An-Najah National University
Faculty of Graduate Studies

EVALUATING TECHNICAL EFFICIENCY OF INSURANCE FIRMS OPERATING IN JORDAN AND PALESTINE

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الإهداء

"الى مصدر قوتي واعتزازي وافتخاري بنفسي أمي "**سهيله حرزالله**"

وإلى من أحمل اسمه أبي الغالي "**رضا حرزالله**"

وإلى من كانوا بجانبي دوما وساعدوني للوصول الى ما أنا عليه اليوم **إخوتي وأخواتي** وأخص بذكر

"شقيقتي "**رؤى حرزالله**"

الى روح جدتي الغالية "**أم سامي**"

وجدتي الغالية "**أم رضا**"

إلى من أتعافى بوجودهم حولي إلى أصدقائي الأعزاء وأخص بالذكر

الصديق "**محمد مصطفى حمارشة**"

والصديق "**محمود باسم بعجاوي**"

إلى من ضحوا بدمائهم في سبيل وطننا الحبيب الى **شهداء فلسطين كافة**

إلى من يقبعون خلف قضبان الاحتلال، إلى **أسرانا البواسل** فك الله بالعز قيدهم

إلى **جرحانا الابطال** شافاهم الله وعافاهم

إلى كل **باحث** يحاول الارتقاء بمستوى البحث العلمي في فلسطين

أهدي هذا العمل

الشكر والتقدير

لا يسعني في هذا المجال إلا أن أتقدم بجزيل الشكر والعرفان لله سبحانه وتعالى الذي علم الانسان ما لم يعلم فالحمد لله حمدا كثيرا طيبا مباركا لما أنا عليه اليوم، كما وأتقدم بجزيل الشكر والعرفان إلى جامعة النجاح الوطنية لما قدمت لي من علم ومعرفة خلال مدة دراستي فيها، فأنا اليوم أتشرف بأنني أحد أبناء هذه الجامعة العريقة الشامخة، كما أتقدم بجزيل الشكر لأعضاء الهيئة التدريسية في قسم المحاسبة وخصوصا الأستاذ الدكتور عبدالناصر نور، والدكتور غسان دعاس اللذان أشرفا على أطروحتي وكانا على تواصل دائم مع من أجل توجيهي وإرشادي من أجل الارتقاء بأطروحتي إلى أعلى مستوى، وشكر خاص إلى أستاذي ومعلمي الغالي الذي كان له فضل كبير علي خلال مرحلتي العلمية السابقة في برنامج بكالوريوس المحاسبة الدكتور محمد أبو شربة، شكرا لزملائي الأعزاء الذين تشرفت بمعرفتهم والذين تبادلت معهم العلم والمعرفة وأخص هنا الزميل ليث دويكات الذي شجعني على الالتحاق بجامعة النجاح الوطنية واختيار تخصص ماجستير المحاسبة والزميل أحمد كواملة الذي لم يبخل يوما في مساعدتي سواء على الصعيد الشخصي أو الأكاديمي، وأتقدم بجزيل الشكر للصديق هاشم أبو بكر الذي ساعدني خلال مرحلتي التعليمية الأخيرة، كما وأشكر صديق طفولتي ورفيق دربي صديقي الغالي فراس سليم كيلاني الذي كان بجانبي كلما احتجت إليه، وكل الشكر والعرفان لزملائي في هيئة سوق رأس المال الفلسطينية الذين شجعوني دوما على الاستمرار في مسيرتي التعليمية وكانوا متعاونين معي لأبعد الحدود، وفي نهاية المطاف أسال الله أن تكون هذه الرسالة علما تنتفع به الأمة، ويكون في ميزان حسناتنا يوم القيامة، وآخر دعوانا أن الحمد لله رب العالمين والصلاة والسلام على رسوله الأمين محمد بن عبد الله خاتم الأنبياء والمرسلين.

الباحث

محمد رضا حرزالله

Declaration

I, the undersigned, declare that I submitted the thesis entitled:

EVALUATING TECHNICAL EFFICIENCY OF INSURANCE FIRMS OPERATING IN JORDAN AND PALESTINE

I declare that the work provided in this thesis, unless otherwise referenced, is the researcher's own work, and has not been submitted elsewhere for any other degree or qualification.

Student's Name: **Mohammad Hirzallah**

Signature: 

Date: **02/10/2022**

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Abstract

Objective: As the title indicates, the purpose of this research was to evaluate the technical efficiency of the insurance firms operating in Jordan and Palestine markets and examine the factors affecting this efficiency.

Methods: Using data of 26 insurance firms covering 2016-2020, Data Envelopment Analysis (DEA) was used to evaluate efficiency score while the Panel Data Analysis (PDA) was used to identify the major factors affecting the technical efficiency of the listed insurance firms on Jordan and Palestine stocks exchange markets.

Research results: DEA showed that the insurance firms listed on Palestine Securities Exchange were more efficient than those listed on Amman Stock Exchange Market. Results also showed that non-life insurance firms were more efficient than compound firms on both Palestine Securities and Amman Stock Exchange Market. Panel data regression analysis showed that capital structure and firm size had a negative effect on technical efficiency. However, both market share and Return On Assets (ROA) affected technical efficiency in a positive way. Type of business appeared to have no effect on technical efficiency.

Recommendations: In the light of the research results, the researcher recommends that managements of firms raise capital through issuing bonds instead of common stocks, and refrain from expanding largely in company size without sufficient planning. Managements could keep firm profitable and use selling and advertising techniques to increase their market share. Regulatory bodies could issue laws and regulations to control how firms finance their assets in order to prevent an exaggerated increase in their total assets, and control competition in order to avoid illegal collusion between firms.

Key Words: Efficiency; technical efficiency; insurance; Jordan; Palestine; DEA.

Chapter One

General Framework of The Study

1.1 Introduction

Insurance companies offer economies with outstanding financial services that are required for development and growth. Those services are varied enough to include a wide range of options, including the underwriting or risks involved in economic activities, the transfer of funds through premiums for long-term investments. Even more, the key role of insurers, which is mainly the absorption of risks, enhances the financial stability of financial markets and creates a peaceful atmosphere for economic entities. Without insurance, businesses would be unsustainable given that businesses classified as risky might not be able to take responsibility of any risk in a constantly changing global economy (Tuffour et al., 2021).

Insurance companies offer a variety of contracts to the insured to cover any potentially incurred damage. They issue documents that contain the premium that has to be paid by the insured in exchange of the insurer's coverage. Those companies are then committed to compensate the insured against damage once it takes place. It was at this stage that countries from all over the world started to gradually notice the significance of this sector. They were also inspired to begin supervising the firms that operate in this field through the enactment of a set of laws and regulations to govern this industry (Daher & Wassof, 2016).

From an economic perspective, the significance of insurance lies in the functions of its mediation, risk-pooling and real financial services. It is through these functions that insurance is seen as an indispensable agent and a target for economic development in contemporary economies (Danquah et al., 2018).

According to (Vadlamannati, 2008), the means necessary for development in emerging economies is the creation of a highly-developed insurance sector. This is because insurance offers long term- funds for both social and physical infrastructures while at the same time enhancing risk-taking abilities (Danquah et al., 2018).

Palestine, as any other country, got influenced by the emergence of the insurance sector regardless of its weak economic system. It is worthy of mentioning here that the Palestinian insurance sector is newly established. When the Palestinian Authority returned in 1994, it became the legal body that is responsible for supervising the insurance sector. However, the sector was still in a bad place due to the lack of management control and organization over its work and the expansion of the culture of insurance at the needed level, resulting in a weak and unorganized insurance sector for almost ten years. This was the case until the Palestine Capital Market Authority (PCMA) was established in 2004, which became the authorized legal body to supervise, manage and control the insurance sector and play great role in the issuance of the Palestinian Insurance Law in 2005 (Palestine Economic Policy Research Institute-MAS, 2016).

Regarding the Jordanian situation, the insurance sector is suffering there too. Many Jordanian insurance firms are faced with a lot of performance-related troubles, and the insurance sector has been incurring financial losses due to the difficult existing circumstances (Almasarweh et al., 2022).

Jordan currently has 20 listed insurance companies in ASE, in addition to a number of firms that have been liquidated due to financial troubles. This is considered to be a huge number for a country as small as Jordan which has a relatively small insurance market compared with its neighboring countries, contributing to about 3% of the gross written premiums of the MENA region (Oxford Business Group, 2020).

In spite of the potential need for consolidation, the business has been free of acquisitions and mergers for more than twenty years. Since the majority of the market is focused on third-party vehicle insurance the premiums of which are set by the government, merging two motor-focused firms into a larger one is pointless. Additionally, some firms have lacked the solvency margin since 2015 without being warned and without taking legal action to correct the situation. It is quite unbelievable that some insurance firms there, which are six in fact, have exceeded the solvency margin stated by the 2002 regulations which have specified explicitly that the solvency margin for the companies that operate in this sector must not fall below 150% of the capital required. This primarily means that

there are firms operating in this sector without possessing the required amount of capital for meeting any potential needs, obligations or commitments they may have to deal with (Altarawneh et al., 2022).

Efficiency, which is an indicator of a firm's performance, is enhanced by reducing costs during the production process. It is considered as one of the main foundations that guide insurance firms in ensuring health and safety conditions in such firms (Tuffour et al., 2021).

The issue of efficiency has become a major interest in the insurance industry since it aids in identifying efficient and inefficient firms in the market with the intention of enhancing profitability and competition and increasing policyholders' trust. Insurers' technical efficiency refers to their ability to produce a certain group of outputs through the use of inputs (Jaloudi, 2019).

Not long ago, efficiency measurement has received much attention, and the insurance sector specifically has witnessed an extreme growth in the number of studies which apply frontier efficiency methods. These methods measure company performance relative to best practice frontier comprised of the leading firm in the industry. Data envelopment analysis (DEA) is the most frequently used method of frontier efficiency analysis in the insurance sector. DEA measures the relative performance of firms by constructing a comparison between a set of inputs and outputs and developing benchmarks which are related to industry best practices, relying on the notion that the widespread application of these could enhance performance throughout the entire industry (Barros et al., 2005).

It is of significance here to highlight the reason why Jordan and Palestine were chosen in the first place for this study, and why a comparison was struck between them. The issue of technical efficiency in insurance companies has not been thoroughly researched in Jordan and not at all in Palestine. Further, the two countries, geographically and culturally speaking, are of close proximity with each other. It is worth mentioning here that the West Bank was annexed to Jordan from 1950–1967 (Fischbach, 1994), which gave rise to the implementation of the Jordanian Law in the West Bank. It is for these reasons that the

study combined the two countries and compared the technical efficiency of the listed insurance firms in Amman Stock Exchange and Palestine Exchange Market.

1.2 Statement of Research Problem and Questions

Technical Efficiency is one of the most significant aspects of measuring the performance of a company (Abor et al., 2012). It is through this aspect that the company is expected to fulfill effective cost reduction, therefore improving profitability. The ability of insurance firms to constantly cover risks in economy depends on their capacity to achieve value or profit for their shareholders via the efficiency of operations to eliminate collapse. Therefore, the listed insurance firms in Palestine Exchange Market (PEX) and Amman Stock Exchange market (ASE) must be profitable in order to fulfil its claims to policyholders, otherwise they will collapse or merge with each other in order to survive, especially that the insurance companies listed in ASE already suffer from solvency issues (Altarawneh et al., 2022). Measuring technical efficiency scores is not enough in its own right; its determinants should be examined in order to enhance the technical efficiency of the listed insurance firms in ASE and PEX.

In light of what has been stated, these two main questions can be developed:

1. What are the technical efficiency scores in the listed insurance companies in PEX and ASE?

2. What are the determinants of technical efficiency in the listed insurance companies in PEX and ASE?

Consequently, the following sub-questions can be generated:

- What is the effect of company size on the technical efficiency of the listed insurance companies in PEX and ASE?
- What is the effect of capital structure on the technical efficiency of the listed insurance companies in PEX and ASE?
- What is the effect of profitability on the technical efficiency of the listed insurance companies in PEX and ASE?

- What is the effect of insurance type on the technical efficiency of the listed insurance companies in PEX and ASE?
- What is the effect of market share on the technical efficiency of the listed insurance companies in PEX and ASE?

1.3 Research Objectives

This research generally aims to study the technical efficiency of the insurance companies listed in ASE and PEX, both being developing countries, in order to improve the efficiency of the insurance sector, which in turn will benefit the economy of these countries. Further, the study will shed light on the factors determining such efficiency.

1.3.1 Research sub-objectives

- Evaluating the technical efficiency scores of the listed insurance companies in PEX and ASE.
- Studying the effect of **company size** on the technical efficiency of the listed insurance companies in PEX and ASE.
- Studying the effect of **capital structure** on the technical efficiency of the listed insurance companies in PEX and ASE.
- Examining the effect of **profitability** on the technical efficiency of the listed insurance companies in PEX and ASE.
- Examining the effect of **insurance type** on the technical efficiency of the listed insurance companies in PEX and ASE.
- Exploring the effect of **market share** on the technical efficiency of the listed insurance companies in PEX and ASE.

1.4 Research Importance

This research derives its importance from the fact that efficiency focuses on the reduction of costs for firms. It also results in less resources being wasted (Chou & Hao, 2005). From here, studying the topic of technical efficiency is of great significance since there are no previous studies tackling this issue in Palestine and few studies in Jordan. This research

will shed light on the topic of insurance technical efficiency as the scores of such efficiency in the insurance firms listed in PEX have not been evaluated before neither have the determinants of these firms' efficiency been examined. Further, this research studies the technical efficiency scores in the listed insurance firms in ASE, since few researches have looked into this topic in Jordan which gives rise to a comparison to be made between these neighboring countries. For example, the study of (Jaloudi, 2019) studied the technical efficiency scores of the listed insurance firms in ASE using data from the period (2000-2016). This research is different from Jaloudi (2019) research as it studies the listed insurance firms in PEX and ASE together in order to make comparison between their technical efficiency scores using panel data in the period (2016-2020) to see how the results differ from those of Jaloudi (2019). The study has considerable importance due to the valuable information it presents to investors, management, board of directors, and the bodies responsible for monitoring this sector like the Palestine Capital Market Authority (PCMA) and Central Bank of Jordan (CBJ). Additionally, the information provided by this research facilitates the decision-making process for the involved parties.

1.5 Definitions of Concepts

1.5.1 Efficiency

While measuring the performance level of an entity, efficiency is closely linked to productivity, as these two describe the input-output comparison. Efficiency measures effectiveness using minimum skills without having any time or effort wasted. Put differently, it requires the reduction of the number of non-essential resources used in the production of a given output. Both efficiency and effectiveness set out the performance of an entity. The former is used to produce maximum output employing the smallest cost, and the latter is a broader approach indicating the extent to which the actual results have been reached to meet the sought results by doing things accurately (Abdin el al., 2022).

1.5.2 Type of Efficiency

Determining a firm's efficiency is a significant tool for evaluating its performance and that of markets and entire economies. There are different types of efficiency such as technical efficiency, allocative and production efficiency, and 'X' efficiency, (YAO et al., 2007).

1.5.2.1 Allocative Efficiency

Allocative effeciency is characterestic of efficient markets where capital gets assinged in the most beneficial way to the parties involoved. It represents the optimal distribution of goods and services to consumers in a certain economy and the optimal distribution of financial capital to firms among investors. In allocative effeciency, goods, services and capital get alloted and distributed in a way to insure their most beneficial use. It occurs when private and public organisations spend their resources on the projects that are most profitable and are of benefit to the society, contributing to ecnomoic growht (Cummins & Misas, 2006).

1.5.2.2 Production Efficiency

Production effeciency is an ecnomic concept describing a level that once reached, it loses its ability to produce any more goods or services without lowering another product's level of production. This takes place when production is reportedly happening along a production possibility frontier (PPF). This type of effecieny is also known as productive effeciency, which means that a given business operates at its maximum capacity. As a term, production effeciency, in economics, invloves the charting of a PPF. Economists and operational analysists would typically consider other financial factors, such as capacity utilization and cost-term effeciency when studying ecnomic operational effeciency. In general, ecnomic production effeciency refers to a level of maximum capacity by which resources get utilized ultimately with the intention of prompting the possible most cost-efficient product. At maximum production effeciency, entities cannot manufacture any other units without considerably altering the process of production. Companies shall attempt to gain capeabilites of added capacity by lowering the production of another product (FECHER et al., 1993).

1.5.2.3 Technical Efficiency

Technical effeciency refers to the degree of productivity a business can reach with the fewest resources or inputs that are essential to do the job. An input is defined as any necessary quantifiable resource for the production of an output. Labor as well as equipment and material are forms of input. A firm described as technically efficient aims at being productive while using the minimum quantilty of inputs. The firm seeks to be as efficient as possible with the fewest inputs while simultainously achieving its production goal (Mack, 2017).

1.5.2.4 X-Efficiency

This term describes the extent to which effeciency is maintained by firms within the conditions of imperfect competition. Regarding this, effeciency means a company that obtains the maximum optputs using its inputs, where employee productivity and manufacturing effeciency are included. In a highly competitive market, firms are obliged to be as possibly as efficient to ensure strong profits and and a lasting existence. However, this does not apply to the situations of imperfect competition, such as duopoly or monopoly (Leibenstein, 1966).

1.5.3 Insurance

Insurance is a method of protection against financial loss. It is one of risk management forms that is basically employed to dodge the risk of a contingent or certain loss. An entity which provides insurance is called an insurer while an insurance firm is an insurance underwriter or carrier. An individual or entity covered under the policy is known as the insured. The terms policyholder and the insured are often employed but are not necessarily synonymous as coverage might sometimes include other insureds who did not obtain the insurance. The insurance transaction involves the policyholder who assumes a specified, guaranteed and relatively small loss that comes in the form of a payment to the insurer (premium) in exchange for the insurer’s promise to compensate the insured once a covered loss occurs. The loss may or may not be of a financial nature, but it must be reducible to financial terms (Loreau et al., 2021).

1.5.4 Insurance Premium

Insurance premuim is the amount of money that is paid by an individual or business for an insurance policy. Insurance premuims are paid for policies covering healthcare, auto, life and home insurance. Once earned, a premuim becomes an income for the insurance company. Futher, it represents a liability, for insurers have to provide coverage for claims made against the policy. The policy can be cancelled upon faluire to pay the premuim on the individual or business. When signing up for an insurance policy, the premuim, which is the amount paid for the policy, gets charged by the insurance. Policyholders may choose from different options to pay the premiums of insurance. Some allow the policyholder to pay through installments, either monthly or semi-annually. Others call for an upfront full payment before the comemencement of coverage (Thoyts, 2010).

1.5.5 Insurance Claims

Insurance claim is the formal request which polichholders present to insurance companies to get coverage or compensation for a covered loss or policy event. The claim then gets either validated or denied by the insurance firm. If it gets approved, the insurance firm issues a payment to the insured or to an approved interested party on behalf of the insured. Everything from death benefits on life insurance policies to routine and comprehensive medical exams is covered by insurance claims. So often, a third-party can issue these claims on behalf of the insured. However, in most of such cases, only the person(s) listed on the policy are entitled to claim payments (Thoyts, 2010).

1.5.6 Life Insurance

Life insurance is a contract signed between an insurer and a policyholder. A life insurance policy ensures that the insurer pays a certain sum of money to speicified benefeciaries in case the insured dies in exchange for the premuims which were paid by the policyholder during their lifetime (Billah, 1993).

1.5.7 Non-Life Insurance

Non-life insurance is a type of general insurance the holders of which get protected against non-life events such as property damage, personal injury and natural disasters-

events which occur during the policyholder's life. Further, this type of insurance covers damages such as medical bills, disability and lost wages, but it does not include the risk of death. There are several alternatives to non-life insurance which provide more value compared to a standard policy. Additionally, this kind of insurance might cover property, legal liabilites or people. Its types include: travel insurance, motor insurance and health Insurance (Ohlsson & Johansson, 2010).

1.5.8 Reinsurance

Reinsurance is also known as insurance or insurance for insurers or stop-loss insurance. It is the practice through which insurers transfer portions of their risk portfolios to other parties relying on a particular agreement form in order to minimize the probability of paying huge obligations that emerge from insurance claims. The party which diversifies its insurance portfolio is labelled as the ceding party. The party which accepts a portion of the likely obligation in exchange for a share of the insurance premium is known as the reinsurer. Reinsurance allows insurers to maintain solvency by recovering some or all of the amounts paid to claimants. It minimizes the net liability on individual risks and catastrophe protection from multiple or huge losses. This practice provides ceding companies which seeks reinsurance with the capacity of insuring their underwriting capabilities according to the number and size of risks. With reinsurance, insurers can underwrite policies covering a larger volume or quantity of risk without exceedingly raising administrative costs to cover the margins of their solvency. Additionally, reinsurances offer insurers considerable liquid assets in the vent of exceptional losses (Outreville, 1998).

1.5.9 Economies of Scale

Economies of scale are the cost benefits which companies, whose production is efficient, gain. Companies could achieve economies of scale by decreasing costs and increasing production. This happens since costs are spread over a large number of goods. Costs can be both fixed and variable. Ecmonies of scale might be both internal and external. The former depends on the decisions of the management while the latter has to do with outside

factors. Internal functions include marketing, information technology and accounting which are considered as operational synergies and effeciencies (Anwar, 2015).

1.6 Background of Insurance Sector in Palestine

Insurance was introduced to Palestine during the Ottoman era through the Assurance Companies Act which was issued in 1845. The act was concerned with issues such as covering financial losses. The law was known as the Insurance Contract Act which guarantees that financial losses (whether in moveable or non-moveable money) shall be compensated against damages and risks of any kind whatsoever. In 1929, Act No. 18 was issued which imposed commitments on the insurance companies that are subsidiary of foreign firms. Later in 1947, Act No. 8 was issued which concerns the insurance of vehicles during the period of the British Mandate. After the 1948 Nakba, the West Bank was annexed to Jordan. The Jordanian Law established the System of Insurance Companies No. 24 in 1959. Six years later, it enacted the Supervision of Insurance Businesses Act in 1965. The System of Supervising Insurance Companies No. 76 was also established in the same year. In 1976, the Israeli law issued Act No.662 which stipulates that every employer is obliged to insure their employees. In 1992, two companies were established. The first one is the National Insurance Company which is the first licensed Palestinian insurance company with an estimated capital of 5 million dollars. The other is the Al Mashreq Insurance Company (Palestine Capital market Authority, n.d.).

Since 1993, the Palestinian Authority has begun supervising the Insurance industry. A year later, the geographical range of its supervision got expanded. Pursuant to an agreement concerning the transfer of power, the Palestinian Authority became the legally authorized body to supervise the insurance sector including the licensing of insurers and agents and supervising their business-related activities. The Palestinian laws have maintained a compulsory compensation system covering the victims of road accidents. In 1994, three companies were established: Trust International Insurance Company with an estimated capital of 10 million dollars; Palestine Insurance with an estimated capital of 5 million dollars; and Ahliea Insurance Group. In 1995, Arab Insurance was established, and in 1996 a subsidiary of a foreign insurance company was opened (American Life

Insurance Company). In 1997, Palestine Mortgage and Housing Company was established with an estimated capital of 20 million dollars (Palestine Capital market Authority, n.d.).

The insurance sector suffered from the absence of legalizations and governmental supervision. It also suffered from the chaotic business environment and the long-term lack of confidence in insurance. This was the case until the establishment of the Palestine Capital Market Authority which became the legally authorized body to supervise and regulate the insurance sector in 2004. The issuance of the Insurance Act No. 20 in 2005 was such a significant help in rearranging the insurance sector. In 2005, Act No. 20 was issued which regulates the insurance sector. Under this act, the Palestinian Insurance Federation was established which in turn gave the insurance industry a big boost as it achieved cooperation with the competent authorities and raised awareness regarding insurance (Palestine Capital market Authority, n.d.).

Being the legally-authorized body, the PCMA have, through the general administration of insurance, set detailed policies aiming at developing and improving the insurance sector, establishing the required systems, and providing the proper environment that would help the sector of insurance to thrive, bringing benefit to the entirety of the economic activities in Palestine. It also works constantly on setting plans that would develop and regulate the insurance sector and raise awareness about insurance among society. Additionally, it aspires through its vision to enhance its performance and improve its abilities and its monitoring efficiency in accordance with the international standards and practices by improving its laws and regulations and the internal work systems in a way that guarantees efficiency in practicing its supervisory role (Palestine Capital market Authority, n.d.).

In 2008, Al-Takaful Insurance was established with an estimated capital of 8.5 million dollars. Two years later, Global United Insurance was established in 2010. Later in 2017, Tamkeen Insurance was established to be the second Islamic insurance company operating in Palestine (Palestinian Insurance Federation, 2022).

Today, there are 10 insurance companies in Palestine, two of which practice Islamic insurance, five practice general and life insurance, one practices mortgages, another practices life insurance only and three practice general insurance (Palestinian Insurance Federation, 2022).

1.7 Background of Insurance Sector in Jordan

In the early 1940's, insurance as a sector had no tangible form in Jordan, mainly because of the small population with less than 400,000 people and the limited geographical scope. Still, it was at this time that the country began to experience a rise in trade and traffic activities across Jordan to the neighboring countries due to the key role practiced by the Ottoman Bank in the economies of East Jordan back then. The Bank would insure products and imports using the London-based Eagle Star Insurance company, in which the Bank functioned as a commission-based agent (Jordan Insurance Federation, n.d.).

Insurance began to take shape as an economic activity in the mid-1940s. The first insurance agency was launched in Jordan in 1946. Al Sharq Agency was founded in Amman by Raouf Saad Abu Jaber and was affiliated with an Egyptian insurance company. This agency concentrated on life insurance business as other kinds of insurance were not highly demanded in Jordan (Al Naif & Alhinati, 2016).

After the economic development witnessed in Jordan during the fifties and onwards, the kingdom saw the rise of professional insurance bodies, regulatory and legislative frameworks and the establishment of insurance firms (Al Naif & Alhinati, 2016).

In the 1950s, the Jordanian market witnessed an increase in the activities of car insurance sector (car accidents) and sea shipping when Jordanians had to bring goods into Aqaba port, which called for a strong need for vehicles to transport these goods. The coverage needed in such field called for the establishment of insurance companies. The first company that was established is the Jordan Insurance Company in 1951. During this phase, it was of importance to regulate this field to limit the fierce competition that emerged in the market and the inability to meet the huge demands of some companies and agencies. Therefore, the Jordan Association for Insurance Companies was established (Khsawni, 2022).

In 1956, a group of insurance pioneers launched the 'Jordan Insurance Association for Insurance Companies'. This was the first professional insurance body meeting the demands emerging from the country's economic development. The Association's preparatory committee gathered at the Orthodox Club, which still operates until today, in Amman and elected the Association's committee. The committee was headed by A.D Ledger (Agent - representing Arabia Insurance Co. in Jordan), Elias Habayeb (General Manager of Steele Insurance Agency representing British Royal) as Vice Chairman, and Raouf Abu Jaber (Agent of Egypt's Orient Insurance Co.) as the Secretary of the Association. Additionally, two other members were selected later (Khsawni, 2022).

During the 1960s, the Jordanian market witnessed an increase in the number of Jordanian insurance companies. The Middle East Company was established with a capital of 200,000 JD. This was closely followed by the establishment of the National Insurance Company. After that, Act No. 5 was issued in 1965 as the first law regulating the activities of insurance in Jordan. This law was responsible for supervising the insurance sector under the Insurance Supervision Department in the Ministry of Commerce and Industry. From 1972-1985, the number of insurance companies increased in Jordan, exceeding 30 (Arab Jordanian Insurance Group, n.d.).

The general situation of the sector remained the same during the 1970s until mid-1980s. The number of insurance companies became 33 divided between companies, branches and agencies. Out of these companies, 23 are local and the rest are foreign ones operating in a market whose share premium does not exceed 33 million JD. Given the economic recession in the late 1980s, as well as the random competition in a small market and the low insurance prices, a lot of insurance companies incurred losses back then. This led the government to issue the Act of Supervising Insurance Activities No. 30 of 1984 of which Article 56 stipulated the suspension of issuing new insurance policies. Article 6 (A) of the same Act stipulated the raising of insurance company's capital to 600,000 JD and obliged insurance companies to improve their situation either by merging or raising their capital. All these measures lowered the number of insurance companies to 17 local companies in addition to 1 foreign company in 1987 (Khsawni, 2022).

1.7.1 Unified Insurance Office for Compulsory Motor Insurance – 1987

In 1987, The Insurance Supervision Directorate at the Ministry of Industry and Trade gave its instructions in order to establish the Unified Insurance Office (UIO) for Compulsory Motor Insurance whose operations began in April 1987. The main goal of the Office was organizing the operations of compulsory motor insurance on behalf of insurance firms under the supervision of the Federation. This was in harmony with compulsory motor insurance system's requirements in order to guarantee the commitment of insurance firms to pay claims for policyholders. The Office was supervised by Jordan Insurance Association, which managed the issuing of compulsory (third-party) motor insurance policies and their distribution to insurance firms. Eleven branch offices were established for the UIO with the goal of providing compulsory motor insurance services. After the establishment of Jordan Insurance Federation in 1989, the Office started operating under its umbrella (Jordan Insurance Federation, n.d.).

1.7.2 Jordan Insurance Federation – 1989

The Jordan Insurance Federation was founded in 1989 following a Royal Decree that goes in harmony with regulation No. 30 of 1989- 'The Regulation of Jordan Insurance Federation', issued following Article 41 of Insurance Regulation No. 30 of 1984. The Federation is recognized as Jordan Insurance Association successor. In agreement with the Federation's Articles of Association, Article (4A) specified the Federation's objectives, involving the development and upgrading of the insurance industry, and elevating the standards of practice. They further emphasized the sustaining of the validity of insurance pools and agreements conducted under the statutes of the Jordan Insurance Association (Jordan Insurance Federation, n.d.).

1.7.3 Jordan Insurance Brokers Association

Brokerage businesses in Jordan are recognized under the Jordan Insurance Brokers Association, which was registered in 2005 in agreement with the Societies and Social Bodies Law No. (33) of 1966 along with its amendments. The Association's objectives involve developing and organizing the activities of insurance brokerage, elevating the standards of the profession by the means which were adopted by the Association, such as

preparing studies, analyzing the marketplace and developments of cadres working in the profession (Jordan Insurance Federation, n.d.).

1.8 Insurance Regulatory Bodies in Jordan

1.8.1 Insurance Business Regulatory Directorate

In the 1960s, the Ministry of National Economy (known today as the Ministry of Industry and Trade) established an administrative unit named 'Insurance Business Regulatory Directorate'. The unit was managed by the Insurance Regulator who is responsible for the monitoring and organizing of insurance services and activities that are offered by the whole of entities indulge in insurance business, in harmony with the Insurance Regulation Act No. (5) of 1965. The Directorate is responsible for the implementation of the regulations and provisions related to licensing, establishing, and record keeping for national and foreign insurance firms in the Jordan Insurance Market and the providers of ancillary service providers, agents and brokers included the directorate stayed operating till 1993 upon establishing the Insurance Commission as an independent regulatory body in agreement with Insurance Regulatory Act No. (33) (Jordan Insurance Federation, n.d.).

1.8.2 The Insurance Commission – 1999

Towards the end of 1999, the Insurance Commission (IC) was set up as a public institution aimed at protecting the rights of policyholders and improving the services of insurance in Jordan. The IC was established in harmony with Insurance Regulatory Act No. (33) of 1999, which specifies the supervision and regulations for providing an appropriate environment to improve and develop the role of the sector as an economic facility. The IC replaced the Insurance Directorate, established in 1965 under the Ministry of Industry and Trade. Part of the functions of the IC is adopting annual plans, programs and strategies that are based on two foundations. The first concentrates on setting the technical, legal and financial frameworks to organize the insurance industry. The second focuses on the essential means and techniques that are needed to improve the quality of the institutions of the sector in harmony with the modern international standards of institutions. For fourteen years, the IC constantly performed its tasks until being scrapped

in 2014 with the creation of the Insurance Administration at the Ministry of Industry, Trade and Supply (Jordan Insurance Federation, n.d.).

1.8.3 Central Bank of Jordan

The Central Bank of Jordan started supervising the insurance sector from June 15th, 2021 after the issuance of the Act No. 12 in 2021 which regulates the activities of the insurance sector. The Insurance Supervision Department undertakes the task of regulating the insurance sector, including supervising the insurance companies and insurance services providers in a way that guarantees their wellness of their financial centers and the protection of the insured rights pursuant to the enforced regulations. This is aimed at providing the appropriate environment to develop and enhance the role of the insurance industry in securing people and property against risks to protect the national economy and gather savings to invest them in supporting the growth of the country.

In 2021, Jordan Insurance Federation which comprises 22 insurance firms as members that are licensed to practice in Jordan. Fourteen of these are composite insurers. Seven others provide general and medical insurance services, and a single foreign firm offers life and medical protection covers. In Jordan, insurers offer a wide range of insurance covers such as marine (insuring exported and imported cargo), fire, compulsory and comprehensive motor insurance, credit insurance, earthquake and general accident protection, life, liabilities, medical insurance protection and personal accidents as well as other insurance protection covers. The insurance market in Jordan does not involve a reinsurance firm. Insurance firms reinsure their operations after they deduct retention via foreign and Arab reinsurance firms. Even more, insurance firms exchange capacities by coinsuring large risks jointly (Jordan Insurance Federation, n.d.).

1.9 Positive Accounting Theory

Positive accounting theory (PAT) holds that accounting theory aims at explaining and anticipating the practices of accounting. It tries to illustrate a process relying on the knowledge, understanding the ability of accounting in addition to the most suitable policies of accounting for handling specific future conditions (Patty et al., 2021).

The development of this theory is inseparable from dissatisfaction with normative theory (Watts and Zimmerman, 1986). Additionally, it has been said that the rationale for the analysis of accounting theory using the normative approach was very simple and failed at providing a solid theoretical ground.

Agency theory stands as an example on PAT failure. It takes origin within its reliance on a presumption of level-headed conduct which on the one hand is narrow and on the other is wide and conflicting (Srivastava & Baag, 2020). It is a principle found to solve and illustrate some of the issues regarding the relationship between business principal and their agents. In a common sense, this relationship is the one that holds between shareholders, being principal, and company executives, bring agent (Srivastava & Baag, 2020).

In a broad sense, an agency is any relationship holding between two parties where the agent, one of the parties involved, represents the other, the principal, in day-to-day transactions. The agent has been hired by the principal(s) to perform a service on their behalf (Patty et al., 2021).

Principals delegate the authority of decision making to agents. However, since a majority of the decisions made by the latter can affect the former financially, differences in opinions and priorities may arise. Agency theory holds that the interests of principals and agents are not always consistent with each other, which is often referred to as the principal agent-problem (Safriliana et al., 2018).

At the industrial or firm level, performance is defined as the ratio of output(s) that are produced by a production unit to the input(s) that are used by such a unit (Kokkinou, 2010). So, for monitoring and accountability purpose, principals should review the efficiency and performance of the management to check whether or not they are using their resources in the best way.

PAT theory relates to this research since it examines factors that can be affected by the agency problem between shareholders and management.

For instance, a management may decide to increase the size of its firm by buying new assets and opening new branches. Shareholders however may not accept this step from the management as it could involve some risk. The new branches might not be successful causing losses to the firm and eventually affecting its net income and the EPS for the owner. Therefore, the agency problem affects firm size which in turn affects the efficiency of the firm.

Profit is a very important point for shareholders, and that is why management should do it best to maximize the wealth of the owners. The management's performance should be efficient in order to generate a high profit. Agency problem can arise between the management and owners at this stage. If the management fails to get the amount of profit required by the owners, shareholders may want to replace the management by hiring a new one to run the company, which increases the operating expenses, and consequently affects efficiency.

Capital structure, defined as how the company finances its resources, could influence its efficiency. When a company finances its assets via equity, it becomes able to pay dividends. On the other hand, however, if the management decided to finance its resources by debt, this would cause interest expense and the company would not pay dividends eventually. Therefore, capital structure in this sense could become an agency problem between principals and agents.

Once the management of a non-life insurance company decides that it wants to enter a new business, life insurance for example, this can give rise to some agency problems because agents will need new resources to run the new business. From here, business type is linked with capital structure and both can result in problems between principals and agents.

1.10 Neo Classical Theory

1.10.1 Neo Classical Growth Theory

Neoclassical growth theory is an economic theory outlining the way by which a steady economic growth rate arises from a group of three driving forces, which are capital, labor and technology. The National Bureau of Economic Research credits Trevor Swan and Robert Solow for developing and introducing the long-term economic growth model in 1956. The model, in the first place, regarded the rises of exogenous population to set the growth rate, but Solow integrated technology change into the model in 1957. The theory states that short-term equilibrium emerges through the differing amounts of labor and capital in the production function. Further, the theory argues that technology has a significant influence on a certain economy, and that economic growth does not have the ability to survive without technological advances. This theory clarifies the three factors needed for a growing ecnomy namely capital, labor, and tecnology. It holds that temporary equilbrium is not the same as long-run equilbruim, which does not require any of the factors mentioned previously (Hahn, 2010).

The neo classical connects to this research as it deals with three factors related to efficiency: labor which represents operating expenses used in estimating efficiency scores in the listed insurance firms in Palestine and Jordan stocks exchange markets; capital which is related since firm size and capital structure are examined to see their effect on technical efficiency, and technology which can play a significant role in improving efficiency. The listed insurance firms in Palestine and Jordan stocks exchange markets could develop new technology to improve its efficiency and profit.

1.10.2 Neo Classical Distribution Theory

The main idea upon which this theory is based is that incomes (profit) are earned in the production of goods and services and that the value of the productive factor spreads its contribution to the whole product. Apart from the fact that this fundamental truth was formerly recognized at the beginning of the 19th century (by the French economist J.B.), its evolution was slowed down by the complexity of separating the contributions of the various inputs. To some extent, they all matter for the final result (outputs); there would

be no product, if there was no labor (operating expense), and output would be minimal without capital total (Ferguson, 1970).

This neoclassical theory of the firm views the firm as an entry that has a hyper-retinality behaviour. It supposes that a company makes reational decisions according to profit maximization principle. The theory recognises cost minimization or profit maximisation as the criteria of effeciency. It also examines how companies join between labor (operating cost) and capital (capital structure) with the intention of minimzing the average cost of output (Dargiri, 2017).

Technical efficiceny scores of the listed insurance firms in Palsetine and Jordan stocks exchange markets are estimated by mixing varaibles inputs and outputs. Labor is used in the estiamtion process as its represenst the operating expenses for insurance firms. After that, the capital strucutre for these firms is employed to test the effect it has on the efficeny scores.

1.11 Structure-Conduct-Performance

Structure-Conduct-Performance (SCP) paradigm is rooted in the 1930s works of Edwan Mason who is a Harvard economist. In the 1930-60, It was made popular with its empirical work including the identification of correlations among industry structures and performance. This is a foundational paradigm to industrial organization economies that is consistent with the positional view of strategy, in opposition of the resource-based view of strategy. There exists two hypotheses that are competing in the SCP paradigm: the traditional “structure performance hypothesis” and “efficient structure hypothesis” (Matyjas, 2014).

According to SCP, an industry’s performance, which is the industry’s success in benefiting consumers, is dependent on its firm’s conduct, which in turn relies on the structure (factors determining the market’s competitiveness). The Industry’s structure then relies on basic conditions such as, demand for product and technology. For instance, in an industry with technology such that, the average cost of production is falling as output increases. The industry is likely to have one company, or a small number of companies. The SCP paradigm asserts that market structure would identify company conduct,

determines performance in turn. The company's performance can be measured using a group of indicators such as profitability and efficiency (Matyjas, 2014).

Structure is used to refer to market structure. The variables employed to describe the structures of market involve degree of product differentiation, seller concentration, size and number of competitors and barriers of entry. Conduct is used to refer to a company's behavior. The variables that are employed to depict a company's behavior involve collusion, advertising, pricing strategies, capacity investment and research and development. Conduct is sometimes interpreted as to whether companies compete or collude (Weiss & Choi, 2005).

Performance is used to refer to equilibrium or outcome measured with regards to allocative efficiency. The most used variables to assess performance are profitability and price-cost margin. In the SCP framework, performance has two meanings: the performance of individual companies and that of the entire economy. The logic of the SCP framework says that market concentration lowers collusion cost between companies and brings hyper normal profits. The lower the number of companies in the market (concentrated structure); the less competitive is the company's behavior (price levels are elevated and/or weak output). In other words, the basic idea of the SCP framework is that the industry's structure specifies behavior (conduct) and impacts its performance (Weiss & Choi, 2005).

The SCP approach supposes that market structures which are identified by many companies offering the same products and services, but relatively equal in size, are competitive markets promting greater performance. The SCP approach simply sees market structure as exogenous, meaning that the structural characteristics of markets are what is likely to dictate the impact of both the conduct and the performance of companies. SCP assumes the existence of a positive relation between performance and market concentration which is a function of the number of companies and their respective shares of the entire production (stated differently, total reserves or total capacity) in a market (Base, 2021).

This theory relates to this research by examining the impact of market concentration (represented by market share) on technical efficiency.

1.12 Efficient Structure Hypothesis

The efficient structure hypothesis (ES) holds that what explains the positive relation between market concentration and profitability is effeciency. Companies that are efficient are expanding in size and market share given their ability to make higher profits. Based on (ES), the relation between concentration and performance is not because of corporate collusion, instead it is the result of the firm's effeciency (Jaloudi & Bakir, 2019).

Firms that are better efficient can impose lower prices compared with their competitors, which enables them to obtain a larger market share. Charging lower prices allows them to consistently make ecnomic profits. Additionally, their comperative advantage of being better efficient enables them to get a lager market share, leading to enhanced market concentration, which in turn benefits both of the company and the consumer; the efficient company would make higher profits and the consumer benefits from the lower prices (Mensi & Zouari, 2010).

Consequently, larger companies can achieve higher profits if they have a comperative advantage without even having to resort for collusive measures, such as supply restrictions or price increases (Jaloudi & Bakir, 2019).

The research examines the market share of listed insurance firms in Palestine and Jordan stocks exchange markets and its effect on technical effeicny to see whether or not the firms with high market share are more effeicnt or not as well as examine firm size and profit which are related to market share with efficeiny.

1.13 Theory of Production

In economics, the theory of production is an effort made to explain the principles according to which a company decides how much of each product or output it would produce and sell, and how much of each type of raw material, labor, fixed capital good, etc., which it employs (its factors of production or inputs) would use. This theory revolves around some of the most basic economic principles, such as the relation between

commodities prices and the rents/wages or prices of the productive factors that are used to produce them, and additionally the relation between commodities prices and productive factors and the quantities of such commodities and the productive factors that are used or produced. The different decisions made by a business company regarding its productive activities could be categorized into three layers of growing complexity. The first involves decisions made regarding the methods used in producing a certain quantity of the output in a factory of certain equipment and size. It includes the issue of what is known as short-run cost minimization. The second layer, which involves the determining of the most profitable quantities of products to produce in any factory, has to deal with what is known as short-run profit maximization. The third layer, which involves the determining of the most profitable equipment and size of factory, deals with what is known as long-run profit maximization (Dorfman, 2016).

This theory is closely related to this study as the effect of market shares (the amount of insurance service provided) will be observed on the efficiency of the insurance companies listed in Jordan and Palestine. Further, this theory discusses firm size and links it to output, which is relevant to this study as shall be seen from the effect of firm size on the technical efficiency of the listed insurance companies operating in Jordan and Palestine.

1.14 Background and Literature Review

The topic of technical efficiency has been explored by many researchers given its importance in improving the productivity of insurance firms (Abdin, Prabantarikso, Fahmy, & Farhan, 2022). By reviewing reviewed the previous literature through the online published books and studies, it has been noticed that the results of such studies vary from one another due to different factors such as methodology, sample size, type of efficiency, and the economic environment of each country in the examined sample.

1.14.1 Firm Size

Firm size was one of the most significant factors affecting efficiency, according to (YAO et al., 2007), (Luhnen, 2009), (Kader et al., 2010), (Abor et al., 2012) and (Jaloudi, 2019) who studied the realtion between effciency and firm size in different economic environments. Their findings were that firm size has a positive relationship with

efficiency. According to them, this is attributed to economies of scale. In other studies, however, firm size was found to have a negative relation with efficiency according to (Fenn et al., 2008), (Barros et al,. 2008) and (Danquah et al, 2018) with diseconomies of scale being the reason for this, which increases the production volume leading to an increase in production costs per unit. The discrepancy of the results severs as an encourging motive to study the relatoin between firm size and technical efficency in the Palestinanin and Jordainian insurance markets.

By looking into the related previous literature the following hypothesis can be generated:

H1: There is positive a relationship between firm size and technical efficiency of the listed insurance companies in PEX and ASE.

1.14.2 Capital Structure

There is a good number of studies which have discussed the effect of capital structure on technical effeciency. For instance, (Danquah et al, 2018) and (Abor et al, 2012) examined the effect of capital structure on technical effeciency for the insurance companies operating in Ghana and found that equity capital affects technical effeciency in a negative way. The results of their studies were consistent with (Kasman & Turgutlu, 2009) who studied the effect of capital structure on efficiency in turkish insurance firms and (Barros et al., 2008) who stuided the effcet of capital structure on insurance firms in Nigeria. The results of these studies indicate that companies which raised the portion of their assets owned by shareholders reduced their cost effeciences via the dividends and other agency related problems. Equity capital holdings relative to total assets limited resources allocation to producing output, generated expenses for the insurance companies and led to the reduction of effeciency. These studies suggested that insurance companies could use less equity and/or more debt to finance its capital in order to achieve better effeciency.

From the above the following hypothesis can be develpoed:

H2: There is a positive relationship between capital structure and technical efficiency of the lsited insurance companies in PEX and ASE.

1.14.3 Profitability

Profitablity is of crucial importance when it comes to insurance companies, for it reflects performance and is closely associated with effciency since both are significant in achieving the company's goals. ROA is employed to express profitability. (Jaloud, 2019), (Grmanová & Strunz, 2017) and (Diacon, 2001) have found that profitability and teachnical effciency have a positive relationship, (Nadeem et al., 2022) studied the technical efficiecny for Pakistani banks and its determinanits found the same resutlts. They concluded that the increase in the firms' profit leads to a reduction in the inputs required in prodction as the firm is generating more outputs(profit) form their given inputs.

From the abovementioned, the following hypothesis can be generated:

H3: There is a positive relationship between profitabilty and technical efficiecny of the listed insurance companies in PEX and ASE.

1.14.4 Type of Insurance

The type of business provided by insurance companies can have an impact on its effeciency. By way of example, (Danquah et al, 2018) found that the type of insruance is a key factor in determinning cost effeciency. (Abor et al, 2012) and (Danquah et al, 2018) found that life insurance companies were costly efficient compared with non-life companies. According to them, this result can be explained by the people's limited knowledge of non-life insurance companies' products, and the fierce competition in the life insurance business as opposed to that of non-life.

From here, the following hypothesis can be developed:

H4: There is a positive relationship between type of insurance and technical efficiecny of the listed insurance companies in PEX and ASE.

1.14.5 Market Share

According to the previous literature that examined the relation between market share and efficiceny, it has been observed that the results varied across the selected previous studies. For instence (Barros et al, 2008) -who studied the efficency of Nigerian insurance firms- found this relation to be possitve, which goes in line with the results of (Abor et al, 2012) who studied the technical efficency of Ghana's insurance firms. Both of these studies employed the same methodology which is data envolpment analysis (DEA), and regression analysis. They explained their findings in light of traditional structure conduct-performance hypothesis. On the other hand, there are othere studies in which the relation between market share and effeciency proved to be negative, such as (Fenn et al., 2008) who studied the relationship between market structure and European insurance firms, using data envolpemnt analysis and (Danquah, et al, 2018) who studied the efficency of insruace firms operating in Ghana using the methodology of stochastic frontier analysis. According to them, the relaionship was found to be negative due to the firece competition in the insurance industry because of which companies spend more compared with what they receievce from premium revenues.

This leads to the development of the fifth hypothesis in this research which reads:

H5: There is a positive relationship between market share and the technical efficiency of the listed insurance companies in PEX and ASE.

Chapter Two
Research Methodology

2.1 Introduction

This research aims to estimate the technical efficiency of the listed insurance firms in PEX and ASE, and determine the factors affecting it. This chapter contains the sample of the study, research techniques, research model, and measurements of variables.

2.2 Sample of Study

There are 10 insurance companies operating in the Palestinian market, 8 of which are listed in Palestine Exchange Market (Palestinian Insurance Federation, 2022), whereas in Jordan there are 22 insurance firms, 20 of which are listed in Amman Stock Exchange (Jordan Insurance Federation, 2022).

The study uses panel data for 6 out of 10 insurance firms listed in Palestine Exchange Market, and all the 20 listed insurance firms in Amman Stock Exchange Market. The excluded firms are so due to the unavailability of data covering the entire period of study.

This conforms to the DEA convention requiring that the minimum number of DMUs is three times greater than the number of inputs plus outputs (Abor et al, 2012).

In this study, quantitative research design will be employed by relying on secondary data obtained from the annual financial statements of the insurance firms listed in the stocks exchange markets of Palestine and Jordan over the period (2016-2020).

2.3 Research Techniques

2.3.1 Data Envelopment Analysis

Data Envelopment Analysis approach (DEA) is going to be employed in order to evaluate the scores of technical efficiency.

Data envelopment analysis, which is known as DEA, is a linear programming technique that was brought about through the works of Cooper, Charnes and Rhodes (1978). This technique is non-parametric and is employed in the evaluating of the functions of

production. It has also been extensively used to evaluate measures of technical efficiency in multiple industries (Jaloudi, 2019).

This approach is empirically employed to measure the productive efficiency of decision-making units (DMUs). The method is also employed for benchmarking in operations management, where a specific group of measures is chosen to benchmark the performance of service operations and manufacturing. In benchmarking, the DMUs that are efficient according to DEA are not necessarily supposed to form a production frontier; rather, they are supposed to lead to a 'best-practice' frontier (Kader et al, 2010).

Contrary to parametric methods which call for the ex-ante specification of a production-of cost-function, non-parametric approaches compare feasible input and output combinations only on the basis of available data. DEA, which is one of the mostly-used non-parametric methods, owes its name to the enveloping property of the dataset's efficient DMUs, where the most efficient DMUs, which are empirically observed, form the production frontier which all DMUs are compared against. The popularity of DEA originates from its relative lack of assumptions, its ability to benchmark multi-dimensional inputs and outputs, and its computational ease due to its state of being expressed as a linear program, regardless of its task to calculate efficiency ratios (Abor el al, 2012).

DEA is the mostly applied method determinng effeciency scores for insurance companies (Barros et al., 2008). This is carried out via comparing between inputs and outputs and conducting a comparison in relation to best practice. There are two appraoches that could be used to determine technical effciency (NOURANI el al., 2018). The first is input oriented approach, which minimizes the use of inputs to the lowest level while the level of output remains the same. The second is the output oriented approach, which maximizes the level of production to the highest level while the level of input remains the same. These two appraches can be specified into variable return on scale (VRS) and constaint return on scale (CRS). Under VRS, the output is not going to rise in the same proprtion that is related to rise in inputs. Under CRS, output has to increase as much as input increases (Jaloudi, 2019).

Advantages of DEA:

1. There is no need to specify explicitly a mathematical form for the function of production.
2. It is capable of dealing with multiple inputs and outputs.
3. It is capable of being employed for any input-output measurement, even though ordinal variables stay tricky.

Disadvantges of DEA:

1. The sensitivity of the results to the selection of inputs and outputs.
2. DMU's effeciency scores might be obtained through the use of non-unique combinations of weights on inputs and/or output factors.
3. Efficient firms on the frontier number rises with the number of input and output variables (Ali & Lerme, 1997).

Input-oriented approach- CRS shall be applied here, variables used in DEA described in the following table:

Table (1)

Inputs and outputs for technical efficiency (dependent variable).

Inputs	Reference	Output	Reference
Total operating cost	(Abor, et al, 2012) (Jaloudi, 2019) (Ajlouni & Tobaishat, 2010)	Profit or loss	(Abor, et al, 2012)
Total capital	(Abor, et al, 2012)	Investment income	(Abor, et al, 2012) (Jaloudi, 2019) (Ajlouni & Tobaishat, 2010)
Net incurred claims	(Grmanová & Strunz, 2017)	Net earned premiums before commissions	(Jaloudi, 2019)

Table (2)

Measurements of inputs and outputs for dependent variables

Variables	Description
Total operating cost	Include allocated employee benefits expense, allocated administrative and general expense, unallocated employee benefits, and unallocated administrative and general expense.
Total capital	Include paid in capital, reserves and retained earnings.
Net incurred claims	Include Paid-up claims, Reinsurer's share of paid up claims, Change in reserve of outstanding and unreported claims, and Reinsurer's share of change in reserve of outstanding and unreported claims
Profit or loss	Include net income after taxes from all operations of company
Investment income	Include profits arising from financial investments as well as the interest on deposits in banks and interest on bonds owned by the firm
Net earned premiums before commissions	Include Gross written insurance premiums, Change in unearned premiums, Gross reinsurers' premiums, and Reinsurers' share of change in unearned premiums

According to (Erdemir, 2017) the model of input oriented CCR can be defined as:

$$\max h_k = \frac{\sum_{r=1}^{s} u_{rk} Y_{rk}}{\sum_{i=1}^{m} V_{ik} X_{ik}}$$

$$\frac{\sum_{r=1}^{s} u_{rk} Y_{rk}}{\sum_{i=1}^{m} V_{ik} X_{ik}} \leq 1 \; ; j = 1, \ldots, n$$

$$u_{rk} \geq 0 \; ; r = 1, \ldots,s$$

$$V_{ik} \geq 0 \; ; i = 1, \ldots,m$$

X: shows the I^{th} input variable which is used by J^{th} decision making units.

Y: shows the r^{th} output variable which is used by J^{th} decision making units.

N: the number of decision-making units, minimum number of DMU must be garter three time than number of inputs plus outputs (Abor et al, 2012).

u_{rk} and V_{ik} represents the weights for input I and output r (divided by total assets) for k^{th} decision-making unit.

Where $0 < I \leq m$ and $0 < r \leq s$

2.3.3 Panel data regression

Random-effect regression and Fixed-effect regression used in order to see the effect of all of all independent factors on dependent variables, after that Hausman test applied in order to decide which type of regression to take based on the result we use.

2.4 Research Model

The suggest model is as follow:

Y_{it}= a+ B1log (firm size) $_{it}$+ B2(capital structure) $_{it}$+ B3$(ROA)_{it}$+ B4$(type)_{it}$+ B5log (market share) $_{it}$ + e_{it}

Y: Technical efficiency

a: Constant

Size: Logarithm of total assets

Capital structure: Logarithm of equity to total invested assets

ROA: Return on assets

Type: Dummy variable, 1 for compound / 0 for non-life

Market share: Logarithm market share of insurance firms in its market

B: Parameters

e: Random error

i and t: - indicator for individuals and time

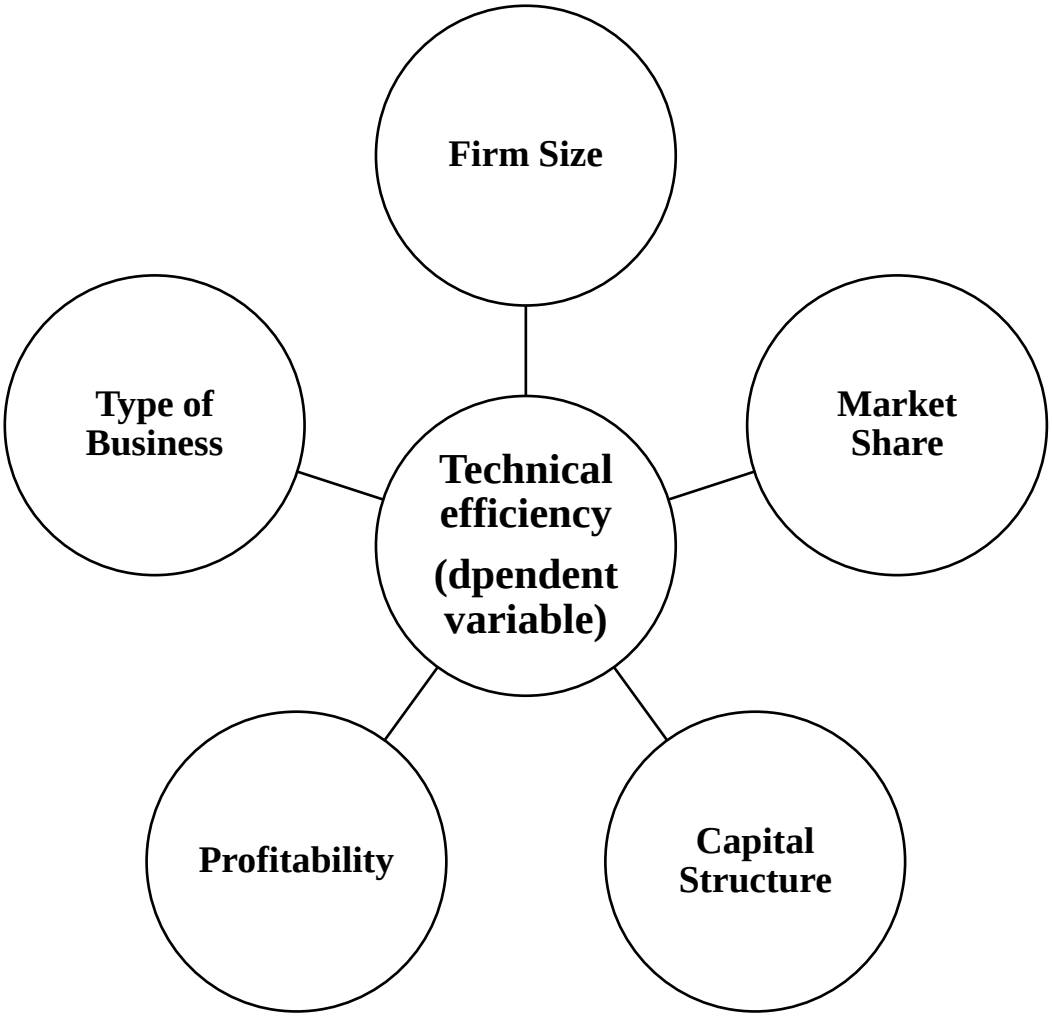
Table (3)

Independent variables measurement

Independent variable	Measurement	Resources
• Size	Logarithm of total assets	(Barros, et al, 2008) (Abor, et al, 2012) (Jaloudi, 2019)
• Type	1 compound firms/ 0 for otherwise	(Jaloudi, 2019)
• Return on Assets	Net income/total assets	(Jaloudi, 2019)
• Market share	Firms gross premium / total gross premium	(Barros, et al, 2008) (Abor, et al, 2012)
• Capital structure	Equity / total assets	(Barros, et al, 2008) (Abor, et al, 2012)

Figure (1)

Research Model



Chapter Three

Data Analysis and Findings

3.1 Introduction

This section discusses the DEA results which represent technical efficiency scores and discusses the statistical analysis of the factors that affect these efficiencies in addition to descriptive analysis, correlation analysis, variance inflation factor and panel data analysis.

3.2 DEA Results

Table (4) and table (5) show the average of technical efficiency per year for the listed insurance firms in PEX and ASE during the period (2016-2020). Five years for each insurance firm.

Table (4)

Average technical efficiency per year for insurance firms listed in PEX

Year	Average
2016	0.619
2017	0.618
2018	0.616
2019	0.615
2020	0.614

The results of DEA show a slight decrease in technical efficiency of the listed insurance firms in PEX, as it was 61.9 percent in 2016 and decreased to 61.4 percent in 2020. The year 2020 witnessed the lowest level of technical efficiency as it was 61.4 percent. From the results, the insurance sector in Palestine is not considered to be fully efficient. There is room for enhancement to be done; the sector as a whole is not mixing its inputs in the best way possible to get certain outputs.

Table (5)

Average technical efficiency per year for the listed insurance firms in ASE

Year	Average
2016	0.594
2017	0.592
2018	0.592
2019	0.592
2020	0.592

The results show that the average technical efficiency of the listed insurance firms in ASE during the period 2016-2020 were constant at 59.2 percent which is lower than that of the listed insurance firms in PEX for each year, which indicates that the insurance firms operating in Palestine are more efficient than the insurance firms operating in Jordan. This could be attributed to the difference in the nature of insurance environment between the two countries.

The insurance sector in Jordan is bigger than that of Palestine, therefore the number of the insurance firms operating in Jordan is larger compared to those operating in Palestine, which leads to a higher completion in Jordan. It is due to this highly completion that the listed insurance firms in ASE cannot mix their inputs and outputs in the best way.

Tables below show the average technical efficiency during 2016-2020 for each of the insurance firms listed in PEX and ASE.

Table (6)

Technical efficiency scores ranking for listed insurance firms in PEX

COMPANY NAME	DEA score (Average)	DEA score Rank
TIC	79.51%	1
PICO	78.82%	2
GUI	77.47%	3
MIC	76.43%	4
Trust	66.29%	11
NIC	63.31%	15

Table (7)

Technical efficiency scores ranking for listed insurance firms in ASE

COMPANY NAME	DEA score (Average)	DEA score Rank
ARGR	74.81%	5
AMMI	72.25%	6
JOFR	71.11%	7
ARAS	70.45%	8
MDGF	70.40%	9
MIIC	66.38%	10
AIUI	65.61%	12
NAAI	64.73%	13
UNIN	63.43%	14
AICJ	60.69%	16
JERY	59.01%	17
AAIN	57.86%	18
GIGJ	57.37%	19
JOIN	56.16%	20
PHIN	55.84%	21
DICL	54.18%	22
TIIC	53.00%	23
MEIN	38.26%	24
FINS	34.67%	25
JIJC	21.88%	26

Tables (6) and (7) show that 9 firms have efficiency score between 70-79 percent, 14 firms have efficiency score in a range of 50-67 percent, and 3 firms within 20-38 percent. These results show that there are no firms in the sample that are considered to be fully efficient. Most of the results flow in a range of 50% to 67 %, and these firms have large inputs so they should have the same outputs by significantly reducing their inputs and making a better combination between inputs and outputs.

It is observed from table (6) that four of the listed insurance firms in PEX have highest technical efficiency scores over the period (2016-2020) which give an impression that the

listed insurance firms in PEX are more efficient than those listed in ASE. The highest technical efficiency score was for AL-TAKAFUL INSURANCE with a score 79.51%. This could be due to strategic planning, decision of management, and training of employees which in turn lower the inputs needed in the process of preproducing outputs. One noticeable point about this firm is that it does not have the highest profit nor the highest premium compared with the other listed firms. Further, it does not have the highest market share, which did not increase over the period covered by the study, meaning that TIC is combining its inputs better than its competitors when producing its outputs.

The results of Trust insurance firm efficiency score were noticeable, sine it has the largest amount of assets and market share among the insurance firms in Palestine, and it has the largest number of agents who provide its insurance services. It also has a very good reputation in the Palestinian market. However, its average efficiency score for the five years was 66.3% which puts it in the 5^{th} place compared to the listed insurance firms in PEX, and in the 11^{th} place of the 26 firms chosen as sample. This points that Trust insurance firm does not mix its input in an efficient way as its competitors PICO, GUI and MIC do. These have lower assets, profit, and market share, but they combine their inputs efficiently.

Another unexpected result was for NIC, since it is considered to be the most profitable insurance firm in Palestine in the last 5 years and it has the second largest market share after Trust insurance firm. Its technical efficiency score was 63.31% putting it in 15th place of 26, and in the last position of the six listed insurance firms in PEX.

The most efficient insurance firm listed in ASE was the Arab Jordanian Insurance Group (ARGR) with an efficiency score 74.81% putting it in 5th place of 26. ARGR which is considered to be a small firm compared to its competitors in Jordan, which means that this firm has a good balance between its inputs and outputs.

The lowest efficient firm was Newton Insurance JIJC with an efficiency score of 21.8% which is very low compared to the other companies. This mean that this firm has poor management and it does not combine its inputs and outputs in efficiency way. Its cost of

production is high and this could be due to the non-add value process. The technical efficiency scores for AMMI, JOFR, ARAS, and MDGF were between (70%-72%). Five of the listed insurance firms in ASE had technical efficiency scores between (60%-66.4%), and seven firms were between (53%-59%). MEIN and FINS firm's technical efficiency score were at 30%.

The following table shows the technical efficiency scores for non-life listed insurance firms in PEX:

Table (8)

Technical efficiency scores for non-life insurance firms listed in PEX

Company	**Efficiency score**	**Rank**
Palestine Insurance	78.82%	2
Al Mashreq Insurance	76.43%	4
Average	**77.6%**	

The following table shows the technical efficiency scores for non-life listed insurance firms in ASE:

Table (9)

Technical efficiency scores for non-life insurance firms listed in ASE

Company	**Efficiency score**	**Rank**
The Arab Assurers Company	70.45%	8
The Mediterranean & Gulf Insurance Co	70.40%	9
AlMANARA Insurance	66.38%	10
Arab Union International Insurance Company	65.61%	12
Gulf Insurance Group	57.37%	19
Pliadelphia Insurance Company	55.84%	21
Average	**61.2**	

Table (8) shows that the highest technical efficiency for the non-life insurance firms listed in PEX is Palestine Insurance and AL Mashreq Insurance with an average 78.82 percent and 76.43 percent respectively. Table (9) shows that the highest technical efficiency for the listed non-life insurance firms in ASE was that of the Arab Assurers Company with

an average of 70.45 percent and the lowest one was that of Pliadelphia with an average of 55.84 percent. Pliadelphia company has a problem with mixing its inputs and outputs, and has a poor management decision and planning. However, the results indicate that the listed non-life insurance firms in PEX are mixing their inputs and outputs better than the ones listed in ASE. This might be due to the competition between the insurance firms that operate in Jordan which is higher compared to the competition between the insurance firms operating in Palestine, which leads to a waste of resources and poor decisions on the part of the management at some time.

The table below shows technical efficiency scores for compound listed insurance firms in PEX.

Table (10)

Technical efficiency scores for compound insurance firms listed in PEX

Company	**Efficiency score**	**Rank**
AL-TAKAFUL INSURANCE	79.51%	1
Global United Insurance	77.47%	3
TRUST PLAESTINE	66.29%	11
NATIONAL INSURANCE COMPANY	63.31%	15
Average	**0.613**	

Table (10) shows that the highest average of the technical efficiency scores for compound insurance firms listed in PEX is that of TIC with an average of 79.51 percent followed by Global United insurance with an average of 77.47 percent. However, the lowest average of technical efficiency is that of NIC which is 63.31 percent. This could be caused by the high amount of inputs NIC uses to produce its outputs; it needs to use less resources to produce the same amount of outputs.

The table (11) [see appendix (A)] represent technical efficiency scores for compound listed insurance firms in ASE.

Table (11) [see appendix (A)] shows that the highest technical efficiency for compound insurance firms listed in ASE is that of Arab Jordanian Insurance Group with an average

of 74.81 percent followed by Euro Arab Insurance group. However, the lowest average is that of Newton insurance with an average of 21.88 percent.

The average score of technical efficiency of non-life insurance firms listed in PEX and ASE is higher than the average score of technical efficiency of compound insurance firms listed in PEX and ASE. This is because when firms compete, they focus on non-life insurance more than life insurance. The market share of life insurance in Jordan and Palestine have not seen any major change in their structure over the period covered by this study. So non-life insurance firms are combining their inputs and outputs better than insurance firms which provide life and non-life. The latter should reduce their inputs in order to raise their technical efficiency score.

3.3 Correlation Between Variables

Table (12) [see appendix (A)] shows correlation between independent variables in order to see if there is a high correlation between them.

From table (12) [see appendix (A)], a high correlation between firm size and market share is found. Variance inflation factor is used to marks multicollinearity in regression analysis.

3.4 Variance Inflation Factor

A Variance inflation factor (VIF) marks multicollinearity in regression analysis. Multicollinearity happens upon the existence of correlation between predictors (independent variables) in a model. Its existence could adversely impact the results of regression. The VIF evaluates how much the variance of a regression coefficient is inflated given multicollinearity in the model (Akinwande et al., 2015).

VIFs are often calculated using software, as part of regression analysis. A VIF column will be seen as part of the output. To calculate VIFs, a predicator is taken and regressed against every other predictor in the model. This results in R-squared values, that could be then plugged into the VIF formula. “i” is the predictor you’re looking at (e.g. x1 or x2):

$$\mathrm{VIF} = \frac{1}{1 - R_i^2}$$

Variance inflation factors range from 1 upwards. The numerical value of a variance inflation factor indicates (in decimal form) the percentage that the variance (the standard error squared) is inflated for each coefficient. For instance, a VIF of 1.9 reads that a certain coefficient's variant is 90% bigger than what is expected if there was no multicollinearity, meaning that there was no correlation with other predictors. (Glen, n.d.)

A general rule for interpreting VIF:

Not correlated = 1

Moderately correlated = Between 1-5

Highly correlated = Greater than 5

Table (13) [see appendix (A)] shows VIF degree for independent variables in order to marks multicollinearity between them. Also, shows that all independent variables are moderately correlated, so the results of panel data regression could be accepted.

3.5 Panel Data Analysis

In order to examine how independent variables affect the level of technical efficiency for insurance companies listed in PEX and ASE, Panel data regression analysis was used to analyze the size and direction of the independent variables effect and their impact on technical efficiency.

Regression model:

Y_{it}= a+ B1log (firm size) $_{it}$+ B2(market share) $_{it}$+ B3(capital structure) $_{it}$+ B4(type)$_{it}$+ B5log (ROA)$_{it}$ + e_{it}

Fixed-effect regression and random-effect regression were applied and then Hausman test was used to see which regression to consider.

The table (14) [see appendix (A)] represent Fixed-effect regression analysis results to see the effect of each independent variables on technical efficiency (dependent variables) for listed insurance firms in PEX and ASE.

Table (15) [see appendix (A)] represents Random-effect regression results to see the effect of each independent variables on technical efficiency (dependent variables) for listed insurance firms in PEX and ASE.

The table (16) [see appendix (A)] Hausman test is presented below in order to see which type of analysis (Fixed or Random) to take.

Test: Ho: difference in coefficients not systematic

Chi2 (2) = (b-B)' [(V_b-V_B) ^ (-1)] (b-B) = 4.67

Prob>chi2 = 0.1973

(V_b-V_B is not positive definite)

From Hausman test since Prob>ch12 = 0.1973 is larger than 5% the random-effect regression GLS is used.

3.6 Hypothesis Testing

From the analysis, a relation between all independent variables and technical efficiency was found since R^2 (0.856), which means that 0.856 of the change in the technical efficiency was explained by all independent's variables.

H1: There is a positive relationship between firm size and the technical efficiency of the listed insurance companies in PEX and ASE.

Table (15) [see appendix (A)] shows a negative effect of firm size on the technical efficiency of the listed insurance firms in PEX and ASE. Since P value is less than 5% and B has negative value. So H1 is rejected.

These results are similar to (Fenn et al., 2008), (Barros et al., 2008) and (Danquah, et al., 2018). This negative effect might be explained by diseconomies of scale; as the increase in the production volume leads to an increase in production costs per unit.

H2: There is a positive relationship between capital structure and the technical efficiency of the listed insurance companies in PEX and ASE.

GLS shows a negative effect of capital structure on the technical efficiency of the listed insurance firms in PEX and ASE. Since P is less than 5% and B has a negative value, H2 is rejected.

The results are similar to those of (Barros et al., 2008), (Kasman & Turgutlu, 2009), (Abor et al., 2012) and (Danquah et al., 2018). This negative effect can be interpted in light of agency problem as equity capital holdings relative to total assets limits resources distribtution to produce the desried output, which generates costs for the insurance companies reduces effeciency.

H3: There is a positive relationship between ROA and the technical efficiency of the listed insurance companies in PEX and ASE.

From table (15) [see appendix (A)], a positive effect of ROA on the technical efficiency of the listed insurance firms in PEX and ASE was found. Since P value is less than 5% and B has a positive value. So H3 is accepted.

The results matched those of (Diacon, 2001), (Grmanová & Strunz, 2017), (Jaloudi, 2019) and (Nadeem et al., 2022). As proftis for insurance firms increse, less inputs for the production process are needed.

H4: There is a positive relationship between type of insurance and the technical efficiency of the listed insurance companies in PEX and ASE.

Panel data analysis shows that the type of insurance has no effect on the technical efficiency of the listed insurance firms in PEX and ASE. Since P value is more than 5%, H4 is rejected.

These results are different form the results of (Danquah et al., 2018). This could be attributed to the fact that there is a small share of life insurance premuim in Palestine and Jordan due to religious resons, most of the insurance premiums are for non-life insurance. It is for this reson that no effect of insurance type was found.

H5: There is a positve relationship between market share and the technical efficiency of the listed insurance companies in PEX and ASE.

Table (15) [see appendix (A)], shows that market share has a positive effect on the technical efficiency of the listed insruacne firms in PEX and ASE. Since P value is less than 5% and B has a positve value, H5 is accepted.

The resutls are similer to (Barros et al., 2008) and (Abor, et al., 2012) but are inconsistent with the traditional structure conduct hypothesis, see table (17) [see appendix (A)].

Chapter Four

Conclusion and Recommendations

4.1 Introduction

This research aimed at evaluating technical efficiency and its determinants in the listed insurance firms in PEX and ASE by using a panel data of 26 insurance firms operating in Jordan and Palestine during the period 2016-2020. DEA was used to estimate the technical efficiency scores, and panel regression analysis was used to examine the effect of the factors determining technical efficiency. In this section, the conclusion, recommendations and limitations of research will be presented.

4.2 Conclusion

DEA shows that the insurance firms listed in PEX were more efficient than these listed in ASE during the period covered by the study (2016-2020). This can be attributed to several reasons. First, the Jordanian insurance market is larger than the Palestinian insurance market as the total written premiums in Palestine during 2020 were (286,142,525) and in Jordan were (593,442,124), and the number of firms operating in the Jordanian insurance market is more than the Palestinian insurance firms, which makes competition between Jordanian insurance companies more complicated compared to the Palestinian insurance market. This indicates that firms spend their resources in the wrong way while trying to beat their competitors. Second, the cancellation of the Jordanian insurance authority in 2014 left the Jordanian insurance market without a legal supervisor while in the Palestinian insurance market, the PCMA has been supervising the sector and protecting the insurance firms operating in Palestine form wasting their recourses.

DEA also shows that the listed non-life insurance firms have an average technical efficiency higher than the listed compound insurance firms in PEX and ASE. This is because the culture of Palestine and Jordan is affected by Islam which prohibits life insurance. Therefore, the market share of life insurance is limited in both countries and the firms can spend their resources used for life insurance to other insurance branches.

DEA also shows that the listed non-life insurance firms have an average technical efficiency higher than the listed compound insurance firms in PEX and ASE. This is

because the culture of Palestine and Jordan is affected by Islam which prohibits life insurance. Therefore, the market share of life insurance is limited in both countries and the firms can spend their resources used for life insurance to other insurance branches.

GLR analysis shows that firm size has a negative effect on the technical efficiency of the listed insurance firms in PEX and ASE. This result matches the results of (Fenn et al., 2008), (Barros et al., 2008) and (Danquah, et al., 2018). This negative effect is caused by diseconomies of scale, which happen when a company grows very largely, making its cost per unit increases. Capital structure also was found to have a negative effect on technical efficiency. These results are similar to (Barros et al., 2008), (Kasman & Turgutlu, 2009), (Abor et al., 2012) and (Danquah et al., 2018). This implies that firms which finance their assets with shareholder capital will decrease their technical efficiency through dividends issues and other agency problems. Type of insurance has no effect on technical efficiency. Profitability which is represented in ROA and affects technical efficiency in a positive way, matching results of (Grmanová & Strunz, 2017), (Jaloudi, 2019) and (Nadeem et al., 2022). As proftis for insurance companies increse less resouces is needed for the production.

4.3 Recommendation

1. As the results show, capital structure has a negative effect on technical efficiency. The managements of the listed insurance firms in PEX and ASE could finance the assets of firms through debts and bonds more than common stocks.

2. The results show that firm size affects the technical efficiency of the listed insurance firms in Palestine and Jordan stocks exchange markets in a negative way, hence the managements of these firms could make strategic planning before increasing the total assets of their firms in order to avoid diseconomies of scale.

3. The market share of the listed insurance firms in Palestine and Jordan stocks exchange markets were found to have a positive effect on technical efficiency, so the managements of these firms might take decisions in order to increase their firms' market share through advertising and sales panels, and developing sales strategy.

4. The managements of the listed insurance firms in Palestine and Jordan stocks exchange markets might better extend their efforts to increase the profits of these companies by increasing their revenues and reducing their costs. This could be achieved by eliminating non-added value process in their operations.

5. Regulatory bodies may issue laws and regulations controlling how firms finance their assets in order to prevent an exaggerated increase in firms' total assets, and controlling the competition in order to avoid illegal collusion between firms, or any price leading which could affect the market share of some firms and cause a drop in their profits.

6. As the technical efficiency of the listed insurance firms in Palestine and Jordan stocks exchange markets was examined by DEA and regression analysis, future researches could be done by implying other analysis techniques or by examining other types of efficiency. By way of example, researchers may study the efficiency of the Palestinian and Jordanian insurance markets and compare their results with the findings of this study to come up with more recommendations that could improve the efficiency of the insurance sector in Palestine and Jordan.

4.4 Originality/ Implications

The research is different from previous researches since it studies technical efficiency in two developing countries (Jordan and Palestine). There are no similar previous researches taking up the efficiency of the insurance sector in Palestine using multiple inputs and outputs in data envelopment analysis (DEA) to estimate technical efficiency scores. The technical efficiency scores of the listed insurance firms in PEX were compared with the technical efficiency scores of listed insurance in ASE, and compound listed insurance firms in Palestine and Jordan stocks exchange markets were compared with non-compound insurance firms to see if there is a difference between their technical efficiency scores. GLR regression analysis was used to examine the effect of independent factors on technical efficiency. Investor can employ the results of this research in order to evaluate firms' performance since it is reflected by efficiency, which could improve their decision-making process. The management of these firms can also use these results in order to

improve the service providing process and reduce cost and eventually increase profits. This research could be useful for the Supervising Authorities on insurance as they can depend on the results to issue laws and rules improving the insurance sector in Palestine and Jordan.

4.5 Limitations

Some of the limitations faced in this research is the difference of sample size between Palestine and Jordan, as the Jordanian insurance sector is much larger than the Palestinian. So, the competition in the Jordanian insurance market is higher, which can make the comparison between the efficiency of the firms listed in PEX with ASE less accurate. Another limitation is that there are no previous studies in Palestine tackling the issue of efficiency of the Palestinian insurance sector. Consequently, comparing the findings of this research with those of other researches form same environment cannot be done.

List of Abbreviations

Abbreviations	Definition
PCMA	Palestine Capital Market Authority
PEX	Palestine Stocks Exchange Market
ASE	Amman Stock Exchange Market
ROA	Return on Assets
CBJ	Central Bank of Jordan
DEA	Data Envelopment Analysis
DMU	Decisions Making Units

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Appendices

Appendix (A)

Tables

Table (11)

Technical efficiency scores for compound insurance firms listed in ASE

Company	Efficiency score	Rank
Arab Jordanian Insurance Group	74.81%	5
Euro Arab Insurance Group	72.25%	6
JORDAN FRENCH INSURANCE Co. (P.L.C)	71.11%	7
National Insurance Company WATANIA	64.73%	13
UNITED INSURANCE	63.43%	14
ARABIA Insurance Company – JORDAN	60.69%	16
JERUSALEM INSURANCE	59.01%	17
Al-Nisr Al-Arabi Insurance	57.86%	18
Jordan Insurance Company	56.16%	20
Delta Insurance	54.18%	22
Islamic Insurance Company	53.00%	23
Middle East Insurance Co.	38.26%	24
First Insurance (SOLIDARITY)	34.67%	25
Newton Insurance (JIJC)	21.88%	26
Average	**0.584**	

Table (12)

Correlation between variables

	Firmsi~s	Capita~s	ROA	Type	Market ~ e	Model
Firm ~ s	1.0000					
Capita ~ s	-0.0885	1.000				
	0.3165					
ROA	0.1487	0.1346	1.00000			
	0.0912	0.1269				
Type market ~ e	0.2726	0.4144	0.2300	1.00000		
	0.0017	0.0000	0.0085			
Market Share	0.8843	-0.2021	0.1441	0.1935	1.000	
	0.0000	0.0211	0.1018	0.0274		
Model	-0.0709	-0.7536	0.3392	-0.02653	0.1675	1.000
	0.4231	0.0000	0.0001	0.0023	0.0567	

Table (13)

Variance inflation factor

Variable	VIF	1/VIF
Firm Size	4.88	0.204864
Capital structure	1.37	0.731870
ROA	1.07	0.930414
Type	1.40	0.715696
Market share	4.96	0.201527
Mean VIF	**2.74**	

Table (14)

Fixed-effect regression

VARIABLES	Model
Firm size	-0.000
	(0.000)
Capital structure	-0.882***
	(0.104)
ROA	1.797***
	(0.113)
Type	-
Market share	0.483*
	(0.248)
Constant	0.866***
	(0.047)
Observations	130
Number of coid	26
R-squared	0.719

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table (15)

Random-effect regression

VARIABLES	Model
Firm size	-0.000***
	(0.000)
Capital structure	-1.041***
	(0.074)
ROA	1.895***
	(0.107)
Type	-0.003
	(0.021)
Market share	0.541***
	(0.163)
Constant	0.978***
	(0.029)
Observations	130
Number of coid	26
R-squared	0.856

Table (16)

Hausman test

	Coefficients			
	(b)	(B)	(b-B)	Sqrt (diag (V_b)-V_B))
	fixed	random	Difference	S.E
Firm size	-2.11e-10	-1.36e-09	1.15e-09	2.09e-10
Capital structure	-.8819523	-1.040511	.158584	.072823
ROA	1.797466	1.895384	-.0979185	.0374456
Market share	.482731	.5410619	-.0581887	.1871788

b = consistent under HO and Ha; obtained from xtreg

B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Table (17)

Testing hypothesis results

#	Hypothesis	Accepted / rejected
1	There is a positive relationship between firm size and the technical efficiency of the listed insurance companies in PEX and ASE.	Rejected.
2	There is a positive relationship between capital structure and the technical efficiency of the listed insurance companies PEX and ASE.	Rejected
3	There is a positive relationship between ROA of insurance and the technical efficiency of the listed insurance companies in PEX and ASE.	Accepted.
4	There is a positive relationship between type on insurance and the technical efficiency of the listed insurance companies in PEX and ASE.	Rejected
5	There is a positive relationship between market share and the technical efficiency of the listed insurance companies in PEX and ASE.	Accepted.

Table (18)

Sample of the study

No.	Company Name	Market
1.	NATIONAL INSURANCE COMPANY (NIC)	Palestine
2.	Al Mashreq Insurance	Palestine
3.	TRUST PLAESTINE	Palestine
4.	Palestine Insurance	Palestine
5.	Global United Insurance	Palestine
6.	AL-TAKAFUL INSURANCE	Palestine
7.	Middle East Insurance Co.	Jordan
8.	Al-Nisr Al-Arabi Insurance	Jordan
9.	Jordan Insurance Company	Jordan
10.	ARABIA Insurance Company – JORDAN	Jordan
11.	Delta Insurance	Jordan
12.	JERUSALEM INSURANCE	Jordan
13.	UNITED INSURANCE	Jordan
14.	JORDAN FRENCH INSURANCE Co. (P.L.C)	Jordan
15.	AlMANARA Insurance	Jordan
16.	Arab Orient Insurance	Jordan
17.	Pliadelphia Insurance Company	Jordan
18.	Arab Union International Insurance Company	Jordan
19.	National Insurance Company WATANIA	Jordan
20.	Newton Insurance	Jordan
21.	Euro Arab Insurance Group	Jordan
22.	Islamic Insurance Company	Jordan
23.	The Arab Assurers Company	Jordan
24.	Arab Jordanian Insurance Group	Jordan
25.	The Mediterranean & Gulf Insurance Co.	Jordan
26.	First Insurance (SOLIDARITY)	Jordan

جـامعـــة النجاح الوطنية

كليـــة الدراســـات العليـــا

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إشراف

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قدمت هذه الرسالة استكمالا لمتطلبات الحصول علي درجه الماجستير في المحاسبة، من كلية الدراسات العليا، في جامعة النجاح الوطنية، نابلس– فلسطين.

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الملخص

الأهداف: هدفت هذه الدراسة الى قياس الكفاءة التقنية لشركات التأمين العاملة في الأردن وفلسطين ودراسة العوامل المؤثرة على هذه الكفاءة.

المنهجية: تم استخدام البيانات المتعلقة بستة وعشرين شركة تأمين مدرجة في بورصة فلسطين للأوراق المالية وسوق عمان للأوراق المالية خلال الفترة (2016–2020)، وتم حساب الكفاءة التقنية لهذه الشركات من خلال أسوب التحليل DEA لمعرفة كفاءة هذه الشركات وترتيبها ترتيبا تنازليا ومقارنة كفاءة الشركات العاملة في فلسطين مع الشركات العاملة في الأردن. ومن تم استخدام panel data analysis لدراسة العوامل المؤثرة في هذه الكفاءة حيث تم دراسة أثر كل من حجم الشركة، هيكلية رأس المال، ربحية الشركة، نوع الخدمة التأمينية المقدمة، وحصة الشركة السوقية.

النتائج الرئيسية: حيث تبين أن شركات التأمين المدرجة في بورصة فلسطين ذات كفاءة أعلى من شركات التأمين المدرجة في السوق الأردنية لشركات التأمين. وكما وتبين من خلال التحليل أن شركات التأمين التي لا تقدم خدمة التأمين على الحياة ذات كفاءة أعلى من الشركات التي تقدم خدمة التأمين على الحياة في كل من فلسطين والأردن. حيث أظهرت نتائج التحليل أن هيكلية رأس المال وحجم الشركة يؤثران بشكل سلبي على الكفاءة التقنية، وأن كل من ربحية الشركة الممثلة في ROAوحصة الشركة السوقية تؤثر بشكل إيجابي، في حين لم يكن لنوع الخدمة التأمينية المقدمة أي أثر يذكر على الكفاءة.

التوصيات: وعليه خرجت الرسالة بتوصيات مفادها ضرورة اعتماد شركة التأمين في تمويلها على الدين من خلال الاقتراض وإصدار السندات عوضا عن اصدار الأسهم، وعدم التوسع في حجم الشركة دون دراسة وتخطيط كافي لما يترتب عليه من تكاليف تخفض الكفاءة، ويجب على الشركة المحافظة على ربحية الشركة والعمل على رفع حصتها السوقية.

كلمات مفتاحية: الكفاءة، كفاءة تقنية، تأمين، فلسطين، الأردن، DEA.