



HAL
open science

Political patronage and banks' leverage in the Middle Eastern and North African region: A new neural panel regression analysis

Rihem Braham, Christian de Peretti, Lotfi Belkacem

► To cite this version:

Rihem Braham, Christian de Peretti, Lotfi Belkacem. Political patronage and banks' leverage in the Middle Eastern and North African region: A new neural panel regression analysis. *Quarterly Review of Economics and Finance*, 2023, 89, pp.298-306. <10.1016/j.qref.2022.08.011>. <hal-04875470>

HAL Id: hal-04875470

<https://hal.science/hal-04875470v1>

Submitted on 9 Jul 2025

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire HAL, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



Distributed under a Creative Commons CC BY-NC 4.0 - Attribution - Non-commercial use - International License

**Political patronage and banks' leverage in the Middle Eastern and North African region:
A new neural panel regression analysis**

Rihem Braham *, *Christian de Peretti* † and *Lotfi Belkacem**

* *Laboratory Research in Economics, Management and Quantitative Finance, Institute of High Commercial Studies, University of Sousse, Tunisia.*

† *Université de Lyon, Université Claude Bernard Lyon 1, Laboratoire de Sciences Actuarielle et Financière (EA 2429), F-69007, Lyon, France.*

Abstract

This research examines the effect of political patronage on financing decisions for a sample of 67 commercial banks from the Middle East and North African region for the period 2003-2017. For this aim, a fixed effect neural panel model was developed to investigate this relationship which is not done in prior researches. In contrast to classical panel regression, our model allows to detect all possible combinations between the variables. Although little evidence on the direct impact of political connection is found, the results reveal that the effect of political patronage on leverage is nonlinear through its interaction with bank profitability and efficiency. The nonlinear effect is also related to the political and the institutional environment.

Key words: political patronage, nonlinear, neural panel regression, MENA region.

JEL classification: G32, G38.

Acknowledgements

This work was financially supported by the "PHC Utique" program of the French Ministry of Foreign Affairs and Ministry of higher education and research and the Tunisian Ministry of higher education and scientific research in the CMCU project number 18G0411.

1. Introduction

Although the role of political patronage as a driver of firms' financing decisions has been widely accepted in the literature (Johnson and Mitton, 2003; Bliss and Gul, 2012; Boubakri et al., 2012), we examine the relationship between banks' political connections in the Middle East and North Africa (MENA) and leverage in a new framework by conducting non-linear analyses to detect some possible new relations undetected by classical linear analyses.

Political patronage is defined as preferential treatment given to businessmen who are either politicians or politically connected to the government, allowing them to capture various state rents in exchange for economic and political support (Gomez and Jomo, 1997). These arrangements are particularly common in developing countries characterised by a high level of corruption, an unreliable legal system, and weak laws (Faccio, 2006). For example, the Malaysia case exhibits many of the characteristics of developing countries that are controlled by closely linked political and economic elites with continuity in the government (Esfahani, 1994). Hence, the discussion on the institutional environment and governance characteristics of the MENA region posits that politically connected companies in MENA countries behave differently from the non-politically connected ones.

Several studies have highlighted that political patronage can be of value to companies. Firms benefiting from political patronage enjoy many advantages, such as preferential access to financial resources (Saeed et al., 2015; Leuz and Oberholzer-Gee, 2006), lower tax rates (Adhikari et al., 2006), preferential treatment from the government (Khwaja and Mian, 2005), lower cost of debt (Chkir et al., 2019), higher leverage (Johnson and Mitton, 2003; Boubakri et al., 2012; Lim et al., 2012; Bliss and Gul, 2012), high performance (Fraser et al., 2006; Wang et al., 2019), and abnormal returns (Shen and Lin, 2015). This evidence can be relevant to both firms and banks. Indeed, banks invest in political connections because the benefits that these connections would provide outweigh the cost to the banks. Some studies recognise the value of political presence on banks' boards and its impact on bank performance (Braun and Raddatz, 2010; Micco et al., 2007) and bank activity (Carretta et al., 2012; Nys et al., 2015).

However, little attention has been paid to the relationship between political patronage and banks' financing decisions (Braham et al., 2019). Mixed findings in the literature suggest that further research is needed to investigate the significance of the linkage between these two factors. Moreover, the politician-firm network is widespread and common in developing countries where the legal system is unreliable and the law does not require the disclosure of

information on which competitive finance depends. Hence, the phenomenon of political patronage may be relevant in the MENA region. As there is a paucity of studies focusing on this region, we aim to improve the existing research by determining the extent to which political patronage affects MENA banks' leverage.

Regarding the methodology, while the majority of studies use classical linear regressions to consider the linkage between political connections and banks' leverage, some non-linear effects may be missed. We thus use a non-linear approach to consider indirect relationships among the variables. For example, Braham et al. (2019) examine the effect of political connections for selected MENA countries for the period 2003–2014 using panel analysis and find that the direct impact of political connection on leverage is not significant. However, an indirect impact could exist through interactions among the variables. Therefore, we go beyond assessing the direct link between the two factors by examining possible indirect effects. Furthermore, previous studies on the political connections of firms use classical linear models. In our article, a thorough non-linear analysis is performed using a new panel neural regression. The model allows studying the maximum number of interactions among the variables. This ensures that no non-linear effects are missed. It is also well known that MENA countries are characterised by weak institutional environments; their financial systems are still lagging behind in terms of size and efficiency, and public governance and investor protection are often deficient (Awartani et al., 2016). Therefore, the work of Braham et al. (2019) is extended by controlling for institutional as well as country-level variables.

After using a sample of 67 commercial banks operating in the MENA region over the period 2003–2017, different regression analyses are used to examine the relationship between banks' leverage and political connections. In addition to the traditional linear and non-linear panel regression, we develop a new neural panel regression by modifying the classical artificial neural network (ANN) model (multilayer perceptron). Fixed-effect components are added to the model to account for unobserved individual heterogeneity. The results reveal that the relationship between leverage and political connections is non-linear. Moreover, it is important to control for institutional factors as the value of political patronage would be more pronounced in emerging countries than in developed economies.

Overall, our results support the hypothesis that political patronage may affect the financing decisions of banks in the MENA region. However, this effect seems weak or insignificant in linear analyses found in the literature. Our non-linear analysis shows that the indirect effects of political connections are more pronounced. Political patronage is a double-edged

sword. Despite the negative effect on leverage, the implicit effect through efficiency suggests that the need for political connections may counterbalance the need for managerial skills. Finally, our evidence does not deny the value of political connections in emerging countries but suggests that the politician–bank network should be carefully considered by regulators and investors and emphasises the need for better corporate governance mechanisms in countries of the MENA region to reduce its negative effects.

The rest of the article proceeds as follows. The next section briefly reviews the literature on political patronage and presents the hypotheses. The third section describes the data, the sample selection procedure, and the models. The results of our estimations are then reported and discussed in Section 4. Section 5 concludes the research, and Section 6 gives some implications and suggestions for future research.

2. Review of the literature

2.1. Political patronage for firms

A growing body of research focuses on the value of political patronage (Wisniewski, 2016). Faccio (2010) finds that the financial characteristics of politically connected firms differ more from those of their unconnected peers and that the influence of political connections occurred more often in emerging countries characterised by high levels of corruption and less developed financial systems. Furthermore, political ties are believed to be a valuable resource for many firms (Fisman, 2001), and many researchers provided evidence that these ties help firms to extract rent from the government and gain further advantages that enhance their value.

While the literature favours the idea that links with the government or politicians are seen as helpful, some studies come to the opposite conclusion. On the one hand, political relationships have several advantages, including easier access to financial resources, such as bank loans and other funds, on more favourable terms (Fraser et al., 2006; Khwaja and Mian, 2005), improved performance (Johnson and Mitton, 2003; Ding et al., 2014), higher probability of bailout (Faccio, 2006), and lower cost equity (Boubakri et al., 2012). On the other hand, some studies show that political patronage has a negative impact on firms by lowering the quality of accounting information (Chaney et al., 2011), appointing less qualified managers and directors (Boubakri et al., 2005; Leuz and Oberholzer-Gee, 2006), decreasing long-term performance because of lower managerial incentives and/or inefficiency (Claessens

et al., 2008; Fan et al., 2007), and increasing the cost of debt (Bliss and Gul, 2012) and investment inefficiency (Chahal and Ahmad, 2020).

Political connections can also affect the financing decision of companies. Previous research in this regard has supported a similar assumption. By examining the link between state ownership and debt choice for privatised firms in an international context, Boubakri and Saffar (2018) suggest that newly privatised firms continue to benefit from government support and hence should rely more on bank debt than public debt financing. The findings are consistent with Faccio's (2006) argument regarding implicit government support for politically connected firms. According to Johnson and Mitton (2003), there is a positive relationship between leverage and political patronage, suggesting that firms with political ties tend to carry more debt than others. Fraser et al. (2006) focus on developing economies and use three measures as indicators of political patronage to find a positive and significant link between leverage and political connections. They also suggest that larger and more profitable firms with political patronage tend to be more indebted than simple firms with political patronage. Moreover, Bliss and Gul (2012) extend the work of Fraser et al. (2006) and find that politically connected Malaysian firms have negative equity, that the market-to-book ratio is positively associated with leverage, and that borrowing politically connected firms have significantly lower profitability compared to unconnected firms. In fact, politically connected firms are perceived by lenders as having higher risk and are charged higher interest rates. Dong et al. (2010) also hypothesise that Chinese firms with stronger political connections should carry more debt. The empirical results support this hypothesis: long-term debt ratios are positively related to firm size and asset tangibility but negatively related to profitability and growth opportunities and tend to be higher for politically connected firms. Additionally, Lim et al. (2012) examine the effect of political patronage on the capital structure of companies listed on the Shanghai Stock Exchange. They have hypothesised that Chinese firms with stronger political connections should carry more debts. Apart from determinants such as firm size, growth opportunities, profitability, and asset tangibility, state ownership and a large number of non-tradable shares may influence the choice of capital structure. Ebrahim et al. (2014) determine the optimal capital structure of Malaysian firms based on some firms' characteristics and gauge the effect of political patronage on firms' financing decisions. The results are as follows. During the crisis, firms amend capital structure, and politically patronised firms de-lever faster. During the recovery period, patronised firms are highly levered, but the results are insignificant, and there is no difference concerning the core factors of capital structures of patronised and unconnected firms. In a more recent study, Chkir et al.

(2019), by examining the effect of political connections on the financing decisions of U.S. companies, suggest that these links enable companies to benefit from a lower cost of debt consistent with emerging markets' results.

2.2. Political patronage for banks

While the political connections of non-financial firms are well documented in the literature, the impact of political patronage on banks is less studied. It is important to note that a strong political relationship can be seen as an important intangible asset to avoid administrative hurdles, attract public deposit accounts, and receive preferential treatment. Banks even appoint politically connected directors to draw more direct rent from the government which the bank would otherwise not have. According to Dong et al. (2014), the incursion of politics is detrimental to corporate outcomes. In this way, state-owned banks can be seen as vehicles for financing projects with high social returns but potentially high risk and low profit and returns. Despite the implementation of good governance to insulate state-owned banks from political influence, the need to achieve government objectives may precede the efficiency of private banks (Mohieldin and Nasr, 2007). Braun and Raddatz (2010) examine the extent to which banks are politically connected, where this connectivity is most prevalent, and whether it is associated with better outcomes for banks. They find that connected banks do better than unconnected ones in terms of size and profitability. Connectivity is positively associated with corruption but negatively associated with government accountability. Carretta et al. (2012) examine the effects of political presence on the boards of directors of cooperative banks and find that political presence on the board of directors appears to exert a negative impact on net interest revenues, loan portfolio quality, and capitalisation level and a positive impact on the banks' efficiency in terms of overhead costs. Moreover, Disli et al. (2013) focus on depositor discipline and test the hypothesis that political connections reduce depositor discipline. In fact, depositors exert less discipline over their banks when the banks' top executives have been formerly elected to Parliament. The reason behind this is that depositors perceive the presence of politically connected directors or chairmen in the board as a sign of implicit government guarantee. Recently, Nys et al. (2015) have studied the impact of banks' political connections on their ability to collect deposits under two different deposit insurance schemes to determine whether banks' political connections facilitate access to deposit funding. They find that the supply fund is higher for politically connected banks compared to their non-politically connected counterparts. A state-owned bank or a politically connected private bank is able to attract deposits more easily than its unconnected counterparts. Finally, Braham et al. (2019) examine the association between political patronage and banks' financing decisions in

the MENA region. The results reveal that politically backed banks tend to have higher leverage, and the positive association is found to be not so large but significant through interaction with profitability.

The above studies provide mixed results for different approaches and contexts. To determine whether political patronage affects bank leverage in the MENA region, the following hypothesis is tested:

Hypothesis 1: ‘Political patronage has a significant and positive impact on bank leverage.’

As there may be indirect links between leverage and political patronage through interactions with other variables, we also test the following hypothesis:

Hypothesis 2: ‘Political patronage has a non-linear impact on leverage.’

Therefore, we extend the work of Braham et al. (2019) by investigating the maximum number of interactions among variables that could explain the impact of political patronage on leverage.

3. Data and methodology

3.1. Sample selection and data source

Our sample contains a balanced panel of 67 banks operating in selected MENA countries – Bahrain, Egypt, Jordan, Kuwait, Lebanon, Morocco, Oman, Qatar, Saudi Arabia, Tunisia, and the United Arab Emirates – for the period 2003–2017. Annual financial data and key ratios are obtained from the Thomson Reuters database. Macro-economic and institutional indicators are provided by the World Bank database (<https://data.worldbank.org/>).

3.2. Political patronage variable construction

The most commonly used measure of corporate political connections was developed by Faccio (2006) and defines political connections as follows: ‘a company is connected with a politician if one of the company’s large shareholders or top officers is a member of parliament, a minister or the head of state, or . . . closely related to a top officer’. Close relationships also include cases of friendship, former political positions, foreign politicians, and well-known cases of relationships with political parties.

Braham et al. (2019) extend the definition by including members of the royal families or those described as influential individuals in the country and/or having informal ties with politically connected individuals, such as relatives of individuals belonging to the aforementioned categories.

In the study of Braham et al. (2019), their method for constructing the political connection variable is adopted as our primary reference. The cases of politically patronised banks are

identified based on manually collected information. Moreover, we extend the dataset of banks by including more countries of the MENA region.

3.3. Definition of variables

The determinants of leverage are well documented in the literature on firms. As this research focused on banks, some variables presumed to be related to leverage are set. Moreover, a dummy variable is used as a proxy for political connections. The names of the variables, their definitions, and their expected signs are presented in Table 1.

The political connection (*polcon*) is expected to have a positive impact on bank leverage, in line with the empirical literature on firms. Firms with higher political connections tend to have higher leverage in their corporate financing structures (Johnson and Mitton, 2003; Fraser, 2006). Size should be positively related to leverage since large banks tend to have lower debt agency cost and easier access to the credit market and require more debt to fully benefit from the tax shield. Static trade-off and agency cost theories suggest that size should be positively related to leverage (Gropp and Heider, 2010). For profitability (*prof*), the empirical results are mixed. Following the pecking-order prediction, profitable banks accumulate internal reserves, which allow them to depend less on external funds. On the other hand, the most profitable firms should lever up to shield their profits and benefit from debt tax shields, as tax-based theory suggests. Also, politically connected profitable firms accumulate higher leverage than connected unprofitable firms (Saeed et al., 2015). Risk as measured by the loans-to-deposits ratio (*loandep*) is expected to have a negative relationship with leverage. When business risk increases, the probability of bankruptcy increases, which may increase the cost of debt. Hence, the debt level in the capital structure should decrease (Gropp and Heider, 2010). Efficiency (*eff*) is expected to have a positive impact on leverage. According to the efficiency-risk hypothesis (Margaritis and Psillaky, 2007), more efficient firms choose higher leverage ratios because higher efficiency is expected to lower the costs of bankruptcy and financial distress.

The capital structure of banks is also determined by external factors. Macro variables of the economy are important for cross-country analysis. Hence, GDP growth and inflation are considered. GDP growth (*gdp*) is expected to be positively associated with leverage, in line with trade-off theory. More investing opportunities in the market cause banks to increase their leverage to generate the funds required to capture these opportunities (Booth et al., 2001; Oztekin, 2013). Inflation (*inf*) is expected to be positively related to leverage, as suggested by trade-off theory. When inflation is high, the real value of tax deductions on

interest payments is high. Firms therefore tend to be highly leveraged to trade-off costs with rising benefits (Frank and Goyal, 2009).

Earlier research argues that a firm's financing can be influenced by the institutional environment (Oztekin, 2013; Boubakri et al., 2012). We suggest that institutional factors such as government effectiveness, political stability, and corruption are related to political connections. Government effectiveness (goveff) is expected to be negatively related to leverage. When government effectiveness increases, the benefits of connected firms derived from their political connections are eroded, such as preferential treatment in government contracts and preferential access to financing, forcing them to be less leveraged. Political stability (polstab) may have a positive impact on leverage. We propose that political stability helps firms with political connections to be more certain of benefiting from their connections and to have greater leverage. For control of corruption (corrupt), most cross-country studies highlight the harmful effect of corruption on firms, while some studies find the opposite (Ullah, 2020). A high level of corruption is associated with higher leverage of politically connected banks. This is consistent with the findings of Braun and Raddatz (2010), who suggest that countries with more connected banks are shown to have a higher rank of corruption and government regulatory power and are thus lower on accountability.

Table 1. Variable descriptions and expected signs

Variables	Measure	Definition	Expected sign	References
Leverage	Leverage ratio	The ratio of total assets for the fiscal year to common shareholders' equity for the same period (assets/equity)		
polcon	Binary variable	= 1 if a bank has political connections and 0 otherwise	+	Fraser (2006); Johnson and Mitton (2003)
prof	ROA ratio	The ratio of return on assets before taxes, calculated as income before tax for the fiscal year divided by the average total assets for the same period	+/-	Gropp and Heider (2010)
loansdep	Loans-to-deposits ratio	The ratio of end-of-fiscal-year loans to deposits for the same period	-	Gropp and Heider (2010); Lemmon et al. (2008)
Size	Logarithm of total assets	= log (total assets)	+	Gropp and Heider (2010)
eff	Efficiency ratio	The ratio of non-interest expense for the fiscal year to total revenue less interest expense for the same period, measuring the cost to the bank of each unit of revenue	-	Margaritis and Psillaki (2007); Fan et al. (2007)
gdp	Growth rate of GDP	Growth rate of GDP at market prices based on constant local currency (GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products)	+	Booth et al. (2001); Oztekkin (2013)
inf	Inflation rate	The consumer price index reflects the annual percentage change in the cost to the average consumer of acquiring a basket of goods and services that may be fixed or changed at specified intervals	+	Frank and Goyal (2009)
polstab	Political stability indicator	Perceptions of the likelihood of political instability and/or politically motivated violence, including terrorism, ranging from approximately -2.5 (weak) to 2.5 (strong) governance performance	+	Harymawan and Nowland (2016)
goveff	Government effectiveness indicator	Perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies, ranging from approximately -2.5 (weak) to 2.5 (strong) governance performance	-	Harymawan and Nowland (2016)
corrupt	Control of corruption indicator	Reflects perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as 'capture' of the state by elites and private interests, ranging from approximately -2.5 (weak) to 2.5 (strong) governance performance	-	Braun and Raddatz (2010); Faccio (2006)

3.4. Neural panel model

In econometric terms, ANNs are nothing but algorithms for finding an optimal solution of regressors derived from input variables by adjusting the activation functions and the network architecture. The ANN can enclose many models, such as linear regression, the binary probit model, and others. In fact, the classical linear panel regression model may not reveal all the explanatory power of the variables. The main advantage of the ANN approach is that such models have the flexibility to detect and duplicate any complex pattern. Also, they are free from statistical assumptions such as linearity and more robust to missing and inaccurate data. There are numerous studies comparing the performance of the ANN with traditional statistical approaches. An inspiring work of Crane-Droesch (2017) suggests an adaptation of neural networks to panel data and demonstrates that it is suitable for longitudinal data, providing unbiased estimation of the parametric component of the model with good properties of estimated confidence intervals. Angelini et al. (2008) present an application of the ANN to credit risk assessment that better estimates the probability of default. Other applications of using ANNs on panel data include de Peretti et al. (2009) developing an ANN procedure to test the unit root hypothesis in heterogeneous panels, which provides an application to a panel of bilateral real exchange rate series with the U.S. dollar from the 20 major OECD countries. Overall, the literature on neural networks and panel models provides evidence that neural networks outperform traditional econometric models and have a comparative advantage in terms of non-linearity, assumptions, and predictive power (Nuroglu, 2014; Sorayaei et al., 2016).

In this study, a standard neuron network model is used with one layer of hidden neurons whose optimal number is to be determined using information criteria. However, to consider individual heterogeneity, we had to invent a new ANN model. The idea is to include dummies by banks at the same level as the hidden layer, hence a direct input in the model of leverage. In fact, using a classic ANN by naively including dummies by banks in the inputs of the ANN would not make much sense for two reasons. On one hand, combining dummies which are binary variables and orthogonal would have no additional explanatory effect because the subspace vector generated by these variables will be the same. On the other hand, the combination of dummies with the other explanatory variables allows the possibility of having parameters associated with different variables within banks. In other words, the analysis is done bank by bank, which is not appropriate to measure the general effect of the variables on leverage. The model is expressed as follows:

$$\begin{aligned}
\text{leverage} &= \beta_0 + \sum_{j=1}^q \beta_j g(\omega_{it} \gamma_j) + \vartheta_i + \varepsilon_{it} \\
&= \beta_0 + \sum_{j=1}^q \frac{\beta_j}{1 + \exp[-(\gamma_{j,0} + \gamma_{j,1} \text{prof}_{it} + \dots + \gamma_{j,k} \text{corrupt}_{it})]} + \vartheta_i + \varepsilon_{it}
\end{aligned}$$

where

- $\omega = (1, \text{prof}, \text{size}, \text{eff}, \text{loansdep}, \text{gdp}, \text{inf}, \text{goveff}, \text{polstab}, \text{corrupt})$ is a vector of explanatory variables at time t for individual i
- $\gamma_j = (\gamma_{j,0}, \gamma_{j,1}, \dots, \gamma_{j,k})'$ is a vector of unknown parameters for hidden node j , $j = 1 \dots q$
- ϑ_i is unobserved heterogeneity modelled by fixed effects

The structure of the ANN can be explained by the following figure:

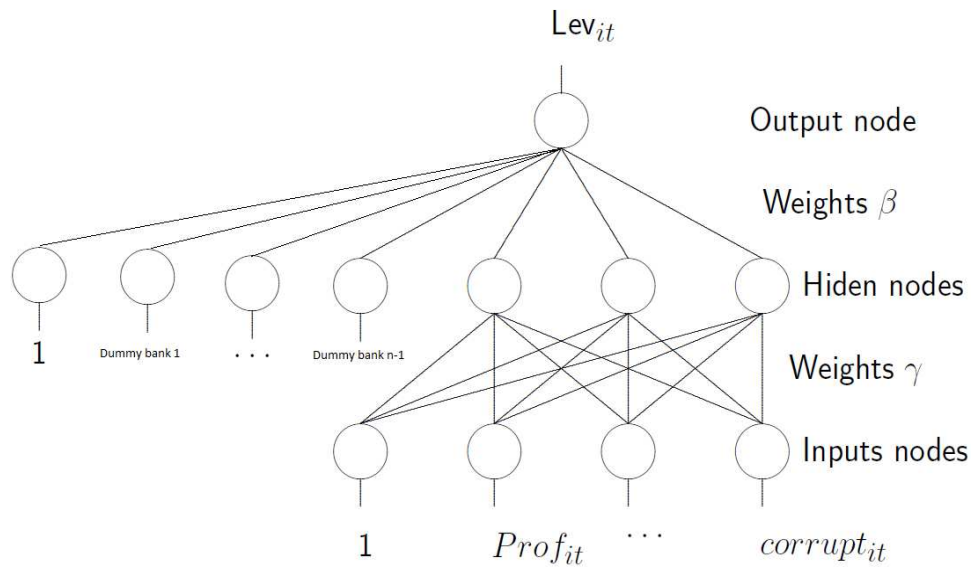


Figure 1. Panel neural network.

The models are estimated by minimising the sum of the squared residuals. It is therefore a non-linear least squares estimation. Since the sum of the squared residuals is a complex function of the parameters, classical optimisation algorithms (the downward gradient, for example) would not converge and would not overcome the local minima problem. To solve the problem of minimisation, we use a combination of random search with 100,000 iterations, which allows getting the local minima and descending gradient research which is locally optimal. The choice of the number of neurons of the hidden layer should be determined optimally. Since the number of parameters overflows with the number of neurons – leading to choosing, systematically, the minimum of neurons – the information criteria of AIC and BIC are not very appropriate in this case. Hence, to exploit the power of the ANN, we decide to use the number of explanatory variables as the number of hidden-layer neurons

twice but not more so as to avoid the problem of overlearning. As the classical linear regression models, the insignificant variables are successively deleted. Their suppression does not increase or decrease the error of prediction, but it enables retaining only the variables contributing to the model.

Regarding the interpretation of the parameters of the model, it is difficult to interpret all the weights of the network. Although the ANNs are reliable in terms of predictions, they are considered a black box and difficult to interpret. However, we believe that this limit is unfounded. Similarly to the probit and logit models, it is sufficient to calculate the marginal effects of the explanatory variables on the dependent variable. Thus, we provide the marginal effects of each explanatory variable on the average of the other variables. It should be noted that the interpretation of these marginal effects is similar to that of the coefficients of the linear regression, which are also the marginal effects of the explanatory variables of the linear model. It should be noted that in the ANN estimation, the marginal effect of a variable includes not only the direct effect of the variable but also the indirect effects with the other variables. Thus, these effects could be linear and non-linear.

3.5. Nonlinear panel model

The relationship between leverage and political connection is estimated using panel data regression. Extending Braham et al. (2019), different additional variables are included, namely macro-economic (GDP growth and inflation) and institutional variables (government effectiveness, political stability, and corruption). Also, it is important to test for possible non-linear effects of political connections on leverage. We will therefore extend the model by interacting political connection with the explanatory variables in the regression as follows:

$$\begin{aligned} leverage_{it} = & \beta_0 + \beta_1 polcon_{it} + \beta_2 prof_{it} + \beta_3 size_{it} + \beta_4 eff_{it} + \beta_5 loansdep_{it} + \beta_6 gdp_{it} + \beta_7 inf_{it} + \\ & \beta_8 goveff_{it} + \beta_9 polstab_{it} + \beta_{10} corrupt_{it} + polcon_{it} \times (\gamma_1 prof_{it} + \gamma_2 size_{it} + \gamma_3 eff_{it} + \gamma_4 loansdep_{it} + \\ & \gamma_5 gdp_{it} + \gamma_6 inf_{it} + \gamma_7 goveff_{it} + \gamma_8 polstab_{it} + \gamma_9 corrupt_{it} + \mu_i + \varepsilon_{it} \quad (2) \end{aligned}$$

where β and γ are the regression coefficients of independent variables, i denotes the individual dimension ($I = 1, 2, \dots, 67$), t denotes the year ($t = 2003 \dots 2017$), μ_i is the unobserved time-invariant individual effect, and ε_{it} is the error term, white noise independent to μ_i .

Two panel estimation methods are used, namely within-estimator fixed effects and generalised least squares random effects. To choose between the fixed and random effect models, the Hausman (1978) test for specification is applied. It tests the null hypothesis that the coefficients estimated by the efficient random effects estimator are the same as those

estimated by the consistent fixed-effect estimator. If the null hypothesis is rejected, this implies that the random effect model is inconsistent, and thus, the fixed-effect model is used. Model (2) is estimated using an iterative procedure. The first step is to estimate the model with all the variables (the original and cross variables) using classical panel linear estimation. The problem is the large number of variables, which reduces the power of the estimations. Second, the most insignificant variable, on the basis of its student statistic, is removed, and the model is re-estimated, making the remaining estimates more powerful. Then the procedure is iterated until only the significant variables remain.

4. Empirical results

4.1. Preliminary analysis

Before conducting the estimation results, preliminary analysis is reported regarding the selection bias problem, descriptive statistics, and correlations among the variables. In fact, using a dummy variable to identify a politically connected bank in a sample of politically and non-politically connected banks is inappropriate as a problem of selection bias may occur and politically connected banks being in the sample may not be random. Therefore, a mean comparison test is done for the initial sample of total banks and the sample of the study after excluding banks with no available information on political connection in their boards. A comparison in the means of the variables shows that the differences identified by the student test are not significant for leverage as well as for other variables. Hence, there is no significant difference among the samples, and this should not bias or contradict our results.

Table 2 summarises all the descriptive statistics (average, standard deviation, maximal value, and minimal value) and the correlation coefficients of the variables used in this study.

Table 2. Summary statistics of the variables

	Obs	Mean	Std. dev.	Min	Max	leverage	polcon	size	roa	loansdep	eff	gdp	infl	polstab	goveff	corrupt
leverage	999	9.6392	5.5163	1.01	130.24	1.0000										
polcon	1005	0.59104	0.4918	0	1	-0.0592 (0.0613)	1.0000									
size	996	1.8859	1.4743	-9.9	13.2	-0.0132 (0.6779)	0.0755 (0.0168)	1.0000								
prof	1003	8.9037	1.2447	4.3845	12.3137	-0.4232 (0.0000)	0.0289 (0.3621)	0.0093 (0.7695)	1.0000							
loansdep	983	0.78707	0.4715	-0.12	6.31	-0.1350 (0.0000)	-0.0376 (0.2393)	-0.0741 (0.0201)	0.0190 (0.5539)	1.0000						
eff	1000	0.4437	0.1743	-0.117	2.569	0.3261 (0.0000)	-0.0714 (0.0239)	-0.2589 (0.0000)	-0.5756 (0.0000)	-0.0172 (0.5896)	1.0000					
gdp	998	4.7052	4.1135	-7.0761	26.1702	-0.0882 (0.0054)	-0.0662 (0.0365)	-0.1133 (0.0003)	0.2289 (0.0000)	0.0244 (0.4461)	-0.1460 (0.0000)	1.0000				
inf	907	4.1780	4.3018	-4.8632	29.5019	0.1520 (0.0000)	0.0531 (0.1102)	-0.2237 (0.0000)	0.0905 (0.0065)	-0.1666 (0.0000)	-0.0658 (0.0483)	0.1457 (0.0000)	1.0000			
polstab	1005	-0.0427	0.8166	-2.1167	1.2236	-0.3244 (0.0000)	-0.0041 (0.8966)	0.1125 (0.0004)	0.1855 (0.0000)	0.2418 (0.0000)	-0.2792 (0.0000)	0.2274 (0.0000)	-0.2659 (0.0000)	1.0000		
goveff	1005	0.2973	0.5535	-0.8773	1.5098	-0.3449 (0.0000)	-0.0037 (0.9068)	0.1710 (0.0000)	0.0790 (0.0127)	0.2649 (0.0000)	-0.1701 (0.0000)	0.0712 (0.0244)	-0.3624 (0.0000)	0.7846 (0.0000)	1.0000	
corrupt	1005	0.2259	0.6217	-1.0372	1.51	-0.3711 (0.0000)	-0.0255 (0.4196)	0.1724 (0.0000)	0.2076 (0.0000)	0.2361 (0.0000)	-0.2703 (0.0000)	0.1831 (0.0000)	-0.3061 (0.0000)	0.8342 (0.0000)	0.9010 (0.0000)	1.0000

Note: the significance level of each correlation coefficient is in parentheses.

A multicollinearity test is also performed for the variance inflation factor (VIF). Table 3 provides the results of the collinearity diagnostics of the variables. Bank variables and country-level variables have VIF values less than 2. However, VIF values for the institutional variables are greater than 5. Overall, the mean VIF value is around 2.

Table 3. Collinearity diagnostics of the variables

Variable	VIF	SQRT VIF	Tolerance	R-Squared
leverage	1.39	1.18	0.7187	0.2813
polcon	1.04	1.02	0.9637	0.0363
size	1.27	1.12	0.7903	0.2097
prof	1.74	1.32	0.5737	0.4263
loansdep	1.11	1.05	0.9031	0.0969
eff	1.78	1.34	0.5602	0.4398
gdp	1.19	1.09	0.8380	0.1620
inf	1.27	1.13	0.7864	0.2136
polstab	3.16	1.78	0.3666	0.6384
goveff	6.22	2.49	0.3565	0.8392
corrupt	6.84	2.62	0.1462	0.8538
mean VIF	2.46			

4.2. Estimation results for the neural panel model

The ANN regressions are performed by dividing our sample into two groups: politically connected and non-politically connected banks. Indeed, in the non-linear model, combining the variables with political connection may correspond roughly to making two regressions: one for the non-politically connected banks and one for the politically connected banks. Thus, it would be better to make two panel regressions: one for the politically connected banks and one for the non-politically connected banks. In this way, the different values of the coefficients of respective variables could be observed, and the selected variables may be different. Table 4 provides the estimation results from the neural panel data model for the two sub-samples along with the fixed- and random-effect panel estimations.

Table 4. Estimation of neural panel data model

	Linear panel estimation				ANN estimation	
	polcon=0		polcon=1		polcon=0	Polcon=1
	Fixed effects	Random effects	Fixed effects	Random effects	Neuronal (400.000 iterations)	Neuronal (200.000 iterations)
R-squared	0.3263	0.3485	0.1133	0.3623	0.7721	0.8008
	Coef.	Coef.	Coef.	Coef.	Average Marginal effects	Average Marginal effects
prof	-2.2261***	-2.2469***	-0.7703***	-.8146***	36.6099	-87.3128
loansdep	0.4488	0.1365	0.9487	.7371	-1.5009	-3.7442
size	0.4778	0.6581	0.1794	.0192	-1.7529	-0.0888
eff	14.1764***	13.2848	-2.9914***	-2.9118***	0.4436	-5.2280
gdp	0.0169	0.0477	0.0606**	0.0814***		
inf	0.2977***	0.2575***	0.0191	0.0260		
polstab	0.4295	-0.1582	0.1487	-0.2095	-1.3931	-0.8923
goveff	-8.0821***	-7.6240***	-1.1738**	-1.3087***	-2.5416	-4.8096
corrupt	5.9978***	4.8870***	0.0013	-1.1328***	1.8547	-0.3258
constant	2.8091	1.9545	9.7983	11.5704		
Hausman test						
Chi2 (9)		195.15		147.42		
Prob>chi2		0.000		0.000		

*Note: dependent variable=leverage; *, **, and *** denote the statistical significance at the 10, 5 and 1 per cent test levels, respectively.*

Regarding the panel estimation results, profitability, efficiency, government effectiveness, and control of corruption are statistically significant, whereas the variables of loans to deposits, size, and political stability are not significant. Thus, we note that for politically connected and non-politically connected banks, profitability and government effectiveness have a negative effect on leverage, whereas in the neural regressions, all the variables are significant except for GDP growth and inflation. In terms of explained variances, those of profitability, risk, efficiency, political stability, and control of corruption significantly contribute to the results of politically connected banks. For non-politically connected ones, efficiency and control of corruption have more explanatory power than other variables.

Adding to this, the comparison of the estimation results between the two sub-samples revealed some differences. Profitability, efficiency, and control of corruption have a positive effect on leverage for non-politically connected banks and have the opposite effect for politically connected banks. More precisely, for efficiency and control of corruption, the results are in line with those provided by the non-linear estimation. For example, in the non-linear regression, the effect of efficiency on leverage for non-politically connected banks is about 14.49 as the effect of the interactive term (poleff) is null. So its net effect for politically connected banks is equal to $-18.00 + 14.49$, which is negative. Regarding profitability, its effect on leverage is positive for non-politically connected banks, while it is the opposite for politically connected banks, but this is in contrast with panel estimations.

Based on the neural panel analysis, first, this study finds profitability to be significantly and negatively associated with leverage for politically connected banks and positively associated with leverage for non-politically connected banks, in line with the findings of Bliss and Gul (2012). Second, the efficiency is found to be negatively related to leverage for politically connected banks and positively related to leverage for non-politically connected banks. In other words, the presence of political connections negatively impacts leverage through efficiency. After controlling for some institutional factors, a high level of corruption is found to be associated with more leveraged politically connected banks. Similarly, government effectiveness has a significantly negative association—that is, when government effectiveness increases, the level of leverage for politically connected and non-politically connected banks decreases. Controversially, political stability is found to be negatively related to leverage for politically connected banks. This finding is in contrast with the hypothesis that increased political stability increases a firm's certainty of deriving benefits from their connections, which results in higher leverage.

4.3. Estimation results for the non-linear panel model

The results of the two panel estimation methods regarding the non-linear model are presented in Table 5. Statistically, the generally accepted way of choosing between fixed and random effects is to perform a Hausman test. Based on the test result, the random-effects model is retained for the initial estimation. Table 5 summarises the estimation results in the following way: the results relative to the initial estimation, which includes all the variables as well as interactive terms with political connection, are provided. In addition, as a result of the iterative procedure, the results of the last iteration, which includes only significant variables, are provided. Political connection is significant and positively related to leverage. Profitability and government effectiveness are negatively significant; however, the related interaction variables have the opposite signs. The same results are found for efficiency, size, and control of corruption. Overall, political connection is found to have both direct and indirect effects on bank leverage.

Table 5. Estimation of non-linear panel data model

variable	Estimation from first iteration						Estimation from last iteration					
	Fixed effect model			Random effect model			Fixed effect model			Random effect model		
	Coef.	Std. Err.	t	Coef.	Std. Err.	z	Coef.	Std. Err.	t	Coef.	Std. Err.	z
polcon	18.4553***	5.8119	3.18	12.3631***	4.692172	2.63	17.5585***	5.2047	3.37	12.97445***	4.3054	3.01
prof	-2.0818***	0.2926	-7.11	-2.1720***	0.2768472	-7.85	-2.0434***	0.2842	-7.19	-2.1119***	0.2692	-7.84
loansdep	0.4022	0.5007	0.80	0.3178	0.4362064	0.73						
eff	14.9657***	2.5468	5.88	14.2105***	2.413433	5.89	14.4929***	2.4929	5.81	13.9718***	2.3575	5.93
size	1.2156**	0.4943	2.46	0.9014***	0.3427153	2.63	0.92869**	0.4245	2.19	0.8137***	0.3145	2.59
gdp	0.0240	0.0604	0.40	0.0494	0.0569536	0.87						
inf	0.2606***	0.0684	3.81	0.2396***	0.0662454	3.62	0.2658***	0.0662	4.01	0.2503***	0.0646	3.87
polstab	0.9856	0.8109	1.22	0.1094	0.6213818	0.18						
goveff	-8.8756***	1.4879	-5.97	-8.2188***	1.234679	-6.66	-8.0619***	1.3313	-6.06	-8.1933***	1.1393	-7.19
corrupt	6.8570***	1.2409	5.53	5.4116***	1.087452	4.98	7.1602***	1.1744	6.10	5.6266***	1.00682	5.59
polprof	1.2723***	0.3548	3.59	1.3110***	0.334722	3.92	1.2299***	0.3432	3.58	1.2291***	0.3233	3.80
polloansdep	0.0792	1.2296	0.06	0.1788	1.122659	0.16						
poleff	-18.2536***	3.1401	-5.81	-16.8141***	2.951995	-5.70	-18.0054***	3.0382	-5.93	-16.9024***	2.8475	-5.94
polsize	-1.4404**	0.5672	-2.54	-0.8594**	0.4155172	-2.07	-1.2718***	0.4927	-2.58	-0.8577**	0.3827	-2.24
polgdp	0.0435	0.0855	0.51	0.0404	0.0804511	0.50						
polinf	-0.2221**	0.0870	-2.55	-0.1878**	0.0836353	-2.25	-0.2247***	0.0830	-2.71	-0.2005**	0.0805	-2.49
polpolstab	-1.2949	1.0511	-1.23	-0.4076	0.8552889	-0.48						
polgoveff	7.6212***	1.9016	4.01	6.8182***	1.605904	4.25	6.7019***	1.6376	4.09	6.7358***	1.4353	4.69
polcorrupt	-7.5400***	1.5928	-4.73	-7.0109***	1.413528	-4.96	-7.6531***	1.5051	-5.08	-7.2925***	1.3207	-5.52
constant	-4.3025	5.0070	-0.86	-0.8005	3.927701	-0.20	-1.5265	4.4457	-0.34	0.3718	3.6234	0.10
R-squared	0.3008			0.3521			0.2964			0.3592		
Hausman chi2(7)	20.95						23.39					
Prob>chi2	0.3377						0.0372					

Note: dependent variable=leverage; *, **, and *** denote the statistical significance at the 10, 5 and 1 per cent test levels, respectively.

4.4. Discussion

Based on the novel neural panel analysis and a comparison among our mixed results, we suggest that politically connected banks with higher profitability are less leveraged than politically unconnected firms. Figure 2 presents the leverage as a function of profitability for politically connected and unconnected banks. The results are in contrast to the findings of Fraser et al. (2006) and Braham et al. (2019). This result may be explained by the fact that politically connected banks are perceived by lenders as riskier and are charged with higher interest rates (Bliss and Gul, 2012). Second, the presence of political connections has a negative impact on leverage through efficiency, as shown in Figure 2. The result can be explained by the evidence of Fan et al. (2007). The appointment of politically connected directors fulfils the personal goals of political patrons and does not enhance firm efficiency. Moreover, banks seek political connections when the external governance structure is ineffective (Carretta et al., 2012).

Furthermore, corruption is found to be positively associated with the leverage of politically backed banks. This result is consistent with that of Braun and Raddatz (2010), who suggest that countries with politically connected banks rank higher on corruption and lower on regulatory power. According to Feng et al. (2019), government intervention helps firms to gain financial access, but it also leads to corruption, which mediates the promotional effect of government intervention on financial access. In the same vein, as government effectiveness increases, government-induced benefits erode, forcing banks to be more responsive to market pressures and resulting in a lower level of leverage.

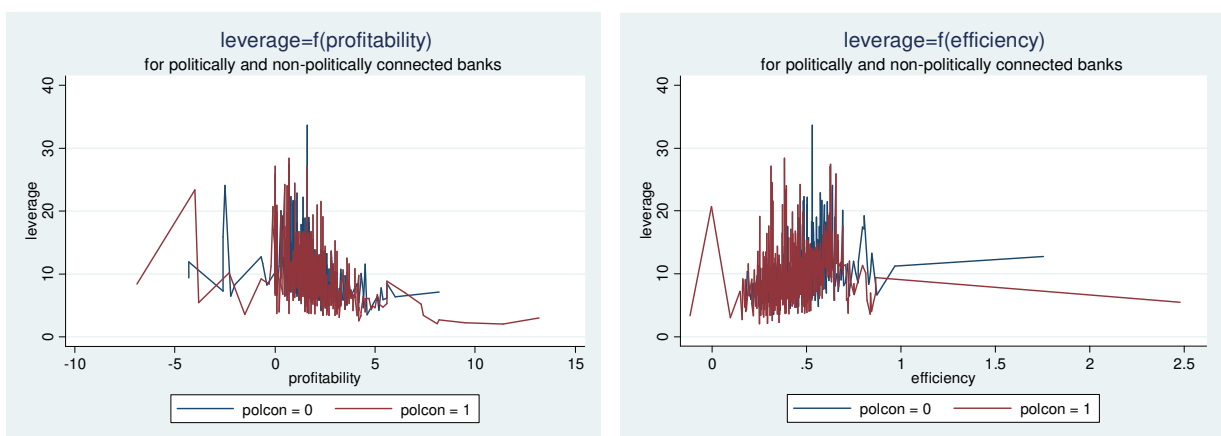


Figure 2. Graphic display of leverage according to profitability and efficiency.

5. Conclusion

Various studies have shown that political patronage can be either beneficial or detrimental to firms, and the empirical evidence is mixed depending on the context of the study. This article supports the hypothesis that political patronage may affect the financing decisions of banks in the MENA region. A comparison between politically connected and non-politically connected banks suggests that profitability and efficiency are significantly and negatively associated with leverage for politically connected banks and positively associated with leverage for non-politically connected banks. A more interesting issue is the indirect impact of political connection through interactions with other bank characteristics. We agree that the indirect effects are more pronounced within the non-linear analysis. After controlling for some institutional factors, it turns out that corruption and government effectiveness are positively associated with bank leverage for politically backed banks operating in MENA countries. Finally, a comparison between our findings and previous study results implies that the effect of political patronage can be negative or positive depending on political factors and the institutional environment.

6. Implications and future research

This article provides an overview of the costs and benefits of political connections in the MENA region and gives insight into the decision-making processes of investors and governments for investments or policymaking. The banking sector is strongly influenced by political issues given its importance in emerging economies. On the one hand, the government has to inject capital into some banks during the crisis to avoid the collapse of the banking sector. On the other hand, politically connected banks, which have the privilege of being bailed out in cases of distress, may engage in riskier and more inefficient activities. The governmental monitoring of these banks should be stronger than that of unconnected banks in terms of risk and efficiency. This research also gives insights to investors when testing the risk profiles of politically patronised banks. Risk-averse investors should then be able to identify companies with such characteristics as riskier and with incentives to require higher returns. Finally, the use of binary variables to proxy for political connection lacks important information. An important challenge is to look into a more informative measurement of political connection.

References

- Adhikari, A., Derashid, C. and Zhang, H., (2006), “Public policy, political connections and effective tax rates: Longitudinal evidence from Malaysia”, *Journal of Accounting and Public Policy*, 25, 574-595.
- Angelini, E., di Tollo, G., & Roli, R., (2008) “A neural network approach for credit risk evaluation”. *The Quarterly Review of Economics and Finance*, 48(4), 733-755.
- Awartani, B., Belkhir, M., Boubaker, S. & Maghyereh, A., (2016) «Corporate debt maturity in the MENA region: Does institutional quality matter? », *International Review of Financial Analysis*, 46, 309-325.
- Crane-Droesch, A., (2017) “Semiparametric panel data models using neural networks”
- Bliss, M.A., & Gul, F.A., (2012) “Political connection and leverage: Some Malaysian evidence.”, *Journal of Banking and Finance*, 36(8), 2344-2350.
- Boubakri, N., Cosset, J. C., & Guedhami, O. (2005) “Economic reforms, corporate governance and privatization: Evidence from developing countries.” *Journal of Corporate Finance*, 11, 767-790
- Boubakri, N., Guedhami, O., Mishra, D., & Saffar, W., (2012) “Political connections and the cost of equity capital”, *Journal of Corporate Finance*, 18, 541-559.
- Boubakri, N., Cosset, J., & Saffar, W. (2012) “The impact of political connections on firms’ operating performance and financing decisions”. *Journal of Financial Research*, 35(3), 397–423.
- Boubakri, N., & Saffar, W., (2019) « State Ownership and Debt Choice: Evidence from Privatization », *Journal of Financial and Quantitative Analysis*, 54(3), 1313-1346.
- Booth, L., Aivazian, V., Demirguc-kunt, A. & Maksimovic, V., (2001) “Capital structures in developing countries”. *The journal of finance*, 56(1), 87-130.
- Braham, R., Belkacem L., de Peretti, C., (2019) "Do political connections affect banks' leverage? Evidence from some Middle Eastern and North African countries", *Journal of Management and Governance*, 23, 989–1006.
- Braun, M., & Raddatz, C. (2010) “Banking on politics: When former high-ranking politicians become bank directors”, *The World Bank Economic Review*, 24(2), 234-279.
- Carretta, A., Farina, V., Gon, A., & Parisi, A. (2012) “Politicians on board: Do political connections affect banking activities in Italy?” *European Management Review*, 9(2), 75-83.
- Chahal, R. J. K., & Ahmad, W., (2020) « Political connections, investment inefficiency, and the Indian banking crisis ». *The Quarterly Review of Economics and Finance*, <https://doi.org/10.1016/j.qref.2020.10.016>.

- Chaney, P., Faccio, M., & Parsley, D., (2011) “The quality of accounting information in politically connected firms”. *Journal of Accounting and Economics*, 51 (1-2), 58-76.
- Chkir, I., Gallali, M. I., & Toukabri, M., (2020) « Political connections and corporate debt: Evidence from two U.S. election campaigns ». *The Quarterly Review of Economics and Finance*, 75, 229-239.
- Claessens, S., Feijen, L., & Schmukler, L. (2008) “Political connections and preferential access to finance: The role of campaign contributions.” *Journal of Financial Economics*, 88(3), 554-580.
- de Peretti, C., Siani, C., & Cerrato, M. (2009) “An artificial neural network based heterogeneous panel unit root test in case of cross sectional independence”, *International Joint Conference on Neural Networks 2009*, 2487-2493.
- Disli, M., Schoors, K., & Meir, J., (2013) “Political connections and depositor discipline.”, *Journal of Financial Stability*, 9(4), 804-819.
- Ding, S., Jia, C., Wu, Z., Zhang X., (2014) «Executive political connections and firm performance: Comparative evidence from privately-controlled and state-owned enterprises », *International Review of Financial Analysis*, 36, 153-167.
- Dong, Y., Meng, C., Firth, M., & Hou, W., (2014) «Ownership structure and risk-taking: Comparative evidence from private and state-controlled banks in China, *International Review of Financial*, 36, 120-130.
- Dong, Y., Liu, *Markets Finance and Trade*, 50(3), 102-125.
- Ebrahim, M.S., Girma, S., Shah, M.E., & Williams, J., (2014) “Dynamic capital structure and political patronage Z., Shen, Z. & Sun, Q. (2010) “Political patronage and capital structure in China.” *Emerging: The case of Malaysia*”. *International Review of Financial Analysis*, 31, 117-128.
- Esfahani, H. S., (1994) “Lessons from the political economy of privatization and public sector reform in the Middle East and Southeast Asia”. *The Quarterly Review of Economics and Finance*, 34, 301-331.
- Faccio, M. (2010) “Differences between politically connected and non-connected firms: A cross country analysis.” *Journal of Financial Management*, 39(3), 905-927.
- Fan, J.P.H., Wong, T.J., & Zhang, T. (2007) “Politically connected CEOs, corporate governance, and post-IPO performance of China's newly partially privatized firms”. *Journal of Financial Economics*, 84(2), 330-357.

- Feng L., Fu, T., & Kutan, Ali M., (2019) “Can government intervention be both a curse and a blessing? Evidence from China's finance sector”. *International Review of Financial Analysis*, 61, 71-81.
- Fisman, R., (2001) “Estimating the value of political connections”. *American Economic Review*, 91(4), 1095-1102.
- Frank, Murray Z., & Vidhan K. Goyal (2009) “Capital structure decisions: Which factors are reliably important?” *Financial Management*, 38, 1–37.
- Fraser, D. R., Zhang, H., & Derashid, C. (2006) “Capital structure and political patronage: The case of Malaysia.” *Journal of Banking and Finance*, 30(4), 1291-1308.
- Gomez, E.T., & Jomo, K.S. (1997) “*Malaysia's political economy: Politics, patronage and profits*”. Cambridge: Cambridge University Press.
- Gropp, R., & Heider, F., (2010) “The determinants of bank capital structure”. *Review of Finance*, 14, 587-622.
- Harymawan, I., & Nowland, J., (2016) "Political connections and earnings quality: how do connected firms respond to changes in political stability and government effectiveness?" *International Journal of Accounting & Information Management*, 24(4), 339-356.
- Hausman, J. A., (1978) “Specifications tests in econometrics”, *Econometrica*, 46(6), 1251-1271.
- Johnson, S., & Mitton, T. (2003) “Cronyism and capital controls: Evidence from Malaysia”. *Journal of Financial Economics*, 67(2), 351-382.
- Khwaja, A. I., & Mian, A., (2005) “Do lenders favour politically connected firms? Rent provision in an emerging financial market”. *Quarterly Journal of Economics*, 120(4), 1371-1411.
- Lemmon, M.L., Roberts, M.R., & Zender, J.F., (2008) “Back to the Beginning: Persistence and the CrossSection of Corporate Capital Structure”. *Journal of Finance*, 63, 1575-1608.
- Leuz, C., & Oberholzer-Gee, F., (2006) “Political relationships, global financing and corporate transparency: Evidence from Indonesia.” *Journal of Financial Economics*, 81(2), 411-439.
- Lim, T.C., Chai, R., Zhao, D., & Lim, X.Y., (2012). “Capital structure and political patronage: Evidence from China”. *American Journal of Business and Management*, 1(4), 177-182.
- Margaritis, D., & Psillaki, M., (2007) “Capital Structure and Firm Efficiency” *Journal of Business Finance & Accounting*, 34(9) & (10), 1447–1469.

- Micco, A., Panizza, U., & Yañez, M. (2007) “Bank ownership and performance: Does politics matter?” *Journal of Banking and Finance*, 31(1), 219-241.
- Mohieldin M., & Nasr S., (2007) “On bank privatization: The case of Egypt”, *The Quarterly Review of Economics and Finance*, 46, 707–725.
- Nuroglu, E. (2014) “Estimating and forecasting trade flows by panel data analysis and neural networks”. *İktisat Fakültesi Mecmuası*, 64, 85-112.
- Nys, E., Tarazi, A., & Trinugroho, I., (2015) “Political connections, bank deposits and formal deposit insurance”, *Journal of Financial Stability*, 19, 83-104.
- Öztekin, Ö., (2013) “Capital Structure Decisions Around the World: Which Factors are Reliably Important?” *Journal of Financial and Quantitative Analysis*, 50(3), 301–323.
- Saeed, A., Belghitar, Y. & Clark, E. (2015). “Political Connections and Leverage: Firm-level Evidence from Pakistan.” *Managerial and decision economics*, 36 (6), 364-383.
- Shen, C-H., & Lin, C-Y., (2015) “Betting on presidential elections: Should we buy stocks connected with the winning party?”. *The Quarterly Review of Economics and Finance*, 56, 98-109.
- Sorayaei, A., Atf, Z., & Gholami M., (2016) “Prediction stock price using artificial neural network (Case study: chemical industry firms accepted in Tehran stock exchange)”. *Bulletin de la Société Royale des Sciences*, 85, 991 – 998.
- Ullah, B. (2020) « Financial constraints, corruption, and SME growth in transition economies ». *The Quarterly Review of Economics and Finance*, 75, 120-132.
- Wang, Y., Yao, C., & Kang, D., (2019) “Political connections and firm performance: Evidence from government officials' site visits”. *Pacific-Basin Finance Journal*, 57, 101021.
- Wisniewski, T. P., (2016) «Is there a link between politics and stock returns? A literature survey », *International Review of Financial Analysis*, 47, 15–23.