease Money" Speed Up the Wheels of Commerce?”, NBER Working Paper No. w7093. Available at SSRN: https://ssrn.com/abstract=162974

Kaufmann, D., Kraay, A., and Mastruzzi, M., (2010), "The worldwide governance indicators: A summary of methodology, data and analytical issues", World Bank Policy Research Working Paper No. 5430.

Keeley, M., (1990), “Deposit insurance, risk and market power in banking” American Economic Review, 80 (5): 1183-1200.

Keeton, W., (1999), "Does faster loan growth lead to higher loan losses?", *Economic Review*, Federal Reserve Bank of Kansas City, issue Q II, pages 57-75.

Keeton, W., (1999), "Does faster loan growth lead to higher loan losses?," *Economic Review*, Federal Reserve Bank of Kansas City, issue Q II, pages 57-75.

Keeton, W., (1999), “Does faster loan growth lead to higher loan losses?”, *Economic Review - Federal Reserve Bank of Kansas City;* Second Quarter, 84(2): 57-75

Krishnamurthy, A., and Muir, T., (2015), “Credit spreads and the severity of financial crises, Stanford GSB working paper.

Krishnamurthy, A., and Muir, T., (2017), "How Credit Cycles across a Financial Crisis," NBER Working Papers 23850, National Bureau of Economic Research, Inc.AN M. TAYLOR

La Porta, R., (1996), “Expectations and the cross-section of stock returns”, *Journal of Finance,* 51: 1715-1742

La Porta, R., Lopez-de-Silanes, F., Shleifer, A., and Vishny, R., (1999), “The quality of government”. *Journal of Law, Economics, and Organization*, 15: 222-279.

La Porta, R., Lopez-de-Silanes, F., Shleifer, A., Vishny, R., (1997), “ Legal determinants of external finance”, *Journal of Finance* 52, 1131}1150.

Lardy, N., (1998), “China and the Asian contagion”, *Foreign Affairs*, 77(4): 78-88.

Levine R, Zervos, S., (1998), “Stock markets, banks, and economic growth”, *American Economic Review,* 88(3):537–558

Levine R., Loayza N., Beck T., (2000), “Financial intermediation and growth: causality and causes”, *Journal of Monetary Economics*, 46:31–77

Levine, R., (1998), “The legal environment, banks, and long-run economic growth”, *Journal of Money, Credit, and Banking*, 30: 596–613.

Levine, R., (1999), “Law, finance, and economic growth”, *Journal of Financial Intermediation*, 8: 36–67.

Luminita, L., and Florentin, C., (2016), “The Impact of Corruption on Economic Development: Case Study Romania”, SSRN working paper at: SSRN: https://ssrn.com/abstract=2792575 or http://dx.doi.org/10.2139/ssrn.2792575.

Lien, D., (1990), “Corruption and allocation efficiency”, *Journal of Development Economics,* 33:153–164.

Marcucci, J., and Quagliariello, M., (2009), “Asymmetric effects of the business cycle on bank credit risk”, *Journal of Banking & Finance,* 33(9): 1624-1635.

Mauro, P., (1996), “The effects of corruption on investment, growth, and government expenditure”. International Monetary Fund Working paper 96/98

Merilainen, M., (2016), “Lending growth during the financial crisis and the sovereign debt crisis: The role of bank ownership type”, *Journal of International Financial Markets, Institutions and Money*, 41:168-182.

Merton R., (1974), "On the pricing of corporate debt: the risk structure of interest rates", *Journal of Finance*, 29:449–70.

Mian, A., Sufi, A., (2018), "Credit Supply and Housing Speculation. National Bureau of Economic Research Working Paper Number 24823.

Mian, A., Sufi, A., (2014), "What Explains the 2007-2009 Drop in Employment?", Econometrica, 82: 2197–2223.

Mishkin, F. (2001). "Financial policies and the prevention of financial crises in emerging market countries", Cambridge. MA. National Bureau of economic Research. NBER Working Paper No. 8087

Mo, P., (2001), "Corruption and economic growth", *Journal of Comparative Economics*, vol. 29, issue 1, 66-79.

Niu, J., *(2016),"* Loan growth and bank valuations", *The Quarterly Review of Economics and Finance*, 61,185-191.

Olson, D., and Zoubi, T., (2017), "Convergence in bank performance for commercial and Islamic banks during and after the Global Financial Crisis", *The Quarterly Review of Economics and Finance*, 65: 71-87.

Park, J., 2012. "Corruption, soundness of the banking sector, and economic growth: A cross-country study," Journal of International Money and Finance, Elsevier, vol. 31(5), pages 907-929.

Paunov, C., (2016), "Corruption's asymmetric impacts on firm innovation", *Journal of Development Economics*, 118: 216-231.

Qian, J., and Strahan, P., (2007), "How Laws and Institutions Shape Financial Contracts: The Case of Bank Loans", *Journal of Finance*, 62 (6): 2803-2834.

Rajan, R., "Why credit policies fluctuate: a theory and some evidence", *Quarterly Journal of Economics*, 109: 399– 442

Reinhart, C., Rogoff, K., (2009), "The Aftermath of Financial Crises", NBER Working Paper No. 14656

Saghi-Zedek, N., (2016), "Product diversification and bank performance: Does ownership structure matter?", *Journal of Banking and Finance*, 71: 154–167.

Salas, V., and Saurina, J., (2002), "Credit risk in two institutional regimes: Spanish commercial and saving banks", *Journal of Financial Services Research*, 22: 203 – 224.

Schumpeter, A., (1934), "The Theory of Economic Development". Translated by: Redvers Opie, Harvard University Press, Cambridge, MA.

Sinkey, J., and Mary, B. Greenwalt,M.,(1991)," Loan-Loss experience and risk-taking behvior at large commercial banks", *Journal of Financial Services Research*, 5: 43-59.

Stigler, G., (1971), "The Theory of Economic Regulation," *Bell Journal of Economics*, 2(1): 3-21.

Swaleheen, M., (2007), "Corruption and saving in a panel of countries", *Journal of Macroeconomics*, 30 (3):1285-1301

Toader, T., Onofrei, M., Popescu, A., and Andrieș, M., (2018), "Corruption and Banking Stability: Evidence from Emerging Economies", *Emerging Markets Finance and Trade*, 54(3): 591-617.

Vithessonthi, C., (2016), "Deflation, bank credit growth, and non-performing loans: Evidence from Japan", *International Review of Financial Analysis*, 45: 295-305.

Weill, L., (2009), "Does corruption hamper bank lending? Macro and micro evidence", *Empirical Economics*, 41(1):25-42

Wieneke, A., Gries, T., “SME performance in transition economies: The financial regulation and firm-level corruption nexus”, *Journal of Comparative Economics*, 39 (2): 221-229.
Wilhelm, P., (2002), “International validation of the corruption perceptions index: Implications for business ethics and entrepreneurship education”, *Journal of Business Ethics*, 35 (3):177–189.
Williamson, O., (1963), “Managerial discretion and business behavior”, *American Economic Review*, 53: 1032-1057.