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Banking performance and industry growth in an oil-rich economy: Evidence from Qatar

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ABSTRACT

This article investigates whether bank performance measures of competition, efficiency, profitability and stability are contributory to industry growth for oil-rich countries. Qatar is chosen as a case study. The real growth of value added for the 42 non-oil sub-sector industries is regressed on the banking performance, together with the quantity-based indicators by taking account of the degree of external finance-dependence over the economically stable period 2000–2006. The results, which survive robustness and sensitivity tests, reveal that a competitive, efficient and stable banking system is indeed a source of enhancing financially-dependent industries to grow faster. Our empirical results serve to provide a useful insight for policy strategies of oil-exporting countries.

1. Introduction

In this paper, we examine the effect of bank performance[2] on industry growth in the non-oil industry sectors for Qatar over the sample period 2000–2006 based on the panel linear model.[3] We regress the growth of 42 non-oil industry sub-sectors (out of 17 industries) on the performance of 11 banks in Qatar. Following the methodology of Rajan and Zingales (1998), we take into account the degree of external-finance dependence. Rajan and Zingales (1998) argue that, when a firm faces an investment opportunity, it typically relies on two important resources: one is the internal cash flow generated within the firm, and the other is the external sources of finance. If the sector has to rely heavily on the latter, then the development of financial intermediaries or financial markets would considerably affect their growth performance. For example, development in finance promotes accounting information and disclosure rules, and improves corporate governance, hence the cost of access to external sources will be reduced. In such a scenario, those firms which are technologically more dependent on external finance, would disproportionately benefit from financial development.[4]

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[2] In this paper, the term 'bank performance' refers to quality-based measures, including competition, efficiency, stability and profitability. This is distinguished from quantity-based indicators.

[3] Since the industry-level data for Qatar are only available for 2000–2006, the sample period for the empirical analysis is restricted. For example, there are only 27 industry observations during the financial crisis period 2008–2010, and even with firm-level data as an alternative to the industry-level data, there are not enough observations to conduct estimation beyond 2006.

[4] It has an important implication on the overall rate of growth in a country (Pang and Wu, 2009). Suppose a country has two types of industries of low (I_L) and high (I_M) reliance on external sources of finance, respectively. If both industries face an unexpected growth opportunity, banking performance has little impact on less externally dependent industries, since I_L can respond quickly to such an opportunity by using internal funds. Bank performance would, however, play an important role for industries that are more reliant on external finance. If high performance in the banking sector means more and/or qualitative funds for borrowers (for example, an efficient, competitive and healthy banking may have these characteristics), then one would expect the growth rate to be higher in a country with high banking performance.

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We consider four indicators of banking performance, namely, competition, efficiency, profitability and stability. Competition and efficiency in the banking sector are important for social welfare, since they are associated with low prices, high quality and the promotion of business innovation. Bank competition can enhance the accessibility of banking services to small and medium-sized businesses at an affordable cost.[5] Several empirical studies find that banking competition improves overall economic performance (Cetorelli & Strahan, 2006; Claessens & Laeven, 2005; Liu & Mirzaei, 2013; Maudos & Fernandez de Guevara, 2006). Bank efficiency seems to capture the allocative function of banks, in that the ability to use the available technology and to optimally combine the inputs into the production process can be considered a necessary condition for the effective allocation of resources. There is also broad consensus in the literature that a healthy banking system contributes to an efficient allocation of real economic resources, and an efficient management of wealth and capital accumulation. Profitability and stability are crucial indicators of banking system health. A stable and profitable banking sector is better able to withstand negative shocks and to contribute to the stability of the financial system as a whole.

The contribution of this paper is largely two-fold. It is argued that improvement in banking performance would have a more pronounced economic effect in the bank-based economies. If this is the case, non-trivial impact would be felt by firms in oil-rich countries. Firms in the oil-rich Arab countries traditionally rely almost solely on bank loans as a source of finance, as the regional bond markets are still largely underdeveloped. Rocha, Farazi, Khouri, and Pearce (2011), for example, argue that banks still play an important role in financing small and medium enterprises (SMEs) in the Middle East and North Africa (MENA) region. Banks in this region regard the SME segment as potentially profitable, and are, to some degree, engaged in SME lending. Rocha et al. also point out that financial services that are dominantly executed by commercial and Islamic banks constitute a major segment of market capitalization in the region. However, to the best of our knowledge, there is no study conducted for oil-rich economies in gauging the extent to which bank performance could affect economic growth. Thus, the analysis of banking sectors in these countries is one of the contributions to the literature.

Secondly, it is related to the specific features of the oil-rich countries. Theory makes ambiguous predictions about the finance-growth relationship in resource-based economies (Aghion, Bacchetta, Ranciere, & Rogoff, 2009). One argument is that the financial system might be less important as growth depends less on finance-intensive sectors, whereas the other theory suggests that financial-system development might be more important to compensate for the negative effects of 'Dutch disease' and also to diversify the economy.[6] In the case of the MENA region, the latter argument is supported. The oil-rich Arab states are strongly dependent on the hydrocarbon sectors (Ayadi & Pieter de Groen, 2013), and they have a long-term policy objective to diversify their economic activities with a view to reducing their dependency on natural resources that may be depleted in the future. Having a competitive, efficient and sound banking sector may thus have a pivotal role in this strategy of economic diversification. Infrastructure and non-oil industrial sectors are the core of the diversification. It is expected that those industries that are more dependent on external funds will benefit disproportionately if the performance of the banking sector is of a good quality in this region.[7] In this respect, this paper may be contributory to policy makers by providing policy implications.

Qatar provides a good case study for examining the relationship between bank performance and industry growth in the MENA region. During the period of 2001–2010 the country's GDP growth increased significantly reaching around 17 percent in 2010 which is well above other countries. Although Qatar is an oil-rich economy, the non-oil and gas sector still plays an important role in the country's economic growth, accounting for around 38 percent of the overall GDP in 2008. The manufacturing sector grew by 32 percent over the period of 2006–2008, and among others, refining, chemical, fertilizers, and steel are the major sub-sectors of the manufacturing sector. A large infrastructure spending programme that would boost demand for cement, steel and other materials highlights the important role of the manufacturing sector in this country, potentially increasing the share of GDP. Given the fact that growth in some manufacturing sectors in Qatar has relied heavily on external finance, and firms have to relay the bulk of finance from banks due to a less developed capital market, the role of the banking sector is of vital importance. In practical terms, Qatar is one of the rare countries in the region that reports its industry data during 2000–2006 through the United Nations Industrial Development Organization (UNIDO) database, making it possible to conduct the study. Al-Hassan, Khamis, and Oulidi (2010) show that financial markets in the region exhibit a number of common structural characteristics. For example, the banking sector is relatively concentrated with a few domestic players dominating the market. Over the past two decades oil-rich Arab countries have taken important steps to achieve economic and financial integration. Espinoza, Prasad, and Williams (2010) show a regional financial integration following such policies. The economic structure of these countries is also similar, exhibiting convergence on many macroeconomic indicators, and they are likely to face common shocks. Thus, studying the impact of bank performance on Qatari industry growth could be generalised to other oil-rich countries, where the data are too sparse to conduct a detailed analysis. Understanding the impact of bank performance on industry growth will assist policy makers in setting policies that facilitate access to external finance for their manufacturing sectors.

Empirical evidence reveals that, while the quantity of finance does not matter for industry growth, a competitive and efficient banking system allows financially dependent industries to grow faster. For example, when we measure the economic relevance of banking-system competition for industry growth, it is found that industry growth increases by 10% p.a., if we move from the 75th percentile market power to the 25th percentile level among Qatari banks. Similarly, the total impact on growth is raised by 10% p.a. if we move from the 75th percentile of bank inefficiency to 25th percentile level. The stability of the banking system is also found to be an essential component for industry growth. These results remain after robustness and sensitivity tests.

The remainder of this paper is organised as follows. Section 2 presents a literature review of the finance-growth relationship. Section 3 contains the model specification used for hypothesis testing. The description of data is also presented in this section. The empirical results are reported in Section 4 with some robustness tests. Section 5 is for conclusions.

[5] It is, however, argued that severe competition may deteriorate bank market power which may, in turn, deter lending relationships with borrowers, increasing financial obstacles.

[6] Beck (2011) shows that financial development is as important for economic growth in resource-based economies as in other countries. Resource-based economies have less developed financial systems, and there is, in general, a credit constraint amongst firms due to poor provision of bank loans.

[7] For example, Hasanov and Huseynov (2013) examine the impact of bank credits on non-oil economic growth in Azerbaijan. They find that bank credits have a positive impact on non-oil tradable sectors' output.

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2. Literature review

The study of the relationship between financial markets and economic growth can be traced back to Schumpeter (1911). Following Schumpeter, the empirical studies by McKinnon (1973) and Shaw (1973) emerged to contribute to research on the financial development – growth nexus. Recently, substantial theoretical and empirical works on the positive relationship between development in finance and economic growth can be found (for example, King & Levine, 1993 and Boyd & Smith, 1996). Such economists have stressed the role of financial development in terms of mobilising savings, improving risk-taking, producing ex-ante information on investment opportunities and capital allocation, easing the exchange of goods and services, and boosting technological innovation that are all essential catalysts for economic growth. Greenwood and Boyan (1990), for instance, developed a model in which financial intermediaries have a better ability to identify productive projects than individual investors. The financial intermediaries also improve the efficiency of capital allocation, and further allow a higher rate of return on capital to be earned. The conclusion of the aforementioned studies is that future economic growth is strongly related to development in finance (see also Demirguc-Kunt & Maksimovic, 1998 and Levine & Zervos, 1998).

Given an expected positive relationship between financial development and economic growth, scholars have made attempts to identify specific characteristics of finance that impact on non-financial firms. Among others, the adequate performance of banks is very important for their private and business customers. The operational efficiency and the degree of competition in markets determine the price and quality of financial products. Beck, Ross, and Norman (2000) state that banking finance is closely associated with economic development due to the externalities of bank performance to non-financial industries. In existing literature, there is substantial evidence of a positive effect of banking sector development on the long-run output growth of an economy. The common measures of banking development are, however, the quantity-based measures such as the size of banking systems, the amount of credit allocated for productive use or liquid liabilities (King & Levine, 1993). These quantity-based indicators have been used extensively by many empirical studies (e.g. Alan Gelb, 1989; Cetorelli & Gamberra, 2001; Easterly, 1993; Gertler & Rose, 1991; King & Levine, 1993; Roubini & Sala-i-Martin, 1992) usually in cross-country studies. However, recent findings show weak evidence of a finance-growth nexus. For instance, Rousseau and Wachtel (2011) find that the financial crisis dampens the finance-growth relationship, suggesting that quantity effects alone may be insufficient to incite growth. It is argued that excessive financial deepening or a rapid growth of credit may have led to weakened banking systems, which may have given rise to growth-inhibiting financial crises. Hence, in literature the emphasis has been moving towards the quality side of the banking sector, when we analyse the relationship between banking performance and growth. For instance, Jayaratne and Strahan (1996) and Cetorelli and Gamberra (2001) analysed the effects of banking structure on firms' growth, Levine (1999) examined the role of the quality of legal protection for creditors on economic growth, and La Porta, Florencio, and Andrei (2002) studied the role of state ownership in the banking sector.

Some studies have focused on one dimension of banking sector performance, which is bank market structure and competition, in a cross-country study. From an empirical perspective, there emerge some contradictions about the role of bank competition in stimulating the growth of an economy. More market power (less competition) may relax external-financing constraints on firms, as banks have more incentive to finance firms with a strong lending relationship, facilitating the availability of credit (Dell'Ariccia & Marquez, 2004; Petersen & Rajan, 1995). Boot (2000), for instance, argues that in an uncompetitive banking system, firms have greater access to credit in the long-term.

The existence of market power in a market with perfect information implies that the price is set above the marginal cost. In this sense, the quantity of goods or services traded is less than that at the competitive equilibrium (where price is set to the marginal cost). Hence, banking markets with greater competition generate a lower price of credit and supply more loanable funds. However, the existence of asymmetric information between banks and their clients within the banking sector obstructs various exchanges that would have taken place. Boot (2000) emphasises that one way of mitigating asymmetries of information and acquiring soft and informal information by financial intermediaries, is to establish a *lending relationship* with borrowers. In this sense, banks are able to screen and monitor their clients more efficiently, making possible the supply of lendable funds for financially-dependent firms. Furthermore, some studies find that, although lending relationships with borrowers do not lower the cost of finance, they nevertheless relax the financial constraints and provide more access to finance (Petersen & Rajan, 1995). Degryse and Van Cayseele (2000) and Chakrabortt and Hu (2006) argue that a lending relationship helps clients to offer fewer assets as collateral. Petersen and Rajan (1995) show that firms in countries with competitive banking systems are subject to greater financial constraints for SEMs in USA, suggesting that a greater degree of concentration relaxes financial constraints for firms.

However, when banking systems are less competitive, borrowers are less inclined to use bank services due to higher borrowing costs. It is argued that services provided by uncompetitive systems can be more costly and of lower quality. Difficulties for firms in accessing bank finance can slow down their business development and so economic growth. For example, D'Auria, Foglia, and Reedtz (1999) assessed the cost of bank credit for firms in Italy by specifying the degree of competition (proxied by the Herfindahl-Hirschman index) into the model, and found that competition decreases the cost of finance. Berlin and Mester (1999) also find evidence that there is a negative association between competition and the cost of finance. Beck, Demirguc-Kunt, and Maksimovic (2004) find that greater concentration in banking sectors increases financial obstacles, in particular, adversely affecting smaller firms. Welfare theory also suggests that inefficiencies, arising from lack of competition, increase credit constraints on firms (Pagano, 1993).

With respect to bank efficiency, there is a theoretical aspect to suggest that efficiency in the banking sector has a non-trivial impact on the process of capital accumulation. The efficient banking sector contributes to the growth of non-financial firms through several channels, for instance, by selecting more profitable and less risky capital projects, and financing more working capital for existing projects. Moreover, the efficient banking sector is able to effectively monitor invested projects, to reduce the processing time of loan applications and to establish more lending relationships with borrowers. The cost of borrowing is lower among efficient banks than inefficient banks allowing non-financial firms to grow faster. Thus, efficiency in the banking sector could have a positive impact on industry growth. In Lucchetti, Papi, and Zazzaro (2001), using cost efficiency for Italian regions, they find that bank efficiency has, indeed, an independent effect on real growth. Hasan, Koetter, Lensink, and Meesters (2009) also find that cost efficiency associated with the banking sector has a positive effect on economic growth, using a sample of 100 countries over 1996–2005. Hasan, Koetter, & Wedow (2009b) argue that banks promote growth through three channels of quantity-based variables (e.g. credit), quality-based variables (e.g. efficient intermediates), and the interaction of both. Using data for 7000 banks in 11 European countries over the period 1996–2004, the impact of the quality of finance on regional growth is found to be almost three times as large as that of

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the quantity channel. Furthermore, Koetter and Wedow (2010) find that bank efficiency as a measure of quality finance has a positive influence on promoting growth.

A healthy banking sector also matters for industry growth (see e.g., Fernández, González, & Suárez, 2013; Kroszner, Laeven, & Klingebiel, 2007; Levintal, 2013). Banking system health may be measured by the degree of profitability and stability. There is a bi-directional causation between these two variables. For instance, a profitable banking sector is better able to fend off adverse shocks, contributing to stability, on the other hand, a stable bank is likely to reduce its non-performing assets maintaining profitability. It is recognised that financial markets, in general, and banking systems, specifically, have greater incentives to finance non-financial firms during a period of financial stability. Also, when banks are stable, more financially-dependent firms are willing to establish lending relationships with banks, enhancing their access to external finance. However, private sector growth slows down in response to credit crunches due to the fact that the amount of credit available for externally-dependent firms is likely to fall (see Demirguc-Kunt, Beck, & Maksimovic, 2004; Love, Preve, & Sarria-Allende, 2007; Rajan & Zingales, 1998). Moreover, firms have fewer incentives to enter into lending relationships with banks if they suspect that banks are unstable, or may be about to go bankrupt due to a banking crisis. These arguments suggest that if the performance of the banking sector can affect the real economy through their impact on the supply of bank loans (Pang & Wu, 2009), we should observe that both, stability and profitability contribute to industry growth.

The innovative nature of our study is that we investigate the effect of the quality of bank finance with several dimensions including market structure, efficiency, profitability and stability on industry growth. Moreover, the study on industry growth is rare, as the majority of these studies are concerned with aggregate economic growth.

3. Model specification and data description

3.1. Model specification

Our model is based on Rajan and Zingales (1998), who tested whether the sectors which rely more on external finance yield higher growth in economies with a higher level of financial development by specifying the interaction between an industry characteristic (in terms of external financial dependence) and a country characteristic (in terms of financial development). As noted by Maudos and Fernandez de Guevara (2006), this test allows us to examine whether ex-ante banking systems influence economic growth. It has been adopted in a number of ways to test the impact on industrial growth of banking system concentration (Cetorelli & Gamberra, 2001), the strength of property rights (Claessens & Laeven, 2003), the development of trade finance (Fisman & Love, 2004), the degree of competition or market power (Cetorelli, 2004; Claessens & Laeven, 2005) and banking regulation (Utrero-Gonzalez, 2007).

The model allows us to examine whether the sectors which demand more external finance grow faster in Qatar if the country's banking sector performs better. Our baseline model for estimation is as follows:

$$\begin{aligned} Growth_{i,t} &= \alpha_0 + \beta_1 Share\ in\ value\ added_{i,t-1} \\ &+ \beta_2 Fin.Dep._{\cdot i} * Finance\ Quantity_t \\ &+ \beta_3 Fin.Dep._{\cdot i} * Banking\ Performance_t \\ &+ \beta_4 Fin.Dep._{\cdot i} * real\ GDP\ growth_t + \emptyset_1 Industry\ dummy_i \\ &+ \varphi_1 Time\ dummy_t + \varepsilon_{i,t} \end{aligned} \quad (1)$$

where subscripts i and t refer to industry i at time t, respectively. *Growth* is the annual growth rate of value-added.[8] *Fin.Dep.* is the measure of dependence on external finance for industry i.[9] Since sectors with large initial shares in the industry usually grow at a slower rate, we introduce a one-year lag of sector share in value-added (*Share in value added*) in order to capture the possible "convergence" effect at a sectoral level. We predict that sectors, which have grown considerably in their life cycle in the past, are unlikely to continue to grow at a higher rate in the future (Cetorelli & Gamberra, 2001; Cetorelli, 2004; Rajan & Zingales, 1998); hence a negative β_1 is expected.[10]

We use three indicators of *Finance Quantity*, including credit provided by banking sector, total credit to private sector (including that granted by the government),[11] and market capitalization of listed companies. It is expected that an effective measure of *Banking Performance* shall contain information that can affect users of bank services. The first set of measures is related to banking competition, and the second set is those related to bank efficiency. The third set is to capture bank profitability, and as the fourth, bank stability is considered. See Section 3.2 below for the detail of the measures of *Banking Performance*. As a control variable the *real GDP growth* is specified.[12]

The fixed effects ($Industry_i$ and $Time_t$) control any unobserved industry- and year-specific heterogeneity, and ε is the error term with normal distribution.

3.2. Data description

Bank-level data collected from BankScope are computed to estimate bank performance (competition, efficiency, profitability and stability). Data includes those of commercial and Islamic banks. In order to avoid double-counting, the consolidated statements are used where they are available. There are 11 banks (7 commercial banks and 4 Islamic banks). Table A1 in Appendix shows the name, type and size of these banks.

For indicators of bank competition, two proxies of bank concentration are computed, i.e. 5-firm concentration ratio (CR5) and Herfindahl-Hirschman (HH) index. CR5 is the share of assets of five largest banks as a share of total banking assets. HH index is the summation of the country's square of market share: If MS_i represents the market shares by firm i and N is the number of firms in the market then $HH\ index = \sum_{i=1}^{N}(MS_i)^2$. One indicator of new industrial organisation, so-called, the Lerner index is also derived. The advantage of the Lerner index over other competitive indicators (e.g. the H-statistics) is that it can be applied at the bank level allowing us to assess the evaluation of market power over time. It is the mark-up of price over marginal cost where marginal cost is estimated on the basis of a translog cost function with total assets

[8] We also used output growth as an alternative indicator for value-added growth. The results are similar to those of value-added growth.

[9] In terms of empirical application, one advantage of interacting external financial-dependence with our variables of interest (e.g. banking performance) is to mitigate the usual reverse causality problem between economic growth and financial development.

[10] Guiso, Jappelli, Padula, and Pagano (2004) argue that the specification of the initial share in total value-added avoids the bias derived from the possible correlation between financial development and sector specialisation, since financial development can affect both the growth of a sector and the pattern of specialisation.

[11] The distinction between credit provided by the banking sector and total credit is relevant to the less developed countries, where intervention by the government in the financing of the economy is significant. Note that in estimation the share of credit to GDP is used.

[12] In literature several other factors are found to be important for the relationship between banks and manufacturing sectors such as property rights, ownership structure (La Porta et al., 2002), and enforceability of financial contracts (Levine, 1999). However, the data for these variables are either not available or static over the sample time.

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being bank output and price of funds, labour and capital being three bank inputs.[13] The lower indicators imply a higher degree of bank competition.

For bank efficiency, three accounting indicators of cost-to-income ratio, overhead costs to total assets, and interest rate spread are applied. The cost-to-income ratio is the ratio between operating expenses and operating income, which is a measure of how costs are changing compared to income, and is thus one of the main key-performance indicators of a bank's efficiency. Overhead costs to total assets are operating expenses of a bank as a share of the value of all assets held. The interest-rate spread is defined by the lending rate (as the total interest income over total loans) minus the deposit rate (as the total interest expenses over total deposits and short-term funds). The lower these three ratios are, the more efficient is the banking system.

We select three indicators for bank profitability: return on average assets (ROAA), return on average equity (ROAE), and net interest margin (NIM). ROAA is net profits before tax as a percentage of average total assets of a bank. ROAE is net profits before tax as a percentage of the average equity of a bank. NIM is the accounting value of a bank's net interest revenue as a share of its average interest-bearing (total earning) assets. The higher values of these three ratios indicate that banks are more profitable.

In order to take account of bank stability, the *Z*-score, the Sharpe ratio and non-performing loans to total loans are employed. The *Z*-score is the inverse measure of the likelihood of bank insolvency, defined as ROAA plus the capital asset ratio (CAR) divided by the standard deviation of ROAA in bank i at time t: $Z\text{-}score_{i,t} = (ROAA_{i,t} + CAR_{i,t})/\sigma(ROAA_{i,t})$. The Sharp ratio is the risk-adjusted returns on equity that is given by the mean value of ROAE divided by the standard deviation of ROAE in bank i at time t: $Sharp\ ratio_{i,t} = ROAE_{i,t}/\sigma(ROAE_{i,t})$. To obtain time-varying measures of bank stability (*Z*-score and *Sharp ratio*) we calculate $\sigma(ROAA)$ and $\sigma(ROAE)$ based on a three-year rolling window. See e.g. Laeven and Levine (2009), Demirguc-Kunt and Huizinga (2010) and Mirzaei, Moore, and Liu (2013) for the use of these variables. The ratio of non-performing loans to total loans is utilised as the bank's credit risk. The higher the *Z*-score and Sharpe ratio, the greater is the bank stability, whereas the higher the non-performing loans, the lower the bank's stability.

We use the average values of the bank performance variables across the 11 Qatari banks to construct aggregated country-level information over time.

Data on the value-added for each industry are retrieved from the Industrial Statistics Database (INDSTAT4 2008) that is collected by the United Nations Industrial Development Organization (UNIDO). Value-added equals the difference between an industry's gross output and the cost of its intermediate inputs. In the case of Qatar, there are 42 sub-sector industries that report data for the period 2000–2006. The external finance-dependence data for each industry are based on the U.S. dataset as a benchmark, which is computed by Klapper, Laeven, and Rajan (2006) using a sample of U.S. companies over the period 1990–1999.

An important assumption underlying the degree of external financial dependence from Rajan and Zingales (1998) is that external dependence reflects technological characteristics of the industry that are relatively stable across space and time. Furthermore, external dependence is more closely associated with a firm's long-run rather than short-run dependence on external funds (Fernández, González, & Suárez, 2013). Capital markets in the United States are among the most advanced in the world, and large publicly traded firms typically face the least friction in accessing finance. This suggests a valid and exogenous way of identifying the extent of an industry's external dependence elsewhere in the world. Thus, the degree of U.S. firms' dependence on external finance is a good proxy for the demand for external funds in other countries (Rajan & Zingales, 1998). See Levintal (2013), Maskus, Neumann, and Seidel (2012) and Hsu, Tian, and Xu (2014), among others. For example, Maskus et al. (2012) use external financial-dependence of Klapper et al. (2006) to examine the impact of financial development on R&D for 22 manufacturing industries in 18 OECD countries for the period 1990–2003.

External finance-dependence is defined as capital expenditures minus cash-flow from operations divided by capital expenditures. We have used UNIDO data with a two-digit level by the classification of ISIC Rev.3. As a robustness test, we use the external financial-dependence data of two-digit SIC industries obtained from Hsu et al. (2014), completed over the period 1976–2006 covering the sample period in this study.

Data for *Finance quantity* as well as *real GDP growth* are collected from the World Bank dataset. Table A2 in the Appendix summarises the variables, their definitions, and sources, and Table A3 shows the averages of these variables.

Table 1 shows the composition of industries in Qatar, where Panel A indicates the average value-added growth and the average firm size for each industry sector. As can be seen, whilst the average growth is 70 percent, the chemicals (ISIC 24), non-metallic mineral (ISIC 26) and motor vehicle (ISIC 34) sectors have grown at a much faster rate during the period. 'Coke, refined petroleum sector' (ISIC 23) has the largest average size of firms. Panel B is for the average industry growth (measured either in terms of value-added or output) each year, where a dramatic increase is observed in 2004.

4. Empirical results

In this section, we present the estimation result based on estimate Eq. (1), where the dependent variable is the real growth-rate of value-added. Our identification strategy is to use a panel-based fixed-effects approach using dummy variables for industries and years, which embrace the specific economic mechanisms through which banking performance affects industry growth. The Hausman

[13] The Lerner index is computed as $Lerne_{it} = P_{it} - MC_{it}/P_{it}$ where P_{it} is the price of the output of bank i at year t, and MC_{it} is the marginal cost. Following Anginer, Demirguc-Kunt, and Zhu (2014) and Mirzaei and Moore (2014), among others, the marginal cost is estimated on the basis of the following translog cost function:

$$\ln(TC_{it}) = \alpha_0 + \alpha_1 \times \ln Q_{it} + \frac{1}{2} \times \alpha_2 \times (\ln Q_{it})^2 + \sum_{j=1}^{3} \beta_j \times \ln w_{j,it} + \frac{1}{2} \sum_{j=1}^{3} \sum_{k=1}^{3} \beta_{jk} \times \ln w_{j,it} \times \ln w_{k,it} + \sum_{j=1}^{3} \gamma_j \times \ln Q \times \ln w_{j,it} + \Phi \times year\ Dummies + \Omega \times Bank\ Specialization\ Dummies + \varepsilon_{it}$$

where TC_{it} is the total cost (i.e. the sum of personnel expenses, other administrative expenses, and other operating expenses) of bank i at time t. Following prior studies (e.g. Anginer et al., 2014, among others), we choose one output: total assets (Q), and three input prices: cost of deposits (W_1) computed by dividing financial costs (interest paid) by their corresponding liabilities, cost of labour (W_2) calculated by dividing personnel costs by total assets, and cost of physical capital (W_3) calculated as the ratio between expenditures on plant and equipment (other non-interest expenses) and the book value of physical capital (fixed assets). Since we have two bank specialisations of commercial and Islamic banks, we use bank dummies to capture the effect of each type of bank. Furthermore, to account for changes in technology over time, we include *Year dummies*. We apply the restrictions of standard symmetry and homogeneity of degree one in prices to the translog functional form. We then use the coefficients of above cost function to estimate the marginal cost for bank i at year t: $MC_{it} = \frac{\partial TC_{it}}{\partial Q_{it}} = \frac{TC_{it}}{Q_{it}} \left[\widehat{\alpha}_1 + \widehat{\alpha}_2 \times \ln Q_{it} + \sum_{j=1}^{3} \widehat{\gamma}_j \times Lnw_{j,it}\right]$.

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Table 1
Composition of industry growth in Qatar.

Panel A: Industry sectors and growth over 2001–2006

ISIC	Sector	# of sub sectors	Value added growth	Average firm size by value added	Average firm size by employment	External financial dependence
15	Food and beverages	8	0.33	12.89	3.03	0.181
17	Textiles	1	0.19	11.09	1.52	0.262
18	Wearing apparel, fur	1	−0.06	10.86	2.18	0.174
19	Leather, leather pro. and footwear	2	0.28	11.64	3.96	0.098
20	Wood products (excl. furniture)	3	0.80	12.72	3.30	0.156
21	Paper and paper products	2	0.72	13.46	3.70	0.123
23	Coke, refined petroleum products	1	0.47	19.46	6.57	−0.044
24	Chemicals and chemical products	6	1.20	15.19	4.32	0.791
25	Rubber and plastics products	1	0.31	13.16	3.15	0.300
26	Non-metallic mineral products	5	2.29	13.62	3.90	−0.121
27	Basic metals	3	0.86	15.01	3.81	0.147
29	Machinery and equipment n.e.c.	1	0.82	13.00	3.25	0.076
31	Electrical machinery and apparatus	1	0.15	14.27	3.41	0.137
34	Motor vehicles, trailers, semi-trai.	2	2.04	12.53	3.36	0.394
35	Other transport equipment	2	0.29	11.30	1.02	0.124
36	Furniture; manufacturing n.e.c.	2	0.22	11.64	1.99	0.376
37	Recycling	1	0.94	13.32	3.34	1.058
All		**42**	0.70	13.24	3.28	0.181

Panel B: Industry growth by year

Year	Value added	Output
2001	0.06	0.03
2002	0.22	0.12
2003	0.09	0.07
2004	5.01	5.21
2005	0.48	0.21
2006	0.10	0.12

Note: The figures for industry growth (value added) and firm size (natural log of either value added to establishments or employment to establishments) are computed as simple averages for each sector over 2000–2006. Financial dependence is the external financial dependence of each sector taken from Klapper et al. (2006).

Table 2
Financial development and industry growth in Qatar.

	(1)	(2)	(3)	(4)	(5)	(6)
Share in value added ($t-1$)	−2.174***	−2.178***	−2.722***	−2.723***	−2.714***	−2.716***
	(−4.53)	(−4.52)	(−4.54)	(−4.52)	(−4.53)	(−4.52)
Quantity of finance						
Credit prov. by banking*Fin. Dep.	0.146*	0.140*				
	(1.73)	(1.70)				
Credit to private sector*Fin. Dep.			0.111*	0.103		
			(1.69)	(1.54)		
Market capitalization*Fin. Dep.					0.014	0.015
					(0.22)	(0.20)
Control variable						
GDP growth*Fin. Dep.		0.031		0.014		0.010
		(0.15)		(0.17)		(0.11)
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Hausman test (*p-value*)	0.00	0.00	0.00	0.00	0.00	0.00
Number of industries	42	42	42	42	42	42
Observations	214	214	214	214	214	214
Adj. *R*-squared	0.265	0.260	0.177	0.172	0.177	0.172

Notes: Dependent variable is the real yearly growth in sectoral value added over 2000–2006. *Fin.Dep.* is the external financial dependence of each sector taken from Klapper et al. (2006). Definitions of all variables are listed in Appendix Table A2. Regressions are estimated using industry and year fixed effects. The Hausman specification test compares the fixed versus random effects under the null hypothesis that the individual effects are uncorrelated with the other regressors in the model. Robust *t*-values are in parentheses. * Significant at 10%, ** Significant at 5% and *** Significant at 1%.

test presented in all estimation tables (from Tables 2–5) rejects the null, supporting the fixed-effect identification.[14]

We firstly specify only the indicators of quantity of finance on industry growth. Table 2 reports the empirical results. As predicted, the lag of an industry's market share has a negative sign in all

[14] Note that in order to distinguish between the pooled OLS and the industry fixed-effects, we tested the joint significance of the fixed-effects using the *F*-test. The null hypothesis where all fixed-effects are zero is rejected. It is also found that the time fixed-effects is significant by the *F*-test. These tests support the industry and year fixed-effects approach.

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Table 3
Bank performance and industry growth in Qatar.

	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Impact of bank competition						
Share in value added ($t-1$)	−2.183***	−2.444***	−2.256***	−2.449***	−2.714***	−2.719***
	(−3.91)	(−3.90)	(−4.21)	(−4.23)	(−4.53)	(−4.51)
Financial development						
Credit prov. by banking*Fin. Dep.		0.048		0.064		0.012
		(0.37)		(0.63)		(0.93)
Bank performance (Competition)						
5-firm concentration*Fin. Dep.	−0.062**	−0.056*				
	(−2.01)	(−1.85)				
HH index*Fin. Dep.			−0.013**	−0.014***		
			(−2.02)	(−2.57)		
Lerner index*Fin. Dep.					−0.522**	−0.621***
					(−1.93)	(−2.96)
Control variable						
GDP growth*Fin. Dep.		0.016		0.018		
		(0.47)		(0.88)		
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Hausman test (*p-value*)	0.00	0.00	0.00	0.00	0.00	0.00
Number of industries	42	42	42	42	42	42
Observations	214	214	214	214	214	214
Adj. *R*-squared	0.365	0.363	0.371	0.378	0.353	0.356
Panel B: Impact of bank efficiency						
Share in value added ($t-1$)	−2.720***	−2.723***	−2.715***	−2.724***	−2.714***	−2.723***
	(−4.54)	(−4.51)	(−4.53)	(−4.55)	(−4.53)	(−4.54)
Financial development						
Credit prov. by banking*Fin. Dep.		0.040		0.095		0.061
		(0.76)		(0.73)		(0.59)
Bank performance (Efficiency)						
Cost to income ratio*Fin. Dep.	−0.694**	−0.558***				
	(−3.01)	(−3.19)				
Overheads to total assets*Fin. Dep.			−0.244***	−0.287***		
			(−3.62)	(−4.18)		
Interest rate spread*Fin. Dep.					−0.197	−0.160
					(−1.05)	(−1.29)
Control variable						
GDP growth*Fin. Dep.		0.033		0.047		0.056
		(0.06)		(0.21)		(0.28)
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Hausman test (*p-value*)	0.00	0.00	0.00	0.00	0.00	0.00
Number of industries	42	42	42	42	42	42
Observations	214	214	214	214	214	214
Adj. *R*-squared	0.353	0.352	0.345	0.347	0.366	0.369
Panel C: Impact of bank profitability						
	(1)	(2)	(3)	(4)	(5)	(6)
Share in value added ($t-1$)	−2.720***	−2.726***	−2.719***	−2.720***	−2.725***	−2.725***
	(−4.53)	(−4.52)	(−4.53)	(−4.54)	(−4.54)	(−4.50)
Financial development						
Credit prov. by banking*Fin. Dep.		0.078		0.048		0.106
		(0.77)		(0.83)		(0.72)
Bank performance (Profitability)						
ROAA*Fin. Dep.	0.159	0.134				
	(0.18)	(0.21)				
ROAE*Fin. Dep.			0.041	0.037		
			(0.17)	(0.70)		
NIM*Fin. Dep.					−0.161	−0.197
					(−0.26)	(−0.57)
Control variable						
GDP growth*Fin. Dep.		0.054		0.045		0.042
		(0.83)		(0.57)		(0.76)
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Hausman test (*p-value*)	0.00	0.00	0.00	0.00	0.00	0.00
Number of industries	42	42	42	42	42	42
Observations	214	214	214	214	214	214
Adj. *R*-squared	0.359	0.356	0.351	0.349	0.348	0.344
Panel D: Impact of bank stability						
Share in value added ($t-1$)	−2.717***	−2.726***	−2.716***	−2.723***	−2.717***	−2.727***
	(−4.53)	(−4.55)	(−4.50)	(−4.53)	(−4.53)	(−4.50)

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Table 3 (*Continued*)

	(1)	(2)	(3)	(4)	(5)	(6)
Financial development						
Credit prov. by banking*Fin. Dep.		0.073		0.110		0.113
		(0.78)		(0.94)		(0.63)
Bank performance (Stability)						
Z-score*Fin. Dep.	0.199*	0.222**				
	(1.81)	(2.11)				
Sharp ratio*Fin. Dep.			0.159	0.195		
			(1.50)	(1.62)		
Non per. loans to total loans*Fin. Dep.				−0.029	−0.047	
					(−0.43)	(−0.53)
Control variable						
GDP growth*Fin. Dep.		0.079		0.059		0.044
		(0.75)		(0.88)		(0.69)
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Hausman test (*p-value*)	0.00	0.00	0.00	0.00	0.00	0.00
Number of industries	42	42	42	42	42	42
Observations	214	214	214	214	214	214
Adj. *R*-squared	0.353	0.350	0.354	0.351	0.345	0.348

Notes: Dependent variable is the real yearly growth in sectoral value added over 2000–2006. *Fin.Dep.* is the external financial dependence of each sector taken from Klapper et al. (2006). Definitions of all variables are listed in Appendix Table A2. Regressions are estimated using industry and year fixed effects. The Hausman specification test compares the fixed versus random effects under the null hypothesis that the individual effects are uncorrelated with the other regressors in the model. Robust *t*-values are in parentheses. * Significant at 10%, ** Significant at 5% and *** Significant at 1%.

Table 4
Sensitive and robustness tests.

	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Excluding high-growth industries						
Share in value added ($t-1$)	−1.831***	−1.830***	−1.840***	−1.816***	−1.822***	−1.824***
	(−8.34)	(−8.34)	(−8.46)	(−8.32)	(−8.30)	(−8.30)
Financial development						
Credit prov. by banking*Fin. Dep.	0.014	0.031	0.091	0.089	0.058	0.046
	(0.32)	(0.34)	(0.57)	(0.58)	(0.46)	(0.27)
Bank performance (Competition)						
5-firm concentration*Fin. Dep.	−0.092*					
	(−1.77)					
HH index*Fin. Dep.		−0.071*				
		(−1.75)				
Lerner index*Fin. Dep.			−0.319***			
			(−2.64)			
Bank performance (Efficiency)						
Cost to income ratio*Fin. Dep.				−0.513**		
				(−2.14)		
Overheads to total assets*Fin. Dep.					−0.121*	
					(−1.69)	
Bank performance (Stability)						
Z-score*Fin. Dep.						0.121**
						(1.99)
Panel B: Dummy 2004						
Share in value added ($t-1$)	−0.272***	−2.726***	−2.723***	−2.724***	−2.720***	−2.721***
	(−4.50)	(−4.49)	(−4.50)	(−4.39)	(−4.38)	(−4.37)
Financial development						
Credit prov. by banking*Fin. Dep.	0.015	0.024	0.014	0.067	0.029	0.080
	(0.81)	(0.46)	(0.31)	(0.76)	(0.34)	(0.59)
Bank performance (Competition)						
5-firm concentration*Fin. Dep.	−0.061*					
	(−1.79)					
HH index*Fin. Dep.		−0.068*				
		(−1.90)				
Lerner index*Fin. Dep.			−0.313			
			(−1.65)			
Bank performance (Efficiency)						
Cost to income ratio*Fin. Dep.				−0.589***		
				(−3.60)		
Overheads to total assets*Fin. Dep.					−0.106*	
					(−1.83)	
Bank performance (Stability)						
Z-score*Fin. Dep.						0.112**
						(2.01)

Notes: Dependent variable is the real yearly growth in sectoral value added over 2000–2006. *Fin.Dep.* is the external financial dependence of each sector taken from Klapper et al. (2006). Definitions of all variables are listed in Appendix Table A2. Regressions are estimated using industry and year fixed effects. Robust *t*-values are in parentheses. * Significant at 10%, ** Significant at 5% and *** Significant at 1%. In order to save space, other information is not reported, but is available from the authors upon request.

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Table 5
Robustness to alternative measure of external financial dependence.

	(1)	(2)	(3)	(4)	(5)	(6)
Share in value added ($t-1$)	−2.740***	−2.739***	−2.720***	−2.724***	−2.729***	−2.735***
	(−4.52)	(−4.37)	(−4.51)	(−4.50)	(−4.51)	(−4.52)
Financial development						
Credit prov. by banking*Fin. Dep.	0.042	0.089	0.063	0.029	0.041	0.059
	(0.26)	(0.33)	(0.82)	(0.15)	(0.33)	(0.48)
Bank performance (Competition)						
5-firm concentration*Fin. Dep.	−0.191**					
	(−1.99)					
HH index*Fin. Dep.		−0.014*				
		(−1.75)				
Lerner index*Fin. Dep.			−0.131			
			(−0.52)			
Bank performance (Efficiency)						
Cost to income ratio*Fin. Dep.				−0.240***		
				(−2.73)		
Overheads to total assets*Fin. Dep.					−0.341***	
					(−3.12)	
Bank performance (Stability)						
Z-score*Fin. Dep.						0.019**
						(2.12)
Control variable						
GDP growth*Fin. Dep.	0.084	0.043	0.044	0.099	0.084	0.050
	(0.74)	(0.38)	(0.35)	(0.79)	(0.48)	(0.44)
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Hausman test (*p-value*)	0.00	0.00	0.00	0.00	0.00	0.00
Number of industries	42	42	42	42	42	42
Observations	214	214	214	214	214	214
Adj. *R*-squared	0.354	0.353	0.355	0.354	0.353	0.356

Notes: Dependent variable is the real yearly growth in sectoral value added over 2000–2006. *Fin.Dep.* is the external financial dependence of each sector taken from Hsu et al. (2014). Definitions of all variables are listed in Appendix Table A2. Regressions are estimated using industry and year fixed effects. The Hausman specification test compares the fixed versus random effects under the null hypothesis that the individual effects are uncorrelated with the other regressors in the model. Robust *t*-values are in parentheses. * Significant at 10%, ** Significant at 5% and *** Significant at 1%.

regressions, suggesting a convergence trend in growth across industries. The impact of credit provided by the banking sector on industry growth is statistically significant, though only at the 10% level. The coefficients for other variables of the quantity-finance are insignificant. Note that *Credit to private sector* includes not only that released by banks, but also that granted by the central bank or government. The results imply that credit allocated by the state is unlikely to exert a positive impact on growth and this may be due to some sort of crowding-out effect operating in Qatar. The implication is that the allocative decision of banks, for the share of credit granted, may matter for industry growth, and quantity effects alone may be insufficient to boost growth in developing countries.

Table 3 shows the results of bank performance with Panel A, B, C and D showing the impact of bank competition, efficiency, profitability and stability on industry growth, respectively. In order to control for the possible effect through quantity finance, we retain the variable of credit provided by the banking sector that is found to be significant in Table 2.

The coefficients of bank concentration (5-firm concentration and HH index) and bank market-power (the Lerner index) interacted with financial-dependence are all negative and statistically significant in Panel A. This implies that the industrial sectors relying on greater external finance tend to develop faster if the country has a more competitive (or a less concentrated) banking sector. The result supports the study of Cetorelli and Gamberra (2001) who find a negative effect of banking concentration on economic growth, however it is contrasted with that of Liu, Mirzaei, and Vandoros (2014) who report a positive impact. In Panel B, it is observed that the impact of bank inefficiency measured by cost-to-income ratio and overheads-to-total assets on growth is negative. The interaction term indicates that this effect is strong for industrial sectors which rely more on external finance. The result supports the view that a more efficient banking sector promotes economic growth by offering lower priced and better quality products. Using cost efficiency for Italy, Lucchetti et al. (2001) also find that bank efficiency has a positive effect on real growth. See also Hasan et al. (2009b) and Koetter and Wedow (2010), who find a valid effect of bank efficiency on aggregate economic growth. Overall, these results suggest that banking competition and efficiency are likely to contribute to Qatar's economic growth.

To interpret the results we measure the economic relevance of banking-system competition for economic growth in Qatar. The effect of bank market-power (measured by the Lerner index) is not only statistically significant but also economically meaningful. For instance, based on the estimated coefficient for the Lerner index (regression (5) in Panel A), moving from the 75th percentile of market power (at 0.29) to 25th percentile (at 0.10) level increases industry growth by 0.19 multiplied by the size of the coefficient at 0.522, which is translated into an increase of industry growth by 10% p.a. Since average industry growth during the sample period is 91% p.a. (Table A3 in Appendix), 10% is economically significant. Similarly, the total impact on growth based on the estimated coefficient for the cost-to-income ratio (regression (1) in Panel B) is raised by 10% p.a. if we move from the 75th percentile of bank inefficiency (at 0.41) to 25th percentile (at 0.27) level.

Panel C and D in Table 3 present regression results for profitability and stability respectively. None of the profitability indicators are statistically significant, suggesting that a profitable banking sector does not seem to affect the growth of industrial sectors. This could be due to the fact that high profitability in banks in Qatar is the consequence of higher interest rates for lending in a concentrated banking market, and a higher cost of borrowing dampens industry

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growth. However, we observe that a stable banking sector contributes to the growth of financially dependent industries, when the stability is measured by the *Z*-score. A sound banking system, rather than a profitable one seems to be a component of industry growth in Qatar.

In all cases, the significant effect of the quantity finance variable (credit provided by banks) found in Table 2 has receded, when it is specified with the indicators of banking performance. The results indicate the dominance of the quality-effect in terms of industry growth, and are complementary to the recent evidence that a larger lending volume alone does not stimulate growth (Rousseau & Wachtel, 2011). One may wonder if the result is due to 'reverse causality', as Lucchetti et al. (2001) point out, that the growth of credit is more influenced by the economic activities of industry rather than the other way round.

To examine the possibility that variable behaviour in an individual industry alters the results, we re-estimate the equation by dropping industries with high growth that may potentially exert a large impact on behaviour. The excluded industries are those that grew by more than 100% during the sample period (see Panel A in Table 1). Furthermore, we re-estimated by taking a point dummy for the year 2004 when we observe a dramatic rise in value-added growth at 5.01 (see Panel B in Table 1). Table 4 shows the results. In both cases, almost all coefficients retain their statistical significance with the correct sign, and the initial findings are proved to be robust.

We extend the robustness test in Table 5 where we examine the validity of the use of external finance-dependence obtained from Klapper et al. (2006) by using an alternative dataset retrieved from Hsu et al. (2014). We specify the bank performance indicators that are found to be significant in the initial estimation results in Table 3, at least at the 10% level. The estimation result reveals that the indicators of 5-firm concentration and HH index remain to be negative and significant. This implies the adverse effects of bank concentration on industry growth. The inefficiency variables are consistently negative and highly significant at the 1% level, suggesting the credible effect of bank efficiency. The stability measured by the *Z*-score also remains to be one of the important sources of industry growth.

5. Conclusion

We have examined the effect of bank performance on industry growth over the sample period 2000–2006 for 42 Qatari industries. For the first time, the extent of the influence derived from bank performance was analysed for an oil-rich country. The empirical results support the view that competition, efficiency and stability in the banking sector offer a qualifying impact on the finance-growth relationship. The mere increase of credit allocation is unlikely to contribute to the growth of non-oil and gas industries. Policy implications are apparent: Promoting the ability of banks to provide financial products and services efficiently in a stabilised and less concentrated environment is warranted rather than merely expanding the quantity of credit.

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Appendix.

See Tables A1–A3.

Table A1
Number of banks, name of banks, type and size (based on last available year) of Qatari banks.

Row	Bank name	Type	Total assets (USD mil.)	%
1	Qatar National Bank	Commercial	100,784	47.11
2	Commercial Bank of Qatar (The) QSC	Commercial	21,988	10.28
3	Qatar Islamic Bank SAQ	Islamic	20,108	9.40
4	Masraf Al Rayan (Q.S.C.)	Islamic	16,931	7.91
5	Doha Bank	Commercial	15,168	7.09
6	Al Khalij Commercial Bank	Commercial	9251	4.32
7	International Bank of Qatar Q.S.C.	Commercial	8844	4.13
8	Qatar International Islamic Bank	Islamic	7846	3.67
9	Barwa Bank	Commercial	6940	3.24
10	Ahli Bank QSC	Commercial	5661	2.65
11	First Finance Company (Q.S.C.)	Islamic	436	0.20

Table A2
Definitions and sources of variables.

Variable	Definition and source
Dependent variables (industry performance)	
Industry growth	
Value added	Annual growth rate of value added in a particular sector. Source: UNIDO database, and own calculation.
Output	Annual growth rate of output in a particular sector. Source: UNIDO database, and own calculation.
Explanatory variables	
i. Industry characteristics	
Share in value added	The value added of each sector as a percentage of the total value added of all sectors at each year. Source: UNIDO database, and own calculation.
Financial dependence	External financial dependence of U.S. firms by 2-digit ISIC sector over the period 1990–1999. This is an industry-level median of the ratio of capital expenditures minus cash flow over capital expenditures. Cash flow is defined as the sum of funds from operations, decreases in inventories, decreases in receivables, and increases in payables. Capital expenditures include net acquisitions of fixed assets. This definition follows Rajan and Zingales (1998). Source: Klapper et al. (2006).

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Table A2 (*Continued*)

Variable	Definition and source
ii. Finance quantity	
Domestic credit to private sector	Ratio of domestic credit to private sector to GDP, which refers to financial resources provided to the private sector. Source: World Bank-World Development Indicators.
Credit provided by banking sector	Ratio of credit to private sector by banking sector to GDP. Source: Source: World Bank-World Development Indicators.
Market capitalization	Average stock market capitalization of listed companies to GDP of a country. Source: World Bank-World Development Indicators.
iii. Bank performance	
Bank competition	
5-firm concentration ratio	A country-level indicator of bank concentration, measured by the share of assets of five top largest banks in the market, with higher values indicating greater market concentration. Source: BankScope and own estimation.
HH index	A country-level indicator of bank concentration, measured as the sum of squared market share of total assets (in %) of a country's banking system. Source: BankScope and own estimation.
Lerner index	Average Lerner index of 11 Qatari banks. Lerner index is calculated as the ratio of price-cost spread over price. Price is defined as price of total assets; cost is defined as marginal cost which obtained from a translog cost function. Source: BankScope and own estimation.
Efficiency	
Cost to income ratio	Average cost to income ratio of 11 banks. It is calculated as operating expenses of a bank as a share of sum of net-interest revenue and other operating income. Source: BankScope.
Overheads to total assets	Average of bank overhead costs to total assets of 11 banks. Source: BankScope.
Interest rate spread	The difference between lending and deposit rates (lending rate as total interest income over total loans and deposit rate as total interest expenses over total deposits and short-term funds), average of 11 banks. Source: BankScope and own estimation.
Profitability	
ROAA	Return on average assets defined as profit before tax as a percentage of total assets, average of 11 banks. Source: BankScope.
ROAE	Return on average equity defined as profit before tax as a percentage of equity, average of 11 banks. Source: BankScope.
NIM	Net interest margin is a measure of the difference between the interest income generated by banks and the amount of interest paid out to their deposits, relative to the amount of their (interest-earning) assets, average of 11 banks. Source: BankScope.
Stability	
Z-score	Average of 11 banks Z-index, which is measured as return on assets plus capital asset ratio over the volatility of return on assets. Volatilities are taken based on a three-year rolling window. Source: BankScope and own calculation.
Sharp ratio	The Sharp ratio is risk-adjusted returns on equity that is given by the mean value of the returns on equity divided by the standard deviation of the returns on equity, average of 11 banks. Source: BankScope and own estimation.
Non-performing loans	Average of 11 banks ratio of nonperforming loans to total loans; a higher value indicates a riskier loan portfolio. Source: BankScope.
iv. Control variable	
GDP growth	Real growth of GDP. Source: World Bank-World Development Indicators.

Table A3
Averages for the industry growth, bank performance and country variables over the period 2000–2006.

Variable	Mean	Median	St. Dev.	Min.	Max.
Panel A: Industry variables					
Industry growth					
Value added	0.91	0.05	4.69	−0.87	57.00
Output	0.89	0.05	5.08	−0.82	55.50
Share in value added	0.03	0.00	0.08	0.00	0.47
External financial dependence	0.25	0.18	0.29	−0.12	1.06
Panel B: Finance quantity					
Credit provided by banking sector (% of GDP)	47.53	44.14	6.86	40.09	59.06
Domestic credit to private sector (% of GDP)	31.51	29.99	3.46	26.85	36.23
Market capitalization (% of GDP)	108.88	101.76	55.53	29.01	202.87
Panel C: Banking variables					
Competition					
5-firm concentration	0.88	0.89	0.02	0.86	0.90
HH index	3151	3268	407	2610	3577
Lerner index	0.15	0.16	0.05	0.09	0.21
Efficiency					
Cost to income ratio (%)	34.97	35.18	6.18	25.81	43.29
Overheads to total assets	0.01	0.02	0.00	0.01	0.02
Interest rate spread	0.06	0.06	0.01	0.05	0.07
Profitability					
ROAA (%)	2.73	2.61	1.36	0.56	4.81
ROAE (%)	20.09	23.31	7.30	4.92	29.50
NIM (%)	3.62	3.75	0.49	2.82	4.42
Stability					
Z-score	61.44	72.01	18.98	34.01	86.74
Sharp ratio	7.65	6.94	1.62	5.82	10.41
Non per. loans to total loans (%)	8.67	9.92	4.07	2.01	13.25
Panel D: Control variable					
GDP growth (%)	10.17	7.37	6.99	3.33	20.84

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