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Hidden Action Problems: The Case of Insurers and Business Policyholders in The Egyptian Car Insurance Market

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List of Abbreviations

AVE	Average Variance Extracted
B2B	Business to Business
CFA	Confirmatory Factor Analysis
CFI	Comparative Fit Index
EFA	Exploratory Factor Analysis
EFSA	Egyptian Financial Supervisory Authority
EISA	Egyptian Insurance Supervisory Authority
GDP	Gross Domestic Product
IFI	Incremental Fit Index
KMO	Kaiser-Meyer-Olkin
LE	Egyptian pound
MENA	Middle East and North Africa
MOSI	Ministry of Social Insurance
NASI	National Authority of Social Insurance
NIB	National Investment Bank
OECD	Organization for Economic Cooperation and Development
OLS	Ordinary Least Square
PAT	Principle Agent Theory
PIO	Pension Insurance Organization
RCT	Relational Contracting Theory
RMSEA	Root Mean Square Error of Approximation
SEM	Structural Equation Model
SIFGE	Social Insurance Fund of Government Employees
SIFPPSE	Social Insurance Fund of Private and Public Sector Employees
SIO	Social Insurance Organization
SIS	Social Insurance System
SKU	Stock Keeping Units
USD	United States Dollar
VIF	Variance Inflation Factor

Abstract

Purpose: The paper seeks to investigate the effect of asymmetric information in an exchange relationship involving pre-screening by insurers, trust between insurer and policyholder, self-protection provided by different kinds of contracts on hidden action in the Egyptian car insurance market.

Design, methodology and approach: The total population of all registered non-life insurance companies (32) in Egypt as approved by the Egyptian Financial Services Association (EFSA), the regulatory body in the insurance industry in Egypt, constitute the sampling frame for this study. In this study, respondents answered questions about their most recent cases of compensation by insurers based on a questionnaire. A total of 63 questionnaires were distributed and regression analysis was used to test and validate the hypotheses of this study.

Findings: Information asymmetry is one of the main antecedents of hidden action problems by policyholders. The level of pre-screening done by insurer also goes a long way in attenuating hidden action. Furthermore, the level of trust in an exchange relationship attenuates the hidden action problems faced by policyholders. Moreover, the study found that self-protection attenuates hidden action problems at different types of contracts. It was further observed that self-protection is more efficient in genuinely attenuating hidden action with co-payment car insurance contract than with deductible car insurance contract.

Research limitation/implications: As a result of numerous constraint in the field during the data collection phase, this study had a reasonable sample size which the authors would have easily increased; 63 responses have been obtained for this study and as such is not exhaustive to generalize the findings. In addition, a cross sectional design was used at a particular time and as such this study does not inform changes in the market over time. Thus such is a provision for future research of longitudinal study to cater for market dynamics.

Theoretical implication: The level of information asymmetry in a buyer seller relationship is an antecedent for hidden action problems; as one party (policyholder) possess private information which the other party (insurer) desires and might lack due to self-seeking attitude of potential policyholders and they use this idiosyncratic information in purchasing their insurance policy.

However, when insurer execute high level of pre-screening it serves as a basis to attract appropriate and high quality policyholder by revealing adequate information that help insurer in making selling decision; this can serve as proactive strategy in attenuating hidden action.

An exchange relationship characterized by trust tend to significantly weakens and attenuate hidden action problems by policyholders.

Managerial implication: Hidden action is very harmful for the smooth and sustainable operation of business especially in the insurance market. This study has highlighted the antecedent of hidden action which business leaders and managers should take seriously in conducting business as it can ruin the performance of their client in honouring their contract. Also, it adversely affects exchange relationship, reduce market share and supply chain efficiency, increase the loss reserve of insurer, reduces profitability and affect the health of insurer's balance sheet. Thus, it is prudent to engage and coordinate effectively in an exchange relationship, developing trust which improves coordination and cooperation between trading partners and business performance.

Keywords: hidden action problems, trust, self-protection, information asymmetry, pre-screening, kind of contract, size of damages, policyholders, insurers, insurance industry, Egypt, principal agent theory, relational contracting theory.

CHAPTER ONE

THE PROBEM AND ITS CONTEXT

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1.1 Background Information about the Insurance Industry

The global insurance industry has been a growing and thriving business, especially in the western and developed nations that have dominated the trade for a very long time, including the United States, Japan, and some European countries. The United States alone accounted for 27% of the world's global insurance premium, Japan for 11%, and China and some European countries largely dominated the remainder. The Group of Seven (G7) nations account for more than 65% of the global insurance premium with only 10% of the world's population living in those regions. In these economies, the per capita expenditure on insurance premium is $3,910 while people in emerging markets like Africa spend an average $120 per person (KPMG 2012, OECD 2015, Rorbye 2013, Re 2015).

However, the insurance industry in Africa is still at its embryonic stage. It is growing rapidly, but is still largely underdeveloped. There is a glaringly low penetration of insurance in the African market, for which a range of factors is responsible. It is not only the inability to pay for insurance products; there is a lack of expertise in this sector, and the perceived challenges and peculiarities in the business environment in Africa bear no less blame. Foreign companies with the required expertise and knowhow are unwilling to invest and develop this sector in Africa. Another challenge that multinationals cite for their reluctance to invest in the African insurance industry is the lack of appropriate platforms to gather accurate and comprehensive information about individuals and businesses to assess their creditworthiness. In addition, the weak and poor judicial system in Africa makes things complicated; investors are always in a dilemma to put their money in a sector that relies heavily on highly developed and functioning judicial and financial sectors, among other factors (KPMG 2012).

Another critical factor for the underdevelopment of the insurance sector in the continent is the underdeveloped financial system, which is still at a young stage, and is unable to capitalize on insurance and re-insurance activities. Moreover, most regions in Africa use informal insurance as opposed to the services provided by the formal insurance sector (KPMG 2012). However, the insurance industry is a very vital business to further the socio-economic aspirations of any nation, and Egypt is no exception.

The Egyptian insurance industry has shown resilience and grown at an impressive rate despite the upheavals the country has gone through in recent years. This sector has been crucial in managing the risks of other sectors and in facilitating growth across the different sectors. It has done this by pooling the risks of individuals and businesses, managing these risks, and by investing the capital accumulated from the premiums of policyholders in various sectors of the economy, which is essential for the growth of the economy and society as a whole. This has happened despite the recent upheaval that saw a fall in the Egyptian GDP from 5.1% in 2010 to 1.8% in 2011, and 2.2% in 2012 (Wagdi 2014, (EFSA) 2014a).

Nonetheless, this did not affect the insurance industry, which has grown consistently over the years. It has recorded a compounded annual growth rate of 9.2% between 2008 and 2012, of which the non-life insurance sector accounted for 47.1% of the total gross premium in the industry, amounting to EGP 5 billion in 2012 alone. The non-life segment has been driving overall growth in the sector with demand for property and causality insurance products surging. Motor insurance accounted for 40% and property, approximately 30% of the total written premiums in 2012 ((EFSA) 2014a, Wagdi 2014).

Moreover, a range of complex inter-firm relationships—starting from that between the insurers and the policyholder, to that among other strategic players in the industry—characterizes the industry. The insurer provides a range of products oriented towards different activities in the various sectors of the economy and the policyholders' need to enhance and facilitate their business operations and safeguard those from risks. The policyholders do not have the wherewithal and knowhow to effectively manage these risks and transfer these to the insurance companies. However, the dilemma of this exchange relationship remains hard to manage. If people have insurance coverage, their behaviour changes in a way that can increase their expected expenses. This affects the cost of the insurer's business and the general cost of coverage, which both deductible and co-payment contracts can mitigate (Shavell 1979b, Pauly 2007).

Since usually after signing the contract, policyholders do not have the incentive to invest in self-insurance or protection—which is very costly and policyholders often see no value in incurring additional cost after securing a policy—this often leads to 'hidden action' problems. The higher the cost of self-insurance, the lower is the incentive to invest more.

In the context of insurance, 'hidden action' refers to a situation wherein policyholders make less effort to mitigate the possibility of the risks they are insured against from happening (Keser and Willinger 2000, Pauly 2007, Tumay 2009).

According to agency theory, the principal (insurer) enters into a transaction with the agents (policyholders) but both parties have different interests in the transaction. The principal cannot observe every action of the agent and capture or rationalize all outcomes in a contract; the agents are bound to be self-seeking and pursue their interests. This dilemma poses numerous challenges for the principal-agent relationship, and represents the typical principal-agent problem. Due to the hidden action problems, agents are disinterested and have no incentive to pursue the goals of the principal as they have of their own; this divergence of goals presents a serious problem for the principal-agent interaction. In the case of insurance, policyholders have no incentive to self-protect or insure after they have bought coverage as this involves additional cost, which they are unwilling to incur in most cases (Keser and Willinger 2007, 2000).

This triggers both adverse selection and hidden action problems as the principal cannot detect the value of a parameter—the true characteristics of the agent—and monitor his activities after the signing of the contractual agreement, since the process is very expensive and impractical (Guesnerie and Laffont 1984). Nonetheless, to reduce the hidden action problem (moral hazard), insurers use both deductible and co-payment riders (Tumay 2009).

However, Relational Contracting Theory (RCT) shows that the partners in an exchange relationship develop trust mostly through repeated transactions; this will strengthen the relationship as partners develop norms and values they are bound to uphold because of the deepened relationship. This will obviously minimize the possibility of moral hazard as partners look beyond the transaction and focus on the relationship and norms within it. It will foster a mutually beneficial relationship between the exchange partners (Buvik and Reve 2002, Macneil 1977).

This study seeks to analyse the dyadic relationship between policyholders and insurers. It has used appropriate theoretical framework as a basis to explain the complex dynamics embedded in such interactions.

1.2 Research Problem

This study focuses on the hidden action problems (moral hazard) in the Egyptian car insurance market for business policyholders; it tries to ascertain their magnitude and how those affects the insurers' businesses and the general economy. To form a robust basis for analysis, the authors will use constructs from extant literature and appropriate theoretical framework from the Principal Agent Theory (PTA) and the RCT. These actions are a function of related exchange hazard (hidden action/moral hazard) that alters the motives of businesses to prevent loss, as Steven (1979) and Tumay (2009) depict and elucidate.

Extant literature has considerably explored the principal-agent problem in the form of a buyer-seller relationship. The problem occurs when a principal (insurer) hires an agent (policyholder) to carry out certain obligations, but their ultimate goal in the exchange is different. As such, each party is inclined to pursue its individual interest, which leads to hidden action problems (moral hazards). In insurance, this happens when the projected loss from a certain adverse event increases as the coverage increases. This can take varying forms, such as when a partner deliberately neglects his/her obligations in an agreement. In the case of car insurance, it amounts to not honouring the maintenance schedule when it's due and not getting the maintenance done at the approved centres under the agreement, speeding, drink driving, failing to invest in a system to protect the car from accidents, recruiting drivers without proper background check and qualifications, etc.

Thus, these post-contractual actions involve costs that the other partner is not willing to invest in after securing the policy (Pauly 2007). This will increase the probability of the happening of the risks against which the policyholders are insured. This, in its turn, will increase the amount of claims from customers, adversely affecting the insurance company's profitability. Insurance companies will thus increase their loss reserve since they cannot monitor the actions of policyholders after signing the contract, which is in most cases impractical and prohibitively expensive.

Against this background, the authors seek to analyse the moral hazard problems prevalent in the Egyptian car insurance industry, to identify the root causes of this problem, and proffer solutions based on evidence gathered from the market, which will serve as a panacea for insurers and policyholders to forge a fruitful and healthy business relationship. To analyse this problem, the authors have used a theoretical framework to serve as a concrete basis for detailed elaboration of this issue; they have used a paradigm from the PAT and the RCT.

These theories have shed light on the nature and dynamics of exchange relationships similar to the one under consideration, i.e. between insurers and policyholders. In short, this work seeks to address the research questions below:

1. What are the antecedents of hidden action problems in a business-to-business relationship, i.e. between the insurer and the business policyholder?

2. How can the hidden action problems in the car insurance industry in Egypt be attenuated?

1.3 Objective of the Study

This work primarily seeks to analyse the antecedents of hidden action problems in a buyer-seller relationship in the Egyptian car insurance industry, with a focus on the exchange relationship between the insurers and policyholders. This exchange relationship forms the unit of analysis of the hidden action problems in the industry.

One of the main antecedents of hidden action is information asymmetry wherein one partner in an exchange has more information compared with the other one. He/she uses this information advantage while buying the insurance policy, which tends to perpetuate hidden action by the policyholder and as such has very huge financial and business implications for insurers. However, with a proper and adequate pre-screening process, insurers can validate policyholders and categorize them according to their risk profile, which ensures that they pay an actuarially fair premium that is healthy for the insurer's balance sheet and business.

Furthermore, the level of pre-screening done by insurers helps them to determine the characteristics of the policyholders and, through the screening process, categorize this information to attenuate hidden action and thus, maximize profit. The amount the policyholder is willing to invest in self-protection goes a long way to attenuate hidden action because self-protection reduces its level. Insurance companies can also use their internal policy to attenuate hidden action based on the kind of contract they sell policyholders. That is because customers tend to behave differently based on the nature of the contract. In short, the degree of trust in an exchange relationship attenuates hidden action, as policyholders tend to honour their obligations in a business relationship. They are then less likely to behave opportunistically as trust results in repeated satisfactory business dealings over time.

1.4 Justification for the Study

Insurance is one of the fastest growing service sectors in the Egyptian economy. Despite the recent political upheaval and fall in GDP growth, the sector is still recording impressive growth and has huge untapped potential. This sector has continued to serve as an engine of growth for other sectors in the economy; businesses rely on the insurance market to shoulder and manage their risks, provide the necessary investment in the economy, etc. In addition, the insurance sector provides employment to many people (KPMG 2012, (EFSA) 2014a).

Therefore, because of the ever-growing insurance industry in Egypt, the landscape and dynamics of the sector and its players will evolve to adapt to this change. New and complex firms will emerge and the nature of relationships will change considerably. To manage this change effectively, the nature and the level of interactions between the players in the sector, such as insurers, policyholders, regulatory authorities, rating agencies, consultants, government authorities, etc., have to be in line with the dynamic trends in the sector. Thus, it is important to study inter-firm relationships in the insurance industry (Wagdi 2014).

Justifiably, this study primarily seeks to explore the antecedents of hidden action problems in the Egyptian car insurance market and provide suggestions to attenuate those in the exchange interaction between the insurer and the business policyholder.

In short, the buyer-seller relationship remains at a rudimentary stage in the service industry compared with the manufacturing industry. Thus, deepening our understanding of the inter-firm relationship in the service sector is another huge incentive for this study.

1.5 Scope and Delimitation of the Study

The Egyptian insurance industry comprises numerous players, ranging from the standard insurance companies, the 'Takaful', which are traditional insurance companies that base their exchange policies on Islamic principles, policyholders, reinsurance companies, and the EFSA, which is responsible for regulating, enforcing and monitoring insurance activities in Egypt. EFSA has its mandate from the central government. There are many other players, who participate both directly and indirectly in the market. However, this study delineates the dyadic buyer-seller relationship between insurers and policyholders in the insurance value chain. Against this background, this study extends the PAT and the RCT in the service industry to the insurance industry.

Moreover, because of this expected growth in overall activities in the industry, and given that the industry has huge untapped potential, there will emerge complex new challenges and the arrangement to manage those. No one has exhaustively addressed the hidden action (moral hazard)—a dilemma that emerges in a growing insurance industry—in the Egyptian one. This study will provide insight into the nature of hidden action problems and make recommendations to mitigate it. This provides an adequate justification for the choice of Egypt as the research setting. This sector is pivotal for absorbing the risks in various other sectors across the economy and providing the required investment to facilitate economic growth and development. Therefore, it is important to analyse and scrutinize the activities in this sector to come up with informed suggestions so that policymakers and government authorities can take proper decisions. That would help the sector to continue to grow and serve as a reliable industry to support growth activities across the economy.

However, because of numerous constraints—largely financial and time—the study sample mainly comprises insurance companies headquartered in Cairo, which is the commercial capital of Egypt. Nonetheless, the choice of sample was largely merit-based as the bulk of insurance activity happens in Cairo, and all major insurance companies have an office there.

1.6 Organization of the Study

This study comprises nine chapters. Chapter 1 gives a brief introduction to and a background of the insurance industry in Egypt, the nature of the research problem under consideration, and the justification of the study. Chapter 2 presents the current trends in the insurance industry, service characteristics, and relevance of Egypt as the research setting. Chapter 3 presents the theoretical framework relevant for the study. The authors used these theories to formulate the conceptual framework of the study. Chapter 4 presents the conceptual model. In addition, the authors develop the hypotheses in this chapter, based on the theoretical background and the dynamics of the insurance industry.

Chapter 5 gives details of the research design and the methodology used in the study. Chapter 6 gives the definitions and the operationalization of the variables. Chapter 7 presents measurement and data validations. Chapter 8 delineates the regression model and the hypotheses of the study. Finally, Chapter 9 gives a summary of the findings and a detailed discussion. In addition, it also gives the limitations and implications of this work and a proposition for future research.

1.7 Summary

This chapter has provided a detailed background of the proposed study and stated the research problem that forms the basis of this study. It has also given an overview of the objective, justification, scope and delimitation, and the organization of the study. The research gap is clearly due to very little contribution of the theoretical framework, such as the PAT, and the RCT, to the service industry, which this study tends to highlight. It also seeks to contribute to the existing work on the service industry. The next chapter will give details of the nature and dynamics of the Egyptian insurance industry.

CHAPTER TWO

THE RESEARCH SETTING

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2.1 Introduction

This chapter gives a brief synopsis of the global insurance industry, and pinpoints the trends and peculiarities of the Egyptian car insurance industry, which is the focus of the study. It details the activities of policyholders and the manner in which they interact with insurers while buying policies, and further discusses how this interaction leads to hidden action. This chapter gives a detailed description of the insurance industry and its value chain. The authors conclude it by discussing the relevance of the Egyptian market as the basis of this research.

2.2 Insurance Industry Overview

The global insurance industry has been consistently growing over the years. The demand for insurance increases as activities and innovation in the global economy rise, as business tends to edge past risks and unforeseen eventualities, thus assuring continuity and sustainability in operations. In 2015, some positive outcomes could be seen because of macroeconomic improvement in several regions and countries, the ever-increasing middle class, and high-net-worth individuals. These factors formed the foundation of a growing and rising insurance sector globally (Young 2015).

The global insurance industry premium is $5 trillion, with a global insurance capital of $4.2 trillion, global causality property premium of $1.4 trillion, and a 6% growth in global insurance capital. The global property causality capital is $1.3 trillion, with a 1.9% property causality penetration in the top 50 countries, and an estimated 39% growth if the penetration level increases by 2.5%. Insurers are capitalizing on modern technology (analytics, cloud computing) and modelling techniques to deepen their market segmentation strategies, reduce the amount of claims, and to improve underwriting capabilities and risk management.

In addition, they are investing hugely in technologies that improve the existing processes and collaboration with policyholders as well as regulatory authorities (Aon annual market report 2015). Insurance contributes significantly to economic growth by creating a climate conducive for investment, and promotes activities that would be cumbersome and implausible to do in the absence of the risk management instrument that the insurance functions provide (Rorbye 2013).

However, this favourable picture of the global insurance market has cascaded to other markets across the world. For instance, the Egyptian insurance industry has shown resilience and consistent improvement over the years. Despite the numerous challenges in emerging markets and developing countries, there is a huge growth potential, which growing economies and the growing wealth of emerging economies largely dictate. With constant improvement in insurance possibilities and a change in the consumer mindset, opportunities are opening up in the sector (Rorbye 2013).

Nonetheless, the degree of loss in guaranteeing non-life insurance keeps increasing, which is a serious concern and can be largely attributed to moral hazard and hidden information problems as most insurance companies in Africa are state-owned and some others are closely linked with it (Mishra, Heide, and Cort 1998). The gross premium of Egyptian insurance amounted to LE 14.4 billion in 2013-2014, representing a growth of 12.5% from LE 12.5 billion in 2012-2013. This amount was generated from both life and non-life insurance businesses, of which LE 6.15 billion was from life insurance and an estimated LE 8.2 billion from non-life insurance. In 2014, insurance premium contributed 1.2% to the Egyptian GDP. Nonetheless, the insurance industry has a tremendous growth potential, considering the low insurance density in the country (premium per capita) and the level of insurance business penetration (premium per GDP). The insurance density of gross premium grew from $21.6 to $22.3 between 2013 and 2014 ((EFSA) 2014a).

This consistent growth and the huge part of the industry that remains untapped present a huge opportunity for the insurance business in Egypt. Moreover, the gross claim paid out for the period amounted to EGP 7.3 billion, representing a 5% increase from EGP 6.9 billion in 2013. Investment in the sector has also grown to EGP 48.5 billion, which represents a 14.6% increase in investment compared with EGP 42.3 billion in the previous year (KPMG 2012, (EFSA) 2014a).

2.3 Egyptian Insurance Market

The Egyptian insurance market has 32 registered and licensed insurance companies, with 13 of these offering mainly life insurance products and the remaining 19 offering non-life insurance products that cover property and causality.

There is also a cooperative insurance company, an export credit society, and 610 private insurance funds. In addition to these, there are eight Takaful (Islamic) insurance companies, three of those offering life insurance and the remaining five dealing in non-life products. The table below shows the breakdown of both commercial and Takaful insurance businesses:

No. of insurance companies based on Commercial and Takaful

Activity	2012	2013	2014
Commercial business	23	23	24
Takaful business	8	8	8
Total	31	31	32

Table 1.1: No. of insurance businesses (both commercial and Takaful) in Egypt

Over the years, the number of players in the market has been relatively stable. However, there has been a substantial increase in the size of their operations and portfolios, leading to an increase in market share, improvement in financial outcomes, and increase in investment in the sector. Between 2013 and 2014, gross investment in the sector increased by 14%. Income from investment and other sources rose too; interest from reinsurance deposits and gains realized on exchange amounted to EGP 4.7 billion in 2014, surpassing by 23.3% the EGP 3.7 billion achieved in the previous year. Policyholders' rights also grew by an impressive 11.4% in the same period ((EFSA) 2014a).

The Middle East and North Africa (MENA) region has economically grown rapidly over the last decade despite the numerous challenges and instabilities in some of its countries. Other challenges that remain are the transformation of the local economies and inclusive job creation, especially for the growing young population. The insurance sector is vital for providing the necessary conditions for socio-economic advancement and for supporting sustainable long-term economic growth. It is a very pivotal sector to address the myriad challenges. Insurance provides cushion against adverse economic situations through risk transfer and provision of capital. It thus contributes to economic development and offers risk-management mechanism, and thus increases the total welfare effect in society by bringing policyholders to their pre-loss conditions and supporting overall economic activities (Berno 2013).

2.4 Insurers' Activities and Functions of Insurance

The insurance industry is very critical in any economy because of several reasons. For one thing, it enhances the social and economic outcomes of individuals through effective risk management—policyholders can transfer their risks and other unforeseen eventualities to their insurers. Thus, insurance serves as a reliable and efficient mechanism to safeguard individuals and businesses against adverse and devastating outcomes that may have huge consequences.

Insurance mitigates risks and facilitates business and economic activities, and ensures continuity of business operations. The following are some of the key functions and benefits of insurance.

Benefits and functions of insurance

Payment of losses: Insurance mainly serves as a guarantee of continuity, and secures businesses against unforeseen eventualities and uncertainties that may ruin a business or bring a project to an abrupt halt. For instance, a business failure will not only lead to financial hardship for its promoters and managers, the impact will be devastating and far-reaching if they cannot meet their commitment to their employees, customers, and suppliers. With insurance, the business can resume operations almost immediately and protect the interests and activities of the company and its stakeholders (Vaughan and Vaughan 2007).

Loss prevention: Insurance promotes activities oriented towards self-assurance and protection by promoting a culture of safety that significantly reduces the losses. For instance, automobile insurance encourages the use of seat belts, installation of vehicle-tracking devices and accident-prevention systems. All these measures serve to minimize accidents and losses (Vaughan and Vaughan 2007).

Credit support: Financial institutions rely heavily on insurance to ensure that they can recover the loans/credits they give out in the event of unforeseen eventualities. This helps banks to secure their lending and take the edge off any adverse uncertain situation. Moreover, a substantial amount of the premium is invested in the financial industry. It is also a huge part of the total investment, and contributes to boosting the economy by its multiplier effect—it gives more liquidity to the financial market, which can utilize it for additional lending and other investments (Berno 2013).

Economic growth: Insurance serves as an efficient mechanism for the transfer of risk through risk pooling. Policyholders contribute funds in the form of premium to a pool, which serves as a basis to cover possible risks. It is essentially based on the law of large numbers, as the amount contributed to this pool cannot cover the maximum loss if it happens. Insurance is the second largest contributor to investment in the Egyptian economy, second only to commercial banking as most of the premium collected from policyholders is invested in the different portfolios that facilitate economic growth across the economy (Brainard 2008).

2.5 Relationship between the Insurer and the Policyholder

This forms the basis for this study, whose purpose is to evaluate and analyse the relationship between the insurer and the policyholders in the Egyptian insurance industry. The parties are dependent on each other. An effective collaboration will enhance mutual interest in the form of a buyer-seller relationship, the buyer being the policyholder and the seller being the insurer. Insurers offer policyholders—both individuals and businesses—products that serve as a reliable measure to protect against risks and uncertainties. However, there are lot of challenges in this interaction, both before and after the signing of the contract. The chief among those is the problem of adverse selection and moral hazards (hidden actions) (Tumay 2009, KPMG 2012).

The focus of this study is on the latter in the context of the Egyptian car insurance industry for businesses. We seek to investigate the degree of existence of moral hazards, which normally occur after the signing of the contract (ex-post) in this segment of the insurance industry. After buying insurance coverage, most businesses do not have the incentive to invest in self-insurance or protection, such as safety measures, which they often find expensive. Thus, they rely on the insurance companies to intervene if there is any accident or when the actual risk, against which they are insured, happens. This leads to moral hazard problems because it is very difficult for insurance companies to implement effective monitoring mechanisms, which are very costly, and in some cases, implausible.

This dilemma has been a perennial problem of the insurance market. Researchers have suggested different strategies to deal with it. The most used among those is proper contracting by including deductible and co-payment riders. However, these methods are not exhaustive and cannot rationalize all the dynamics and possible outcomes of a contractual agreement. Thus, the relationship between the insurers and policyholders is crucial in determining the outcome of a certain coverage transaction. Hence, better collaboration and effective coordination between these parties is important for a mutually beneficial relationship (Guesnerie and Laffont 1984, Tumay 2009).

2.6 Insurance Industry's Service Characteristics

2.6.1 Intangibility

Insurance services are intangible, that is, they cannot be touched or stored. Hence, unlike goods, which one can produce in a certain quantity and store in stock keeping units (SKUs), it is difficult to manage and account for insurance services. Thus, there will be a shift from holding stock to managing capacity; to manage services, one must be efficient and flexible in capacity management (Ellram, Tate, and Billington 2004). Moreover, since service is intangible, it is hard to form an exhaustive specification at the time of acquisition. It is also difficult to measure quality after service delivery. For instance, a car insurance product is intangible since before buying it, customers cannot pre-test it as they do with goods. Therefore, some complexities are involved in the management of car insurance products (Zhou and Park 2009).

2.6.2 Simultaneity of Production and Consumption

The production and consumption of service outputs happen concurrently, usually at the point of request. Suppose a policyholder enters an insurance outlet and buys a car insurance product. Alternatively, the policyholder can request for the product through an online platform. Thus, production and consumption happen at the same time. In the case of goods, the process follows sequential stages in production without the customer being present on the factory floor. The goods are ready for consumption upon completion of production. Thus, unlike manufactured goods, services like insurance products are produced and consumed simultaneously (Zhou and Park 2009).

2.6.3 Heterogeneity

Services offered in the insurance industry are largely heterogeneous. Even within a product, there can be different forms of deductibles and other characteristics to differentiate among the services. Customers play a huge role in service design. They have different needs, because of which services vary. However, the difference in needs also makes it hard to measure and monitor service quality (Drzymalski 2012, Ellram, Tate, and Billington 2004).

2.6.4 Customer-Supplier Duality

A famous example of duality comes from the electronics repairing business. A customer walks up to the service provider and the service is being provided to the customer as well. That is, service cannot begin until the customer supplies the inputs. It is labour intensive and the services provided are highly heterogeneous. In addition, the customer is part of the production as well as the consumption process (Kato 2010).

2.7 Relevance of Egypt as the Research Setting

Egypt has one of the largest economies in Africa. Because of the return of stability to the country, its economy is growing again and impressive GDP figures are showing strong signs of recovery. The Egyptian insurance market is also among the fastest growing ones in the world and in the MENA region, showing robust growth over the years.

However, the outcome of this work will corroborate existing research on similar issues done in other parts of the world, especially in western economies. This study will serve as a guide for taking relevant policy and regulation decisions in the insurance industry. It will lead to better policies and regulations that will enhance and improve the relationship between insurers and policyholders, minimize the degree of hidden action problems and foster mutually beneficial exchange relationships in the insurance industry ((EFSA) 2014a, KPMG 2012, Rorbye 2013, Berno 2013).

2.8 Summary

This chapter has described and discussed in detail the nature, dynamics, and trends in the insurance industry in Egypt. It has also delineated the different activities and functions of the insurance sector and the insurer's relationship with business policyholders. It has also presented the nature and characteristics of the service industry, and the way in which its value chain is different from that of the manufacturing industry. It has further justified the relevance of Egypt as the research setting. The next chapter presents the theoretical framework that this study used.

CHAPTER THREE

LITERATURE AND THEORITICAL REVIEW

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LITERATURE AND THEORITICAL REVIEW

3.1 Introduction

This chapter discusses the theoretical perspectives relevant to this study and presents the literature review relating to the research problem. As the starting point of the discussion of the theoretical perspectives, the authors have presented the definition of hidden action problems. They have used two theoretical perspectives in this study, viz. PAT and RCT. The purpose of using the two perspectives is to develop the conceptual model of this study. The authors have derived different constructs regarding hidden action problems in a buyer-seller relationship from these theoretical frameworks.

3.2 Principal Agent Theory

An agency relationship can be presented as any employment relationship wherein one party (the principal) depends on another party (the agent) to undertake an action on behalf of the latter. The formal agency literature presents two different but related models. The first one focuses on pre-contractual and the second on post-contractual issues. There is also a positive branch within the theory, mainly concerning the design of appropriate intra-organizational control mechanisms and governance. Agency theory uses the contract to describe the relationships in which one party delegates work to another (Jensen and Meckling 1976).

The focus of the theory is on determining the most efficient contract in an exchange relationship in order to govern it, given the characteristics of the parties involved, and considering the fact that the cost of obtaining information and environmental uncertainty in business relationships make it impossible for the principal to monitor the agent completely. It is important to realize that most agency models define efficiency from the principal's point of view. The main assumption is that the principal is the dominant party in the relationship. Hence, rather than maximizing the benefits for both the principal and the agent, the 'efficient' contract ensures the best possible outcome for the principal, given the constraints imposed by the situation (Bergen, Dutta, and Walker Jr 1992).

Two Types of Agency Problems

When the principal forges a relationship with an agent, it faces two distinct problems. The first one—pre-contractual problem—arises when the principal decides to offer an agent a contract. The major issue here is deciding on the strategy to find an agent who has the characteristics the principal seeks.

The second problem emerges after the principal and the agent have forged the relationship. It is called a 'post-contractual problem'. The major issue here is to decide on the information strategy that the principal should employ to evaluate and reward the agent's performance to guarantee that he/she will be motivated to behave in a manner consistent with the principal's goals. Pre-contractual issues are often termed as 'hidden information' problems and post-contractual issues as 'hidden action' problems (Bergen, Dutta, and Walker Jr 1992).

3.2.1 The Hidden Information Model

This model deals with the problems a principal may face when it enters into a contractual relationship with an agent. These problems crop up largely because of information asymmetry. It is quite difficult for the principal to determine ex-ante whether an agent will act opportunistically. This situation can be mitigated by screening, examining signals from the potential agent or by providing opportunities for self-selection (Arrow 1984).

Screening

The principal must have a set of criteria to evaluate a potential agent's true characteristics and must adjust these to the changing environmental conditions over time. The principal can recruit agents based only on the information available, without any screening. However, doing that would lead to the recruitment of wrong agents, which would lead to poor performance and inefficiency. In this case, the principal faces the option between the cost of the screening process or the loss due to poor performance. Nonetheless, screening serves as an effective mechanism to combat the problem of hidden information, especially when it can reveal key information about potential agents before the principal contracts them (Van Osnabrugge 2000).

The Agent's Signals

If the agents know their potential and ability to execute contractual agreements, they tend to signal to the principal that they have the desired characteristics the principal is looking for. However, the challenge is that some agents will take advantage of such a situation and send a false signal (Morris 1987).

The Principal's Actions Providing Opportunities for Self-Selection

The principal should offer incentives to agents to genuinely signal their capabilities and willingness to undertake an activity (Arrow 1984).

3.2.2 The Hidden Action Model

This model deals with the problems a principal may encounter after signing the contract with the agent. The hidden action model makes several assumptions about the principal and the agent. *First assumption:* self-interest motivates the principal and the agent. Such self-interest typically translates into maximizing profits (or utility) (Bergen, Dutta, and Walker Jr 1992).

Second assumption: principals labour under conditions of incomplete information. This implies that the agent has more information than the principal does and would like to obtain. The situation where one party has information the other desires—and this characterizes most agency relationships—is called information asymmetries. The main problem here is that self-interest often makes the agent averse to sharing the information with the principal, or even motivates him/her to send the principal wrong information (Arrow 1984, Bergen, Dutta, and Walker Jr 1992).

Third assumption: environmental factors partly determine outcomes. When the principal and the agent have conflicting goals and different risk preferences, problems tend to arise in the relationship, which lead them to prefer different courses of action. The degree of an individual's or firm's preference for adventure to security can be thought of as risk preference (Bergen, Dutta, and Walker Jr 1992).

3.2.2.1 First Assumption: Hidden Action Problem is a Moral Hazard in Insurance Markets

Different authors define moral hazard differently. One of the important definitions is that moral hazard is the risk of change in behaviour of one party to a contract to the detriment of the other party once the contract has been concluded. With regard to insurance, moral hazard can be defined as the propensity of insurance policyholders to make less effort to protect the insured goods against theft or damage (Frank and Glass 1991).

The reason why moral hazard is called a *hidden action problem* is that it refers to situations where one side of the market cannot observe the actions of the other (Bergstrom and Varian 1990). Hidden action problems also occur when the policyholder's action increases the likelihood of a loss. However, the insurer cannot know about these actions.

This results in a situation where the insurer cannot price the premium and compensations correctly because these depend on the actions of the policyholder. This may lead to market failure (Lee 1992). Furthermore, moral hazard problems arise when policyholders, armed with private information, can take actions that can adversely affect the insurer's outcomes.

Based on these definitions, the authors could derive some features of moral hazard:

1. The policyholder whose actions are hidden by either action or inattention, increases the probability of a 'bad' outcome.

2. One party, the insurer, cannot observe the (hidden) action of the other party, the policyholder.

Thereby, it is expected that car insurance gives people an incentive to run into accidents, especially if their business is not doing well and they decide that they would rather have the compensation for the car from the insurance company than the car itself. It would be suitable for policyholders to have an accident that causes injury or property damage. Policyholders may drive worse than those who are not insured. However, *why does Moral Hazard occur?* As mentioned before, moral hazard is a hidden action problem. Taking care to avoid a particular loss involves costs. Once the policyholder is fully insured, he/she has no incentive to incur these costs since the insurance will cover the loss.

3.2.2.2 Second Assumption: Information Asymmetry

Making accurate decisions is a core point for firms. However, this decision is always based on the extent of availability of knowledge about the other business party. When one party to an economic transaction has insufficient knowledge about the other, there is a problem of 'asymmetric information'. In the insurance market, the problem of asymmetric information can occur in two stages—first, before the signing of the insurance contract, and second, after signing it. The first happens because of absence of knowledge about the other party and the second, because of the inability to observe the actions of the other party.

There are mainly two types of information asymmetry. The first is the 'hidden characteristic' type and it is relevant to the stage of ex-ante contract and occurs when one party to a transaction knows something about itself the other side does not. The second is called the 'hidden action' type and it is relevant to the stage of ex-post contract, which occurs when one side can take an action that affects the other side, but which the other side cannot directly observe (Katz 1998). Regarding the hidden characteristic type, the uninformed party can gather some information about the informed party in two ways.

The first way is 'signalling', which could be defined as an observable indicator of a hidden characteristic. The second way is screening—the uninformed party's attempt to sort out the informed parties.

Different literatures mention hidden action as a moral hazard. It is a problem of asymmetric information and occurs after the transaction has taken place. This problem can arise when one party to the transaction hides some actions from the other, which the latter cannot observe. Adverse selection is a problem of asymmetric information and occurs before the transaction has taken place. This problem can arise where there is a hidden characteristics problem and the informed side in the transaction selects itself in a way that is harmful to the uninformed one (Katz 1998).

3.2.2.3 Third Assumption: Hidden Action Problems in the Egyptian Car Insurance Market

The concern about such a hidden action problem arises when a policyholder who insures an asset (say, car) fails to maintain it properly (e.g., parks it in a bad neighbourhood). Usually such actions are either unobservable by the insurer or are too difficult to be specified in the contract. Therefore, the insurance contract could not be directly contingent on such actions.

As far as moral hazard is concerned, this case is a negative one, since the actions known as moral hazards impose an externality on the insurer. Insurers are careful about entering into contracts that caution against these (Caillaud and Hermalin 2000). Moral hazard represents a passive form of opportunism and occurs when an exchange partner distorts information or misleads the other party to protect its own interest, overlooks quality or fails to fulfil promises or obligations stated in the contract (John 1984, Wathne and Heide 2000, Williamson 2007). Moral hazard happens when the focal firm cannot establish the exchange party's current performance capabilities due to information asymmetry. It also happens due to 'hold-up', which arises from unilateral idiosyncratic investments that create the potential for exploitation by the focal receiver (Barney and Ouchi 1986).

Tumay (2009) defines moral hazard as the risk that one party to the contract can change its behaviour to the detriment of the other after they have signed it. In the insurance market, the manner in which people behave towards their insured goods, that is, make less effort to protect those, indicates moral hazard. Although the principal-agent analysis is more general than this, the name 'moral hazard' has stuck.

Therefore, the types of problems considered here, such as hidden action problems, are often called moral-hazard problems, too. A more descriptive name, which is also used in the literature and has been used in this study as well, is 'hidden action problems' (Caillaud and Hermalin 2000). Hidden action problems occur when a policyholder can take an action that affects the insurer, but the insurer cannot directly observe it (Tumay 2009). Hidden action problems also occur when an action taken by the policyholders affects the probability and severity of a loss, but the insurer cannot observe it.

In this case, the insurer cannot price the premium and the indemnity correctly since it depends on the actions of the policyholders, leading to market failure (Lee 1992). Hidden action problems arise in insurance markets when the insurer offers contracts that cover the occurrence of a claim, but there is no significant way for the insurer to observe the policyholder's effort to prevent the potential risks. Once established, the conflict between the insurer and the policyholder continues (the higher coverage the insurer offers, the lower effort the policyholder makes to prevent the risk) (García Rubiano 2009). As mentioned before, the main reason behind the hidden action problem is the cost involved in taking precautions and taking care to avoid a potential risk.

When a policyholder is fully insured, he/she has no reason to incur more costs (Tumay 2009). According to Shavell (1979), the effects of static hidden action on the insurance market show that the incentives for policyholders to prevent the loss are distorted, especially since the insurer cannot observe their actions. In the Egyptian car insurance market, several mechanisms are used to avoid such hidden action problems. Some of those are the principle of comparison, which is based on two basic concepts—'previewing' and 'reviewing'. The first is used before the contract is signed, wherein the insurer sends a group of technical managers to check the car and register all the required details. The latter is used after a claim has been made, to discover all possible reasons behind the occurrence of the damage and any possible hidden action. Furthermore, the main mechanisms that are used in advance when the contract is signed are the deductible and co-payment riders.

If the insurer discovers any hidden action by the policyholder, it will not pay the latter any compensation and punish him/her with 'penalty points' based on the insurance principle of 'utmost good faith', which both the insurer and the policyholder know. The contract stipulates the punishment.

Egyptian insurers give some incentives to policyholders so that they are motivated to invest more in protecting their cars. There are reward schedules that represent an enforceable contract (e.g., if the policyholder obeys the terms of the contract, he/she will get a reward), and there is the 'contract with bonus', which is offered when the policyholder renews the car insurance contract without making any preceding claims. Egyptian insurers only cover models of cars that are not more than six years old. The focus of this study is to examine the degree of existence of hidden action problems in business-to-business service and to determine the main factors that influence and deter the problems.

Such behaviour would include hiding the following actions or similar: leaving the car unlocked or with the engine running, leaving the keys in or the key fobs attached, leaving a window or the roof open, damage or loss resulting from another person driving the car without permission, using the car for a purpose not mentioned in the contract, crossing the state borders with a domestic contract, violation of traffic rules, and getting tricked by fraudsters pretending to be buyers.

Some more such actions would be not leaving removable in-car electronic equipment in the glove compartment or the locked boot, not installing any security or tracking device suggested by the insurer, network subscription for any tracking device not being up-to-date or operable, leaving any driver-recognition device for a tracking device unattended, drink- driving, not using seatbelts, not having a fire-extinguisher in the car, and so on.

3.2.3 Insurance and Risk

A long time before the social sciences discovered the institution, insurance agencies were designing contracts and negotiating their way around opportunism, monitoring challenges, goal conflicts, and incentives. Therefore, insurance companies have so much knowledge about the reasons behind the failure of an agency that they even enter into contracts like liability policies for breach of fiduciary duty or professional malpractice. As Heimer demonstrated in 1985, sociologists have a great deal to learn from the social practices of insurance. They still do (Shapiro 2005).

3.2.4 Agency Costs

Many tough principals try to minimize agency costs, but all agency relationships do experience these. Agency costs can arise from many origins—recruitment, adverse selection, moral hazard, specific and discerning preferences, shirking responsibility, stealing, incentives, self-dealing, corruption, self-regulation, monitoring and policing, bonding and insurance, agents who oversee agents who oversee agents, and failures in costly corrective devices. Since the principal cannot observe the agent's behaviour, they *'rely on imperfect surrogate measures, which can lead the agent to displace his behaviour towards the surrogates in order to appear to be behaving well'* (Mitnick 1992). For example, insurers/principals provide the policyholders/agents with prevention incentives to motivate them to protect their cars against the potential risks. A few policyholders get involved in moral hazard only to gain such incentives.

Therefore, agency costs can increase if agents concentrate their efforts in the wrong direction (Mitnick 1992, Jensen and Meckling 1976). Agency costs can also increase if organizations, such as insurance companies, build some paradigms to minimize hidden action problems: create balances, rotate employees, implement reporting requirements, fragment responsibilities, introduce redundancies, lock revolving doors, add layers of supervision, and so on.

Such costs increase because fearing abuse, principals impose procedures, decision rules or formularies to limit agent discretion. Ironically, principals who seek out agents tell them how to take decisions on their behalf. Either the agents lack the expertise to take decisions, or the principals tie their hands (Eisenhardt 1989). Since insurers fear that agents (policyholders) might act to suit their self-interests, they want them to be disinterested. They take agents out of embedded networks where their loyalties and interests are entangled with those of others. Agents may also profitably remain in the service of their principals because of their fear of losing social capital, reputation, goodwill, and inside information. Principals also fear that agents will get their preferences wrong, and therefore construct a protective social edifice that ensures that they will get them less right.

3.3 Relational Contracting Theory

Relational Contracting Theory (RCT) assumes that a long-term exchange relationship, in which firms conduct business repeatedly, can lead to the emergence of inter-firm relationships. These provide a tool—relational norms—that can safeguard the relationship (Bradach and Eccles 1989, Buvik and Halskau 2001, Granovetter 1985). Such a relationship tool acts as a defence against hidden action by trading partners. Extant theories say that business engagements in an exchange relationship are expected to develop certain behaviours, trust, and relational norms that constantly govern the methods in which suppliers and manufacturers interact with each other (Buvik and Reve 2002, Macneil 1977).

Trust refers to the predisposition to rely on an exchange partner in whom one has confidence. Therefore, the presence of trust in an exchange relationship leads reduced need for contractual safeguard against future eventualities (Moorman, Deshpande, and Zaltman 1993). The duration of the relationship is considered to be an important construct, since trust regenerates from exchange relationships that occur over time (Buvik and Halskau 2001, Lusch and Brown 1996).

3.3.1 Relationship Duration, Trust, Relational Norms and Hidden Action Problems

With regard to this study, this subsection is particularly relevant. The variable 'trust' will be in focus since this study concentrates on business-to-business relationships. Thus, this variable will receive special treatment in this research model and in the subsequent discussions. According to Relational Exchange Theory, the prior duration or link duration is the core element of the business relationship, which is strongly associated with relational governance (Burki and Buvik 2010).

The development of norms, such as trust and truthfulness, is based on the history of the relationship, which is considered to be a safeguard against hidden action (Buvik and Halskau 2001). According to Buvik and Halskau (2001), ongoing terms of trade, contractual practices and inter-firm interactions could be established by treating the relationship status over time as the point of reference. In any business, exchange partners have a limited understanding of each other's norms and values in the initial stages of their relationship; thus, it can make the initial trust very difficult (Heide 1994, Burki and Buvik 2010).

Wathne, Wathne, and Heide (2000) argue that as time passes, norms can stand as informal agreements even if formal contracts already exist. In any case, the scope of formal contracts is limited due to their finite duration.

Relational norms such as trust are generally important if the intention is to build enduring relationships. Relational norms involve setting several boundaries on the permissible limits of the behaviour of partners, which safeguard against hidden action (Burki and Buvik 2010). The RCT, in relevance to this study, is expected to determine the relationship between insurance companies and car policyholders due to the business interactions over time. The relationships are expected to have some level of trustworthiness, which is expected to deter hidden action despite the existence of formal contracts. Therefore, policyholders, in relationships characterized by friendships, truthfulness, and trustworthiness, are expected to pose fewer hidden action problems for insurance companies.

3.4 Summary

This chapter has presented and discussed the PAT and the RCT to guide this study. The PAT says that self-protection, agency costs, information asymmetry, and screening are present whenever insurers and policyholders interact. Thus, these are used as mechanisms to adjust the behaviour of exchange partners in a buyer-seller relationship, therefore reducing hidden action problems. RCT says that relationship norms, duration, and trust guide the behaviour of exchange partners in a buyer-seller relationship, thus reducing hidden action problems, too.

CHAPTER FOUR

REASEARCH SYNTHESIS AND HYPOTHESIS DEVELOPMENT

CHAPTER FOUR
REASEARCH SYNTHESIS AND HYPOTHESES DEVELOPMENT

4.1 Introduction

This chapter presents an overview of the conceptual model based on extant literature elucidated and reviewed in the preceding chapter. This study has defined *hidden action problems* as 'the actions taken by policyholders after signing the contract (ex-post) which are unobservable by the insurer'. That is because after obtaining an insurance policy, some policyholders have no incentive to safeguard their assets against loss, which would involve additional costs. Examples of these actions include, but are not limited to, speeding, non-adherence to maintenance schedule, not parking in designated places, not using an anti-lock brake system, not using tracking or safety devices as suggested, etc. (Tumay 2009).

Business policyholders in the Egyptian car insurance market have used *hidden action problems* as the main indicator of opportunistic behaviour. Furthermore, this chapter seeks to develop the hypotheses relevant for this study based on the theoretical background—PAT and RCT—as highlighted in Chapter 3. This study has identified and used five independent variables to establish the research model, as Figure 4.1 below shows. The research model in Figure 4.1 comprises both direct effects and interaction effects, as the arrows indicate. Generally, this chapter provides a glance into the hypotheses developed for the possible main effects and interaction effects between and among the variables. The empirical tests conducted for this purpose will be presented later.

4.2 An Overview of the Research Conceptual Model

The conceptual model of this study seeks to *measure the antecedents of hidden action by business policyholders* in the Egyptian car insurance market. It also seeks to *explore factors that attenuate hidden action* by policyholders. Increasing trust and mutuality between exchange partners yields positive and improved business performance, extant literature has proved.

Figur 4.1 Research Model
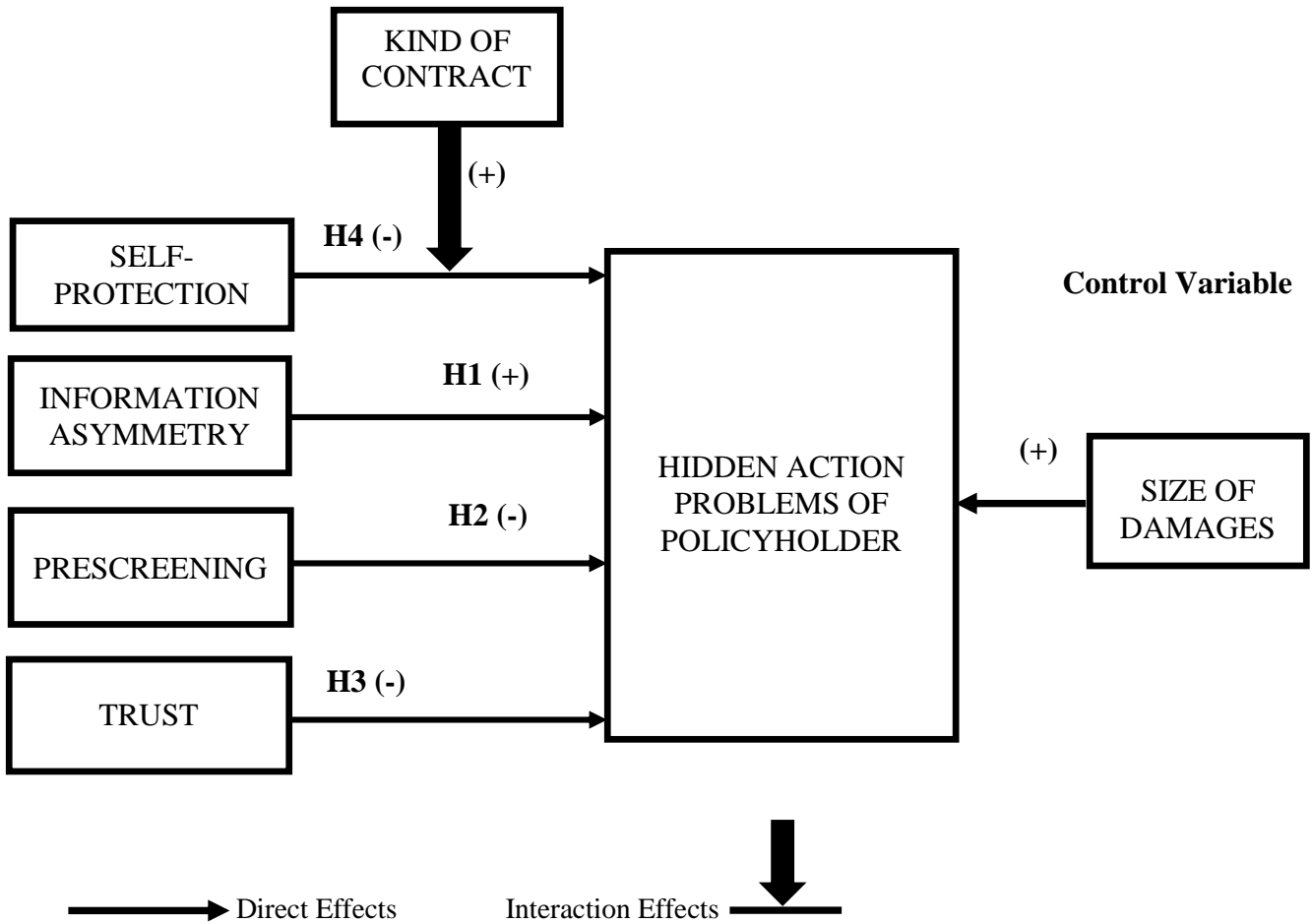
Source: Authors' own development from literature review.

Basis of research model and hypothesis development

The authors will empirically test the influence of the five independent variables shown above in figure 4.1 on the dependent variable. The five independent variables are:

Kind of contract by policyholders (KINDCONTRAC), which denotes the nature of contract the insurer gives the policyholders based on their risk profile, degree of risk aversion, and other considerations (Shogren and Crocker 2004).

Self-protection by policyholders (SELFPROT), which is the degree of willingness of the policyholder to invest in measures to attenuate the risk insured against (Huang 2006b).

Insurer's information asymmetry (ASYMMINFO), which is the information gap between the insurer and the policyholder. How policyholders use this tacit knowledge to influence the outcome of the policy is a key antecedent of hidden action problems (Akerlof 1995).

Pre-screening of insurers (PRESCREEN), which is the amount of effort the insurer expends to get vital information about the characteristics of the policyholders to avoid hidden action problems (Smart 2000).

Trust (TRUST), which serves as a measure to attenuate hidden action problems since it ensures that partners in an exchange relationship honour their obligations and are accountable to each other (Burki and Buvik 2010).

The dependent variable in the study is *Hidden action* (HIDDENACT), which are the ex-post actions by policyholders unobservable by the insurer (Tumay 2009).

This research model also includes a control variable, *size of damages* (SIZOFDAMAGE), which is the amount of compensation paid to policyholders if the risk insured against happens because of its potential influence on hidden actions (Chiappori and Salanie 2000, Carlier, Dana, and Shahidi 2003).

4.3 Development of Research Hypotheses

Foundation of hypothesis

This study focuses on the antecedents of hidden action problems and uses the intra-firm buyer-seller relationship as the main unit to analyse opportunistic behaviour by policyholders within the Egyptian car insurance market. The following research hypotheses were developed based on: 1. factors relating to the buyer-supplier relationship in the Egyptian car insurance market, 2. literature review on PAT and RCT, and 3. insights from preliminary review of the Egyptian car insurance market, which provided us with the means to develop the hypotheses.

This paper has drawn only an initial overview of the possible effects of the independent variables on hidden action problems, as illustrated in Figure 4.1, with attention to the four hypotheses (H1, H2, H3 and H4) and the control variable to recognize the research problem at a glance.

Size of damages: In this study, the control variable 'size of damages' (SIZOFDAMAGE) influences the probability of hidden action problems by measuring the size of the damages to be paid against claims by policyholders.

Putting in place riders like deductible and co-payment in advance will reduce the amount of damages to be paid if the risk insured against actually occurs, so as to avoid the opportunistic behaviour referred to as 'hidden action problems' from policyholders in this study. Hence, the control variable (SIZOFDAMAGE) is expected to positively influence hidden action by policyholders (Chiappori and Salanie 2000, Carlier, Dana, and Shahidi 2003)

Market segment: This chapter focuses its attention on the antecedents and the possible ways of attenuating hidden action by car insurance business policyholders, because of their clear effect on the financial situation of the Egyptian insurance market. The chapter on data analysis will discuss this in detail. However, the 'trust' variable should be considered when it comes to business-to-business policyholders. It plays a pivotal role in such relationships.

4.3.1 The Association between Information Asymmetry and Hidden Action by Policyholders (Hypothesis 1)

Root of the problem

Each party to an economic transaction needs detailed and sufficient information and knowledge to take accurate decisions, and to achieve the most efficient outcome. However, in the case of information asymmetry, one party has more information than the other (Tumay 2009). Information asymmetry is regarded as a market failure that adversely affects the level of production and consumption, thus affecting market equilibrium. This refers to a situation where one party to a transaction has more information or details than the other party does, and might use this information to their advantage.

Information asymmetry

Information asymmetry refers to a situation where one party to a transaction has information the other does not have. If they had this information, the nature of the transaction would have been different. Akerlof (1970) first used the industry of used cars to effectively explain the concept of information asymmetry in his work on the 'lemons' market. In such markets, there are cars of different qualities—good ones and bad ones (lemons). This is also very important in the insurance industry as their principal product aims to mitigate risks. The prevalence of information asymmetry presents a huge challenge to the operations of the insurance market. Asymmetric information leads to hidden action problems—a situation wherein one party's actions can influence the other party and hence, the former has an incentive to pursue hidden action to suit his/her self-interests (Filipova-Neumann and Welzel 2010).

Hidden action in terms of information asymmetry

This refers to a scenario where products of different qualities are sold at the same price but the buyer cannot differentiate between those (Akerlof 1995). However, the insurance market deals mainly with the mitigation of risks and losses. It takes on the risks of policyholders and compensates them accordingly. Nonetheless, the risks have to be coincidental. However, coincidence can be also influenced by human behaviour based on asymmetric information regarding their risk levels, which can increase the probability of the risk occurring. The following are the possible cases of information asymmetry:

Policyholders to insurance company: The policyholder has private information about the cars it wants to insure or about the conduct/behaviour of the drivers. The insurer does not have this information. However, if the insurer has this information, the policyholder will have to pay a higher premium to get the policy. Say, a company makes an insurance claim after an accident, but does not report the circumstances that surrounded the accident, e.g., speeding or overloading (Rybák 2015).

Client	Business customer
Main insurance product	Fleet/cars
Basic reason for insurance	Assurance of corporate costs and liabilities from business operations, assurance of corporate revenue and receivables from business operations
Insurance indemnity	Compensation for unexpected damage
Main motivation for fraud	Covering of costs
Risk incurred by realization of insurance fraud for insurer	Risk of excessive payment of claims, solvency risk
Risk incurred by realization of insurance fraud for client	Risk of imprisonment, solvency risk, reputation risk

Source: Motivation for insurance according to client needs (Rybák 2015)**.**

The table above illustrates a scenario of a business customer with information asymmetry that has the potential to increase the level of hidden action problems; the table delineates the dynamics of their risk profile and the motivation of buying an insurance product.

Examples of some hidden action cases with information asymmetry in the Egyptian car insurance sector:

- Concealment of relevant and material information
- Wilfully giving false data about the fleet and other factors (age of vehicle, size of risk, documents, origin of claim, etc.)
- Deliberately overstating claims
- Negligently or carelessly causing damage (car accident, injury) to claim insurance
- Overpricing assets during the underwriting process and presenting an already-damaged product as if it were undamaged (e.g. crashed car) (Rybák 2015)

Nature of the problem

This information gap between market players often leads to hidden action problems, which normally leads to a positive correlation between the choice of insurance coverage and the occurrence claim.

This prompts insurance companies to charge customers based on their loss probabilities, which can lead to cross-subsidization in the loss ratio between high- and low-risk customers (Huang 2006a). Furthermore, policyholders who have private information about their risk type tend to underreport their claim history to insurers—an action taken because of information asymmetry in the market, especially by high-risk customers.

The magnitude to which individuals have knowledge of their risks is a key determinant of their willingness to buy insurance and the extent of the coverage they buy. Potential policyholders who know that they have low risk have a relatively lower willingness to pay for coverage; this might lead to the problem of hidden action and low-risk policyholders getting less than full insurance (Olivella and Vera-Hernández 2013). Marketing relationship is largely characterized by information asymmetry: one party to the exchange possesses more information than the other about the object of exchange. Many products and services have attributes whose quality can be measured only after the services have been bought (Nelson 1970).

For example, in car repair services, it is hard to determine the quality of the service being offered in a transaction. The inability of one party to ascertain the quality can lead to the other acting opportunistically by pursuing certain hidden actions. Parties that do not possess the requisite quality to provide services might be tempted to misrepresent their ability by making false quality claims, which may lead to hidden action problems.

This problem presents concerns for parties in an exchange relationship when the object of the exchange is hard to ascertain and when the actions are unobservable (Mishra, Heide, and Cort 1998).

Tumay (2009) postulated that market participants usually hold information asymmetrically since not all actions of players are observable. This leads to hidden action where the party with more information self-selects in a way that adversely affects the other party. However, the focus of the study is on the ex-post hidden action problem—that is, when one party (policyholder) engages in activities that are detrimental to the terms of agreement with the other party (insurer). However, information asymmetry often leads to hidden action.

Consequences of the problem

When one party undertakes an action that is detrimental to the terms of the agreement, and affects the other party because the latter's actions are largely unobservable after signing of the contract, it is considered as information asymmetry. In other words, policyholders will expend less effort on self-protection to mitigate the risk after buying the policy, which will increase the likelihood of the risk happening and subsequently of the claim, too.

Hidden action also explains a situation wherein one party in the market cannot observe the actions of the other. This occurs when policyholders possessing private information take actions that increase the probability of a bad outcome (Filipova-Neumann and Welzel 2010).

This also refers to a case in which actions pursued by policyholders increase the probability of the loss happening but cannot be observed by the insurer. Therefore, the insurer cannot efficiently charge the correct premium and indemnify the policyholder based on his/her actual actions. That is because his/her actions are hidden and unobservable. This leads to market failure. For example, car insurance could make it easier for people to have injuries and property damage by pursuing hidden actions, because they will not take care while driving as their car is already insured. Thus, the higher the level of information asymmetry, the higher is the likelihood of increased hidden actions (Tumay 2009).

Another consequence of information asymmetry is that the policyholder has an incentive to undertake actions that will increase the risk level more than that agreed in the contract. The hidden action problem induces them to take more risks once they have secured an insurance coverage because they have passed on a huge part of the financial burden to the insurer.

It is very expensive and in some cases impractical to put in place effective monitoring mechanism to minimize this problem. It is also costly for the insurer to offer incentives that will motivate the policyholder to take preventive measures to reduce the loss probability (Arvidsson 2010).

Solution to information asymmetry

To mitigate the degree of information asymmetry, the insurer employs a range of screening strategies by classifying the various risks using different criteria (Rothschild and Stiglitz 1976). Using this technique, the uninformed party (insurer) uses the available information and trend to approximate the accurate picture of the policyholder. To achieve an efficient risk-classification outcome, the insurer utilizes the available information and the observable trend that have a strong correlation with ex-post risk (Arvidsson 2010).

In addition, hidden action problems can be solved by offering incentives, which can mitigate poor performance and cheating. Another method is to ensure that transactions are arranged in such a way that the agent will act in his best interest and pursue activities to the principal's preference even when his/her actions are unobservable.

Over the years, premiums that exceed the marginal cost of quality have been used as an incentive to enhance quality in service provision (Mishra, Heide, and Cort 1998). A range of incentive mechanisms and cultural values manage the hidden action problem and minimize the possibility of cheating.

The major challenge of hidden action problems is that one party can take actions that the other cannot monitor efficiently. In the case of insurance contract, the activities of the policyholders (agent) affect the level of profitability and the business of the other party, i.e. the insurer (principal). Since it is difficult and costly for the insurer to effectively monitor the activities of the policyholder ex-post, it is important that the insurer designs a contract that will make the policyholder try to not misuse the information gap (Keser and Willinger 2000).

In addition, Hypothesis (H1) proposes a positive association between asymmetric information and hidden action problems. It is assumed that the insurer knows something about a policyholder's characteristics and abilities, but the knowledge about the policyholder's actions is neither perfect nor complete. In contrast, the policyholder has information that the insurer would like to obtain.

Such information asymmetries—when one party has information the other desires but does not have—characterize most agency relationships. The problem is that self-interest often makes the policyholders reluctant to share the information with the insurer. It may even motivate them to send the insurer false information (Akerlof 1995).

H1: The degree of information asymmetry is positively associated with hidden action problems in the Egyptian car insurance market.

4.3.2 The Association between Pre-screening and Hidden Action by Policyholders (Hypothesis 2)

Pre-screening refers to activities undertaken by the insurer to ascertain the material characteristics of policyholders after they have signed the contract. It measures the probability of accident and the degree of risk aversion between and among customers, with high-risk and low-risk customers likely to choose different contracts. Customers are inherently different in their risk profile. However, it is difficult for the insurance market to operate as a perfectly competitive one since the degree of accident (i.e. loss) probabilities of a potential policyholder cannot be observed ex-ante. Thus, certain terms of contract, such as deductibles, may encourage the policyholder to reveal as much information as possible in the pre-screening stage before they sign the agreement.

When the accident probability is the same, low-risk policyholders are more likely to go for lower insurance compared with high-risk policyholders (Smart 2000). Insurance uses deductibles and policy limit in insurance contracts as a method of multi-dimensional screening to ascertain whether potential policyholders have hidden knowledge about the magnitude of their risk, thus minimizing the externality of hidden action. When policyholders have tacit knowledge about the likelihood of the occurrence of their risks, the market is driven by competition for policyholders in the low-risk category. They strive to differentiate themselves from the high-risk policyholders to get favourable terms of contract than if they are pooled with high-risk policyholders (Crocker and Snow 2011).

Risk categorization

Insurers realize this separation strategy using a screening mechanism where they offer different menus of contracts to prospective policyholders. They offer high-risk policyholders a full and fair package but with a lower-than-average price of coverage, and possibly the rider of a deductible, which is to some extent unacceptable to high-risk policyholders.

Thus, effective screening separates the different risk categories. Insurers can achieve this through multidimensiual screening and the contractual bundling of various risks and possible losses (Schumacher 2014).

Pre-screening and contracting

Bundled coverage, varying deductibles, and policy limit give an advantage to insurers to screen customers in various ways, thus minimizing the externality and the cost borne by low-risk policyholders to separate themselves from the high-risk ones. Therefore, insurers can compete effectively by using efficient multidimensional screening in their operations (Crocker and Snow 2011). Netzer and Scheuer (2010) pointed out in their work that policyholders differ largely in their risk of incurring a loss; risk categories should be completely separated and high-risk customers should buy higher coverage. This implies a positive correlation between risk and level of coverage.

By expanding the Rothschild-Stiglitz screening model to a dynamic setting, they further explained that with endogenous wealth creation, high-risk individuals ceteris paribus demonstrate a lower-than-marginal willingness to pay for insurance coverage compared with low-risk individuals—a situation they described as 'irregular crossing'. The rationale is that given the same contract, high-risk policyholders exhibit a lower degree of risk aversion and tend to pay a lower cost to protect themselves (Netzer and Scheuer 2010).

Pre-screening in mitigating hidden action

According to Spinnewijn and Johannes (2013), heterogeneous risk perceptions influence the terms of contract offered by insurers since policyholders differ in their risk perception and degree of risk aversion. The risk perception of policyholders somewhat determines the willingness to pay for insurance and the extent to which they will go to self-protect against the risks, largely influencing the design of an insurance contract. However, in extant literature, the focus has been largely on the heterogeneity of risks rather than the perception. Since high-risk customers have a greater need for insurance, heterogeneity gives rise to the problem of hidden action. As a result, risk and coverage are positively correlated and in equilibrium. However, this equilibrium does not really hold for many other insurance markets since risk-tolerant policyholders tend to buy less coverage and spend less effort and resources in protecting against the risk because of heterogeneous risk preference amongst policyholders (Lee 1992).

Consequently, the positive correlation between risk and the level of coverage can also be explained by the differences in risk perception of the policyholders with regard to the risk itself and his/her capacity to effectively manage the risk. Also, screening is a function of the differences in perception and the nature of competition in the market (Spinnewijn 2013).

The level of background risk prevalent in its portfolio can also influence the efficiency of the insurance market. The degree of background risk influences policymakers by increasing their level of risk aversion. When potential policyholders cannot be effectively screened for background risk, the efficiency of the market is affected since high-risk policyholders are free from background risk screening (Crocker and Snow 2011).

In this hypothesis (H2), the researchers expect a negative association between the level of *pre-screening by insurer* and hidden action by policyholders. An insurer pre-screens policyholders to ascertain whether he/she is sufficiently eligible to obtain a policy. Consequently, the insurer can categorize customers based on information about their various risk probabilities obtained at this stage. This information is critical as it has a direct positive effect on the eventual claim amount. It also gives a vivid picture of the insurance needs of various policyholders and the associated premium to be charged. Therefore, the extent and quality of pre-screening can significantly reduce the degree of hidden action problems. Thus, ceteris paribus, the insurer is well positioned to reasonably determine the possible outcomes of the contractual agreement with such policyholders, and as such, minimize the degree of hidden action (Netzer and Scheuer 2010).

H2: The level of pre-screening is negatively associated with hidden action by policyholders in the Egyptian car insurance market.

4.3.3 The Association between Trust and Hidden Action by Policyholders (Hypothesis 3)

For a business boom to happen and a successful buyer-supplier relationship to take shape, mutual understanding and consistent settlement of exchange partners' duties and responsibilities are important. These could be valuable for creating confidence in the exchange partner, and hence, building up trust. In a service industry, such as the insurance industry, where risks and uncertainty are increased by one's inability to evaluate service attributes before those are actually bought, the need for trust is of particular importance (Parasuraman, Zeithaml, and Berry 1985).

Nature and impact of trust in business

Business relationships such as that between the insurer and the policyholder do not arise overnight. It comes through many exchange encounters over time. These encounters may make customers take concrete safety measures to alleviate the possibility of a car accident. For instance, they may test drivers with breathalysers before the start of work, implement company-specific speed limits, give drivers safety and environmental training, etc. Hence, the history of encounters may help develop interpersonal and inter-organizational trust between two exchange partners (Heide 1994, Dwyer, Schurr, and Oh 1987, Anderson and Weitz 1989).

Trust may arise from a good relationship between exchange partners, derived from successful past buyer-supplier interactions. That is the core indicator of the willingness of an exchange partner to rely on its counterpart (Moorman, Deshpande, and Zaltman 1993). Based on that, the authors argue that trust is only applicable to business-to-business relationships. However, the level of trust between the insurer and the business policyholder is different from the one between customers, depending on the relationship duration, and the size and reputation of the business customer.

Trust in improving coordination and cooperation in exchange

According to Burki and Buvik (2010), once trust is established in an exchange relationship, it sets a boundary for the permissible behaviour of the partners, and increases tolerance for exchange partners' behaviour (Ganesan 1994, Sharma 1996, Doney and Cannon 1997). Therefore, it defeats opportunistic tendencies and minimizes hidden action by policyholders, which is inherent in exchange parties. Consequently, it allows them to look out for one another and reduces the gap between their objective and preferences. As Anderson and Narus (1990) put it, exchange partners are expected to perform actions that enhance positive outcomes for their organizations and do away with unexpected actions that may bring forth negative payoffs. According to Heide (1994), inter-organization trust acts as a form of governance mechanism against opportunism in exchange transactions.

Furthermore, the higher the trust between the insurer and the policyholder, the lower are the hidden action problems. Norms and values, which enhance cooperation and lead to relational integration, govern the exchange relationship then.

Therefore, trust serves as an effective ingredient to attenuate hidden action problems in the business relationship as both parties become more accountable and pursue actions that lead to favourable outcomes for the preservation of the relationship. On the other hand, if the degree of trust between the insurer and the policyholder diminishes, there will be a greater need for prevention incentives to motivate the policyholders to protect themselves against the risk. These prevention incentives will minimize the probability of the existence of hidden action by the policyholder.

If there is trust, the customers may take concrete safety actions to alleviate possibilities of a car accident, for instance, test drivers with breathalysers before the start of work, implement company-specific speed limits by using speed shooting guns, give drivers safety and environmental training, etc.

This hypothesis (H3) proposes a strong negative association between the levels of trust and hidden action by policyholders. The proposed strong negative association follows the argument that trust is the product of successful past encounters, that is, the exchange parties are consistently able to discharge their responsibilities. The experience makes exchange parties reliable and trustworthy. Exchange partners tend to act in a manner that protects the interest of all parties involved in the exchange (Heide 1994, Dwyer, Schurr, and Oh 1987, Anderson and Weitz 1989).

H3: The level of trust between the insurer and policyholders is negatively associated with hidden action by the policyholder in the Egyptian car insurance market.

4.3.4 Interaction Effect

Self-Protection, Kind of Contract, and Hidden Action by Policyholders (Hypothesis 4)

- ## Self-Protection (SELFPROT)

Self-protection reduces the possibility of hidden actions problems. Insurers can determine a policyholder's risk type by his/her willingness to invest in self-protection, but the investment is largely unobservable to them. The private information about the policyholder's characteristics available to the insurer will affect the policyholder's decision to invest in self-protection, and further result in heterogeneous ex-post risk probability.

In other words, self-protection is the willingness of the policyholders to exert some effort or incur some cost to avoid the risk. That will be reflected in the ex-post risk probability and the frequency of accidents (Shavell 1979a, Ehrlich and Becker 1972).

Examples of self-protection in the Egyptian car insurance market

Proper maintenance of a car will reduce the probability of an accident. However, when it comes to the underwriting process, insurance companies do not use the maintenance record in the contractual negotiation. The maintenance record could serve as an investment of self-protection, but in this case, it is a hidden action. It is important to consider the fact that investment in self-protection is rather the decision of individuals than an exogenous factor. However, the incentives provided by the insurer and the cost involved can influence it (Huang 2006b).

Self-protection alone cannot attenuate hidden action problems. In as much as, policyholders are motivated by multifarious reasons to pursue effort of self-protection and as such other ways to minimize or attenuate hidden action in an exchange relationship should be explored by insurers. The degree of self-protection undertaken by policyholders influence the probability of the occurrence of an accident. Therefore, as such policyholders should be incentivised and encouraged to pursue efforts of self-protection. Consequently, this will go a long way in mitigating the degree of hidden action in an exchange relationship. Even though, self-protection alone is not exhaustive to fully attenuate the hidden action problems (Lakdawalla and Zanjani 2005).

With hidden action, the association between the level of the hidden action and the degree of self-protection does not necessarily need to be positive. The decision of self-protection by one policyholder increases the risk probability of another. Therefore, the policyholder who is not inclined to pursue self-protection stands out and is considered as high risk by the insurer, compared to those who choose to pursue self-protection. Thus leading to externalities; for instance, policyholders spending in self-protection will increase the risk of the other policyholders group who choose not/cannot to pursue self-protection. Therefore, they will be perceived by the insurer as riskier customer group. Thus it is positive for insurer as it makes classification of policyholder into high and low risk category and charging appropriately actuarially fair premium.

Therefore, insurer levy premium and offer product to policyholders based on risk categories and policyholders with perceived high risk by the insurer contribute more funds to the pool in premium.

Hence, this has the tendency to stimulate self-protection by policyholders as they want to attract lower premium and be perceived by the insurer as less risk than they are. Thus creating a pool of set of policyholders who spend in self-protection and those who do not. Hence, yielding the insurer balance in their portfolio; as one group of policyholders' activities compensates for the other group who do not pursue self-protection.

This helps insurer categorizes policyholders and offer them the right product with the appropriate premiums that is actuarially fair based on the insurer's perception of their risk profile. Consequently, attenuating hidden action and minimizing strain on the insurer's balance sheet and increasing profitability (Lakdawalla and Zanjani 2005).

The Egyptian case

Based on the relationship stated above, the Egyptian car insurer has introduced the prevention and self-protection mandate, which stipulates that entities requesting car insurance must produce a certificate proving that they have taken measures to prevent the risk of car accident before they can get a policy. The required documents include a valid car licence, a valid driver's licence, a maintenance certificate, the driver's health certificate, and a certificate that confirms that the information supplied by the policyholder is true and complete. This can be the main reason for the existence of the initial self-protection by the policyholder before he/she can obtain the policy (Filipova-Neumann and Welzel 2010).

Prevalence and perception of self-protection in the Egyptian car insurance market

The Egyptian situation is a bit different in terms of self-protection since many considerations influence that issue. Some of these are the nature of the unobservable self-protection measures, the type of the customer (business or individual), the driver's nature regarding risk, his age, and the car's price, its model, and its cost. Policyholders often substitute self-protection measures, which are expected to reduce the probability of hidden action or its severity or both, with collectively supplied safety programmes. The nature of self-protection as an 'unobservable' increases the probability that the policyholder will avoid the effort, time and cost involved with the measures. The main reason for policyholders in Egypt to avoid self-protection measures is that they know that they have full coverage for the risk and there are no incentives for them to spend such cost, effort, and time, as the insurer will fully compensate them in the event of an accident (Filipova-Neumann and Welzel 2010).

The case of business policyholders

If drivers are categorized by age and the tendency to take risk, individuals tend to be more risk loving and adventurous compared with business policyholders' drivers. Actions such as joining the races, drinking and driving, or violation of traffic rules can reveal the love for risk. When categorized by age, the younger group is more willing to take risks than the more rational older group. Business policyholders' drivers are more averse to taking risks since they have to adhere to the rules and regulations of their company. Besides, companies select their drivers carefully, based on certain criteria (Ehrlich and Becker 1972).

Car prices and models also affect the policyholder's behaviour in favour of self-interest. If the car is expensive, the policyholder will take care of it and make more effort to protect it. Egyptian insurers provide cover only for car models manufactured over the last six years. The idea is that proud of their new cars, people will spend more effort to protect those. One of the most important factors that affect investment in self-protection is the cost involved in taking precautions to reduce the risk probabilities after buying an insurance product. In other words, the main mechanism that influences the degree of willingness of the policyholders to invest in self-protection measures is the cost and the impact of the potential accident (Shavell 1979a).

Business policyholders are more capable than individual ones to invest time, effort and money to protect their cars against the potential risks, though the insurer cannot observe the self-protection measures. Furthermore, they have more incentive to invest in protecting their cars. Such incentives are avoiding the loss of market share, avoiding the damage of their reputation, and avoiding discontinuity of operations. Keeping their business going means a lot for the companies (Filipova-Neumann and Welzel 2010).

- **Kind of Contract (KINDCONTRAC)**

Kind of contract refers to the nature of contracts agreed upon based on the different products, the potential policyholder's characteristics, and other considerations made by the insurer to determine the appropriate contract to offer policyholders based on their peculiarities. The contract clearly outlines all technical details, obligations and responsibilities of the parties to it. It also specifies the appropriate remedial action to be taken in the event of a breach and how to enforce it. Insurance companies adopt two techniques to prevent hidden actions problems—deductible and co-payment riders (Schumacher 2014).

Deductible contract

A deductible contract refers to a situation where the buyer of an insurance policy is obliged to pay the initial damages to a certain limit if the risk insured against happens. If the hazard has a higher likelihood of increasing the risk of loss, a deductible is most suitable because this method does not only protect the insurer from spending money but significantly reduces the cost involved in processing small claims (Tumay 2009, Bakker, van Vliet, and van de Ven 2000).
The insurer uses the *deductible as a screening method* to categorize policyholders based on their willingness to invest in the frequency of compensations demand, thus inducing individuals to reveal the magnitude of their risks. The choice of deductible is principally contingent on the degree to which it reduces the premium to be paid. Therefore, a prudent policyholder will consider the expected expenses of the policy before deciding to buy it. Under an actuarially fair premium, the optimal position for policyholders is to buy full coverage (Dimitriyadis and Öney 2009).

Co-payment contract

A co-payment rider is a provision in the policy in which the policyholder has to pay a part of the cost if there is a claim. If there is a chance that the degree of hidden action problem will increase the claim amount if the risk occurs, co-payment is the most appropriate safeguard for the insurance company. The greater the loss of the insured, the larger the co-payment will be. This will offer the insured customer the incentive to lower the cost of his/her loss or give an accurate/reasonable estimate of it (Tumay 2009).

Co-payment as an effective strategy to attenuate hidden action: Co-payment has proven to be the most effective kind of contract to reduce hidden action problem efficiently. Insurers often employ it in their agreement with policyholders. In the Egyptian car insurance market, the appropriate cost-sharing method in the contract will significantly reduce hidden action problems if it is applied to the right group of products. Policyholders will then spend on self-protection, e.g. hire qualified and experienced drivers, buy monitoring devices, look out for fire problems, follow the agreed maintenance schedule, etc. These actions will reduce the likelihood of accidents and the potential claim (Qingyue, Liying, and Beibei 2011).

Nature of insurance contract

Although insurance contracts are largely standardized, they can be subject to different interpretations under different circumstances. However, the terms of the contract must be interpreted in a legally sound and socially expedient manner. An insurance policy must be construed and enforced based on the principles of the contract; these well-written and unambiguous terms must not be modified by a court of laws based on the reasonable expectation of the policyholders.

Interpretation of insurance contracts normally brings out an element of uniformity and possible areas of contract disputes. The problem with a strict formalistic interpretative approach is that insurance contracts are not normal ordinary contracts negotiated by parties with equal bargaining power (Swisher 1996). These are largely adhesion contracts where the insurer has a far superior bargaining power compared with the policyholder, who, more often than not, is compelled to accept the policy on a take-it-or-leave-it basis. In a real-life situation, very few policyholders take the time to read and understand the details of the terms binding them in an insurance contract. That is why some courts of law use a functional approach in interpreting disputes, seeking to protect the reasonable expectations of policyholders from a likely forfeiture of coverage (Swisher 1996). To ensure efficiency in utilization of the product, to avoid any financial burden on policyholders, and also as an appropriate safeguard for the insurer, most insurance contracts involve cost-sharing measures such as co-payment, deductible and coinsurance, or a combination of any two of these. These cost-sharing methods have proven to minimize the degree of hidden action problems in the car insurance business as policyholders share a certain percentage of the potential damages, which is the essence of adopting such contractual terms (Donnelly et al. 2014).

Egyptian case

The presence of hidden action problems in the Egyptian insurance market is pervasive. Policyholders hold idiosyncratic information, which increases the probability of their making a claim on the policy. For instance, in the automobile market, the insurer will not be able to ascertain whether the driver is aggressive or cool while driving. This behaviour tends to increase the probability of an accident. In short, policyholders have a huge degree of control on the probability of the occurrence of the risk insured against and its magnitude. This, in turn, can increase the amount to be paid in damages.

However, the insurer cannot monitor such activity. This information gap puts the insurer in a disadvantage ex-ante and can exacerbate the problem when certain policyholders tend to act opportunistically. There is often a strong correlation between the policyholder's claim and the level of insurance coverage. Efficient contracting is essential to combat this anomaly. Co-payment is an efficient measure to curb both ex-ante and ex-post hidden action by policyholders and as such reduces their degree (Donnelly et al. 2014).

Rationalization of commonly used contract in the Egyptian car insurance market

According to Tumay (2009), insurers adopt both deductible and co-payment riders to reduce the extent of hidden actions in their business. Deductible contracts are adopted when the likelihood of the risk happening is high. These provide an incentive to the insurer to save money to honour claims, thereby minimizing the number of claims to be processed, saving time and administrative cost in processing claims. On the other hand, co-payment is used when the amount to be potentially paid as claims is relatively high. Therefore, the higher the insurer's loss, the larger is the amount of co-payment to be made.

The effect of self-protection on hidden action in different kinds of contract

The effect of self-protection on reducing hidden actions of policyholders in different kinds of contract has two scenarios; the first scenario when the effect of self-protection on reducing hidden actions of policyholders is very high with co-payment car insurance contract. In this situation, the policyholders are investing substantial amount of self-protection in order to protect themselves against the potential risks, since they know that they will have to share huge portion of the loss; and the amount they will share is up to the size of the loss. Therefore, these policyholders have no incentives in hidden action as long as they know that they must pay most of the possible damages.

Thus the effect of self-protection on reducing hidden action is very high with co-payment contract (Ehrlich and Becker 1972).

The second scenario when the effect of self-protection on reducing hidden actions of policyholders is very low under deductible contract. In this situation, the policyholders are not investing heavily in protecting themselves against the potential risks, as they will only incur the initial payment in the event of a loss. Despite of that in some cases, the policyholders are investing in self-protection, however the insurers think that these policyholders still have incentives for hidden action because the contract give them the incentives for the hidden action.

The reason why they invest in self-protection is that, the policyholders are looking only for an economic gain and better business (Ehrlich and Becker 1972).

Figur 4.2 Moderating Effect of Self-protection on Hidden Action by Policyholders in Different Kinds of Contracts
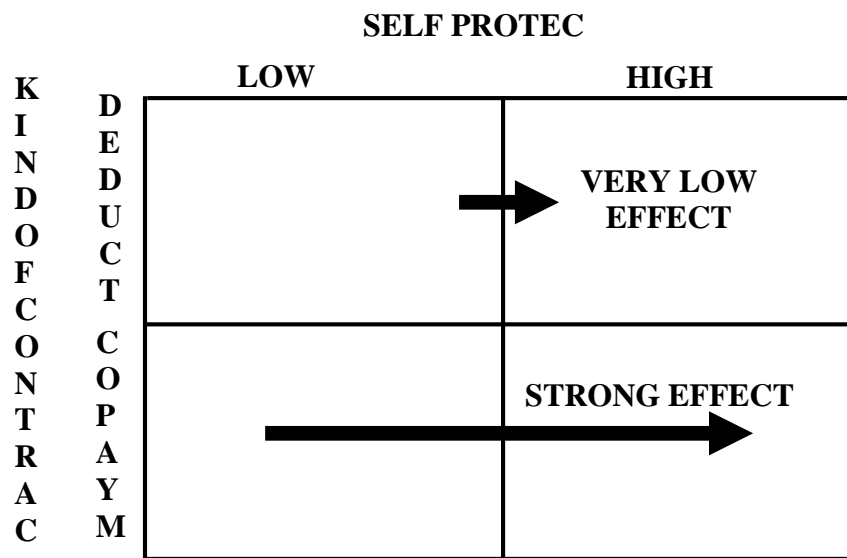
Note: ⟶ indicates the effect the self-protection has on reducing hidden action

The figure above explains the moderating effect of self-protection on hidden action problems in different kinds of contract. Policyholders face varying obligations because of the contractual agreement with the insurer. These are mostly either a deductible or a co-payment. Besides, each kind of contract depends on the nature of risks and other parameters governing the exchange relationship.

As shown in figure 4.2, self-protection has very low effect on reducing hidden action when the contract kind is deductible. It is so because in an agreement with a deductible, policyholders will only honour the initial payment of the loss if the risk insured against happens. Nonetheless, policyholders may still allocate a positive amount of his/her wealth as a precautionary measure for future income risks, though he/she may pursue self-protection mainly because of the business and the profit motive. However, the insurer still believes that this policyholder group has a tendency to pursue hidden action as the contract kind provides the incentive for this. Thus, the effect of self-protection on attenuating hidden action is very low under a deductible contract (Jindapon 2013).

On the other hand, the effect of self-protection in attenuating hidden action is very high under the co-payment contract kind. In it, the policyholder has to share a huge part of the loss, and the amount the policyholder will share depends on the size of the loss. The higher the loss, the bigger is the amount. As a result, it is expedient for the policyholder to invest in self-protection, leading to increased investment in it. Thus, the level of self-protection will be very high and the effect of self-protection in reducing hidden action will be greater as well. Insurers perceive this policyholder group to be genuine and willing to invest in self-protection to avoid paying a huge part of the damages. Thus, it serves as a proactive measure to avoid substantial future loss. In short, the effect of self-protection on attenuating hidden action problems by policyholders is very high under co-payment contract and very low for deductible car insurance contract.

Figur 4.3 Matrix of Self-protection, Kind of Contract and Hidden Action Problems by Policyholder

SELF PROTEC

		LOW	HIGH
K I N D O F C O N T R A C	**D E D U C T**	**Very high Hidden action problems** Cell 1	**High Hidden action problems** Cell 2
	C O P A Y M	**High-Modest Hidden action problems** Cell 3	**Very low Hidden action problems** Cell 4

Cell 1: This represents a situation wherein the kind of contract offered to the policyholder is a deductible. This normally happens when policyholders do not adhere to the contractual obligations to mitigate the risks from happening, thus increasing hidden action problems. However, in the event of any damages, the policyholder will only make the initial payment and the insurer will cover the rest of the liability. Hence, policyholders may be reluctant to invest significantly in self-protection, especially if the cost involved is prohibitive.

Since he/she does not get an additional value/incentive for incurring the cost to mitigate the risks, he/she will not spend substantially on any preventative measure to reduce the burden on the insurer. This increases the level of hidden action problems because the insurer cannot proactively monitor the policyholders for compliance (Ehrlich and Becker 1972).

Cell 2: This refers to a case where a deductible contract is used and the probability of the risk occurring and the level of hidden action are both high. Therefore, any self-protection measure adopted by the policyholder is to serve his/her self-interest and not necessarily to reduce hidden action. The policyholder has no genuine incentive to take self-protection measures because the contract kind does not attenuate hidden action.

However, in the case of car insurance, some companies in Egypt invest heavily in self-protection (e.g., maintaining schedule, investing in tracking devices, hiring experienced and qualified drivers, etc.) since an accident might be disastrous for their business. It will affect their service quality, interrupt production and business, reduce their market share, and adversely affect profitability. Purely from a business standpoint, they deem it prudent to invest in self-protection measures, and not necessarily because they have bought an insurance policy. Thus, their action is a positive externality for the insurer (Jindapon 2013).

Cell 3: This represents co-payment, which has been found to be very effective in minimizing hidden actions, as the policyholder's share of payment will increase with the loss. In this scenario, the level of co-payment is low, and thus, does not significantly lead to an increase in hidden actions. Policyholders may still adopt safety measures like installing anti-lock braking system, tracking devices, and alarms, and drive carefully. This does not necessarily reduce the degree of hidden actions by policyholders and imposes a huge financial constraint on the insurer.

That is because the co-payment to be made is low in this case. The reserve ratio and profitability will decrease because the volume and frequency of compensation will increase dramatically in this situation (Lee 1992).

Cell 4: This represents a scenario with a higher co-payment, which serves as an attenuation of hidden action problems. Policyholders will take self-protect measures to minimize the possibility of accidents, as they will also incur huge losses if the risk occurs, because the degree of co-payment increases with the amount of loss. Hence, self-protection is valuable to this customer group. The insurer believes that these policyholders have little or no motivation for hidden action since they have to pay a substantial part of any loss suffered.

Thus, high self-protection leads to utmost good faith and the belief that the policyholder is genuine and has integrity. Hence, it serves as an attenuation of hidden action. To avoid jeopardizing their business and a financial situation that might have far-reaching implications for it, policyholders tend to invest in self-protection as a proactive measure. They try to avoid potential higher losses in future, because if an accident occurs, their businesses will not be operational and meet its obligations. At the same time, because of the co-payment contract clause, they will be highly liable for a larger share of any loss (Qingyue, Liying, and Beibei 2011).

Simply put, the main reason behind hidden action is the cost involved in taking precautions and taking care to avoid a potential risk. When policyholders are fully insured, they have no reason to incur such costs since their insurance will cover the loss (Tumay 2009).

Relationship between self-protection and hidden action in different kinds of contract: 'Kind of contract' refers to the different agreements (mostly deductible and co-payment) insurers have with policyholders based on the latter's peculiarities and risk profile. Thus, the degree of self-protection to attenuate hidden action depends on the different kinds of contracts. Policyholders tend to spend genuinely on self-protection to attenuate hidden action if the contract type (co-payment) transfers some obligations to them. To mitigate any potential burden in the event of a loss, they invest in self-insurance, though the insurer cannot monitor their actions completely. Thus, self-protection influences the degree of hidden action problems in different kinds of contract (Qingyue, Liying, and Beibei 2011).

On the other hand, if the kind of contract is deductible, the insurer believes that the policyholders still have incentive to pursue actions that can increase the degree of hidden action. That is because the contract type is insufficient to prevent hidden action and provides an incentive for the policyholders to shirk responsibility (hidden action); it is more beneficial for them. Nonetheless, some business policyholders still invest hugely in self-protection to avoid disruption in production and operations because that would have huge implications for their business. However, the insurer still believes that the customers in this contract group pursue hidden actions since the contract type creates room for that. They might also under/over-report accidents when those occur (Ehrlich and Becker 1972).

Finally, in this study, hypothesis four (H4) deals with the interaction between self-protection by policyholders, the kind of contract they sign, and how it influences their hidden action. This study expects larger negative association between self-protection and hidden action of policyholders for co-payment contract than for deductible contract based on the reasoning that, When the insurers consider policyholders with a co-payment contract who increase their self-protection, insurers think that this will reduce their opportunism. The insurers will think that these policyholders have nothing to hide.

The insurers know that these policyholders will do self-protection just to reduce possible accidents because the policyholders must pay a high price whenever an accidents happen. Hence, self-protection is very valuable for this customer group. The insurers think that these policyholders have low self-interests in hidden action as long as they must pay most of the possible damages. Thus, high self-protection in this contract group is a signal to the insurers that the policyholders are serious and truthful in the exchange. Therefore, this study expects a strong negative association between self-protection and hidden action under co-payment car insurance contract.

On the other hand, when the insurers consider policyholders with deductible contract and increased self-protection, the insurance companies think that these policyholders still have incentives to shirk because the contract still give incentives for shirking (hidden action) because of high compensations. The reason why policyholders then increase self-protection? Just, to run their business better and have fewer accidents. The insurers, however, still think that these contract group still will have the incentive to shirk when a real accident occurs (Shogren and Crocker 2004).

Following the foregoing discussions and reasoning, the authors hypothesize that:

H4: The association between self-protection and hidden action by policyholder is more negatively shaped for co-payment contracts compared with deductible contracts.

4.4 Summary

This chapter presented an overview of the conceptual model of this study. The authors used the literature review on PAT and RCT discussed in the preceding chapter to develop the research model and formulate the hypotheses. They developed four hypotheses based on the conceptual model; three represent the hypothesized main effect and the fourth, interaction effects. Furthermore, they also presented a discussion on the control variable.

CHAPTER FIVE

RESEARCH METHEDOLOGY

CHAPTER FIVE
RESEARCH METHODOLOGY

5.1 Introduction

This chapter presents the methodology relevant to this study. It gives a glance into the research design and data collection methods. It also discusses and shows survey instrument development and sampling procedures. Furthermore, it describes the data collection techniques and procedures adopted in this study.

5.2 Research Design

Research design involves the procedures for executing a research. It clears the path for data collection and analysis. A research deals with a wide range of decisions, the principal among these being the choice of design to adopt for the study. Different methods and approaches can be adopted, which are largely determined by the nature of the research problem to be addressed, the personal experiences of the researcher, and the audiences for which the work is intended (Clark and Creswell 2014).

Research design is used as a basis for planning, implementation, and analysis of a study. It enables the researchers to address the research questions and hypothesis. However, the research design adopted is a function of the type of research questions and the hypothesis to be addressed. Most studies adopt a mix of both quantitative and qualitative research design techniques to carry out studies (Sousa, Driessnack, and Mendes 2007).

Research design can be further divided into exploratory and conclusive research. Exploratory research deals with exploring a certain aspect of the topic without necessarily drawing a conclusion. Conclusive research can be further divided into descriptive and causal. Descriptive research delineates specific causes, activities, and relationships in the research; causal mainly studies cause-and-effect relationships (Keyvani, Sasani, and Mirzaei 2014). This study adopted a few qualitative aspects as well as some quantitative aspects of research design. In the preliminary stages, qualitative aspects were adopted, where the authors conducted face-to-face interviews with a few key informants and stakeholders in the Egyptian insurance industry.

To gain more insight into the research problem, the authors sought information from representatives of insurance companies. To develop questions reflecting the industry's current practice, it was important for the authors to gather the information through discussions with key informants. In the next stages, the main research design of this study involves carrying out informed cross-sectional design using quantitative aspects. To test the association between dependent and independent variables, this study has adopted a cross-sectional and correlational design, because cross-sectional design is appropriate for establishing the degree of association between variables (Busk 2005).

5.3 Data Collection

The authors collected primary and secondary data to test the hypotheses and to address the research problem scientifically. Primary data represents a data collection technique wherein the researcher could gather data first-hand from the Egyptian insurance industry. Secondary data represents the data collected from published reports through desk reviews. Thus, the authors collected primary data through questionnaires. The biggest six insurance companies in Egypt were approached, and requested to fill in the questionnaires. Yin (2013) pointed out that a questionnaire may be administered in different ways, such as mail, fax, on the telephone, or in person (Yin 2013, Crano, Brewer, and Lac 2014).

Secondary data has played a critical role in this study to provide the infrastructure to establish a proper theoretical framework, and therefore, create the best conceptual model utilized herein. Such data is considered very important for giving a glance into the conceptual foundation and the relevant theoretical framework, besides going deeply into studying the nature of the Egyptian insurance industry. The authors gathered secondary data from literary sources such as scholarly journals, books, theses, conference papers, and documents and reports from the ministries of insurance, and finance and economy, and regulatory authorities such as EFSA, insurance associations such as EISA, MOSI, NASI, NIB, PIO, SIFGE, SIFPPSE, SIO, SIS, the Central Agency for Public Mobilization and Statistics, and other web-based sources. They developed the theoretical framework for this study and corroborated the empirical findings based on these sources.

5.3.1 Population, Sampling Frame, Sample Size and Sampling Procedures

Brewer (2014) defined population as the total number of cases that belong and conform to some particular or designated specifications. There are two investigations for obtaining the population parameters—a census and a sample survey. Most technical sampling literatures distinguished between the two. Census is an investigation containing all the potential identities that could pertain to the target population (the universe of interest). A sample survey refers to a subset of worthy identities in a population (Crano, Brewer, and Lac 2014).

According to Brewer (2014), there are five steps in sampling design. These are: (a) defining the universe or population of interest, (b) defining the sampling unit within the population of interest, (c) preparing the list of all the items within the population of interest, (d) determining the sample size, and (e) deciding on the technique of sampling. All registered and licensed insurance companies in Egypt represent the population in this study. A report obtained from the Egyptian Financial Supervisory Authority (2014) revealed that there were 32 insurance companies in the country in that year ((EFSA) 2014b). The majority of these companies are located in Cairo, with branches in different cities of Egypt.

- **Sampling Frame**

Brewer (2014) defined a sampling frame as a listing of the population of interest, from which units of that population are drawn and used as the sample for a study. The sampling frame for this study consisted of 32 registered and licensed insurance companies ((EFSA) 2014b) located in Cairo. According to Henry (1990), sampling can be classified as random or non-random. Random sampling uses a random mechanism to obtain a sample that is intended to be representative of the underlying population. Random samples can be gathered in different ways, including simple random sampling, systematic sampling, cluster sampling, stratified sampling, and multistage sampling.

Furthermore, random sampling is also known as probability sampling because every member of the population has a chance to be included in the sample, though the probability of every member's selection may not be equal.

Non-random sampling uses a non-random mechanism to obtain a sample from a population. Non-random samples are gathered based on convenience, through approaches such as snowball sampling or quota sampling. In non-random sampling, also known as non-probability sampling, members are selected from a population that cannot be determined due to unavailability of a sampling frame listing the potential respondents or locations. Using random sampling approaches will produce higher external validity than using non-random approaches (Crano, Brewer, and Lac 2014).

Thus, this study employed a simple random sampling technique whose underlying assumption was that every member of the population in question had an equal and non-zero probability of being selected every time a unit was drawn for inclusion in the sample (Crano, Brewer, and Lac 2014). It was used to select a representative sample from the sampling frame of 32 insurance companies.

- **Sample Size**

The samples for this study were obtained randomly from among non-life insurance companies in Cairo to measure the antecedents of hidden action. However, there is generally no consensus on the right sample size to use in a given study. A range of factors, such as the purpose of the study, population size, and the magnitude of the acceptable sampling error, determine it. Three criteria must be determined to ascertain the appropriate sample size in a study—the level of precision the study wants to achieve, the confidence interval, and the degree of variability of the attributes being measured (Israel 1992). The ultimate goal of fully representing the population and the design of the study may not completely reside on the collected sample's size, but on the quality of the samples (Lenth 2001).

As highlighted above, this study has used a randomly selected sample of insurers in Cairo, which houses major insurance companies. A study design has four inter-related features. The sample size is one of these features, which can influence the detection of significant differences, relationships or interactions (Peers 2006). However, extant literature does not provide a clear description of how to determine the appropriate sample size. Denscombe (2014) pointed out that in the case of large-scale surveys using probability sampling, the calculation of an appropriate sample size will depend on four things—the size of the research population, the accuracy of the estimates, the level of confidence, and the variation (Denscombe 2014).

Nevertheless, different authors have suggested different thumb rules. For instance, Boomsma (1982) recommended a reasonable sample size of 100 or 200 elements when using the structural equation model (SEM). Bentler and Chou (1987) and Bollen (1989) suggested a sample size of five or 10 observations per estimated parameter. Nunnally (1967) suggested that a sample should have a ratio of 10 observations per variable or construct.

This study has seven variables or constructs; thus, the minimum sample based on Nunnally's criterion (1967) is 7x10 = 70. Nonetheless, the authors targeted 75 respondents to gather adequate representative responses that would be fit for factor analysis.

5.3.2 Questionnaire Development and Data Collection Techniques

- **Questionnaire Development**

The authors used an extensive and rigorous literature review to develop all latent constructs and their corresponding constituent measurement variables. Moreover, the supervisor was a critical factor in the survey-instrument-development process. Argument and criticism from the experienced researcher were useful for the clarity, completeness, and adequacy of measurement variables as recommended by (Bergdahl et al. 2007, Forza 2002). To get more insight into the insurance industry domain and to clarify the nature of the research problem, the authors conducted face-to-face interviews in the initial phase.

These interviews equipped the authors well to determine the variables that were relevant, useful, and critical to this study. Furthermore, these allowed the authors to utilize similar constructs used in previous researches by fitting them to the context of the Egyptian car insurance industry. Before starting data collection, the questionnaire was pre-tested for content validity (Cade et al. 2002, Alaimo, Olson, and Frongillo 1999). Respondents were asked to pre-review the questionnaire's structure, ambiguity, completeness, and readability as (Dillman 1978)) recommended.

Valuable information was gathered from the respondents—who were managers in their respective companies—to correct obscure and inappropriate vocabulary, as (Dias, Rajan, and Thompson 2008) have recommended. The feedbacks from the experienced researcher and practitioners were incorporated to develop the final questionnaire, which was in English. However, it was translated into Arabic, and the data collection process was also done in Arabic.

The collected data was then translated into English (see Appendix 1). The respondents were requested to grade all items using a seven-point Likert scale, anchored from 1='strongly disagree' to 7='strongly agree', with regard to one of their most recent cases of insurance compensation to business policyholders.

To conclude, the survey instrument in this study consisted of three main parts. The first was to collect background information of the insurers (respondents) and their main policyholders. The second was to use a multi-item, seven-point Likert scale anchored from 1='strongly disagree' to 7='strongly agree', which was created to measure the relevant constructs in the study. The third part used single-item measures for general questions—both open-ended and closed-ended—which were designed to infer the various aspects of the relationship between the insurers and their policyholders.

- **Data-Collection Procedures and Techniques**

The key data-collection technique adopted in this study was the one suggested by (Watt and Van den Berg 1995). The rule followed for the exploratory study herein confirmed that general managers, operation managers, compensation department managers, information system managers, and screening department managers have the first responsibility to deal with policyholders.

Therefore, these managers are knowledgeable enough about the relationship between the focal firm (insurer) and partner firms (policyholders), and hence, are well qualified to be the key informants. The main tool for data collection in this study was a survey with a questionnaire. As Yin (2013) pointed out, a questionnaire may be administered in different ways, such as mail, fax, on the telephone, or even in person through face-to-face interview. In this study, questionnaires were administered in person through face-to-face interviews.

This method was chosen because questionnaires by mail were likely to get a very low response rate, as the information system infrastructure in Egypt is poorly developed. The questionnaire comprised 59 questions, which would make putting them through telephone calls very costly. The associated cost and the length of the questionnaire would possibly have resulted in a very low response rate.

One of the authors visited a sample of Egyptian insurance companies from 17 January 2016 to 25 February 2016. The sample comprised six of the biggest insurance companies in Egypt, specifically in Cairo. The author conducted face-to-face interviews with the general managers, operations managers, compensation department managers, information system managers, and screening department managers, who were supposed to have sufficient knowledge and experience about the relationship with their policyholders. The questions were about the most recent insurance compensation cases by business policyholders.

All the informants assisted with the filling in of the questionnaires according to every specialization of their department, as contact was established with them beforehand. The author started with a seminar about the research problem to give the informants a brief idea about the most important points to be analysed with respect to the research problem as well as to explain the importance of the research for their industry and how to fill in the questionnaire. Thus, for every insurance-compensation case between the insurer and the business policyholders, there was a face-to-face interview between the author and the aforementioned informants, where every insurer filled in eight to 11 questionnaires.

- **Response Rate**

All the informants were asked to identify the most recent insurance compensation cases with business policyholders and then relate all the subsequent questions about the relationship with this policyholder (see Appendix 1). The response rate for this study was 84%, as 63 responses could be collected out of the targeted 75. The technique embraced for data collection—the questionnaire—got a high response rate through face-to-face interview. One of the most important techniques that led to an increase in the response rate was the seminars that the author conducted with every respondent to give him/her a synopsis of the nature of the research problems and the purpose of the study. Face-to-face interview was chosen because it yields a high response rate (Ryu, Couper, and Marans 2006).

5.4 Summary

This chapter presented and discussed the methodology used in this study. It also discussed the main research strategy of this study, which followed the cross-sectional quantitative design. Furthermore, it presented data collection procedures and techniques, and questionnaire development. The next chapter discusses the descriptions and operationalization of the primary latent constructs used in this study.

CHAPTER SIX

OPERATIONALIZATION AND DEFINITIONS OF VARIABLES

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OPERATIONALIZATION AND DEFINITIONS OF VARIABLES

6.1 Introduction

This chapter introduces a measurement model suitable for this study. It defines and elaborates different constructs and their respective measures. Hidden action, self-protection, asymmetric information, pre-screening, and trust are operationalized as perceptual items on a seven-point Likert scale, while kind of contract and size of damage are measured as non-perceptual items on a single-item scale. However, the authors have adopted some measurement items from previous research and modified those to fit the context of this work.

6.2 Measurement

The foundation of scientific inquiry is measurement. Theoretical concepts must be observed at the operational level to test the hypothesis. In other words, all that has been defined should be accurately and justifiably measured. However, measurement has different levels; every level provides differing amounts of information regarding the theoretical constructs in this study. However, some basic issues must be addressed to achieve adequacy of measurement (Watt and Van den Berg 1995). Accordingly, this study has developed and operationalized all constructs based on the recommendations of Churchill (1979), which provide the guidelines for designing the measures of constructs used in a study.

Considering such recommendations, this study also reviewed existing literature extensively to capture the ambit of the constructs used to formulate the hypotheses. Additionally, some measurement items were gleaned from previous researches, which were modified and adapted to fit the context of this study. Multi-item scales were used to operationalize constructs such as hidden action, self-protection, asymmetric information, pre-screening, and trust. The rest of the variables, such as the size of damages and kind of contract, were operationalized using single-item scales.

Arora (2013) postulated that measurement (or observation) is the process of recording and determining the possible traits of a variable, which an individual case possesses or exhibits. The variable 'kind of contract' has two possible traits—co-payment and deductible—and measurement involves deciding which of these two categories a given car insurance contract falls in and has the biggest effect on reducing hidden action.

During the process of measurement, a range of scores (also called points on the scale), which can be assigned to cases, should be specified through a scale of measurement (Arora 2013). Many researchers will always consider the need to develop new questionnaires/scales to test and develop theory. They would consider alternative scaling formats to minimize the possibility of having a great variance by using the common methods. This is known to be true in a wide variety of research contexts (e.g., (Williams and Zipser 1989)). Minimizing the variance could enhance both theory development and testing. Furthermore, where issues of response bias, time, ease of development, and participant fatigue are substantial, it would be more appropriate to develop one or a few elaborate questionnaires than go for the standard five or more Likert-type items (Russell, Weiss, and Mendelsohn 1989, Gardner et al. 1998).

Furthermore, with regard to predictive validity, multi-item scales clearly outperform single-item ones. Single-item scales perform equally well as multi-item ones do, but only under very specific conditions. Therefore, the use of single-item measures in empirical research should be limited to special circumstances, and their use should be approached with caution (Diamantopoulos et al. 2012, Buvik and Grønhaug 2000, Buvik and Haugland 2005, Rokkan and Buvik 2003). As De Vellis (2012) pointed out, poor measurement will undermine the validity of the conclusion of a research. Therefore, to foster a better research conclusion, the measurement process should be carried out well from the beginning (DeVellis 2012).

6.3 Measurement Model

Management scholars often identify structural relationships among latent, unobserved constructs through statistically-related covariation between the observed variables and the latent constructs or indicators of the latent constructs (Borsboom, Mellenbergh, and Van Heerden 2003, 2004). This permits scholars to argue that if variation in a latent construct B is associated with variation in indicator A, the exogenous interferences that can change B can be revealed in A. Most scholars assume this relationship between construct and indicator to be reflective. In other words, the change in the latent construct B is reflected by the change in A; causality flows from the latent construct to the indicator with regard to reflective measurement models (Coltman et al. 2008).

However, not all latent constructs are entities that can be measured with a battery of positively correlated items (Bollen and Lennox 1991, Edwards and Bagozzi 2000, Fornell and Bookstein 1982). An uncommon but equally plausible approach is a formative or causal index that can combine several indicators to form a construct without any assumptions about the patterns of inter-correlation between these items. A formative or causal index results (Centore 1968, Diamantopoulos and Winklhofer 2001, Edwards and Bagozzi 2000) when causality flows in a direction opposite to reflective measurement models—from the indicator to the construct. The formative measurement model view is common in economics and sociology. However, the reflective measurement model view dominates psychological and management sciences (Coltman et al. 2008).

Assigning meaningful relationships to the structural model requires proper specification of a measurement model. Therefore, the distinction between formative and reflective measures is very important (Anderson and Gerbing 1988). Structural equation modelling (Baumgartner and Homburg 1996, Chin and Todd 1995, Shook et al. 2004) and theoretical work in construct validity (Blalock 1991, DeVellis 2012, Edwards and Bagozzi 2000) reinforce the understanding. However, to achieve construct validity, a working researcher should follow some procedures, though considerable debate exists regarding those (e.g., (Diamantopoulos 2005, Finn and Kayande 2005)). Thus, this study has operationalized all constructs as latent variables, where all variables have been measured as reflective scales (see Appendix 3).

Figure 6.1 Measurement Models: (a) Reflective Model and (b) Formative Model
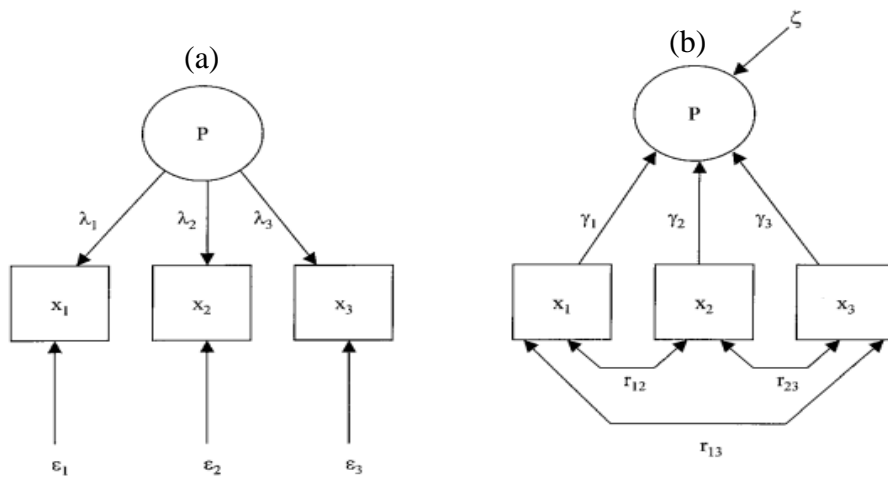
Source: Diamantopoulos (1999)

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6.4 Measurement Process

In this section, all variables will be defined and all question items that make up a particular latent construct, listed. Hidden action by policyholder (HIDDENACT) represents the dependent variable in this study while self-protection (SELFPROT), kind of contract (KINDCONTRAC), asymmetric information (ASYMMINFO), pre-screening (PRESCREEN) and trust (TRUST) represent independent variables. There is one control variable—size of damages (SIZEDAMAGE).

6.4.1 The Dependent Variable

- **Hidden Action (HIDDENACT)**

The dependent variable, hidden action by policyholders, is influenced by the above-mentioned independent variables. The authors composed questions on this latent construct based on the literature review (e.g. (Caillaud and Hermalin 2000, Rauchhaus 2005, Guesnerie 1989)) besides the practical data gathered in the initial stage of the data-collection process. The construct is made up of six items anchored from 1='strongly disagree' to 7='strongly agree'. Therefore, the following items were used to measure hidden action by policyholders, as perceived by the insurer.

HIDDENACT 1	This policyholder sometimes does not adhere to the commitment to use his cars for the purpose agreed upon in the insurance policy in order to get different incentives from my company. He uses his cars for purposes other than that mentioned in the policy.
HIDDENACT 2	When an accident occurs, this policyholder claims a huge (abnormal) amount of damages from my company.
HIDDENACT 3	When an accident occurs, this policyholder does not inform my company on time. He does it later, which is against the terms of the contract.
HIDDENACT 4	This policyholder sometimes makes false promises and claims regarding the maintenance of the cars, for which he does not go to the original brand centre or the approved garages, as specified in the agreement.
HIDDENACT 5	This policyholder occasionally lies or makes misleading assertions regarding buying/hiring safety devices and parking his cars in proper garages, which was a prerequisite ex-ante the contract approval.

HIDDENACT 6   This policyholder sometimes does not report violation of traffic rules by his drivers or carelessness or reckless behaviour on their part, leading to an accident or to an increase in the chance of it.

6.4.2 The Independent Variables

- **Self-protection (SELFPROT)**

Self-protection as a latent construct was measured using a 7-point Likert scale, anchored from 1='strongly disagree' to 7='strongly agree'. This construct was made up of 10 items selected by the authors based on the literature review (e.g. (Dionne and Gagné 2002, Winter 2000b, Huang, Liu, and Tzeng 2010)) and the practical data gathered in the initial stage of the data-collection process.

SELFPROT 1	This policyholder never leaves the car unlocked.
SELFPROT 2	This policyholder never leaves the car engine running.
SELFPROT 3	This policyholder never leaves the car with a window/the roof open.
SELFPROT 4	This policyholder never allows another person to drive the car without the insurer's permission.
SELFPROT 5	This policyholder never crosses the state borders in the car, against the domestic insurance policy.
SELFPROT 6	This policyholder always follows traffic rules.
SELFPROT 7	The drivers of this policyholder's firm never drive the cars without using the seatbelt.
SELFPROT 8	This policyholder always parks his cars in private locked garages equipped with anti-lock system.
SELFPROT 9	The policyholder never gets some parts of the cars repaired during maintenance without the insurer's permission.
SELFPROT 10	The drivers of this firm never break the speed limit while driving the cars.

- **Asymmetric information (ASYMMINFO)**

The authors made this construct based on the literature review (e.g. (Dahlby 1992, Anderson and Moore 2006, Mishra, Heide, and Cort 1998, Cohen and Siegelman 2010, Spindler, Winter, and Hagmayer 2014)) and the practical data gathered in the field during the initial data-collection process. It comprises six items, which were anchored on a seven-point Likert scale from 1='strongly disagree' to 7='strongly agree'.

ASYMMINFO 1	It is very difficult for our company to know/verify whether the policyholder's drivers have driven under the influence of alcohol/drugs.
ASYMMINFO 2	It is very difficult for our company to know/verify whether this policyholder has hired unqualified drivers.
ASYMMINFO 3	It is very difficult for our company to know/verify whether this policyholder has given correct information about the daily working hours of the car.
ASYMMINFO 4	It is very difficult for our company to get exact or accurate information about whether this policyholder has adhered to the specified load capacity.
ASYMMINFO 5	It is very difficult for our company to know/verify whether this policyholder left the car with keys/fobs attached to the switch.
ASYMMINFO 6	It is very difficult for our company to get exact or accurate information about whether this policyholder has used the car for purposes other than that mentioned in the insurance policy.

- **Pre-screening (PRESCREEN)**

This construct is made up of six items anchored from 1='strongly disagree' to 7='strongly agree'. The authors selected the measurement items based on the literature review (e.g., (Reichheld and Teal 2001, Rauchhaus 2009, Landes 2013, Camp 2004) coupled with the practical data gathered during the initial data-collection process.

PRESCREEN 1	Before we signed the contract, we confirmed that this policyholder fulfilled the specific number of kilometres to get the insurance policy.

PRESCREEN 2   Before we signed the contract, we confirmed that this policyholder met the age requirement of the car (6 years) to get the insurance policy.

PRESCREEN 3   Before we signed the contract, we confirmed that the cars of this policyholder had no record of a collision or a serious accident.

PRESCREEN 4   Before we signed the contract, we checked that this policyholder provided the required documents, such as the traffic certificate, and met other regulatory requirements.

PRESCREEN 5   Before we signed the contract, we checked that this policyholder kept regular maintenance record.

PRESCREEN 6   Before we signed the contract, we confirmed that this policyholder has hired insured motorists.

- **Trust (TRUST)**

This construct was measured using a seven-point Likert scale, anchored from 1='strongly disagree' to 7='strongly agree'. This construct comprises seven items adapted from (Kumar, Scheer, and Steenkamp 1995, Morgan and Hunt 1994, Moorman, Deshpande, and Zaltman 1993, Ganesan 1994).

TRUST 1   This policyholder fulfils the promises it makes to our company regarding actions or effort of self-protection.

TRUST 2   We trust that this policyholder follows the guidelines of our formal agreements.

TRUST 3   Our company trusts that this policyholder provides complete and accurate information.

TRUST 4   Our company considers this policyholder friendly and trustworthy because of his truthfulness in previous dealings.

TRUST 5   Going by his/her previous actions and activities, I trust that this policyholder's future decisions and actions will not adversely affect our company.

TRUST 6   This policyholder has high levels of integrity and honesty with regard to my company's business dealings.

TRUST 7   This policyholder always keeps the promises it makes to our company

- **Kind of contract (KINDCONTRAC)**

This construct is dichotomous and categorical. It was operationalized as a single-item scale adapted from previous research by (Chiappori and Salanié 2002, Winter 1992, Barr 2010, Doherty and Mahul 2001). The construct was measured by a single open-ended question:

What kind of contract does your company prefer to eliminate hidden action problems?
   (a) Deductible (b) Co-payment (c) Others (mention) ------------------------

- **Size of damages (SIZDAMAGE)**

This construct was operationalized as a single-item scale, adapted from previous research by (García Rubiano 2009, Barr 2010, Huang 2006b). This construct was measured as a natural logarithm of the total annual dollar value a particular insurer paid for the number of claims received from one of its policyholders. This construct was measured by a single open-ended question:

In terms of monetary value, how much did your company pay this policyholder during the last financial year against the claims received? $ --------------------

6.5 Summary

This chapter defined all constructs used in this study and accordingly, determined their respective measures. Furthermore, it discussed measurement and operationalization of variables. It presented question items for both the dependent variable and the independent variables and evaluated the measurement models. The next chapter will deal with detailed presentation and discussion of the tests of validity and reliability.

CHAPTER SEVEN

DATA EXAMINATION AND VALIDATION

CHAPTER SEVEN
DATA EXAMINATION AND DATA VALIDATION

7.1 Introduction

This chapter provides details of the assessment of the data collected to ascertain the degree of quality and the validation that the authors could use it as a basis of analysis for this study. The authors performed a series of descriptive statistical analyses to ensure that they could achieve the fundamental assumptions to run the regression analysis successfully, thus confirming linearity and normality in the dataset. Furthermore, the authors performed a scale and reliability test along with factor analyses for this study.

7.2 Data Screening and Cleaning

7.2.1 Data Assessment, Cleaning and Screening Process for Missing Data

The authors checked and verified that no data in the dataset was missing and the available data was correct. In all, 63 questionnaires were duly and comprehensively completed. This success rate can be attributed to the data-collection method. The questionnaires were administered in person and the respondents had to complete and return those. A seminar was also conducted to give the respondents a synopsis of the study, which gave them an idea of the research problem. This proactive measure made them fully aware of the issue and their responses were adequate and reliable for the purpose of the study.

7.2.2 Assessment of Outliers, Skewness, and Kurtosis for Normality Check

The next step was to check for outliers and skewness to avoid incompatibility and extreme values in the results. An outlier is defined as an observation that is inconsistent with the other observations in the dataset. There is a very low probability that it emanates from the same and equal statistical distribution of the remaining observations under consideration in the dataset, thus affecting the statistical outcome (Walfish 2006). It is a data point significantly different from the rest of the dataset. It is also called an abnormality, deviant, and anomaly when one or more processes generate it.

Generation of certain datasets acts in an unusual way, leading to the generation of outliers (Aggarwal 2015). However, most real-world data have some degree of outliers, which may be of big or small values different from the rest of the dataset. These adversely affect data analysis—such as ANOVA and regression, based on the distribution assumption—and might provide very important insights into the data of a given study. Outliers can be a result of incorrect data measurement, erroneous data entry, or incompatible dataset. Thus, recognizing and detecting outliers are an essential and integral part of data analysis (Seo 2006).

On the other hand, an extreme value, which is rare, is an observation with a very low probability of occurrence, but there is no statistical evidence to confirm that it originates from a different distribution. Outliers tend to increase error variance and reduce the power of statistical tests. Besides, if they are non-randomly distributed, they can minimize normality and thus, in multivariate analysis, they breach the assumption of specificity and multivariate normality, affecting the possibility of both type 1 and type 2 error. Therefore, they can influence certain variables of interest in a study (Seo 2006).

Generally, observations with more than three standard deviations from the mean are regarded as outliers. However, if the outlier has to be used in the study, it has to be changed to a value that equals the extreme scores that lie between three standard deviations of the mean. Alternatively, formal and informal tests can be carried out to detect the outlier, i.e. test of discordancy and outlier-labelling method (Garson 2012).

However, because of the sample size of this study—63 observations—a standard deviation of 2.5 or higher was considered an outlier. Thus, in the data cleaning and screening process, the authors tried to normalize observations with more than three standard deviations from the mean to cases that were identical to the next extreme observation in the dataset (Aggarwal 2015). In this case, the size of damages, which was an outlier, had values ranging from $500 to $147,000. It was transformed into a logarithmic function to ensure normality.

Because of the comprehensive and exhaustive data cleaning and screening, all the observations for this study fell within the +/- 2.5 standard deviation range. Apart from the detection of outliers and normalizing it in the dataset, the authors also analysed the observations for skewness and kurtosis (Ab Hamid et al. 2011, Aggarwal 2015).

7.3 Descriptive Statistics

Descriptive statistics is a branch of statistics that deals with organizing, displaying and describing of data (Trochim 2006). It refers to the presentation of numerical facts, in either table or graphs, and of details about the methodology of analysing such data. This procedure effectively describes, analyses, and interprets quantitative data. Descriptive statistics accentuates the numerical and graphical approach in representing, describing, and interpreting data (Leach 1979). Sound measurement, devoid of any coding error, generally makes the result of a statistical analysis valid, dependable, and reliable. Thus, it is expedient to run descriptive statistics methods on a given dataset to be certain that the data is as expected in terms of mean and standard deviation, and there are no outliers beyond the normally expected range. This involves the measures of central tendency, which includes range, mean, median, and mode; it also includes measures such as standard deviation, variance, and an assessment for skewness and kurtosis, etc. (Garson 2012). The tables below give details of the descriptive statistics for this study:

Table 7.1: Descriptive Statistics of Sample Characteristics

	N	Minimum	Maximum	Mean	Std. Deviation
SIZOFDAMAGES	63	500.00	147000.00	19254	30514
KINDOFCONTRACT	63	.00	1.00	.4603	.50243

Table 7.2: Descriptive Statistics of Constructs

	N	Minimum	Maximum	Mean	Std. Deviation
HIDDENACT	63	2.75	6.75	4.90	.97
ASYMMINFO	63	1.25	7.00	3.83	1.54
TRUST	63	1.25	7.00	3.63	1.56
SELFPROT	63	1.25	7.00	1.60	1.44
PRESCREEN	63	1.75	6.00	4.18	1.02
SELFPROT X KINDOFCONTRACT	63	.00	6.50	1.60	2.02
SIZOFDAMAGES	63	2.70	5.17	4.00	.48
KINDOFCONTRACT	63	.00	1.00	.46	.50

7.4 Scale Reliability

Reliability refers to the consistency and stability of a given measure in the administering and scoring of a given test. Thus, when multiple and independent methods are used in a given study, and they produce the same conclusions, the study has greater reliability than when a single approach is used to address a given problem. Thus, a combination of methodologies to study the same situation is referred to as 'triangulation' and it is deemed more reliable than a single methodological approach (Kelliher 2011). Morse et al. (2012) emphasize that every research must have an element of rigour, truth-value, applicability, consistency, and neutrality to be deemed worthwhile and fit for its intended purpose. There should be a paradigm-specific criterion to measure the magnitude of rigour in a study, such as internal validity, external validity, reliability, and objectivity. Reliability refers to the extent to which measurements are done repeatedly to identify certain influences that make measurements vary from case to case, which can be a source of measurement error.

Cronbach's alpha is one of the most commonly used tests to ascertain the degree of reliability, accuracy, and dependability of a given measure. A reliability coefficient gives an idea about whether the expected outcomes of a given measure meet the set criteria. Thus, no validity coefficient or factor analysis can be interpreted without a reasonable measure of the degree of error of measurement (Cronbach 1951, Cortina 1993). However, to measure the degree of reliability properly, it is necessary to conduct two independent measures and compare them. Nonetheless, the choice of the reliability measure to be used in a given study is a function of the error-producing factor, and the source of variance that is appropriate in a particular case. This forms the basis for generalizability theory.

However, the alpha coefficient as a test of reliability has been found to be insufficient and not applicable in many cases (Cortina 1993). However, the authors of this study adopted the alpha coefficient to ascertain the magnitude of internal consistency and the degree of reliability of constructs employed in the study. Numerous researches have emphasized this as the most commonly utilized and objective measure of reliability. It is easy to use since it requires only a single test as compared with measures like test-retest reliability estimates. To strengthen the degree of reliability further, the authors also conducted a composite reliability test (Tavakol and Dennick 2011).

The table below shows the scores construct of the reliability test obtained from exploratory factor analysis (EFA) and confirmatory factor analysis (CFA), where the degree of correlation between significant items was used to populate the Cronbach's alpha , and significant factor loadings were utilized to populate the composite reliability for the constructs in this study.

Table 7.3: Construct Reliability Scores

Construct	Items	No. of items	Cronbach's alpha (α)	Composite reliability
HIDDENACT	HIDDENACT 1,2,3,4	4	.582	0.59
SELFPROT	SELFPROT 2,4,9,10	4	.805	0.81
ASYMMINFO	ASYMMINFO 1,2,3,4	4	.831	0.84
PRESCREEN	PRESCREEN 1,2,3,4	4	.820	0.82
TRUST	TRUST 1,6,7	3	.817	0.82

As shown in table 7.3, the Cronbach's alpha coefficient for most of the constructs is above the recommended threshold of 0.7: SELFPROT is 0.8, ASYMMINFO is 0.83, PRESCREEN is 0.8.2, and TRUST is 0.81. However, the construct HIDDENACT is 0.582, which is less than 0.7 (Davey, Gugiu, and Coryn 2010). Nonetheless, Cronbach's alpha is still within the recommended threshold of reliability and dependability as long as it is greater than or equal to 0.5, and reliability within the 0.5 threshold is quite prevalent and acceptable in extant literature (Davey, Gugiu, and Coryn 2010). In summary, the data collection method for this study shows a robust level of reliability and internal consistency, which is fundamental and of paramount significance to making the outcome of this study worthwhile and relevant for industry applicability (Davey, Gugiu, and Coryn 2010, Cortina 1993).

7.5 Validity

Validity is the accurate and true representation of the specifics and details of a phenomenon a study is planning to explain, describe, and put into theory. The extent of validity varies from one situation to another, based on certain influences. Validity seeks to ascertain whether the measurements adopted are appropriate and whether they are actually measuring what they are supposed to measure (Winter 2000a).

Furthermore, validity is the extent to which the measuring instrument accurately measures what is it designed to measure. Validity shows the relationship between the variable being measured and the nature and use of the measurement being used. This is useful to evaluate an instrument for the purpose it was meant to serve.

There are three main types of validity—criterion-related validity or predictive validity, content validity or face validity, and construct validity. These can be further subdivided into other forms of validity (Thatcher 2010). Validity is also defined as the degree to which concepts in a given study are accurately measured quantitatively to meet their intended objective. The various types of validity are defined below:

- Convergent validity: This is a case where different measures using the same concepts give similar results, though the measurement approaches adopted are different.

- Construct validity: This refers to the ability to draw inferences from the results of the concepts studied. It emphasizes the degree to which a given tool actually measures the intended construct (Heale and Twycross 2015).

- Discriminant validity: This shows evidence that the concept measured can be different from other concepts, thus leading to a lower degree of correlation between measures. It provides proof that one concept is different from another related concept in a study (Thatcher 2010).

- Content validity: This provides evidence for the nature of sample representative and the sufficiency of content of a given measurement tool (Heale and Twycross 2015).

- Face validity: Just by the look of the concept, it will be agreed that the test done is a valid and sufficient measure of the concept being measured. This study evaluates whether the measure is in line with a conceptual domain of the concept being measured (Heale and Twycross 2015).

7.5.1 Construct Validity

Construct validity is pivotal in undertaking studies relevant to convergent and discriminant validity. Both forms of validity are essential to ensure that the specifics of construct validity are adhered to. The authors adopted the details of the research from previous studies, but calibrated the nature of the problem to match the dynamics and specifics of the case. Thus, the construct used in the questionnaire is the product of consultation with stakeholders and researchers in the Egyptian insurance industry. This satisfies the threshold of content validity, which is essential for the study (Thatcher 2010, Parker, Taylor, and Bagby 2003)

7.5.2 Discriminant Validity

Discriminant validity refers to the degree of distinctiveness of different constructs in a study. This study conducted an exploratory factor analysis with Varimax rotation to measure both discriminant and convergent validity (Guo et al. 2008). Thus, items with a greater loading factor loaded accordingly on the factors that are in line with the conceptualized constructs for this study. This signifies that the measure fully captured what it was designed to capture. Therefore, the KMO delineation of the sampling adequacy in this study, which is 0.77, showed that common factors could describe inter-firm correlation. Thus, the Bartlett's sphericity is also hugely valid in this study (Hadia, Abdullah, and Sentosa 2016).

Table 7.4: Exploratory Factor Analysis (n=63)

CONSTRUCTS	FACTOR 1 ASYMMINFO	FACTOR 2 PRESCREEN	FACTOR 3 SELFPROT	FACTOR 4 TRUST	FACTOR 5 HIDDENACT
ASYMMINFO1	**.849**	.079	.051	.212	.060
ASYMMINFO2	**.844**	.179	.251	.130	-.019-
ASYMMINFO3	**.559**	.233	.497	.498	.138
ASYMMINFO4	**. 855**	.180	. 186	.068	.032
PRESCREEN1	-.104-	**.914**	-.104-	-.025-	-.069-
PRESCREEN2	-.140-	**.898**	-.170-	-.106-	-.113-
PRESCREEN3	-.275-	**.711**	-.131-	-.175-	-.028-
PRESCREEN4	.005	**.588**	.140	-.305-	-.265-
SELFPROT2	.251	.179	**.844**	.130	-.019-
SELFPROT4	.186	.180	**.855**	.068	.032
SELFPROT9	.371	.157	**.719**	-.113-	-.315-
SELFPROT10	.225	.142	**.617**	.224	-.056-
TRUST1	.212	.079	.051	**.849**	.060
TRUST6	.276	.060	.098	**.868**	-.083-
TRUST7	.383	.237	.147	**.712**	-.177-
HIDDENACT1	-.057-	.399	-.006-	.103	**.770**
HIDDENACT2	.124	.009	.087	-.355-	**.708**
HIDDENACT3	.098	. 469	.099	.105	**.616**
HIDDENACT4	.298	.355	.224	.030	**.480**
Eigen value	2.98	3.07	2.22	2.14	1.52

Extraction Method: Principal Component Analysis

Rotation Method: Varimax with Kaiser Normalization

Rotation converged in eight iterations

The EFA, as shown in the table above, provides sufficient evidence for convergent and discriminant validity, as the loading of one unique construct is higher than the loading of measures of other constructs in the study (Rencher 2002a).

To establish discriminant validity, it is important to have a proper average-variance-extracted (AVE) analysis. The authors ascertained whether the square root of each AVE value belonging to each latent construct was higher than any correlation among any pair of latent constructs.

AVE measures the explained variance of a given construct. When the authors compared the AVE and the correlation coefficient of a given construct in this study, they wanted to ascertain whether the item of the given construct explained more variance than the items of the other construct did. AVE, which measures discriminant validity, can be calculated as AVE = Σ [$\lambda i\ 2$] / Σ [$\lambda i\ 2$] + Σ [Var (εi)] where λi shows the loading of each measurement item on its corresponding construct and εi is the error measurement (Zaiț and BERTEA 2011). For further analysis, this study used AMOS 22 to populate the AVE, using standardized factor loadings. After obtaining the AVE, it was observed that the AVE was greater than the multiple squared correlation for the construct under study, as shown below in table 7.5. This further strengthens and accentuates proof for discriminant validity (Suhr 2006).

Table 7.5: Discriminant Validity, Squared Inter-Construct Correlation (R2) and Average Variance Extracted (AVE)

	1	2	3	4	5	6	7	8
1. HIDDENACT	1.000	.331	.117	.015	.003	.000	.127	.475
2. SIZOFDAMAGES		1.000	.477	.051	.041	.412	.042	.124
3. KINDOFCONTRACT			1.000	.082	.189	.456	.430	.141
4. SELFPROT				1.000	.000	.000	.000	.000
5. ASYMMINFO					1.000	.000	.000	.000
6. PRESCREEN						1.000	.001	.061
7. TRUST							1.000	.000
8. SELFPROT X KINDOFCONTR								1.000
AVE	.81	-	-	.92	.60	.85	.39	-

As seen in the table above, the AVE of this study ranges from 0.39 to 0.92, with constructs such as hidden action problems (HIDDENACT), self-protection (SELFPROT), and asymmetric information (ASYMMINFO) exceeding the 0.50 threshold criterion. However, at 0.39, the AVE values for trust (TRUST) is below the minimum threshold criterion (Chen, Wang, and Chen 2012).

AVE = (Sum of squared standardized loadings) / [(Sum of squared standardized loadings) + (Sum of indicator measurement error)].

Nonetheless, existing literature validates the use of values below 0.50 when the construct reliability is robust (Zaiț and BERTEA 2011), as in this case. Furthermore, constructs with AVE values above 0.30 are a largely acceptable benchmark in exploratory research. In summary, all constructs used in this study robustly support discriminant validity (Hadia, Abdullah, and Sentosa 2016, Hair et al. 2010, Rencher 2003).

7.5.3 Convergent Validity

This study used the convergent validity to ascertain the agreement between different variables of the same construct. Some degree of convergent validity in the EFA can be ascertained from the table above. As depicted in table 7.5, the Eigenvalues for the different constructs are higher than the threshold criterion of 1.0. The Eigen value for the EFA ranges between 1.52 and 3.07. The output of the CFA as shown below is significant with the t value >0.05. In addition, the own factor loading also surpasses the criterion limit of 0.5, thus accentuating convergent validity (Chen, Wang, and Chen 2012). Furthermore, the composite reliability study for SELPROT, ASYMINFO, PRESCREEN and TRUST are all greater than 0.60—beyond the acceptable threshold criterion. Although at 0.59, HIDDENACT is slightly below the minimum acceptable threshold criterion, it can be approximated to 0.60, which is the acceptable threshold criterion. This confirms adequate acceptance of convergent validity in the study (Ab Hamid et al. 2011, Hair et al. 2010, Rencher 2003).

Table 7.6: Measurement Model Confirmatory Factor Analysis (CFA) Results (n=63)

Construct	Factor loading (t–value)[b]	Seven-point Likert-scale-type items with end points strongly disagree and strongly agree
Self-protection SELFPROT: 4 ITEMS p = 0.17 CFI = 0.95; IFI = 0.95 RMSEA = 0.25 α = 0.80; CR = 0.81	0.694[a] 0.638 0.749 0.903	SELFPROT10: The drivers of this policyholder never break the speed limit while driving SELFPROT9: This policyholder never gets any part of the cars repaired during maintenance without the insurer's permission SELFPROT4: This policyholder never allows another person to drive the car without the insurer's permission SELFPROT2: This policyholder never leaves the car with the engine running
Asymmetric Information ASYMMINFO:4 ITEMS p = 0.00 CFI = 0.90; IFI = 0.90 RMSEA = 0.32 α = 0.83; CR = 0.84	0.720[a] 0.906 1.910 0.852	ASYMMINFO4: It is very difficult for our company to get exact information about whether this policyholder has abided by the load capacity clause ASYMMINFO3: It is very difficult for our company to know/verify whether this policyholder has given correct information about the car's operating hours per day ASYMMINFO2: It is very difficult for our company to know/verify whether this policyholder has hired unqualified drivers ASYMMINFO1: It is very difficult for our company to know/verify whether the drivers have driven under the influence of alcohol/drugs
Pre-screening PRESCREEN: 4 ITEMS p = 0.01 CFI = 0.91; IFI = 0.91 RMSEA = 0.22 α = 0.82; CR = 0.82	0.468[a] 0.814 0.872	PRESCREEN4: Before we signed the contract, we checked that this policyholder provided the required certificates, such as the traffic certificate PRESCREEN3: Before we signed the contract, we confirmed that the cars of this policyholder had not had any previous collisions PRESCREEN2: Before we signed the contract, we confirmed that this policyholder's car was not older than the specified age (6 years) to get the insurance policy

	0.884	PRESCREEN1: Before we signed the contract, we confirmed that this policyholder had met the requirement for the specific number of kilometres to get the insurance policy
Trust TRUST: 3 ITEMS $p = 0.02$ CFI = 0.93; IFI = 0.91 RMSEA = 0.19 $\alpha = 0.81$; CR = 0.82 Trivial fit for three-item scale	0.732[a] 0.669 0.870	TRUST7: This policyholder always keeps the promises it makes to our company TRUST6: This policyholder has high levels of integrity and honesty with regard to our company's business dealings TRUST1: This policyholder fulfils the promises it makes to our company regarding the actions of self-protection
Hidden action HIDDENACT: 4 ITEMS CFI = 1.01; IFI = 1.01 RMSEA = 0.28 $\alpha = 0.58$; CR = 0.59	0.618[a] 0.815 0.295 0.617	HIDDENACT4: This policyholder sometimes makes false promises about the maintenance of his cars at the original brand centre HIDDENACT3: When an accident occurs, this policyholder does not inform my company on time, which is against the terms of contract HIDDENACT2: When an accident occurs, this policyholder claims a huge (abnormal) amount of damages HIDDENACT1: This policyholder sometimes pretends that he uses his cars for the purpose mentioned in the insurance policy to get different incentives from my company. He actually uses his cars for purposes other than that mentioned in the policy

[a]Fixed variable.

[b]Standardized loadings significant at $p < 0.05$

7.6 Assessment of the Hypothesized Measurement Model

To fully evaluate and assess how well the hypothesized model fits the data, and to look out for unidimensionality, this study used AMOS 22 to run CFA to measure this assessment. From table 7.6 above, the CFA output emphatically confirms its success (Chen, Wang, and Chen 2012). The loading factors are also significant at p<0.05. In addition, based on their association—as their signs show—the parameters under study acted just as predicted (see appendix 3).

The p values are quite significant; furthermore, many other fit indices meet the acceptable threshold criterion. For example, CFI=0.93 and IFI=0.91—both are above the minimum 0.90 threshold. RMSEA=0.28, which is above 0.08, which is the minimum acceptable criterion. In short, based on the different statistics shown above, numerous evidences fully and robustly support the degree of fit of the hypothesized model and dataset (Suhr 2006, Ab Hamid et al. 2011).

7.7 Summary

This chapter covered preliminary data analysis from assessment, cleaning and screening of observations for normality in the dataset, and various checks. It gave details of the descriptive statistics of this study. It provided the measurement of validity and reliability for the study, and evidence pertaining to the problem. Finally, the authors ran a check for regression analysis to ascertain how fit the hypothesized model was to the data. The next chapter will present further detailed analysis and findings of the study.

CHAPTER EIGHT

HYPOTHESES TESTS AND EMPIRICAL FINDINGS

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HYPOTHESES TESTS AND EMPIRICAL FINDINGS

8.1 Introduction

This chapter provides further detailed analysis of the study, based on the foundation, and the various tests and data validations already mentioned in the preceding chapter. It gives the result of the regression analysis, delineating the various relationships between and among the variables used in this study. Furthermore, it shows the test and results of the hypotheses, which form the crux of this study as the authors set out to prove and validate the propositions.

8.2. Regression Model

To test and effectively measure the hypotheses, the authors adopted the ordinary least square (OLS) regression model technique, which has been extensively used in extant literature to analyse relationships and interactions between and among variables in a study (Lavine 2005). The objective is to test both the main and interaction effects as highlighted in the conceptual research model of the study. After testing the main effects of self-protection (SELFPROT), asymmetric information (ASSYMINFO), pre-screening (PRESCREEN), and trust (TRUST), and the interaction effect of self-protection based on the kind of contract agreed upon, the regression model for this study is given below:

$$\text{HIDDENACT} = b0 + b1\ \$\text{SIZDAMAGES} + b2\ \text{KINDCONTRAC} + b3\ \text{SELFPROT} + b4\ \text{ASYMMINFO} + b5\ \text{PRESCREEN} + b6\ \text{TRUST} + b7\ \text{SELFPROT x KINDCONTRAC} + \varepsilon \qquad \text{Equation 8.1}$$

Where:

HIDDENACT=hidden actions of policyholders is the dependent variable in the study. SELFPROT=self-protection, ASYMMINFO=asymmetric information, PRESCREEN=pre-screening, TRUST=trust, and KINDCONTRAC=kind of contract are the independent variables. SIZDAMAGES=size of damages represents the control variable and SELFPROT x KINDCONTRAC is the interaction between self-protection and the contract type. b0=constant term, bb1, b2, b3, b4, b5, b6, b7=the regression coefficients ε=error term.

8.3 Estimating Results

8.3.1 Correlation Matrix

A challenge this study faced at the preliminary stage was the interaction effect between the variables, which posed the risk of multicollinearity. Since the objective of the regression model is to measure dependency and not interdependencies among variables, it is a sign of poor experimental design, which poses a threat to accurately estimate and effectively specify the relationship the regression analysis seeks to establish (Farrar and Glauber 1967). In this case, the assumption that explanatory variables must be independent of each other is violated.

A major challenge in regression analysis arises when one predictor seems to correlate with another, which seems to be a duplicate. This happens when two or more explanatory variables in a sample overlap (Rencher 2002b, Willis and Perlack 1978). This problem is very disturbing in regression analysis as it leads to estimation error of the regression coefficient; it affects the R square, which leads to larger variance (standard error) in estimates and hence to poor quality of the result parameter estimates. In some cases, it also leads to misspecification of the model, resulting in biased least square estimators. It makes estimates to a given dataset very sensitive, thus altering the estimate coefficient. Separating the influence of explanatory variables and the inability to explain the variance in the dependent variable is a problem (Willis and Perlack 1978).

To solve this problem and avoid its adverse effect on estimates, it is important to use tolerance and variance inflation factor (VIF) (Rencher 2002b, Voss 2004). Using the tolerance method to mitigate the impact of multicollinearity, a Pearson coefficient is populated for the independent variables and subtracted from one (1-Rsquare). The greater the value, the lower is the degree of multicollinearity. Thus, the threshold criterion for acceptability is a value equal to or greater than 0.1 (Rencher 2002b).

As a solution to the problem of multicollinearity, the authors adopted the mean centring of the independent variables used in the interaction term. They did this to increase the estimation accuracy of the regression coefficient as used in numerous extant literatures (Willis and Perlack 1978). Adopting the mean centring of the independent variable and the moderator variable ensures the moderation of the independent variable's effect on the dependent variable at the given moderator variable displays its mean.

Thus, the interaction term is not adversely affected (Rencher 2002b). In addition, this study perused the presence of heteroscedasticity, but found no evidence of it. Below is the correlation matrix:

Table 8.1: Correlation Matrix, Descriptive Statistics and Collinearity Diagnostics

	1	2	3	4	5	6	7	8
1. HIDDENACT	1.0	.05	-.15	.27	.33	-.54	.14	-.01
2. SIZOFDAMAGE		1.0	.01	-.21	-.22	.03	-.22	-.14
3. KINDOFCONTRACT			1.0	-.17	-.11	.02	-.03	-.14
4. SELFPROT				1.0	.85	-.45	.59	.71
5. ASYMMINFO					1.0	-.47	.76	.65
6. PRESCREEN						1.0	-.39	-.19
7. TRUST							1.0	.45
8. SELFPROT X KINDOFCONTR								1.0
Mean	4.90	4.00	.46	.00	3.83	4.18	3.61	-.12
Std. Deviation	.97	.48	.50	1.44	1.54	1.02	1.60	1.00
Tolerance		.93	.95	.21	.16	.17	.39	.46
VIF		1.07	1.04	4.66	6.10	1.40	2.51	2.17

[a]Mean-centred variables

[b]Transformed variables into natural logarithm

The table above gives details of the correlation matrix, descriptive statistics and collinearity diagnostics.

8.4 Regression Analysis

The regression analysis covered in this work principally deals with the main effect, the interaction effect, and the control effect. As a result, the authors have utilized a hierarchical regression model using SPSS to explain the effects of independent variables and the interaction term in the research model, and show the magnitude of effect on the predictive power of the research model (Faraway 2002). The authors selected this approach because it can adequately explain and substantiate the relationship between the main effect and the interaction effect. Finally, the authors used the f value for each model (see appendices) to provide the details for comparison and interpretation of the results for both model 1 and 2.

Table 8.2: Hierarchical Regression Analysis: Dependent Variable—Hidden Action by Policyholders (HIDDENACT)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant) (b_0)	5.933	1.233		4.813	.000
	SIZOFDAMAGE (b_1)	.143	.216	.072	.661	.511
	KINDCONTRAC (b_2)	-.262-	.209	-.135-	-1.254-	.215
	SELFPROT (b_3)	-.167-	.142	-.248-	-1.182-	.242
	ASYMMINFO (b_4)	.340	.162	.539	2.105	.040
	PRESCREEN (b_5)	-.501-	.116	-.526-	-4.336-	.000
	TRUST (b_6)	-.189-	.101	-.311-	-1.864-	.068
Model 1 Fit:		$R^2 = 0.380$, $R^2_{Adj} = 0.314$, $F(6.56) = 5.720$, $p = 000$, $n = 63$				

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
2	(Constant) (b_0)	5.36	1.21		4.41[a]	.00
	SIZOFDAMAGE (b_1)	0.16	.21	.08	.75[d]	.45
	KINDCONTRAC (b_2)	-0.26	.20	-.13	-1.32[c]	.19
	SELFPROT (b_3)	-0.04	.15	-.05	-.23[d]	.81
	ASYMMINFO (b_4) H1 (+)	**0.40**	**.16**	**.63**	**2.55[a]**	**.01**
	PRESCREEN (b_5) H2 (-)	**-0.44**	**.11**	**-.46**	**-3.85[a]**	**.00**
	TRUST (b_6) H3 (-)	**-0.20**	**.09**	**-.32**	**-2.00[b]**	**.05**
	SELFPROT X KINDCONTRAC (b_7) H4 (-)	**-0.33**	**.14**	**-.34**	**-2.30[b]**	**.02**
Model 2 Fit:		$R^2 = 0.435$, $R^2_{Adj} = 0.363$, $F(7.55) = 6.040$, $p = 000$, R^2-change $= 0.435$, $n = 63$				

[a]Significant at $p < 0.01$ for t-values greater than 2.33 one tail

[b]Significant at $p < 0.05$ for t-values greater than 1.65 one tail

[c]Significant at $p < 0.10$ for t-values greater than 1.28 one tail

[d]Not significant

As the starting point, variables were mean centred to attenuate the problem of multicollinearity, and as such, the tolerance and VIF met their various threshold criterion for acceptance—that is, greater than 0.10 for tolerance and less than 10 for VIF. In the first instance, that is, the case of model 1, hidden action by policyholders were regressed on self-protection (SELFPROT), asymmetric information (ASYMMINFO), trust (TRUST), and pre-screening (PRESCREEN)

using the size of damages (SIZDAMAGES) as a control variable. As depicted in table 8.2 above, model 1 provides sufficient and robust explanation for hidden action by policyholders by showing 31% variance with R^2 adjusted = 0.31. It is significant at the $p < 0.05$ level.

Model 2 takes into account the interaction terms between variables, that is, the case of self-protection and kind of contract. Thus, the goodness of fit for the estimated regression model is significant with $F_{(6.56)} = 5.720$, R^2 adjusted = 0.432 (see appendices 5a and 5b). Therefore, model 2 gives a sufficient and robust explanation for the variation in the degree of hidden action by policyholders, with an explanatory strength of 43%. Such good fit indicates that the research model provides an exhaustive and sufficient description of the dataset used in the study (Faraway 2002). In summary, the impact of the interaction effect can be measured in the F change, which is significant at $p < 0.05$ level at $F_{(7.55)} = 6.040$ (see appendix 5a).

This shows that the research model predicts very well the interaction effect between self-protection and the kind of contract and its impact on hidden action problems. The F value for both models are significant at the $p < 0.05$ level, denoting that the independent variables and interaction terms sufficiently explain the variation of hidden action problems. Therefore, the model fully and adequately fits the dataset. In summary, 43% of the level of variation in hidden action problems, which is the dependent variable, is explained by the independent variables self-protection, asymmetric information, pre-screening, trust, the interaction effect between self-protection and kind of contract, and the control variable size of damages.

8.5 Test of Hypotheses

From table 8.2, the regression equation can be formulated and it yields the following result:

$$
\begin{aligned}
\text{HIDDENACT} = \quad & 5.36 + 0.16 \text{ SIZDAMAGES} - 0.26 \text{ KINDCONTRAC} - 0.04 \text{ SELFPROT} \\
& + 0.40 \text{ ASYMMINFO} - 0.44 \text{ PRESCREEN} - 0.20 \text{ TRUST} - 0.33 \\
& \text{SELFPROT x KINDCONTRAC} \qquad\qquad\qquad \text{Equation 8.2}
\end{aligned}
$$

To ascertain the degree of interaction between the terms in equation 8.2, the authors took the partial derivative of self-protection and kind of contract with respect to hidden action by policyholders, as prescribed in extant literature. This study considered how the nature of contact signed ex-ante would influence the degree of self-protection by the policyholder ex-post and subsequently influence the magnitude of hidden action in the relationship. This yielded the equation below:

$$\frac{\delta \text{HIDDENACT}}{\delta \text{SELFPROT}} = b1 + b7 \text{ KINDCONTRAC} \qquad \text{Equation 8.3}$$

Equation 8.2 shows the regression model for this study and depicts the nature of relationship between the dependent variable, hidden action by policyholders (HIDDENACT), and the independent variables self-protection (SELFPROT), asymmetric information (ASYMMINOF), pre-screening (PRESCREEN) and trust (TRUST). It also shows the interaction effect between self-protection (SELFPROT) and kind of contract (KINDCONTRAC), and finally with the control variable, size of damages (SIZDAMAGES).

Hypothesis H1 explains that as the degree of asymmetric information in an exchange relationship—that is, the interaction between the policyholder and the insurer—increases, the level of hidden action problems increases too. Since one party to the exchange (the policyholder) has private and idiosyncratic information that the other is not aware of, it has more knowledge about its risk profile ex-ante, and such information is critical to the nature of the exchange. Thus, one party tends to take advantage of such information gap and act opportunistically, exacerbating the magnitude of hidden action problems in the relationship.

Hypothesis H2 shows that there is a negative relationship between pre-screening and hidden action problems. Thus, as the degree and strength of pre-screening increases, hidden action problems reduce drastically. Pre-screening allows the insurer to get comprehensive and detailed information about the risk profile of the policyholder, and the dynamics of the event to be insured. This ensures that the proper product is offered to the policyholder based on his/her peculiarities, thus mitigating the probability of hidden action problems.

Hypothesis H3 postulates and proves that there is a negative relationship between the level of trust and hidden action by policyholders. As the level of trust in an exchange relationship increases over time—usually after repeated dealings—partners feel obligated to fulfil their side of the bargain and preserve the relationship, which will grow stronger with time and common norms and values will be established. The magnitude of hidden action problems will be significantly reduced because of the prevalence of trust in the exchange relationship.

From the equation above, all the hypotheses are significant and fully supported. The table above reveals that the first hypothesis H1 (b4=0.40, t=2.55, p<0.005) shows a positive association between information asymmetry and hidden action problems. The table also reveals that hypothesis H2, H3 and H4 are all significantly valid and fully supported H2 (b5=-0.44, t =-3.85, p<0.05), H3 (b6=-0.20, t=-2.00).

The interaction effect of self-protection in relation to hidden action problems in different kinds of contract is negative and significant (H4) (b4=-0.33, t value=-2.30, P<0.05 one tail). For the fourth and final hypothesis, the equation above shows the interaction effect between self-protection and kind of contract, thus showing its impact on the degree of hidden action problems.

8.5.1 Interpretation of Interaction Effect: SELFPROT x KINDCONTRAC

As the starting point, the authors conducted a partial derivative on hidden action problems (HIDDENACT) with respect to self-protection based on the estimated regression equation shown in equation 8.3, which gives the output below:

$$\frac{\delta \text{HIDDENACT}}{\delta \text{SELFPROT}} = -0.04 - 0.33\ \text{KINDCONTRAC} \qquad\qquad \text{Equation 8.4}$$

Figure 8.1 below denotes the effect of hidden action problems based on the interaction between the degree of self-protection and kind of contract. It shows that the degree of hidden action problems is not responsive to every contract type. Thus, the incentive for self-protection and reduction of hidden action problems is a function of the nature of agreement with policyholders. The upper horizontal section of the figure shows that with a deductible contract type, regardless of the degree of self-protection, there is little or no probability of the reduction of hidden action problems. That is because in a deductible contract, the policyholder only pays the initial amount of the loss, and subsequently, the insurer takes over and indemnifies the policyholder for the remainder of the loss. Thus, even if the policyholder invests in self-protection, it will not reduce hidden action in any case. That is because the policyholder is likely to be tempted to act opportunistically as there is little or no incentive to invest in self-protection. The insurer will compensate for a huge portion of the loss anyway.

The bottom horizontal section shows that the co-payment contract type will moderate the degree of hidden action problems substantially. Under this arrangement, policyholders pay a huge part of the compensation for any loss suffered, and the higher the loss, the greater is the contribution. Consequently, co-payment obligates policyholders to spend on self-protection as a pre-emptive measure to deter the event insured against from occurring, since it will have serious consequences, both financially and from a business perspective. This will greatly reduce the probability of hidden action, thus confirming that co-payment is a more useful and practical measure to encourage self-protection among policyholders and to minimize the degree of hidden action problems.

Figure 8.1 The Effect of Self-protection on Hidden Action Problems by Policyholders in Different Kinds of Car Insurance Contracts

SELF-PROTECTION

		LOW	HIGH
K I N D O F C O N T R A C	D E D U C T		NO EFFECT (-0.04)
	C O P A Y M		STRONG EFFECT (-0.37)
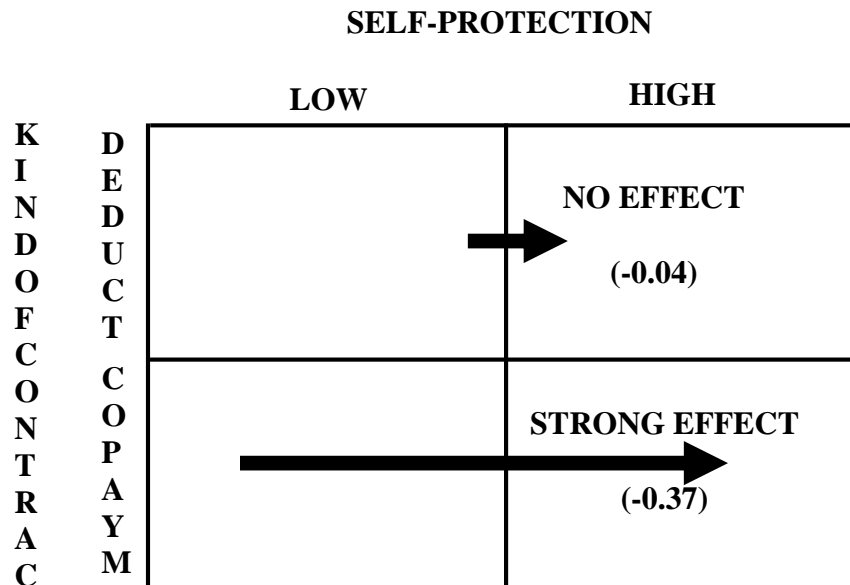
Note: �➤ indicates the effect of self-protection on reducing hidden action in different kinds of contracts

The above equation illustrates the estimated main effect of self-protection on hidden action by policyholder. It can be seen from the figure that the effect of self-protection is almost nothing (-0.04) when the kind of contract is zero, which represents deductible contract. The effect of self-protection is very high (-0.04-0.33 =-0.37) when the kind of contract is co-payment. In conclusion, it can be said that the effect of self-protection is very little or non-existent in the case of deductible contract and very high in the case of co-payment contract.

8.6 Summary of the Hypotheses

Table 8.3: Summary of the Hypotheses and Results

Hypothesis	Coefficient	t-value	Findings
H1: There is a positive association between the level of information asymmetry involved and hidden action by policyholders in the Egyptian car insurance market	0.40	2.55[a]	Supported
H2: There is a negative association between the levels of pre-screening by the insurer and hidden action by policyholders in the Egyptian car insurance market	- 0.44	-3.55[a]	Supported
H3: There is a negative association between the level of trust and hidden action by policyholders in the Egyptian car insurance market	- 0.20	-2.00[b]	Supported
H4: The association between self-protection and hidden action by policyholders is more negatively shaped with co-payment contract than with deductible contract.	- 0.33	-2.30[b]	Supported

[a]Significant at $p < 0.01$ for t-values greater than 2.33 one tail

[b]Significant at $p < 0.05$ for t-values greater than 1.65 one tail

8.7 Summary

This study used the ordinary least square (OLS) regression technique to generate the estimated regression model. It also showed the use of hierarchical regression to further analyse the estimated hidden action problems and test the hypotheses accordingly. In short, all the hypotheses (H1, H2, H3, H4) were duly and robustly supported. The next section gives the summary of the findings of the study in line with relevant theoretical framework.

CHAPTER NINE

DISCUSSION OF FINDINGS, IMPLICATIONS AND FUTURE RESEARCH

CHAPTER NINE

DISCUSSION OF FINDINGS, IMPLICATIONS AND FUTURE RESEARCH

9.1 Introduction

This is the final chapter of this study and covers a summary discussion of the previous chapters based on the relevant theoretical framework used in this work. Furthermore, this chapter presents the key findings of this work based on the research questions and the objective of the study. In short, the authors offer the theoretical and managerial implications of the study, with its limitations, and propositions for future direction.

9.2 Summary of the Findings

The primary objective of this study was to analyse and discuss the antecedents and consequences of hidden action by policyholders in a buyer-seller relationship in the car insurance market. However, this study sought to delineate the moderating effect of self-protection at different kinds of contract signed on the degree of hidden action problems in an exchange relationship. Thus, the findings of this study are expected to help the stakeholders of the insurance industry, such as policymakers, industry professionals, and senior management practitioners, to coordinate the exchange relationship between policyholders and insurers better, considering the ever-evolving complexity and the dynamic nature of the business environment. This will improve integration, and cooperation, which will enhance business and provide sustainable competitive business advantage, offering flexibility and helping the businesses adapt to the ever-changing market.

Table 8.1 shows the hierarchical regression model and analysis. Table 8.3 shows the principal findings of this study, and depicts the goodness of fit for this model: $R^2=0.435$, $R^2_{Adj}=0.363$, $F(7.55)=6.040$, $p=000$, R^2-change=0.435, n=63.

All four hypotheses (H1, H2, H3, and H4) were fully supported, as mentioned earlier. All the hypotheses conformed to theoretical reasoning and showed the expected signs in all the tests done. Furthermore, the construct of the interaction term showed the expected sign and was significant. The control variable—the size of damages, i.e. the amount of compensation the insurer paid to policyholders—was also significant and produced the expected sign with b=0.16, t=0.75 significant at $p<0.05$.

Various appropriate signs show that the findings follow the related empirical setting and the relevant theoretical framework in this research, including PAT and RCT.

The findings highlight the fact that the degree of asymmetric information is positively associated with hidden action problems; the greater the degree of asymmetric information in an exchange relationship, the higher is the hidden action problem. Information asymmetry increases the knowledge gap between insurers and policyholders. Policyholders tend to behave opportunistically and use this private information in their favour. This affects the kind of agreement signed with the insurer and poses the problems of adverse selection and moral hazards, thus increasing the likelihood of hidden action by policyholders.

Thus, the amount of information about policyholders' risks and activities, both ex-ante and ex-post, is critical to effectively manage them for the desired optimal outcome in the business relationship. However, if the magnitude of information asymmetry is reduced, hidden action problems will go down, too. Hence, an effective risk management strategy is in place when the insurer can access and evaluate policyholders and put the appropriate caveats in the contract to forestall hidden action. The study found this to be positive and significant.

However, the degree of trust in an exchange relationship is found to attenuate the extent of hidden action problems. Trust serves as a tool of accountability and consistency; satisfactory and impressive encounters between trading partners help it develop. This weakens the likelihood that any partner will pursue action that will be inimical to the relationship; they value the interaction and are willing to invest their integrity help it sustain.

Thus, the level of trust reduces hidden action problems; the value was negative and significant. The level of pre-screening was also found to be negatively associated with the degree of hidden action by policyholders in the Egyptian car insurance market. This association was significant as well. Finally, the study found that self-protection was also negatively associated with hidden action problems, influenced by the kind of contract signed with policyholders. There was a sharp reduction in hidden actions problems when the contract type was co-payment, but a deductible contract had a small or almost no effect.

9.3 Discussions and Implications

9.3.1 Theoretical Implications

The main goal of this work was to bring to light empirical evidence and implications in a dyadic relationship in the service industry, in line with theoretical assertions relevant to the study, such as the PAT and RCT. Against this background, this study applied the appropriate theoretical framework to analyse the nature of relationship between the insurer and policyholders in the Egyptian car insurance market, and show how certain dimensions tended to significantly weaken the presence of hidden action problems in the exchange relationship.

Trust in attenuating hidden action

The study highlighted the fact that the level of trust in a buyer-seller relationship deters hidden action problems. The latter normally appear ex-post since it is impractical, expensive, and difficult from a business perspective to monitor policyholders efficiently and ensure compliance with contractual terms to promote self-protection and induce efforts to attenuate hidden actions problems. Thus, trust is essential to hold parties accountable seamlessly in the exchange. The two theories (PAT and RCT) validate this. Thus, the authors formulated the hypotheses based on the relevant theoretical framework and the nature and dynamics of the Egyptian insurance market, which serves as the foundation for these hypotheses.

Nature of the principal-agent problem

As the principal-agent problem in agency theory highlights, one party to an exchange can take actions that materially affect the transaction if the other party is unable to monitor or enforce compliance. This is quite prevalent in most principal-agent relationships because of information asymmetry—that is, one party in the exchange possesses special information that the other is not privy to, and can pursue actions based on that, which influences the outcome of the exchange (Keser and Willinger 2000).

Information asymmetry as an antecedent of hidden action

For a business transaction between two parties to be successful, it is important that all material information in the exchange is available to both. However, the presence of information asymmetry—wherein one party has information about his/her peculiar characteristics that the

trading partner is unaware of—and the ability of one party to carry out actions that would violate the agreement after signing the contract increase the chances of the risk to occur (Katz 1998).

The degree of asymmetric information is positively related to hidden action problems, and worsens the business relationship. It implicitly forces one party to act opportunistically in the exchange because of informational advantage. This finding of the study is consistent with the empirical evidence that the higher the level of information asymmetry in an exchange relationship, the greater is the hidden action problem (b=0.04, t=2.55, p<0.05). Theoretical framework such as the PAT and RCT support this finding—the degree of information asymmetry between the principal and the agent in an exchange increases the transaction cost and ex-post hidden action problems, as agents tend to choose actions that maximize their profits (Katz 1998).

Pre-screening as a preventative control of hidden action

Furthermore, the study established that pre-screening is an essential part of the insurance market value chain, as it validates tangible and critical facts in the insurance agreement. Thus, it provides adequate and the requisite information, revealing the probability of an accident and the degree of risk aversion of policyholders. This significantly influences the nature of the contract, as insurers tend to price their product and services based on the peculiar characteristics of different policyholders. A detailed and exhaustive pre-screening process enhances the insurers' ability to categorize policyholders efficiently, thus minimizing the degree of hidden action problems and ensuring that the appropriate product and contract are given to policyholders based on their individual peculiarities (Smart 2000).

Theoretical validation of pre screening

The hypotheses support the theoretical underpinning that the degree of pre-screening will increase the possibility that hidden action problems will go down. As insurer will then be able to deal with the peculiarities of the policyholders. The work of Netzer and Scheuer (2010) well highlights this. They emphasize the need to categorize policyholders based on their risk profile and individualities. It is very cumbersome for the principal (insurer) to monitor the performance of the agents (policyholders), let alone fully verify their ex-post actions. To avoid paying damages based on discretion and subjective assessment, it is important that the insurer carry out the pre-screening process in a manner that the policyholders choose a policy type based on their risk profile.

This will lead to self-enforcing contracts, wherein policyholders will be willing to invest in actions to mitigate or eliminate the possibility of an accident, thus mitigating or eradicating hidden action problems that result from one party's inability to verify the action of the other. The contract type will be exhaustive to measure performance. This will improve the exchange relationship, reduce cost and increase profitability for the insurer.

This argument from the PAT is in line with the findings, and postulated and validated in the hypothesis, which states that pre-screening of policyholders significantly reduces the degree of hidden action problems. Therefore, this work serves as an extension and confirmation of the theoretical framework and its applicability in real-world dynamics (Zhao 2012).

The level of trust and hidden action in an exchange

As partners in an inter-firm relationship have repeated successful dealings, they develop over time trust in the exchange as well as relationship norms that serve as an appropriate safeguard to govern the interaction (Bradach and Eccles 1989, Buvik and Halskau 2001, Granovetter 1985). This weakens the possibility of the partners' behaving opportunistically to harm the relationship; both parties will honour their side of the bargain to keep the relationship going. The degree of trust increases the chance for the partners to develop relational norms that govern the exchange, thus reducing the level of hidden action by policyholders. The findings robustly support this theoretical insight elaborated in RCT. Various works by Buvik and Reve (2002) and Macneil (1977) elucidate this too.

Sande and Haugland (2015) pinpointed in their work the shortcomings of aligning exchange characteristics in a formal contract in a B2B exchange relationship, which impedes the relationship performance and continuity. Therefore, there is need to design formal contracts to minimize business hazards in the exchange relationship. These contracts are fine-tuned to achieve strategic business outcomes. Thus, the seeming lack of trust in the exchange leads to a misaligned form of governance and is a recipe for conflict in the relationship, which affects productivity and business performance.

Theoretical implication of trust as a factor to attenuate hidden action

RCT dictates that the presence of trust in an exchange relationship will generate informal norms and values that create a relational governance form to manage the exchange. This leads to improved business outcomes, and enhances cooperation and the level of coordination in business relationships (Sande and Haugland 2015). This postulation of RCT supports the hypothesis, which found a negative association between the level of trust and hidden action problems in an exchange relationship between the policyholder and the insurer.

Writing a comprehensive contract—especially long-term ones—to govern an exchange relationship can be problematic, as information gathered over time and the agent's performance will reveal more about his characteristics. This information, ex-ante, will significantly lower the transaction cost from the principal's perspective. Therefore, reputation (based on past transactions) and trust (based on expected future outcome) is essential in an exchange relationship. These foster better channel performance and lead to sustainability.

This argument in RCT is consistent with the findings of one of the hypotheses, which adduces that the degree of trust in an exchange relationship attenuates hidden action by policyholders. As trust prevails in business, confidence grows and relations improve, fostering coordination, cooperation, and interdependencies, with mutual interests, shared goals and norms ensuring efficiency and business continuity between the exchange partners, thus attenuating hidden action problems. This work is in line with the theoretical foundation (RCT) and corroborates its underlying assertions of how the degree of trust enhances business outcomes and performance, hence mitigating or eliminating hidden action problems (Parker and Hartley 2003).

Self-protection and hidden action problems

Agency theory predicts that once the contractual agreement has been signed, the principal can hardly monitor the degree of self-protection effort the agent makes. The cost of investing in self-protection or making the effort will determine the agent's (policyholder) level of effort. Whether it is high or low, it will yield some stochastic gains to the principal (insurer). The level of the principal's gain is likely to be higher if the agent chooses a high level of self-protection, but the principal cannot observe the choice of the agent. He might promise a reward to the agent, but based on his realized gain and not necessarily on the degree of self-protection or effort made by the agent.

Agents tend to react according to the expected profit maximization or liability in a given contract (Keser and Willinger 2007)

It follows that the kind of contract agreed upon between the agent (policyholder) and the principal (insurer) largely influences the degree of self-protection or effort invested in by the policyholder to mitigate or significantly reduce the probability of a risk occurring. This study traced the same pattern and the authors observed the varying impacts of different contract types—co-payment and deductible—on the degree of hidden action. This represents an extension and support of the agency theory by providing empirical justification for the relationship between self-protection or its effort and the kind of contract in a principal-agent relationship (Chang, Kang, and Li 2015).

In short, the degree of risk-prevention effort made by the policyholder—i.e. self-protection—has a direct correlation with the expected profitability of the insurer. The higher the self-protection by the policyholder, the higher is the insurer's expected profit. Therefore, it is prudent for the insurer to design a contract that will transfer some liability to the policyholder by inducing a high level of self-protection or its effort in their self-interest. This contract type, especially with the co-payment rider, can serve as an effective measure to attenuate hidden action problems (Keser and Willinger 2000). One of the hypotheses of this study postulated that the association between self-protection and hidden action problems is more negatively shaped when the contract transfers some liability to the policyholder. The findings of the study corroborate this, providing support to the agency theory.

9.3.2 Managerial Implications

It is important to apply the findings to the real world effectively, as the existing theories fully support these. The outcome of this study will be useful for managers and practitioners in the insurance and related industries to improve their relationship with their trading partners, thus strengthening coordination, cooperation, and integration in their operations. This will grow their market share, increase their profitability, and make their business sustainable by offering them a competitive advantage in the market.

Co-payment as effective attenuation of hidden action

The researchers observed that the nature of contracting was a crucial ingredient to determine the degree of self-protection and the eventual size of damages the insurers would have to pay the policyholder. Based on this finding, managers and practitioners can utilize the co-payment contractual term, instead of the deductible, as an efficient deterrent against hidden action problems. The co-payment rider induces policyholders to invest in self-protection significantly to avert any potential damage. Since the degree of the damage would dictate their contribution to the indemnification, the ramifications of a big loss on their business would be far-reaching (Qingyue, Liying, and Beibei 2011).

However, it is worthwhile to note that including a co-payment rider in contracts is not a fixed rule. The manager would be in a better position to categorize their customers based on their risk profile and their degree of risk aversion, and consider other variables to determine the most befitting form of contract. This will satisfy the policyholder and enhance business performance (Tumay 2009).

Pre-screening as a proactive measure to mitigate hidden action

Another useful implication of this study for managers in the insurance sector is that they should develop a comprehensive and flexible pre-screening strategy that can be adapted to the changing market realities and policyholders' expectations, thus minimizing market asymmetries. This will drastically reduce or even eliminate hidden action problems in the Egyptian car insurance market, as the quality of pre-screening and the frequencies and magnitude of claims by policyholders are largely correlated (Smart 2000).

When effectively executed, the process leads to self-selection. That is, policyholders with the profile the insurer is looking for based on some categorization will buy the right policy, thus obviating the problem of adverse selection, which may precipitate moral hazard or hidden action problems. The insurer will then be able to make better estimates of the claims and profitability for a certain period. This will reduce the amount of money insurance companies have to put aside as loss reserve, and improve their cash flow, health of balance sheet, and profitability (Crocker and Snow 2011).

The objective of any business relationship is that the trading partners should deliver their part of the bargain, i.e. meet a given obligation in the exchange relationship. Therefore, it is prudent to keep a mechanism in place, which will make both partners fully accountable to fulfil their obligations. The degree of cooperation and coordination between channel partners is critical for the overall business performance. Businesses tend to prefer long-term relationships, in which interaction changes into integration and increased trust. This ensures that certain norms and values dictate the exchange, improving the degree of coordination and cooperation between partners (Buvik and Halskau 2001, Lusch and Brown 1996). Nonetheless, with information asymmetries in the insurance market, forming such relationships can be a challenge. Since trading partners have access to varying information, some partners tend to behave opportunistically because of an informational advantage and use it for their gain or business advantage. This affects the relationship, hinders performance, and even leads to abrupt termination of the exchange relationship.

The implication of this study for managers is that they should forge strong relationships with important trading partners, based on trust and performance. This will lead to longer-term relationships between insurers and policyholders, thus significantly reducing the likelihood of hidden action problems, which in turn improves coordination and cooperation between the trading partners—i.e. improves business outcomes between the insurer and policyholders—and leads to increased market opportunities and profitability.

9.4 Limitations of the Study

One of the main limitations of this work is the sample size. The researchers collected 63 samples during the field survey. This is a small sample size taking into account factor loading, which emphasizes the need for larger samples in a study. A smaller sample size results in reduced factor loading because of the standard error. As extant literature emphasizes, a sample size of 100 is sufficient for detailed factor analysis to prevent non-convergence and over-determination in the analysis.

Another major constraint was time. Hence, the researchers collected samples from the major non-life insurance companies in Cairo. Since most of the big insurance companies have their headquarters in the commercial capital of Egypt, the sample would sufficiently represent the population (the Egyptian insurance industry). In addition, the authors did not collect samples from the Takafuls, which carry out insurance activities based on Islamic sharia principals.

9.5 Future Direction

The focus of the study was on seller dependence, i.e. the degree of hidden action by policyholders and its consequences for the insurer. Thus, there is an opportunity to examine bilateral dependence between the insurer and policyholders. This will provide detailed information about the power relation between the trading partners, and highlight symmetrical causes of hidden action problems, thus providing the opportunity to eliminate it and foster better cooperation between the parties in the exchange relationship.

Further research can be done by increasing the sample size to enhance reliability and validity, thus reducing the size of standard error. There is also opportunity for more research on the relations between the different partners in the insurance value chain—for example, between brokers and insurance companies, policyholders and brokers, the regulatory authority and insurance companies, and so on. Other forms of insurance activities, like the Takaful, which works on Islamic sharia principles, could also be studied to examine how the dynamics of the governance structure and their relationship with their policyholders and channel partners are different from those dictated by conventional forms of business examined in this work.

Moreover, further research can concentrate on both parties in the dyadic relationship, i.e. simultaneously obtain data from both the policyholders and the insurance companies, to get a better and clearer picture of the direct interaction between the partners in a buyer-seller relationship with regard to hidden action problems.

Another interesting direction for future research would be to take into account the ongoing technological revolution, which has led to the invention of myriads of devices that can monitor seamlessly and real-time, and transfer the required data simultaneously. How technology has changed the business landscape and made ex-post monitoring possible and inexpensive—the degree of hidden action under technological black boxes so to speak—would be interesting to

investigate. Research can also concentrate on comparing customers' ex-post actions when they are under technological supervision and when they are not.

In short, the interaction between the policyholder and the insurer is dynamic and keeps evolving over time. It depends on different factors and the ever-changing market realities are evident in it. The hypotheses of this study and the outcome resulted from a cross-sectional study of the car insurance market in Egypt. Thus, it is significant and valid only for a point in time based on samples collected from the Egyptian insurance industry. Hence, it is necessary to carry out longitudinal studies considering market trends and patterns over time, which can suggest critical decisions, causalities, and movements between insurers and policyholders.

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APPENDICES

Appendix 1: Questionnaire

Dear Respondent,

RE: SURVEY ON HIDDEN ACTION PROBLEMS: THE CASE OF INSURERS AND BUSINESS POLICYHOLDERS IN THE EGYPTIAN CAR INSURANCE MARKET.

This is a master thesis study under the supervision of Professor Arnt Buvik, at Molde University College, a specialized University in Logistics, Molde Norway. The main objective is to study buyer-seller relationships within the insurance industry in Egypt. We are currently conducting a survey on the subject matter above for our master's degree thesis.

The Egyptian insurance industry is very important because it contributes to the GDP of the Egyptian economy and generate a lot of employment opportunities for professionals across the regions of the country. The Egyptian insurance industry in gross premium volume amounted to LE 14.4 billion in 2013/2014, as well as its effect on boost economic growth in different sectors. The result of this survey will reinforce a better understanding of the key factors that should be taken into consideration when it comes to the formulation of the policies for dealing with different business policyholders in the Egyptian car insurance industry. Written master thesis for academic purposes will be provided as an output of this survey as well as a practical summary of findings and implications which may be provided to you upon your request.

Information involved in this questionnaire is robustly confidential and no individual respondent will be specified as a rebuttal to each question will be aggregated to assist in the final analysis of the information provided in this questionnaire, therefore it is not possible to assign information given in the survey to individual respondents.

This survey involves only a small sample of insurers in Cairo, therefore your response is extremely important. Kindly take a few moments to complete the questionnaire below by answering all questions accurately reflecting the real situation regarding your relationship with your major policyholders of car insurance. Particularly with respect to the most recent cases of conflicts or settlements after asking for compensation.

Thank you in advance for taking time to answer the questionnaire. Your support in this study is highly appreciated.

Sincerely,

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A: Background information to the company
1. Company name
2. Number of employees both full time and part time
3. Choose one of your most recent insurance compensation cases by business policyholders: Name of the policyholder-- Case number---------------

B: Based on the policyholder you have identified above, please circle the number that best represents your view regarding the following statements							
	Strongly disagree					Strongly agree	
1- This policyholder sometimes does not adhere to the commitment to use his cars for the purpose agreed upon in the insurance policy in order to get different incentives from my company. He uses his cars for purposes other than that mentioned in the policy	1	2	3	4	5	6	7
2- When an accident occurs, this policyholder claims a huge (abnormal) amount of damages from my company	1	2	3	4	5	6	7
3- When an accident occurs, this policyholder does not inform my company on time. He does it later, which is against the terms of the contract	1	2	3	4	5	6	7
4- This policyholder sometimes makes false promises and claims regarding the maintenance of the cars, for which he does not go to the original brand centre or the approved garages, as specified in the agreement	1	2	3	4	5	6	7
5- This policyholder occasionally lies or makes misleading assertions regarding buying/hiring safety devices and parking his cars in proper garages, which was a prerequisite ex-ante the contract approval	1	2	3	4	5	6	7
	1	2	3	4	5	6	7

6- This policyholder sometimes does not report violation of traffic rules by his drivers or carelessness or reckless behaviour on their part, leading to an accident or to an increase in the chance of it	

We assume that you know something about to what extent this policyholder invest in self-protection, such as actions of the policyholder that he takes to protect himself against the potential risks.

C: Based on the policyholder you have identified above, please circle the number that best represents your view regarding the following statements

	Strongly disagree						Strongly agree
1- This policyholder never leaves the car unlocked	1	2	3	4	5	6	7
2- This policyholder never leaves the car engine running	1	2	3	4	5	6	7
3- This policyholder never leaves the car with a window/the roof open	1	2	3	4	5	6	7
4- This policyholder never allows another person to drive the car without the insurer's permission	1	2	3	4	5	6	7
5- This policyholder never crosses the state borders in the car, against the domestic insurance policy	1	2	3	4	5	6	7

6- This policyholder always follows traffic rules	1	2	3	4	5	6	7
7- The drivers of this policyholder's firm never drive the cars without using the seatbelt	1	2	3	4	5	6	7
8- This policyholder always parks his cars in private locked garages equipped with anti-lock system	1	2	3	4	5	6	7
9- The policyholder never gets some parts of the cars repaired during maintenance without the insurer's permission	1	2	3	4	5	6	7
10- The drivers of this firm never break the speed limit while driving the cars	1	2	3	4	5	6	7

Regarding every action of self-protection actions, there is a cost which must be incurred by the policyholder. If this cost is high, thereby the motivation of the policyholder to incur such cost will be minimized.

D: Based on the policyholder you have identified above, please circle the number that best represents your view regarding the following statements						
	Strongly disagree				Strongly agree	
1- This policyholder always uses high quality tracking devices	1 2 3	4	5	6	7	
2- This policyholder always follows high-standard network subscription for the tracking devices	1 2 3	4	5	6	7	
3- This policyholder always uses high quality fire-extinguisher	1 2 3	4	5	6	7	
4- This policyholder always maintains his cars in the original center of the car's brand	1 2 3	4	5	6	7	
5- This policyholder is buying/hiring safety garages for parking his cars	1 2 3	4	5	6	7	

Information system is one of the most important tools for your company in terms of gathering information about the policyholder with respect to different actions of self-protection as well as the quality of those actions.

E: Based on the policyholder you have identified above, please circle the number that best represents your view regarding the following statements							
	Strongly disagree					Strongly agree	
1- It is very difficult for our company to know/verify whether the policyholder's drivers have driven under the influence of alcohol/drugs	1	2	3	4	5	6	7
2- It is very difficult for our company to know/verify whether this policyholder has hired unqualified drivers	1	2	3	4	5	6	7
3- It is very difficult for our company to know/verify whether this policyholder has given correct information about the daily working hours of the car	1	2	3	4	5	6	7
4- It is very difficult for our company to get exact or accurate information about whether this policyholder has adhered to the specified load capacity	1	2	3	4	5	6	7
5- It is very difficult for our company to know/verify whether this policyholder left the car with keys/fobs attached to the switch	1	2	3	4	5	6	7

6- It is very difficult for our company to get exact or accurate information about whether this policyholder has used the car for purposes other than that mentioned in the insurance policy	1 2 3 4 5 6 7

The determination of the claims amount is based on the comparison between the car pre-screening and the car screening after the accident has been occurred. Therefore the accuracy of pre-screening and screening provide the insurer with the possibility to determine the correct claim.

F: Based on the case you have identified above, please circle the number that best represents your view regarding the following statements

	Strongly disagree Strongly agree
1- Before we signed the contract, we confirmed that this policyholder fulfilled the specific number of kilometres to get the insurance policy	1 2 3 4 5 6 7
2- Before we signed the contract, we confirmed that this policyholder met the age requirement of the car (6 years) to get the insurance policy	1 2 3 4 5 6 7
3- Before we signed the contract, we confirmed that the cars of this policyholder had no record of a collision or a serious accident	1 2 3 4 5 6 7
4- Before we signed the contract, we checked that this policyholder provided the required documents, such as the	1 2 3 4 5 6 7

traffic certificate, and met other regulatory requirements							
5- Before we signed the contract, we checked that this policyholder kept regular maintenance record	1	2	3	4	5	6	7
6- Before we signed the contract, we confirmed that this policyholder has hired insured motorists	1	2	3	4	5	6	7

If efforts of prevention are not observable, that is under moral hazard, policyholders have an incentive to exert the maximum level of effort only if the insurance contract satisfies. Your company may offer some of prevention incentives in order to motivate the policyholder to invest heavily in self-protection against the potential risk.

G: Based on the case you have identified above, please circle the number that best represents your view regarding the following statements							
	Strongly disagree					Strongly agree	
1- Our company has charged (differentiated premiums) lower premiums to careful policyholders, those that can prove that they take effective measures to reduce the insured risks	1	2	3	4	5	6	7
2- Our company has used a deductible which is a provision in an insurance policy under which the person buying insurance has to pay the initial damages up to some set limit	1	2	3	4	5	6	7
3- Our company has used a co-payment which is a provision in an insurance policy under which the policyholder picks up some percentage of the bill for damages when there is a claim	1	2	3	4	5	6	7
4- Our company provides this policyholder a bonus incentive in case that there is no accidents within the first contract period	1	2	3	4	5	6	7

5- Our company has implemented the reward schedule which represents an enforceable contract (i.e., if there is a dispute about whether a player has lived up to the terms of the contract, then a court or similar body can adjudicate the dispute	1	2	3	4	5	6	7

H: Based on the case you have identified above, please circle the number that best represents your view regarding the following statements

	Strongly disagree					Strongly agree	
1- This policyholder fulfils the promises it makes to our company regarding actions or effort of self-protection	1	2	3	4	5	6	7
2- We trust that this policyholder follows the guidelines of our formal agreements	1	2	3	4	5	6	7
3- Our company trusts that this policyholder provides complete and accurate information	1	2	3	4	5	6	7
4- Our company considers this policyholder friendly and trustworthy because of his truthfulness in previous dealings	1	2	3	4	5	6	7
5- Going by his/her previous actions and activities, I trust that this policyholder's future decisions and actions will not adversely affect our company	1	2	3	4	5	6	7
6- This policyholder has high levels of integrity and honesty with regard to my company's business dealings	1	2	3	4	5	6	7
7- This policyholder always keeps the promises it makes to our company	1	2	3	4	5	6	7

I: Kindly complete the following statements regarding the policyholder you have identified above by filling in the blank spaces or ticking where appropriate

1- How long have you been doing business with this policyholder? ----------------- years

2- How much in terms of monetary value did your company sell to this policyholder during the last year -------------------- USD $ (app. insurance premium paid last year)

3- How many claims did your company receive from this policyholder during the last year? ---------------

4- How much in terms of monetary value did your company pay to this policyholder during the last year for the received claims? -------------------- USD $

5- Does your company sell other insurance policies to this policyholder beside car insurance policies? Yes --------- No ----------

6- How many insurance policies did your company trade with this policyholder during the last year?

7- What sales/turnover did your company have during the last year? ------------- USD $

8- What kind of contract is established by your company in order to eliminate moral hazard?

   (a) Deductible (b) Co-payment (c) Others (mention) -----------------------

9- Are you a member of any insurance association? Yes ---------- No ----------

   If Yes; Organization name-------------

10- What is the approximate total sales/turnover of this policyholder? Yes ------ No -----

11- What is the type of the policyholder's company? (a) National (b) multinational (c) universal

Thank You

Appendix 2: Descriptive Statistics and Univariate Normality

	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
HIDDENACT1	2.00	7.00	5.3810	1.11339	-.378-	.302	.381	.595
HIDDENACT2	1.00	7.00	3.9048	2.01378	.000	.302	-1.221-	.595
HIDDENACT3	2.00	7.00	5.5397	1.02902	-.981-	.302	2.847	.595
HIDDENACT4	2.00	7.00	4.8095	1.47951	-.278-	.302	-.588-	.595
HIDDENACT5	1.00	7.00	4.3333	1.31982	-.473-	.302	-.426-	.595
HIDDENACT6	1.00	7.00	3.1587	2.05730	.583	.302	-1.002-	.595
SELFPROT1	1.00	7.00	4.0000	1.60644	.241	.302	-1.123-	.595
SELFPROT2	1.00	7.00	3.8730	1.74589	.013	.302	-1.304-	.595
SELFPROT3	1.00	7.00	3.2063	1.51507	1.046	.302	.209	.595
SELFPROT4	1.00	7.00	3.9206	2.02645	-.093-	.302	-1.454-	.595
SELFPROT5	1.00	7.00	5.6190	2.18815	-1.363-	.302	.318	.595
SELFPROT6	1.00	7.00	4.2857	1.63064	-.111-	.302	-1.156-	.595
SELFPROT7	2.00	7.00	3.9048	1.62356	.392	.302	-1.306-	.595
SELFPROT8	1.00	7.00	3.9365	2.69930	.009	.302	-1.878-	.595
SELFPROT9	1.00	7.00	4.2381	1.73869	-.208-	.302	-1.312-	.595
SELFPROT10	1.00	7.00	3.0000	1.72271	.684	.302	-.673-	.595
ASYMMINFO1	1.00	7.00	3.8413	1.88548	.058	.302	-1.347-	.595
ASYMMINFO2	1.00	7.00	3.8730	1.74589	.013	.302	-1.304-	.595
ASYMMINFO3	1.00	7.00	3.6984	1.89766	.363	.302	-1.016-	.595
ASYMMINFO4	1.00	7.00	3.9206	2.02645	-.093-	.302	-1.454-	.595
ASYMMINFO5	1.00	7.00	5.6190	2.18815	-1.363-	.302	.318	.595
ASYMMINFO6	1.00	6.00	3.3492	1.44979	-.149-	.302	-1.238-	.595
PRESCREEN1	1.00	6.00	3.2698	1.41657	-.006-	.302	-1.018-	.595
PRESCREEN2	1.00	6.00	3.4762	1.62498	-.049-	.302	-1.285-	.595
PRESCREEN3	2.00	7.00	4.6190	1.06904	-.239-	.302	.798	.595
PRESCREEN4	3.00	7.00	5.3651	.78907	-.961-	.302	1.084	.595
PRESCREEN5	5.00	7.00	6.7143	.58000	-1.934-	.302	2.733	.595
PRESCREEN6	1.00	7.00	5.1111	1.09414	-1.219-	.302	2.553	.595
TRUST1	1.00	7.00	3.8413	1.88548	.058	.302	-1.347-	.595
TRUST2	1.00	7.00	4.4603	1.85634	-.162-	.302	-1.093-	.595
TRUST3	1.00	7.00	3.6984	1.89766	.363	.302	-1.016-	.595
TRUST4	1.00	7.00	3.8730	1.48641	.316	.302	-.878-	.595
TRUST5	1.00	7.00	4.0635	1.52266	.116	.302	-.486-	.595
TRUST6	1.00	7.00	3.4603	1.78547	.322	.302	-1.188-	.595
TRUST7	1.00	7.00	3.5397	1.94128	.327	.302	-1.414-	.595

Appendix 3: Confirmatory Factor Analysis Model Fit (n=63)
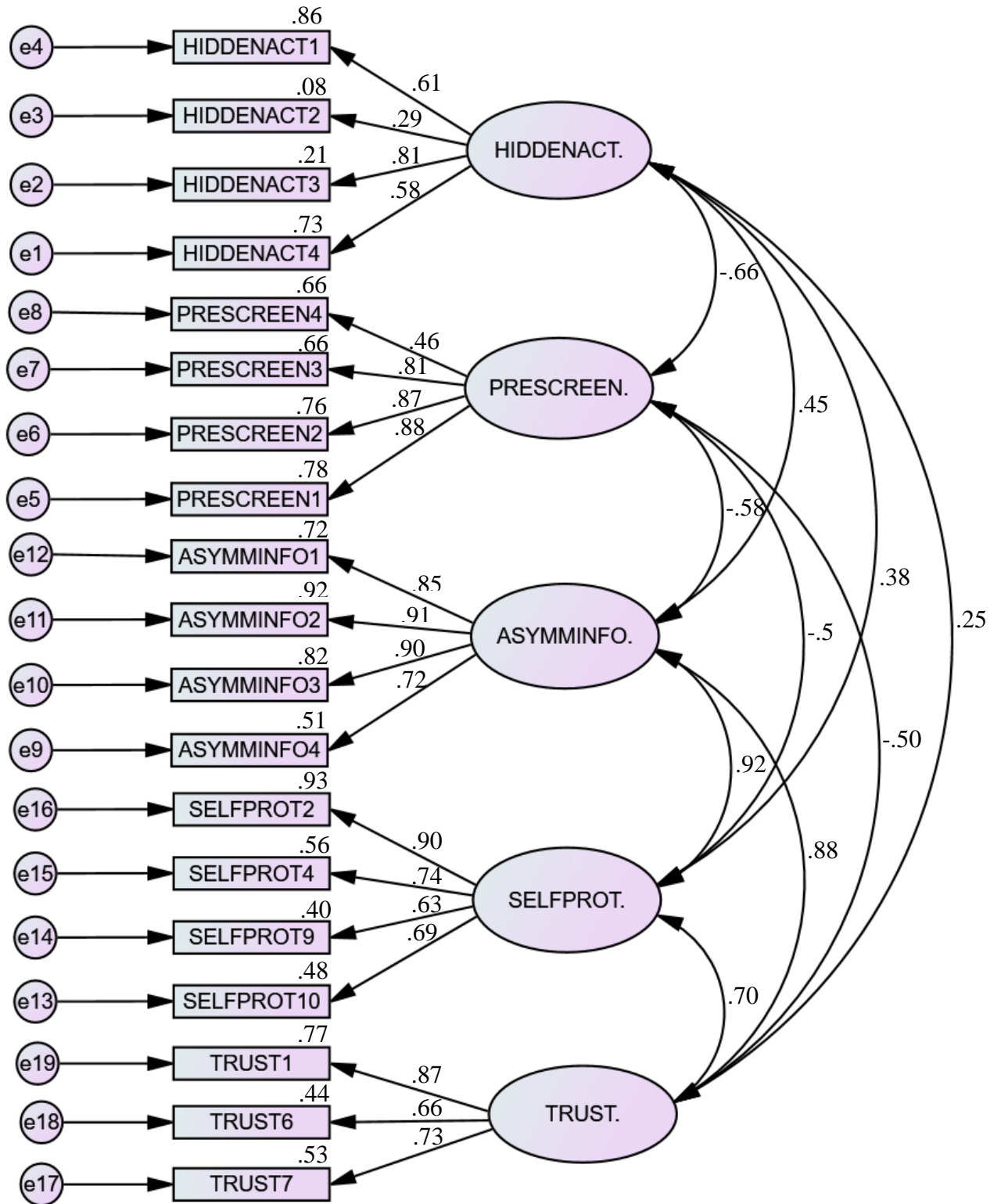
Appendix 4 (a): Residual Distribution Chart

Histogram
Dependent Variable: HIDDENACT

Mean = -2.04E-15
Std. Dev. = 0.942
N = 63
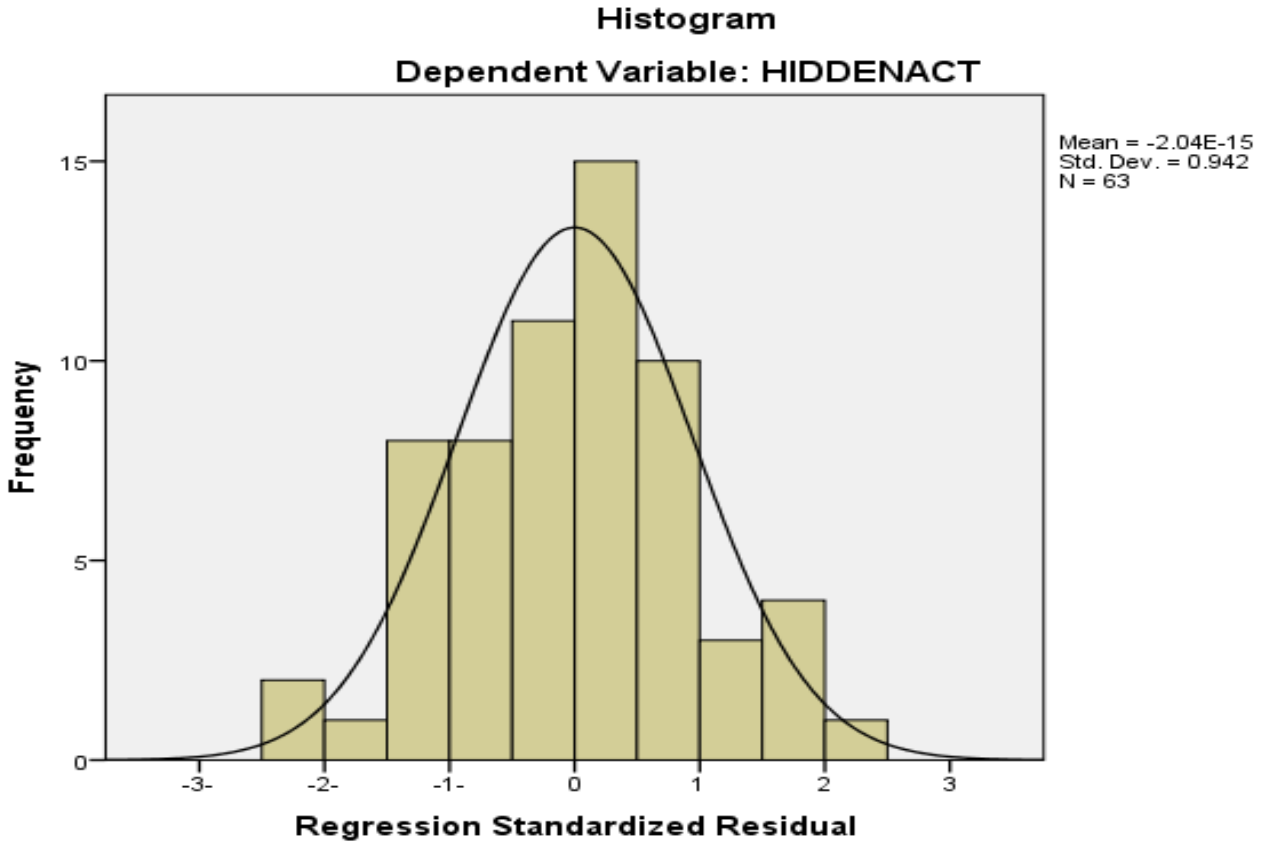
Appendix 4 (b): Normal Probability Plot for Normality Assessment

Normal P-P Plot of Regression Standardized Residual
Dependent Variable: HIDDENACT
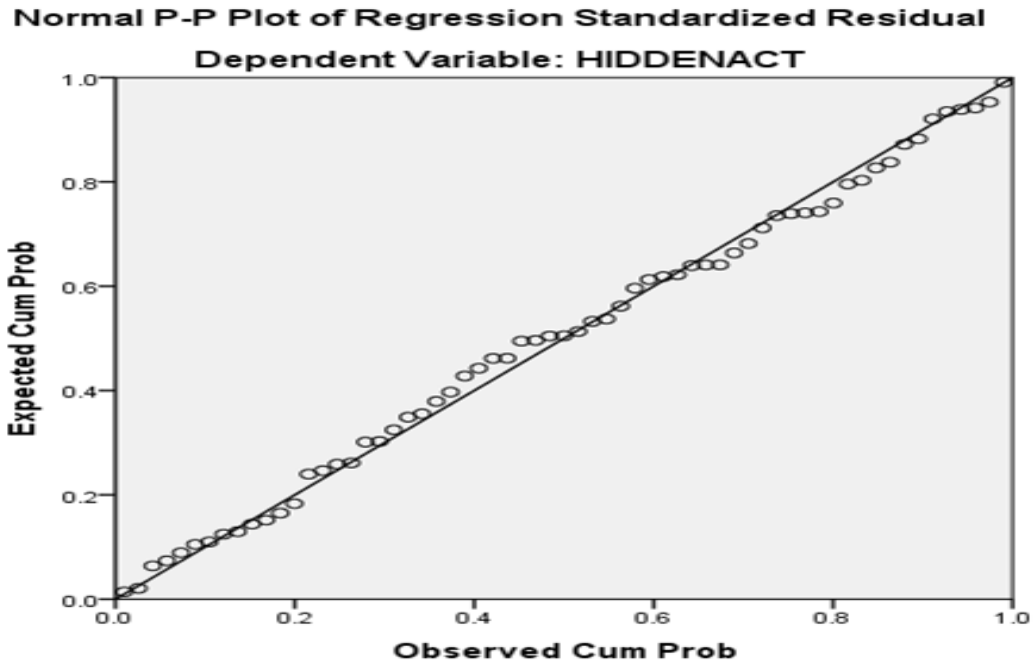
Appendix 5(a): Research's Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.616[a]	.380	.314	.80591	.380	5.720	6	56	.000
2	.659[b]	.435	.363	.77656	.435	6.040	7	55	.000

a. Predictors: (Constant), SELFPROT X KINDCONTRAC, TRUST, KINDCONTRAC, SIZOFDAMAGE, PRESCREEN, SELFPROT, ASYMMINFO

b. Predictors: (Constant), KINDCONTRAC, SIZOFDAMAGE, PRESCREEN, TRUST, SELFPROT, ASYMMINFO

c. Dependent Variable: HIDDENACT

Appendix 5(b): Analysis of Variance (ANOVA)

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	22.291	6	3.715	5.720	.000[a]
	Residual	36.372	56	.649		
	Total	58.663	62			
2	Regression	25.496	7	3.642	6.040	.000[b]
	Residual	33.167	55	.603		
	Total	58.663	62			

a. Dependent Variable: HIDDENACT

b. Predictors: (Constant), TRUST, KINDCONTRAC, SIZOFDAMAGE, PRESCREEN, SELFPROT, ASYMMINFO

c. Predictors: (Constant), SELFPROT X KINDCONTRAC, KINDCONTRAC, SIZOFDAMAGE, PRESCREEN, TRUST, SELFPROT, ASYMMINFO