

## **A COMPARATIVE STUDY OF CREDIT RISK IN LOCAL BANKS AND FOREIGN BANKS OPERATING IN PALESTINE**

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### **Abstract**

*This study aims to compare credit risk of local & Islamic banks and foreign banks in Palestine. Credit risk is calculated for 8 foreign banks and 7 local & Islamic banks by Merton's model, which is based on Black and Scholes's option pricing formula. We measure the distance-to-default (DD) and the default probability (DP) from 2007 to 2013. Foreign banks seem to have a higher mean distance to- default of (7,26) than local and Islamic banks (4,77). Foreign banks have a lower mean default probability of (3.43E-06), than local & Islamic banks (2.86E-04). The study uses Cumulative logistic probability distributions to derive default probability from distance to default. When cumulative probabilities are used up to a threshold, the results are more satisfying: the distribution of default probability has larger tails under the logistic distribution for 2007-2013. At the sample level, default probability is still higher for local & Islamic banks (1.67E-02), in comparison with foreign banks (4.23E-03).*

*Keywords: Credit Risk, Palestine, Banking System, Distance to Default, Probability of default*

### **INTRODUCTION**

Palestinians are known as the bankers of the Middle East and were responsible for the creation of many banking systems in this region, especially in the Gulf States. However, Palestine today has a fairly nascent banking system that lags behind most other countries in structure, diversification and the use of modern technology. A major reason for this was the closure of all

banks operating in the West Bank and Gaza by the Israeli authorities immediately after the war of 1967 and the Israeli occupation of these territories.

From 1517 through 1917, the area now known as the West Bank, was under Ottoman rule and a group of banks were operating in Palestine before 1948. Some of these banks are Ottoman Bank(1856), Barclays Banks(1864), HSBC(1899), Arab Bank(1930) and others banks (Abu-Rub and Abbadi, 2012).The Ottoman Bank was founded in 1856 with the British capital, the French partners and the Ottoman Government, with a capital of 2 million pounds. The Ottoman Bank was mainly involved with public works and railways ([https://en.wikipedia.org/wiki/Ottoman\\_Bank](https://en.wikipedia.org/wiki/Ottoman_Bank)).

However, the First World War had a negative impact on the activities of the Bank. As it was operating in conformity with the Ottoman legislation, the French and British Governments considered the Bank as an "enemy institution". On the other hand, it lost its credibility in front of the Ottoman Empire because of its French and British shareholders. Ottoman Bank opened many branches in Palestine in Jerusalem, Bethlehem, Ramallah and Nablus([www.obarsiv.com](http://www.obarsiv.com)). In the period 1948 - 1967 in Palestine, 11 Banks were operating and the number of branches was 30. In 1967, after Israel's occupation of the West Bank, Israeli government closed all the banks and froze all their assets and transferred all their cash to the Bank of Israel. This sector was one of the most affected sectors by the occupation during 1967-1993, as there were 180 military orders that aimed at restricting the activities of the financial system and closely controlling it. Soon after the occupation, military orders allowed Israeli Banks to open branches in the West Bank and Gaza, which caused eliminating all financial relations with Arab Countries. By 1986, there were four Israeli Banks working in the West Bank and Gaza with 22 branches. The Israeli banks remained working alone in the West Bank and Gaza until the Israeli court of justice allowed Bank of Palestine to reopen its two branches in Gaza in 1981(Economic and Social Commission for Western Asia (ESCWA, 1987).

Israeli banks' activities were very limited as their loans were less than 8% of their assets and their functions were mostly to finance trade or overdraft for some merchants. Very few Palestinians were willing to deal with Israeli Banks and their credit facilities were very limited to facilitate trade between West Bank and Israel by letters of credit or letters of guarantees, which were issued to Palestinians to fulfill their commitment to Israeli firms or merchants at a very high cost. This situation remained until 1987, when all Israeli banks were closed because of the Intifada. The country remained without banks during 1987-1993 except Bank of Palestine and Cairo Amman Bank, which was allowed to reopen one branch in Nablus in 1986 (Laurence, 1988).

Following the signing of the Paris Protocol in 1994 on Economic Relations between the Palestinian National Authority (PNA) and Israel, the Israeli and Jordanian governments signed a peace agreement in Wadi – Araba in 1994. After the Oslo agreement in September 1993, the Palestinian Monetary Authority (PMA) was established to implement and regulate monetary policies in Palestine (Abu-Rub and Abbadi, 2012).

The Jordanian-Palestinian Economic Agreement, signed on January 26, 1995, conveyed the PMA's retroactive approval to open the Jordanian branches that were closed by the Israeli government. With this agreement, Jordanian domination of banking in the Palestinian territories has been confirmed by the subsequent opening of many of these branches (Abu-Rub and Abbadi, 2012).

Since the Israeli occupation and until now, Palestine does not have its own currency. For this reason Palestinians use: Israeli currency (New Israeli Shekel NIS) for daily exchanges and payment of public sector salaries, and US Dollars (\$), Jordanian Dinars (JD) and Euros (€) for savings and commercial exchanges (Import and Export). Especially in the private sector, often people use Dollars, while transactions involving land (renting or buying) are usually denominated in Dinars ([www.pic-palestine.ps](http://www.pic-palestine.ps)).

The activities of Palestinian banks have been developing from traditional banking services of accepting deposits, giving loans, total assets and total equity to giving almost all services offered by modern banks. Their activities were spread over all cities and villages of the West Bank and Gaza. In Palestine, the responsibility for financial regulation and supervision is shared between the Palestine Monetary Authority (PMA) and the Palestine Capital Market Authority (PCMA). While the PMA oversees and regulates banks, money changers and microfinance institutions, the PCMA is responsible for the securities market, insurance companies and real-estate institutions. In this period, Jordanian banks were allowed to reopen their branches closed in 1967 and give licenses to establish new banks and open new branches. They started regulating the Palestinian banks in both West Bank and Gaza. This caused the number of banks to increase gradually (PMA, 2011).

In spite of the difficult environment, Israeli occupation and control over Palestinian financial sector by the Israeli government, Palestinians have managed to establish a financial sector composed of most of the expected sub-sectors: banks, a securities market, insurance companies, payments system, housing finance companies, microfinance institutions and financial leasing companies. As of March 2014, the number of banks in Palestine is 17 : 7 national banks (only 2 of them are Islamic) and 10 foreign banks ([www.paltrade.org](http://www.paltrade.org)). In USD terms, total assets of the banking industry has been growing rapidly from less than 500 million in 1993 to over 8.5 billion in 2010, to over 10.6 billion in 2013. Customer deposits have been

growing from 300 million to about 6.8 billion to about 8.1 billion during the same period. Total equity has been growing from 8.3 billion in 2010 to over 10.6 billion in 2013 and direct credit facilities were growing in the same way from 2.7 billion to 4.3 billion during the same period (PMA, 2014).

## LITERATURE REVIEW

It seems that comparative analysis of risk management in conventional and Islamic banks has been the subject of research of a certain number of scientists worldwide only since the beginning of the 21st century, especially since the outbreak of the global financial crisis.

Tafri, Rahman, and Omar (2011) found that there is no convergence in the use of risk management tools between Islamic and conventional banks, possibly be due to the different nature of the banks and also the lack of tools which are non-riba based (interest-free) and Shari'ah (Islamic law) compliant. The evidence also suggests that risk management tools and systems for Islamic banking are seen as inadequate.

Similarly, Kozarevic, Nuhanovic, and Nurikic (2013) indicated that Islamic banks are exposed to risk more than conventional banks due to special products which they offer to its clients and the lack of harmonization between existing legal regulations and the demand of Islamic banking.

Siddiqi(2011) concluded that Islamic banks are different from traditional banks in the modes of financing that they represent. The risk and equity sharing contracts (Modaraba and Musharaka) are associated with various investment risks, which are the consequence of information asymmetries leading to moral hazard and adverse selection. The different opinions of Islamic scholars on the meaning of Shariah compliance and permissibility of derivatives and options have impeded the development and adoption of Islamic futures, derivatives and option contracts in Pakistan and Middle East.

Ariffin's (2012) found that the financial crisis has an adverse effect on the Islamic banks, profitability and the relationship between liquidity risk and financial performance is not always predicted by the conventional financial theory of high risk - high return.

According to Makiyan, the use of financial services and products that confirm with the Shari'ah principles cause special issues for supervision and risk management in the financial institutions. Efficient risk management in Islamic financial institutions has particular importance as they try to cope with the challenges of globalization in the world. The development of new financial instruments and institutional arrangements for providing an enabling operational environment for Islamic finance is also emphasized.

Boumediene(2011) empirically explores the assertion that Islamic banks have higher credit risk than conventional banks. This risk is then calculated for nine Islamic banks and nine conventional banks using contingent claims analysis. Merton's model, based on Black and Scholes's option pricing formula, used to measure the distance-to-default (DD) and the default probability (DP) from 2005 to 2009. Islamic banks have a mean distance to- default of 204, significantly higher than conventional banks (DD = 15).Hence, he finds that Islamic banks have a lower credit risk than conventional banks.

Due to the fact that there are only 2 Islamic banks in Palestine, we categorize banks into two groups: Local & Islamic banks and foreign banks and empirically explore the assertion that local and Islamic banks in Palestine have higher or lower credit risk than foreign banks.

## RESEARCH METHODOLOGY

### Data Description and Modeling

According to the Palestinian Monetary Authority, by the end of 2014 the number of banks in the Palestinian territories decreased to 17. There are 7 national banks, 2 of which are Islamic banks and 10 foreign banks (with 213 branches :120 national and 93 foreign). The study includes 15 banks of the 17 banks working in Palestinian territories (The banks which the necessary information was not available were dropped out). The financial data of the banks investigated comprises years 2007-2013.

Table 1.Local & Islamic Banks and Foreign Banks in Palestine

The place of listing	Banks
Local	Bank of Palestine
Local	Quds Bank
Local	The National Bank
Local	Palestine Investment Bank
Local	Palestine Commercial Bank
Islamic	Arab Islamic Bank
Islamic	Palestine Islamic Bank
Foreign	Arab Bank
Foreign	Cairo Amman Bank
Foreign	Bank of Jordan
Foreign	Housing Bank for Trade & Finance
Foreign	Jordan Ahli Bank
Foreign	Jordan Commercial Bank
Foreign	Jordan Kuwait Bank
Foreign	Union Bank

Source: Palestine Monetary Authority

The data in the research comprises a 7 years period (from 2007 to 2013). The source of the research data is mainly Palestine Monetary Authority (PMA) and Palestine Capital Market Authority (PCMA), Central Bank of Jordan and Amman Stock Exchange. Financial statements of Arab and Foreign bank branches operating in Palestine are used. Financial statements issued by the JD have been transferred to the USD using the exchange rate of USD/JD= 0.709.

### Research Procedure

We compute the distance-to-default (DD) and the default probability (DP) of the banks investigated from 2007 to 2013. We choose this period in order to analyze the banking sector for a long period of time and to encompass data that can reflect the effects of the global financial crises. Default probability is the probability that the market value of assets will fall below the value of debt (total liabilities here) at the end of the year. Distance-to-default is the distance between market value of assets and debt, adjusted by expected growth of assets and normalized by the volatility of assets.

In 1974 Robert Merton proposed a model for assessing the credit risk of a company by characterizing the company's equity as a call option on its assets. This model assumes that a company has a certain amount of zero-coupon debt that will become due at a future time T. The company defaults if the value of its assets is less than the promised debt repayment at time T (Merton, 1974).

$$dv = \mu_v V dt + \sigma_v V dz$$

Where:-

$dv$ : market value of banks' total assets.

$\mu_v$  : expected rate of return on the assets per unit time.

$\sigma_v^2$  : variance of the return per unit time.

$dz$  : a standard Wiener process.

We will use number of steps to this:-

**The first step:** The methodology of calculation for each variable used in the computation default probability and the distance to default (equity, debt, equity volatility, Rate of growth of assets) (Boumediene, 2011).

Table 2. Variables Used in the Computation DP and the DD

Variables	Conventional banks	Islamic banks
E (equity)	Number of shares outstanding x price of the share at the beginning of each year	Number of shares outstanding x price of the share at the beginning of each year
D (debt)	Total liabilities (extracted from balance sheet statements)	Total liabilities: PLS accounts
$\sigma_E$ (equity volatility)	Historical volatility (standard deviation of share price returns) for each year, annualized	Historical volatility (standard deviation of share price returns) for each year, annualized
T	Maturity of one year	Maturity of one year
$\mu_V$	Rate of growth of assets per annum	Rate of growth of assets per annum

**Note:** Share prices and number of shares outstanding are extracted from Palestine Capital Market Authority (PCMA). Total liabilities are extracted from banks annual reports or Palestine Monetary Authority (PMA). Profit and loss sharing liabilities are extracted from annual reports of Islamic banks.

Annualized volatility is calculated as follows (Hull, 2009):

$$r_i = \ln \left( \frac{pr_t}{pr_{t-1}} \right)$$

Where :-  $r_i$  : daily return on stock price.

$pr_t$  : stock price at the end of day.

Annualized volatility is then estimated as:-

$$\sigma_E = \frac{1}{\sqrt{1/n}} \sqrt{\frac{1}{n-1} \sum_{i=1}^n r_i^2 - \frac{1}{n(n-1)} \left( \sum_{i=1}^n r_i \right)^2}$$

Where : n: number of observations in one year (number of trading days).

**The second step:** We estimate the market value of assets and their volatility ( $v$  and  $\sigma_V$ ), The results obtained allow the expected rate of return on assets ( $v$ ) to be estimated. Then, distance-to-default (DD) and default probability ( $p_T$ ) (Black and Scholes, 1973).

$$E = VN(d_1) - DN(d_2)$$

Where:-

E: Market Value of Equity.

V: Market Value of Assets.

D: Market Value of Debt ( Liabilities).

$N(d_1)$ : Cumulative normal density.

The cumulative normal density function:-

$$d_1 = \frac{\ln(v/d) + \frac{1}{2}\sigma_v^2 T}{\sigma_v \sqrt{T}}$$

$$d_2 = d_1 - \sigma_v \sqrt{T} = \frac{\ln(v/d) - \frac{1}{2}\sigma_v^2 T}{\sigma_v \sqrt{T}}$$

Then we use:

$$\sigma_E E = \sigma_V V N(d_1)$$

**The third step:** We compute the expected rate of return on assets (Boumediene, 2011).

$$\mu_v = \frac{\Delta V}{V_i} = \frac{V_{i+1} - V_i}{V_i}$$

Where :-  $V_i$  and  $V_{i+1}$ : market value of assets in times  $i$  and  $(i + 1)$ .

$\mu_v$  : expected rate of return on the assets per unit time.

**The fourth step:** Calculation of distance-to-default and default probability.

Probability of default (PD) is a financial term describing the likelihood of a default over a particular time horizon. It provides an estimate of the likelihood that a client of a financial institution will be unable to meet its debt obligations. The probability of default is the probability that the market value of assets will fall below the value of debt at maturity  $T$  (Chan-lau et al, 2004).

$$DD = \left( \frac{\ln(v_0/D) + \left( \mu_v - \frac{1}{2}\sigma_v^2 \right) T}{\sigma_v \sqrt{T}} \right)$$

$$P_T = N(-DD)$$

Where :

DD : distance-to-default

$P_T$  : default probability



$d_0$  : value of debt( liabilities)

$v_0$  : value of assets

$\sigma_v$  : standard deviation of the rate of return on the value of the assets

$\mu_v$  : expected rate of return on the assets per unit time

T : maturity

Then we use logit model. The logit model uses a cumulative logistic probability distribution to transform a score Y into a probability (Bessis (2010). Defining p as the default probability (Bessis, 2010):

$$P = \left( \frac{1}{1 + e^{-Y}} \right)$$

A cumulative logistic probability distribution was used to convert distance-to default to default probability, renamed DPlogit , for the sample of banks, as follows (Kealhofer, 2003):

$$Dp_{\text{logit}} = \left( \frac{1}{1 + e^{DD}} \right)$$

Finally, A Wilcoxon rank-sum test (equivalent to a Mann–Whitney U-test) is performed to evaluate whether or not the difference in the distance-to-default and probability of default between 2 groups of banks is statistically significant for the period analyzed (www.real-statistics.com).

Statistic (S) denotes the Wilcoxon two-sample test statistic. The null hypothesis is that the mean value of DD is equal for local and Islamic banks and foreign banks. The p-value is the probability that the null hypothesis will be rejected in favor of the alternative hypothesis that DD is higher for local and Islamic banks compared to foreign banks at the 5 % level of significance (Boumediene, 2011).

## RESULTS AND DISCUSSION

The results in Table 3 show that foreign banks are further from default than local banks (mean distance-to-default is equal to 7.26 and 4.77 respectively). Default probability (3.43E-06 and 2.86E-04 respectively) is thus higher for local banks, which reflects higher credit risk. However, this probability is abnormally high for both types of banks in 2007 and 2008. This is, without doubt, due to the recent financial crisis that began in July 2007. This can be seen from Table 4,

Out of 8 foreign banks, 5 had a plummeting distance-to-default from 2007 to 2008, and out of 7 local banks, 2 had a plummeting distance-to-default from 2007 to 2008.

Table 3. Wilcoxon signed-rank test

DP	DD	Banks
2.86E-04	4.77	Local&Islamic Banks
3.43E-06	7.26	Foreign Banks
	1685.0	Statistic (S)
	0.000	p-Value

The results show that the mean distance-to-default for foreign banks is statistically significantly higher than the mean distance-to-default for local banks at the 1% level.

Table 4. Mean Values of DD and DP

Foreign Banks		Local and Islamic Banks		Years
DP	DD	DP	DD	
5.36E-08	7.92	1.41E-05	5.60	2013
3.61E-08	8.98	1.95E-05	5.75	2012
9.49E-07	8.02	3.55E-05	4.70	2011
3.35E-07	8.62	7.16E-05	4.86	2010
1.87E-06	6.37	7.32E-04	4.11	2009
1.5832E-05	5.07	3.61E-04	4.10	2008
4.89E-06	5.82	8.59E-04	4.11	2007

Figure 1. Mean Value of DD (Local and Islamic banks versus Foreign banks)

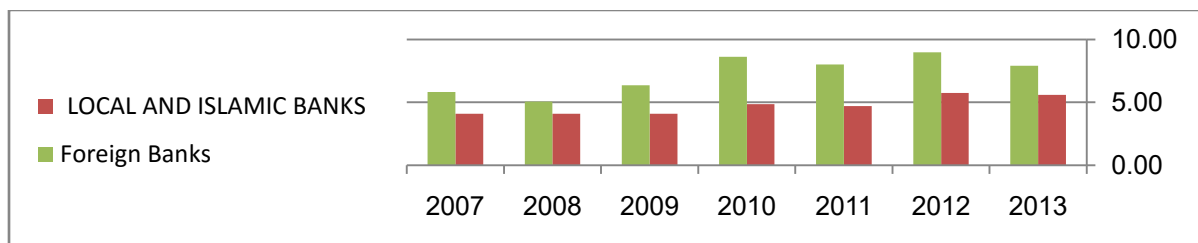
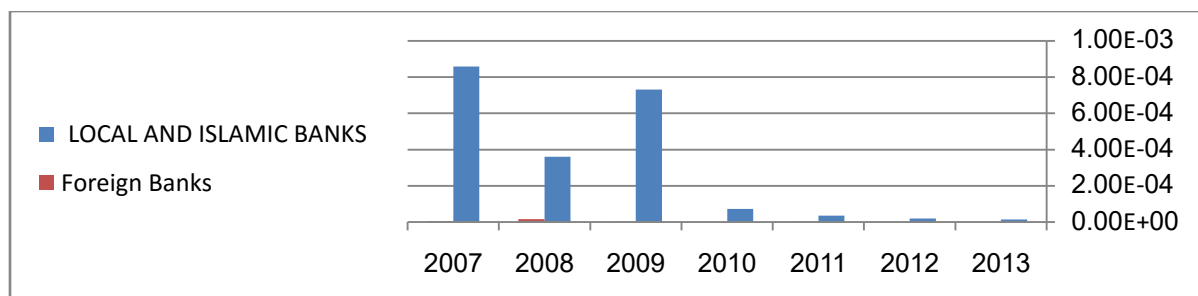


Figure 2. Mean Value of DP (Local and Islamic banks versus Foreign banks)



As it can be seen from Figure 1 and 2, mean values of distance-to-default and default probability for foreign banks appears to be higher than the mean compared to local and Islamic banks for the period investigated. This means that the risk of bankruptcy in foreign banks seems to be lower than local and Islamic banks.

Distance-to-default is a complete and unbiased indicator of firm vulnerability, since it captures the impact of three major determinants of default risk: earnings expectations, leverage and asset risk. DD can be used as an ordinal measure of a company’s default risk. If we consider distance-to-default as a score, this score can be converted into a default probability for banks. A cumulative logistic probability distribution was used to convert distance-to default to default probability, renamed DP logit for the sample of banks (Boumediene, 2011).

Table 5. Mean Value(All Banks), DP Logit and DD

Dp logit	DD	Banks
1.67E-02	6.62	Local & Islamic Banks
4.23E-03	7.26	Foreign Banks

In Table 5, the results are more interesting to study than those obtained with normal probability in Tables 3, and 4. Almost all nil probabilities have disappeared and have been replaced by higher values. For example, 2.12E-10 default probability, under normal distribution, equals 1.94E-03 for Bank of Palestine ( Local Bank) under the logistic distribution for 2003 (DD =6.24 ). Another example for foreign banks, 2.20E-18 default probability, under normal distribution, equals 1.72E-04 for Arab bank under the logistic distribution for 2011 (DD =8.67).

Default probability is still higher for Local and Islamic Banks at 1.67E-02, in comparison with foreign banks, for which it is 4.23E-03. That means, the cumulative logistic probability distribution has larger tails than a cumulative standard normal distribution. Figure 1 and 2 for local banks, and foreign banks show the difference between the normal distribution and logistic distribution based on results found in the empirical study.

Figure 3. Conversion of DD to DP for Local & Islamic banks using a Normal Distribution

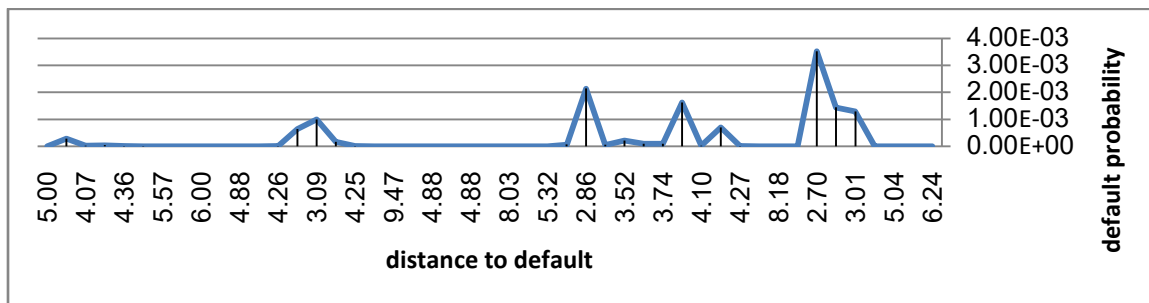


Figure 4 .Conversion of DD to DP for Local & Islamic banks using a Logistic Distribution

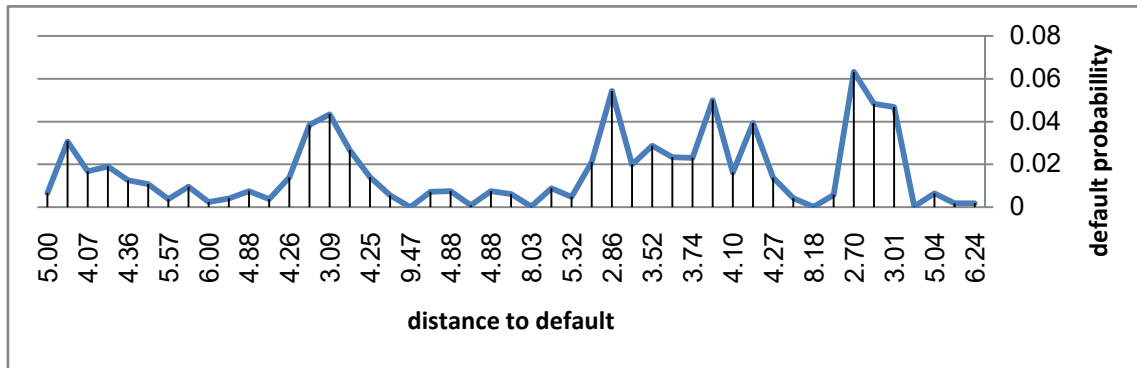


Figure 5 .Conversion of DD to DP for foreign banks, using a Normal Distribution

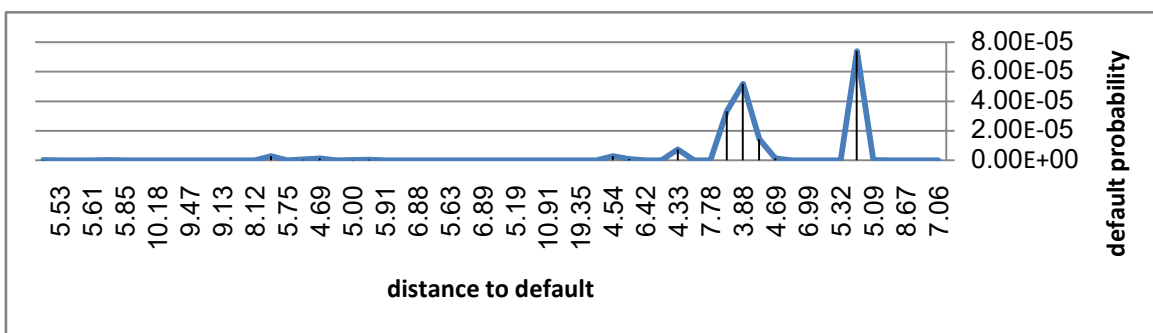
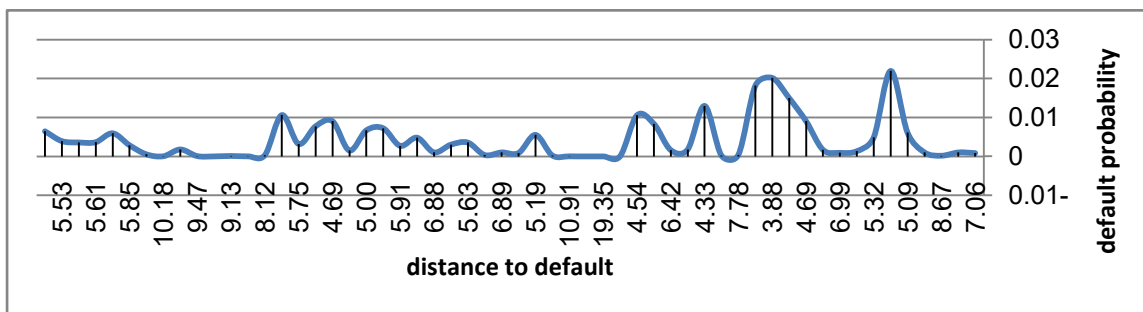


Figure 6 .Conversion of DD to DP for foreign banks, using a Logistic Distribution



## CONCLUSION AND RECOMMENDATIONS

We found that the average scores of distance to default (DD) for Local and Islamic Banks and Foreign Banks in Palestine as a whole are 4.77 and 7.26 respectively, and mean default probability (DP) for Local Banks and Islamic and Foreign Banks in Palestine are 2.86E-04 and 3.43E-06 respectively. The average scores of logistic distribution of DP for local and Islamic Banks and Foreign Banks in Palestine are 1.67E-02 and 4.23E-03 respectively. It has been empirically demonstrated in this research that all banks in Palestine appear to exhibit a low

degree of default risk. However, foreign banks seem to have lower credit risk than local and Islamic banks.

Although credit risk of the in Palestinian Banking sector seems to be low, some recommendations could be made. Financial institutions in Palestine may equip themselves with management skills and operational systems to cope with the contemporary financial environment. They may increase research and training programs in the field of risk management to adopt effective risk management practices. Engagement in good lending principles, efficient supervision and periodic review of loan portfolios may help reduce credit risk of the banking industry. Last but not least, mergers in the sector may enhance stability of the banking sector. Future research can focus on cross country comparisons regarding credit risk of banking systems in neighboring countries Like Jordan, Egypt and Turkey.

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