# What Determines The Duration Of Bank-Enterprise Relationships For Tunisian Firms[1]?

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**ABSTRACT**

*In this paper we analyze factors that determine the duration of the bank-enterprise relationships in Tunisia. Our study is based on data of 100 companies during the period 2000-2007. By adopting panel data estimation, our results show that only firm characteristics, the number of banks, and the credit rationing have significant effects on the duration of banking relationships. However, the characteristics of the banking system did not have any major consequences on the duration of the bank-enterprise relationships.*

**Keywords:**  Duration; Bank Relationships; Tunisian Firms; Panel Data Estimation

## INTRODUCTION

**B**roadly, a bank can be defined as a financial institution whose principal function consists of managing money. In this sense, a bank collects deposits from the public and allocates loans by providing advances out of the funds collected as deposits to needy households. Theory suggests that one reasons for the existence of banks is their ability to mitigate information asymmetries and adverse selection, as well as moral hazard problems and the costs of financial distress[2]. Nowadays, banks have become the dynamo of the economy and they occupy one of the central positions in the modern economy. They are the principal source of employment creation and the principal channel of financing the economy. In more advanced service economies, the banking sector employs more than the manufacturing of apparel, automobiles, computers, pharmaceuticals, and steel combined (Harker and Zenios, 2000). The banking sector contributes 5% of GDP in the US, 5.5% in Germany, 18% in Israel, and 23% in Bahrain[3].

Today, the relationship between banks and enterprises is becoming more important for two reasons:  1) the two institutions play a significant role in the economy (investment, financing, creation of jobs) and 2) their relationship is becoming ever more interdependent, which means that banks need enterprises and *vice versa.* Due to this interdependency, their relationships should be strong and efficient in order to ensure the safety of the economic system as a whole because the failure of the former or the later could generate an economic disaster.

The question of determinants of the bank-enterprise relationships has been abundantly developed in modern literature[4]. However, fewer articles have analyzed the question related to duration of this relationship. Broadly, the duration is a significant measure of the effectiveness of the banking relationship which varies from one country to another. In Germany, the average duration of the bank-firm relationship is 20 years (Elsas and Krahnen, 1998). In Japan, it varies between 21 and 30 years (Horiuchi, Parker and Fakuda, 1998) and in the United States, it is around 7

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[1] The opinions expressed in this article are those of the authors and they do not necessarily represent the official position of their institutions.
[2] According to Diamond (1984), information asymmetries impede the allocation of capital to its most productive use.
[3] Hamdi (2011)
[4] Smith. D. (1998), Farinha L and Santos J (2000), Djelassi et al. (2011)

years (Cole, 1998). Why does the duration of banking relationships vary from one country to another?  What are the determinants of the duration of a bank-enterprise relationship?

The aim of this article is to examine factors that determine the duration of bank-enterprise relationships in Tunisia. We explore the effects of the three principal determinants - characteristics of the firm, characteristics of the banking system, and the number of banks and credit rationing.

The structure of paper is presented in two parts. In the first, we theoretically study principal determinants of the duration of the bank relationship in order to formulate the assumptions to be tested.  In the second, we empirically analyze the principal factors which could affect the duration of bank-enterprise relationships in Tunisia.

## A THEORETICAL FRAMEWORK - DETERMINANTS OF DURATION OF BANK RELATIONSHIPS

### Duration Of Bank Enterprise Relationships And Characteristics Of The Firms

In this section, we focus on characteristics of the firm as factors that may explain the duration of bank-enterprise relationships.  We develop the size of the firm, the age and the level of risk as the main characteristics.

*Size Of The Firm*

To examine the effects of the size of the firm on the duration of the bank relationships, Petersen and Rajan (1994), Berger and Udell (1995), and Cole (1998) have focused their study on a sample of companies of less than 500 employees. The same study was done by Horiuchi et al. (1988) and Elsas and Krahnen (1998) for the Japanese and the German context, respectively, but on large industrial firms. The results of the two studies were unsurprisingly different; thus one can conclude the existence of an implicit tie between size of the firm and duration of the bank relationships. Ongena and Smith (1998) conclude that large companies choose long-term duration, whereas small- and medium-size enterprises (SMEs henceforth) seek to weave short-term relationships. The positive liaison between size and duration can be justified by the fear of an escape of private information when the company weaves a higher number of bank partners.

Broadly, in a long-term relationship there is a gradual acquisition of information between the bank and the enterprise which could mitigate a problem of information asymmetries and reduce the credit rationing. In addition, availability of credit with an affordable cost may encourage companies of a large size and good quality to weave long-term relationships, which is why Japanese companies prefer a long-term duration with their financing institutions.  For SMEs, many recent studies have shown that they prefer building close credit relationships to avoid liquidity constraints and the information monopoly problem. According to Sharpe (1990), large size companies accept paying a high cost to keep their relationships constant and stable, while SMEs are incapable of paying additional costs which is why the duration of their bank relationships is short.

Regarding 'small enterprises' - notably start-up and micro-enterprises, they are perceived by banks as an origin of risk. Small companies are judged as riskier, which is why they face some problems of financing exclusion. A bank refuses to finance a company considered as "risky", and if it obtains financing, it will only be short-term in order to minimize the risk of default.

**H1:**     Small- and medium-size enterprises weave short-term relationships.

*Age Of The Firm*

The age of the firm can influence the duration of bank relationships. In fact, the effect of age is almost proportional to the size of the enterprise. This means that the oldest companies tend to extend their bank relationships, whereas the younger ones prefer short-term duration. In general, old firms that have a good capacity for negotiation are able to acquire financing with good conditions. In the same way, good quality of the services offered to an older firm encourages the latter to extend its relationships. For an older company, the bank can better evaluate its financial situation. In this sense, historical data and information of the previous transactions may help

the bank to make appropriate decisions. Consequently, when a bank has necessary information about an older company, it is beneficial to extend the duration of their relationship as long as possible.

**H2:**     The oldest companies tend to extend their banking relationships.

Contrary to the old firms, banks and "young companies" often have "short-term" relationships. This could be justified by two principal arguments. First, a relationship with a young company is considered (by banks) as risky, uncertain, and with a higher level of asymmetries of information. Banks did not have any historical information about the young firm, which is why they are more rigid in financing this type of enterprise. Second, the financial structure of the young companies is dominated by short-term credits, which obliges these companies to carry out short-term transactions only. These two factors oblige a young company to weave a short-term relationship with a bank. By acquiring more reputation and experiences in the credit market, companies will move toward long-term relationships because they are more beneficial to them than short-term durations.

**H3:**     The young companies weave short-term relationships.

*Level Of Risk*

The level of risk is an important factor that could affect the number and duration of the bank-enterprise relationships. According to Fogila et al. (1998), the high number of bank relationships is associated with a high level of risk. A company is considered "risky" when the duration of its bank relationships is short and the probability of default is high. Furthermore a SME without sufficient capital stock, and/or a young company without sufficient experience and notoriety, is also considered a risky enterprise.

Literature analyzing the link between the level of risk and the duration of bank relationships shows a negative correlation (Fogila et al., 1998; Dietsh and Golitin-Boubakari, 2002). This means that when the level of risk is high, the duration of the bank relationship is short. Broadly, with a high level of risk, the probability that the company obtains the desired credit is very low. Even if a bank takes the risk and finances this type of company, their relationship will be built for only a short period of time. In some cases, the high level of risk-taking could lead to bankruptcy. This level of risk is an indicator of the short- and/or long-term bank relationships by which financial institutions should decide on the duration of its lending contract with the firm.

**H4:**     The level of risk affects the duration of the banking relationships.

**Duration Of Bank Relationships:  Number Of Banks And Credit Rationing**

The number of banks and the credit rationing could affect the duration of the bank-firm relationships.

*Number Of Bank Partners And Duration Of The Relationships*

There is abundant literature analyzing the effect of number of bank relationships on the cost and availability of credit[5]. However, to our knowledge, there are not sufficient articles that study effects of the number of bank partners on the duration of bank-firm relationships. According to available literature, we can conclude a negative relationship between the number of banks and duration of banking relationships. Hence, when the number of banks financing the company increases, the duration of their relationship decreases.

Multiple bank partners leads to a higher cost of credit due to the cost of searching for information and coordination of same. To maintain their bank relationships constant and for a long duration, companies accept paying a higher cost (Sharpe, 1990).

The number of bank relationships of long-term duration appears to be a little more complex for SMEs and young companies because they inherently suffer from a high cost of funding. In its relationship with the bank, the company seeks to minimize the costs of monitoring - called 'hold-up costs' - and the escape of private information.

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[5] See Hamdi *et al* (2012)

In this case, multiplying the bank relationships could resolve this problem. However, within the framework of a long-term relationship, the bank gradually acquires the maximum level of information. Rajan (1992) and Sharpe (1990) argue that information acquired by a bank can create an information monopoly problem.

**H5:**      The number of banks reduces the duration of the bank-firm relationship.

*Credit Rationing And Duration Of Bank Relationships*

Credit rationing is an important financial constraint imposed on some firms. Generally, the bank exerts credit rationing in case of an increasing demand for credit, or when there is a strong asymmetries of information or in a context of uncertainty.

Credit rationing does not mean the end of the bank-firm relationship. In fact, a company can be rationed while its relationship with its financing partner remains stable. The company can be rationed in two different ways: 1) by quantity in which it does not receive the total amount of the requested credit or 2) by pricing in which the bank fixes a very high interest rate to the company.

When a company is rationed several times, it faces a problem of investment constraints due to the imposed charges. In this case, it will be forced to search for another source of financings or other partners to complement the necessary funding. This reveals that credit rationing reduces the duration of banking relationships and it sometimes could be the origin of their end.

**H6:**      Credit rationing reduces the duration of the bank-firm relationship.

**Duration Of Bank Relationship And Banking System Characteristics**

In this section, we study the effects of characteristics of the banking system on duration of bank-enterprise relationships. Two principal characteristics will be developed - concentration and banking stability.

*Stability Of The Banking System And The Duration Of The Bank-Firm Relationships*

Fock et al., (2004) demonstrated that the number of bank relationships decreases during periods of instability and episodes of a financial crisis. The firms are moved toward exclusive and long-term relationships to guarantee their future financing, so banking stability constitutes a factor allowing the companies to multiply their short-term relationships. This result was confirmed in Ongena and Smith's (2000) study in which they demonstrated that companies weave several relationships in a stable and competing banking system. A solid banking sector makes it possible to guarantee necessary financing for firms. With a stable environment, the company enjoys a situation able to ensure the necessary funds. For this reason, it often chooses to multiply their relationships, which are short-term.

**H7:**      Banking stability reduces the duration of the bank-firm relationship.

*Banking Concentration And Duration Of Bank-Enterprise Relationships*

Banking concentration is measured by the number of banks in the credit market. The more this number increases, the less the market is concentrated. In this section, we develop whether banking concentration affects the duration of bank relationships.

Banking concentration results in a reduced number of banks in the market. In this case, the probability of multiplying the relationships is low because every company seeks to keep its banking relationship stable. In this case, companies are forced to have exclusive relationships which will be characterized during the time by long-term relationships.

On the contrary, in a competing banking system characterized by the existence of several competitors, the firm has high probability to weave multiple relationships. Switching from one relationship to another becomes easier, which may encourage the firms to multiply their contracts. Consequently, this may affect the duration of bank relationships.

**H8:**     Banking competition reduced the duration of the banking relationship.

**AN EMPIRICAL STUDY - DETERMINANTS OF DURATION OF BANK-FIRM RELATIONSHIPS**

**Data And Methodology**

Our study is based on data related to 100 Tunisian companies of different sizes and ages and they operate in various sectors of the Tunisian economy (industry, service and trade). Data were collected from the annual reports of firms while qualitative variables were obtained following distribution of a questionnaire to managers of the companies. The econometric method used in this study is panel data estimation and the equation is written in the following form[6]:

$$DUR = \alpha_0 + \beta_1 SIZE_{i,t} + \beta_2 AGE_{i,t} + \beta_3 STBL_{i,t} + \beta_4 RAT_{i,t} + \beta_5 CNCN_{i,t} + \beta_6\ \ NBANK_{i,t} +\ \ \ \ \beta_7 RISQ_{i,t} + \varepsilon_i$$

where

DUR is Duration of bank relationships measured by the number of years the both parties are partners.
AGE is the Age of the firm measured by the date of creation to the date of the collected data.
SIZE is the size of the firm measured by the natural logarithm of total assets
RISQ is the level of risk measured by the standard deviation of the growth rate of sales turnover.
NBANK is the number of banks financing the firms.
RAT is dummy variable of credit rationing it takes the value of 1 if the amount of future credit granted is constant or has increased and 0 if the amount of credit decreases.
CNCN is the banking concentration measured by the HHI index
STBL is the banking stability indicator measured by the level of credit risk

**List of Variables, Definitions and Measurements**

According to literature based on determinants of the duration of bank relationships, and taking into account characteristics of the companies and those of the banking system, the expected signs of this relationship appear in Table 1.

**Table 1: Effect of Explanatory Variables on the Duration of Bank Relationships**

| Variables | Awaited signs |
|---|---|
| AGE | (+/-) |
| SIZE | (+/-) |
| RISQ | (+/-) |
| NBANK | - |
| RAT | - |
| CNCN | - |
| STBL | - |

**Results and Interpretations**

Statistical Table 2 indicates that the average duration of bank relationships of Tunisian companies is 9.07 years. The average number of banks is 1.75 and the average number of bank relationships varies between one and two. This low value reflects the option of Tunisian companies to the exclusiveness in their bank relationships.

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[6] The model is inspired of the article Dietsh and Golitin-Boubakari (2002)

The average age of the companies is almost 10 years old (9.14 years). The average level of risk is 4.07, with a significant standard deviation of 22.42. The average stability of the banking system is 11.04%, whereas the mean level of concentration reaches the value of 7.21%.

**Table 2: Descriptive Statistics**

| Variables | Nbre of obs | Mean | std. Dev | Minimum | Maximum |
|---|---|---|---|---|---|
| DUR | 800 | 9.0714 | 4.6699 | 0 | 26 |
| NBANK | 800 | 1.7551 | 1.0202 | 1 | 4 |
| SIZE | 800 | 0.9584 | 0.6087 | -0.1815 | 2.1852 |
| AGE | 800 | 9.1479 | 4.6506 | 0 | 26 |
| RISK | 800 | 4.0782 | 22.4291 | -0.8916 | 214.65 |
| RAT | 800 | 0.1964 | 0.3975 | 0 | 1 |
| CNCN | 800 | 0.7215 | 0.0095 | 0.7090 | 0.7425 |
| STBL | 800 | 0.1104 | 0.0019 | 0.1064 | 0.1135 |

Table 3 illustrates the degree of correlation between the various variables of our study, which is very low, and means absence of the problem of multicolinearity between the variables.

**Table 3: Correlation Matrix**

| | DUR | NBANK | SIZE | AGE | RISK | RAT | CNCN | STBL |
|---|---|---|---|---|---|---|---|---|
| DUR | 1 | | | | | | | |
| NBANK | 0.0463 | 1 | | | | | | |
| SIZE | 0.0187 | 0.2578 | 1 | | | | | |
| AGE | 0.0870 | 0.0340 | 0.0178 | 1 | | | | |
| RISK | 0.2229 | 0.0962 | -0.0203 | 0.2213 | 1 | | | |
| RAT | -0.027 | -0.1646 | -0.1357 | -0.018 | -0.039 | 1 | | |
| CNCN | -0.078 | -0.0223 | -0.0197 | -0.076 | 0.0005 | -0.029 | 1 | |
| STBL | -0.149 | -0.0693 | 0.0274 | -0.149 | -0.000 | -0.032 | -0.107 | 1 |

Table 4 summarizes the results of the econometric estimation. The tests of Chow and Hausman are significant. Moreover, statistics of the Breusch Pagan test (LM) are significant at the level of 1%. By comparing between and within estimators ($R^2w < R^2b$), we select the random effect specification for this model.

**Table 4: Results of the Regression (Random Effect)**

| Explanatory Variables | Dependant Variables (Duration of the bank-firm relationships= DUR, R.E) | |
|---|---|---|
| | Coefficients | *(z- statistic)* |
| NBANK | -0.0089*** (0.000) | -4.13 |
| SIZE | 0.0218 (0.10) | 1.64 |
| AGE | 1.002*** (0.000) | 458.63 |
| RISK | - 0.005* (0.098) | -1.73 |
| RAT | -0.06*** (0.000) | -3.86 |
| CNCN | -0.715 (0.156) | -1.42 |
| STBL | -1.67 (0.51) | -0.65 |
| $R^2w$ | 0.967 | - |
| $R^2b$ | 0.9972 | - |
| **Fisher Test** Prob > F | 10.33*** (0.0000) | |
| Hausman Test Prob>chi2 | 1.30 ( 0.9885) | |
| Breusch-Pagan (LM) Prob > chi2 | 2549.80*** (0.0000) | |
| **Number of observ** | **800** | |

The results illustrated in Table 4 indicate a negative and significant relationship between number of banks and the duration of bank relationships at the level of 1%. The more the number of bank relationships increases, the more the duration decreases. In the majority of cases, the birth of a new relationship is associated with the end of an old one. Our results show that the duration is a decreasing function of multiple bank relationships for the Tunisian context. Our results disagree with those found by Dietsh and Golitin-Boubakari (2002) where the average duration of bank-firm relationships tends to grow with the number of banks. According to these authors, the existence of banks' competitors does not influence the preservation of long-term relationships with the first partner.

A company having multiple relationships with several banks tries to preserve some information and it does not intend to reveal all the information it has. In this case, a high level of information asymmetry could characterize this relationship. The bank could ration its customers and could also be the cause of the end of the relationship to avoid any problems. The lack of transparency and the ambiguity of one of the two partners could shorten the duration of the bank relationships. Multiple bank relationships shorten the period of the partnerships. According to Fogila et al. (1998), having multiple bank relationships is often associated with a high level of risk. Even if Tunisian companies have a low number of bank relationships, it is more advantageous for them to maintain exclusive and long-term relationships in order to guarantee financing later under good conditions - like the German and Japanese models.

The variable of credit rationing (RAT) exerts a negative and significant effect at the level of 1% with the duration of bank relationships. Credit rationing is considered one of the principal constraints of financing for the companies, especially those of small and medium size. According to the three theoretical justifications - excess demand on the offer of credit (economists of the 1960s), asymmetry of information (new Keynesiens), and uncertainty on the result of the future project (Post- Keynesians) - credit rationing exerts a negative effect over the duration of the bank-firm relationships.

To escape from the problem of credit rationing, companies often weave more than one bank relationship, often in a short duration, to ensure financing of the project. In a credit situation, a single bank relationship can be non optimal because the firm can suffer from a hold-up problem and of credit rationing (Sharpe, 1990, and Rajan, 1992).

As for effects of characteristics of the firm on the duration of bank-firm relationships, our results show a positive and non-significant association between the size of the company and our dependent variable. This relationship appears compatible with theoretical and empirical literature if the companies are large in size. However, the majority of companies in our sample are SMEs from where we expect a negative relationship. In fact, the Tunisian companies build a low number of bank relationships. These companies seek to guarantee future financing, from where they try to keep their relationships constant. In the same way, encouragement of investment in Tunisia, as well as advantages granted to new promoters, are likely to improve bank-firm relationships. Therefore, the companies are encouraged to manage their investments well and banks may find it beneficial to ration firms.

Age of the firm - one of the most significant determinants of the duration of bank relationships - exerts a positive and significant effect on our dependent variable. The majority of empirical studies have shown that the oldest companies tend to weave long-term relationships, whereas young companies are directed toward short-term relationships. Tunisian experience indicates a positive and significant correlation between age of the firm and duration of the bank-firm relationship. To benefit from the advantages of the long-term relationships (lower cost and availability of credit), it is not desirable for Tunisian companies to end a bank relationship and switch to another one. The duration allows a gradual acquisition of information for two parts, which makes it possible to reduce the problem of asymmetry information origin of credit rationing for the company and of a credit risk for the bank. When the companies become older, they risk private information deprived toward these competitors, which encourages companies to weave exclusive and long-term relationships and to preserve confidentiality of the firm.

Among the most determining factors of the duration of bank relationships, Ongena and Smith (1998b) presented quality of the services. Generally, an old company acquires a good reputation. This good perception will

positively affect the quality of services provided for it.  The firm acquires credit at lower costs and under favourable conditions. Consequently, the firm tends to extend its bank relationships.

Contrary to the effect of "age" and "size" of the firm on the duration of bank relationships, the level of risk is correlated negatively and significantly with our dependent variable. Fogila et al. (1998) showed that the riskiest companies are dissociated with a higher number of bank relationships.  Theoretical and empirical literature founded on the bank-firm relationship showed that the long-term relationship makes it possible to better exchange information and to well evaluate the situation of the firm.  Therefore, a company considered to be risky should not extend its bank relationships[7].

As for the effects of banking system characteristics on duration of bank relationships, the effect of concentration and banking stability are negative and non-significant. Fock et al. (2004) showed that financial instabilities and banking crises affect banking relationships.  With regard to banking concentration, Ongena and Smith (2000) showed that the possibility of multiplying banking relationships is very high in a more competing environment. Our results diverge to former studies regarding the effects of concentration (CNCN) and banking stability (STBL) on the duration of bank relationships since our model illustrated no effect. According these results, assumptions H1, H3, H7, and H8 will be rejected, whereas assumptions H2, H4, H5, and H6 are accepted.  To simplify, we conclude that assumptions "the characteristics of the firm affect the duration of the bank relationships" and "the number of banks and credit rationing exert a significant effect on the duration of bank relationships" will be accepted, whereas the assumption "banking system characteristics affects the duration of bank-firm relationships" will be rejected.

**CONCLUSION**

Several theoretical and empirical studies analyze the determinants of the number of bank relationships, whereas literature based on the determinants of duration is limited. In this paper, we tried to determine the factors that could affect the duration of bank relationships. To achieve this goal, we used an econometric model based on panel data for 100 Tunisian companies observed during the period 2000-2007.  Our results show that characteristics of the firm act significantly on duration of bank relationships.  This means that age positively and significantly affects the duration of banking relationships.  On the other hand, the level of risk negatively and significantly affects the duration.

We also found that duration of bank-firm relationships could be influenced by the number of banks financing the firms by means of credit rationing.  In our study, these two variables significantly reduce the duration of bank relationships in a Tunisian context contrary to what literature illustrates for some experiences.

**Disclaimer**

The opinions expressed in this article are those of the author and they do not necessarily represent the official position of the Central Bank of Bahrain.

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[7] Regarding a risky firm, the banks become more rigid as regards granting of credit.  Even if it takes the risk and agrees to finance this type of company, this relation will be at short term.  Gradually, the bank can better evaluate the situation of the company and consequently better decide.  However, if the firm dissociates like risky, the probability of being financed is very weak. So the firm receives either an explicit refusal or it supports the phenomenon of credit rationing.

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**NOTES**