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Risk governance & control: financial markets & institutions

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EDITORIAL

Dear readers!

The recent issue of the journal Risk Governance and Control: Financial Markets and Institutions pays attention to issues of risk assessment, venture capital investments etc. More detailed issues are given below.

**MM Lebambo, R Shambare, R Matlala, R Costa Mousinho** focus on the norms and practices of Internet marketing among small-scale lodging establishments in Bushbuckridge – a small tourist town in northeast South Africa. Findings revealed that, while Internet awareness was quite high, only a few B&Bs utilised the Internet for marketing. **Catherine Oluwatoyin Chovwen, Sunday Samson Babalola** examine the influence of gender and entrepreneur's operational locality on entrepreneurial knowledge and business performance. A quantitative approach using a cross sectional survey design is utilised for the study. **Ahmed Mohammadali-Haji, Zafeer Nagdee** explore the nature and extent to which public sector accounting features in the education syllabi of the leading chartered accountant professional bodies that form part of the IFAC contingent. By following an explorative approach, the study identified international trends within the ambit of public sector accounting education and provides guidance for other professional bodies in assessing the nature and extent of their public sector accounting education requirements. **Inna Bielova, Taras Savchenko** propose to focus on a group of factors of credit risk that are connected with the availability of information about the borrower. It is necessary to make active efforts on improving the effectiveness of credit bureaus in Ukraine by establishing public credit registry and also to focus on solving other problems associated with the collection and use of information about borrowers. **Godly Otto, Wilfred I. Ukpere** examined the factors responsible for increasing cost of production and spending behaviour in Nigeria. The study recommends that government should concentrate on providing social infrastructure that would encourage the private sector to invest and expand output, taking advantage of existing unemployed resources. This would help to stem inflation in Nigeria which is usually caused by scarcity. **Ben Marx, Deon Oosthuizen** investigated the recommended approaches for the task of software patching, with a view to balancing the sometimes conflicting requirements of security and system availability. The study found that there are a number of key aspects that are required to ensure a successful patching process and that the internal auditors of the ‘big four’ South African banks considered most of these factors to be important. **Shailendra Kumar, Amar Johri** analyzed the qualitative and quantitative aspects suggested by the previous studies and studied the relationship between choice of factors among different investors and assigning weightage for them with respect to screening of an IT firm for investment. **Hendrik Marius Wessels, Naomi Wilkinson** determined whether the organisational governance maturity framework can be applied to the selected retail industry organisation to assess the maturity of the organisation’s governance, limited to the ‘leadership’ attribute. The empirical results confirmed that the organisational governance maturity framework can be used to determine the maturity level of organisational governance for the selected attribute of ‘leadership’. **Kung-Cheng Ho, Shih-Cheng Lee, Po-Hsiang Huang, Ting-Yu Hsu** investigate whether the relationship between distress risk and leverage puzzles exists in the Taiwan market. When examined separately, distress intensity is found to be negatively related to stock returns, but leverage is found to not be significantly related to stock returns. The results are the same when distress intensity and leverage are examined simultaneously. **Da Zhao, Tianhao Wu** apply asymmetric ARMA-GARCH model to analyze daily foreign exchange dollar-denominated trading data from four countries of different development levels across Asia and Europe.

We hope that you will enjoy reading the journal and in future we will receive new papers, outlining the most important issues and best practices of corporate governance!
RISK GOVERNANCE & CONTROL: Financial markets and institutions

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GOVERNANCE AND REGULATION OF THE TOURISM INDUSTRY: AN INTERNET MARKETING PERSPECTIVE

MM Lebambo*, R Shambare**, R Matlala*, R Costa Mousinho*

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Abstract

The purpose of this qualitative study is to establish governance and regulation issues pertaining to Internet marketing approaches within the South African tourism sector. The study focuses on the norms and practices of Internet marketing among small-scale lodging establishments in Bushbuckridge – a small tourist town in northeast South Africa. In-depth interviews were collected from eight participating bed and breakfast (B&B) owners. Findings revealed that, while Internet awareness was quite high, only a few B&Bs utilised the Internet for marketing. Participants cited lack of clear industry guidelines on Internet marketing approaches as well as limited Internet experience, among others, as barriers to adoption. Implications and recommendations of the study are presented within the ambit of the existing literature.

Keywords: Adoption, Bed and Breakfast, Bushbuckridge, Governance, Internet Marketing, Regulation

1. INTRODUCTION

The role and impact of electronic marketing (e-Marketing) in terms of globalising small businesses has received considerable attention in existing literature (Lituchy & Rail, 2000; Sparkes & Thomas, 2001; Poon & Swatman, 1995; Su, 2002; Cloete, Courtney & Fintz 2002; Martins & Matlay, 2003; Galloway, Sanders & Deakins, 2011; Rodgers, Jen & Chou, 2002). Substantial research attention has also been directed at investigating the determinants of Internet adoption by small businesses in sectors such as tourism, manufacturing and agriculture (Weber & Kauffman, 2011; Simmons, Durkin, McGowan & Armstrong, 2007; Maswera, Dawson & Edwards 2008; Akkeren & Caveye, 1999; Jullien & Raymond 1994; Poon & Swatman, 1999; El-Gohary, 2012).

The adoption of the Internet by Bed and Breakfast (B&B) businesses as a marketing tool has received some attention in the international literature (Lituchy & Rail, 2000; Chen, Lin & Kuo, 2013; Hudson & Gilbert, 2006; Lee, Reynolds & Kennon, 2003; Jeong, 2004; Huang, 2008). For example, Lituchy and Rail (2000) investigated the impact of technology on globalising B&Bs and small inns in Canada and the USA, and Huang (2008) investigated B&Bs’ adoption of the Internet in Taiwan. However, there are limited studies investigating determinants of Internet adoption as a marketing tool by B&B operators in South Africa.

There are a number of accepted theoretical frameworks that have been used by researchers to investigate the adoption and diffusion of Information Technology (IT) in business. These include the Technology Acceptance Model (TAM) (Davis, 1989) and the Innovation Diffusion Theory (IDT) (Rogers, 1983). Alam, Khatibi, Ahmad & Ismail (2007); Wang, Wang, Lin and Tang (2003); El-Gohary (2012); Simmons et al. (2007); Bhattacharjee (2001); and Dimitriadis and Kyrezis (2011) are some of the researchers who have tested the adoption of the Internet using models of technology adoption. For example, Alam et al. (2007) used the IDT (Rogers, 1995) to investigate factors affecting e-commerce adoption in electronic manufacturing companies in Malaysia. Their study revealed that perceived characteristics of innovation – relative advantage, compatibility, complexity and observability – were useful predictors of technology adoption. El-Gohary (2012) used TAM (Davis, 1989) to investigate factors affecting e-Marketing adoption and implementation in Egyptian tourism firms. The findings demonstrated that internal factors such as compatibility and ease of use had a positive impact on the adoption of e-Marketing by firms.

However, e-Marketing is still a relatively new concept, particularly for organisations operating in developing countries that have limited resources, poor infrastructure, and strong competition and cannot afford to make unwise investments or bad decisions (El-Gohary, 2012). El-Gohary (2012) states that there is a need for a much clearer understanding of e-Marketing challenges as well as the opportunities it presents for such organisations, and how these technologies can be used to carry out marketing activities and processes in a more effective and efficient way compared to traditional marketing practices.

2. THEORETICAL PERSPECTIVE

Through the South African National Development Plan (NDP), tourism has been identified along with other key economic sectors such as manufacturing, mining, ICT and business services as important for stimulating the growth of small businesses and advancing the economy of post-apartheid South Africa.

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Africa. The tourism sector in South Africa continues to increase its contribution to the country’s gross domestic product (GDP) and job creation.

Encouraged in part by the successful hosting of the FIFA 2010 Soccer World Cup, South Africa is increasingly becoming a tourism destination of choice, and its performance continues to grow well compared to other countries. A 2010 competitiveness study by South African Tourism compared its positioning and performance relative to those of key competitors, such as Australia, the United States, Kenya, Thailand, and Brazil, and found that the country has the highest contribution of the tourism sector to GDP at 13 percent, compared to Australia’s 12 percent. In 2013, the United Nations World Tourism Organisation (UNWTO) ranked South Africa second in African destinations, with over 9.5 million international arrivals. The sector reached 10 million international visitors in 2013 (StatsSA, 2014), an impressive growth compared to the 50,000 visitors recorded in the late 1980s at the height of sanctions against the country (Rogerson & Visser, 2004). In 2013, tourism’s GDP contribution was R103.6 billion, an increase from R93.5 billion in 2012. In 2011, the tourism sector’s contribution to employment was estimated at 1.2 million jobs, an increase from 567,378 jobs recorded in 2010. The World Travel and Tourism Council (WTTC) indicates that travel and tourism in South Africa directly employed more people than many other key economic sectors such as the mining, communication services, automotive manufacturing and chemicals manufacturing sectors in 2013 (Tourism, SA 2013).

The most visited provinces in South Africa are Gauteng, the Western Cape and Mpumalanga (Tourism, SA 2013), providing an opportunity for B&Bs in the provinces to grow, and consequently for the sector to become highly competitive. It is therefore important to find new ways of helping South African organisations working in tourism, such as B&Bs, to conduct business in an effective and efficient way. Traditionally, as observed by Nuntusu, Tassiopoulos and Haydam (2004), B&Bs and tourism in South Africa directly employed more people than many other key economic sectors such as the mining, communication services, automotive manufacturing and chemicals manufacturing sectors in 2013 (Tourism, SA 2013).

Despite many potential benefits of using the Internet to market their businesses, B&Bs in Bushbuckridge appear not to be embracing this new technology to build and sustain their businesses. As such, while tourism activity in the area is increasing, many Bushbuckridge B&Bs fail to attract a critical number of guests and are struggling under increasing competition.

### 3. RESEARCH DESIGN AND METHODOLOGY

#### 3.1. Research design

The research adopts a case study design. The purpose of a case study is to understand something that is unique to groups or individuals by collecting rich data (Creswell, 1994 cited in Leedy, 1997:157). The case study enables researchers to learn about participants’ views regarding the research problem situated within their context and build an understanding of the phenomenon under investigation (De Vos, Strydom, Fouche & Delport, 2011; Yin, 2003). Since the research problem concerns B&Bs situated in Bushbuckridge, it was imperative to understand the specific issues that these businesses face.

A qualitative methodological approach was followed in the study which was exploratory in nature. Saunders, Lewis and Thornhill (2012) posit that an exploratory approach is valuable to gain insights about a particular topic of interest under study as it provides the researchers with flexibility and freedom needed to ask open ended questions and explore phenomena where literature is lacking and thus, help to uncover important variables. Furthermore, it often focuses on how individuals and groups view and understand the world and construct meaning out of their experiences.

#### 3.2. Population and sampling

The study was conducted in various B&Bs in the Mpumalanga province of South Africa. A purposive sampling method was employed to select participants who possess relevant experience, knowledge and attributes that serve the purpose of the study (Creswell, 2012:206). This sample...
consisted of B&B managers currently using the Internet and those not using the Internet. Such a technique enables conducting within-case and cross-case analyses. In total, eight (8) B&B managers (n=4 adopters, and n=4 non-adopters) were interviewed.

3.3. Data collection and analysis

Data was collected through interviews and observations. Voice recorders (for interviews) and video recorders (for observations) were used as tools to collect data. Researchers personally visited and interviewed each selected participant in the eight B&Bs in Bushbuckridge, Mpumalanga province. Collected data was analysed using discourse and content analyses, in which within-case and cross-case analyses were utilised. Four cases of B&Bs using the Internet to market their businesses were compared and analysed with four of those B&Bs not using the Internet to market their businesses. ATLAS.ti 7 qualitative data analysis software was used for data analysis.

4. FINDINGS AND DISCUSSION

In total, eight cases from the Bushbuckridge area were included in the study. These included four B&B businesses that use the Internet as a marketing tool, and four B&Bs that have not adopted the Internet as a marketing tool. The cases are grouped into two categories of cases: Category 1 represents those B&B operators that have adopted the Internet as a marketing tool, and Category 2 represents B&B operators that have not adopted the use of Internet for marketing the business.

4.1. Category 1: Adopters’ profiles

4.1.1. B&B 1

The B&B is registered and has been operating since 2011. The business has adopted the Internet as a marketing tool; it has a fully functioning website, uses emails and management refer to the Internet as their primary marketing and communication tool. The B&B has 25 rooms and offers breakfast, lunch and dinner on request. The staff organisational structure consists of the managing owner, receptionist, handyman, and cleaners. The business has applied for grading with the Tourism Grading Council of South Africa (TGCSA) and is waiting for a response.

4.1.2. B&B 2

The B&B is registered and established in 2009. It has 5 bedrooms and offers breakfast as part of the package, lunch and dinner on request. It has adopted the Internet as a marketing tool for the business. The staff organisational structure consists of the managing owner, assisted by her partner, and has a part-time receptionist who is responsible for bookings and overall management in the absence of the owner.

4.1.3. B&B 3

The B&B is registered and has been successfully graded as a 2 stars B&B. There are 34 bedrooms. Fourteen of these are used by B&B clients, and 20 are used permanently for renting. It is the biggest B&B in Bushbuckridge in terms of number of bedrooms offered. It offers breakfast, and lunch and dinner on request, and has 40 staff members including housekeeping, office admin and catering. The establishment is accessible online with a fully functioning website; it has fully adopted the Internet as a marketing tool and identify that the majority of the B&B’s customers originate from the Internet.

4.1.4. B&B 4

The B&B is registered, currently belongs to the Tourism Enterprise Partnership (TEP) and the business is registered with the Mpumalanga Tourism Park’s Board. The Internet has been adopted with a fully functional website and the use of emails to communicate with customers. It is owned by one person with the help of a manager, booking assistant, cleaners and a handyman. It has 14 bedrooms; 8 permanently rented and 6 used as B&B facilities.

4.2. Category 2: Non-adopters’ profiles

4.2.1. B&B 5

The B&B is registered and has been operating since 2010. It has 30 bedrooms and does not offer breakfast or lunch. The business has never used the Internet and relies on walk-ins and referrals from friends and the community. The establishment is managed by an elderly owner with the help of his family members. It has 30 bedrooms and a conference space that can accommodate about 100 people.

4.2.2. B&B 6

This B&B is not registered, although it is in possession of a letter of consent from the municipality to operate a business at home. It has been operating since 2008. It is owned by a family, with the children assisting in the running of the business. It has 11 bedrooms and offers breakfast, and lunch and supper on request. It has never used the Internet and relies on walk-ins and referrals from community members. It belongs to the Mpumalanga TEP.

4.2.3. B&B 7

The B&B is not registered; however it is registered with the municipality to operate a business at home. It has been operating since 2010 and it is managed by the owner, 2 handymen, a cleaner and a receptionist. The business has 11 bedrooms and does not offer breakfast. It has never used the Internet and relies on walk-ins and referrals from community members.

4.2.4. B&B 8

The B&B started operating in 2012, is not registered but it is in a possession of a municipality consent letter to run a business from home. It has 4 bedrooms and is mostly used by touring families due to its size being small. The B&B has not fully adopted the Internet as a marketing and
communication tool, and relies on walk-ins and referrals. It is managed by partners who reside on the property.

### 4.3. Differences and similarities of cases

The cases were compared for similarities and differences on a number of themes, including customer type, telecommunication tools, marketing strategies, profit, survival, business growth, and operational challenges. The comparison of cases is illustrated in Table 1.

#### Table 1. Differences and similarities of cases

<table>
<thead>
<tr>
<th>Customer type</th>
<th>Internet marketing adopters</th>
<th>Internet marketing non-adopters</th>
</tr>
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<tbody>
<tr>
<td>Diverse customers from walk-ins, referrals, Internet customers, touring families</td>
<td>Relies highly on walk-ins and referrals. Visitors usually referred by the community</td>
<td></td>
</tr>
<tr>
<td>Personal cell phones used for business</td>
<td></td>
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</tbody>
</table>

| Telecommunication tools | Websites promotional messages, emails, cell phone messages, flyers, notice boards, word of mouth, road signs directions to the B&B and registering on online business directories |
| Word of mouth; Referrals from community; Flyers; Notice boards; Radio station |

| Marketing strategies | Profitability, growth and competitive advantage are sluggish, profits dropped drastically, struggling to improve profits and surviving; constantly reducing price to attract customers. |
| Some prices dropped from R350 to R150 a bedroom per night in the above attempt |

| Profit, survival and business growth | The use of Internet expands the business clientele and the business’s growth |
| Lack of telecommunication tools such as Internet, telephone, websites, absence of mentors, lack of B&B forums and organisations in the area. |

| Operational challenges | Lack of knowledge of available marketing strategies |
| Lack of government support in providing entrepreneurship skills. |

| Business views on Internet marketing | They view Internet marketing as a way of doing business in today’s world. The businesses mentioned the Internet’s ability to expand the business’s clientele by reaching any part of the world, as their main reason to adopt. |
| The businesses recognized the impact the Internet has on reaching customers from all over the world, however they mentioned lack of knowledge on how to set up the Internet as their reason for not adopting, some is because of lack of resources to finance the Internet connection as their reason for not adopting. |

### 4.4. Use of the Internet by B&Bs

According to the Technology Acceptance Model (TAM), perceived ease of use (PEU) and perceived usefulness (PU) are important factors that influence the adoption of technology. Davis (1989) defines PEU as “the degree to which a person believes that using a particular system would be free from effort”. PU on the other hand refers to “the degree to which a person believes that using a particular system would enhance his or her job performance”.

In the context of the application of the Internet in B&B marketing, there are numerous factors which, at least in theory, explain why businesses would adopt technological innovations. The ease of use, or PEU (Davis, 1989) of the Internet as a marketing tool includes the affordability of setting up a website. In South Africa, the government assists businesses to establish a website with free hosting for entrepreneurs. Others can choose to hire website developers who usually assist in maintaining the website. Marketing through the Internet is not complex: once you set up the website anyone can access it from where they are; the business and the customer both save the cost of disseminating and accessing information. Online directories can also be used to market a business. It reduces cost in additional marketing employees: You do not need to hire staff members specifically to operate the Internet; it is a tool that operates itself and the business’s responsibility is to monitor it. The perceived usefulness, or PU (Davis, 1989) of B&B Internet marketing derives from the fact that it is cost effective, makes it possible to reach more customers, saves time and is user-friendly.

For the purposes of this study, it was important to ascertain the extent to which theory is applicable in real-life situations. Firstly, the researcher sought to establish how the respondents viewed e-Marketing in general and Internet marketing (IM) specifically, in their respective businesses.

### 4.5. How respondents view e-Marketing

#### 4.5.1. B&B 1

The owner of this B&B considered Internet marketing as a “very powerful” tool that enables a business to reach people from all walks of life, both locally and abroad:

"...The Internet is part of our communication... we get people through the Internet using emails. We realised that the mouth-to-mouth doesn’t work sometime especially for people from far...I mean how do you communicate with someone from Cape Town..."
who wants to visit Bushbuckridge? Who will direct you from there?... The connection is also not that difficult, with few resources... a laptop and your 3g, it is that simple..."

This participant understood that the nature of tourism as an industry requires diverse marketing strategies, and strategies which will support the needs of tourists from any part of the country or the world. PEU (perceived ease of use) is captured by the owner's statement of “it is that simple, a laptop and your 3g"; this also gives an indication that the less complicated a technology the greater the chances of adoption.

4.5.2. B&B 2

This B&B owner admitted that when the business started, Internet was considered to be significant and of value to bigger hospitality industry businesses like hotels; and B&B owners were not motivated to adopt the Internet because of the small size of the business and sufficient numbers of walk-in customers and referrals. Their perception changed when their B&B was not receiving customers or calls to enquire about bookings for a period of about a month. They had then to reconsider their initial perception of the need to use the Internet. This B&B now regards the Internet as an important medium to breach the gap between the business and customers, and, even although the B&B is small with only 5 rooms, they emphasize that a room without an occupant represents a constraint to the business and to profits:

"... It (the Internet) was seen as a thing for big business, like your hotels, not for us with small rooms... again maybe it was fear that it (the Internet) is too complicated to use, like I will have to train my receptionist... you know things like that...""

This indicates that as an owner of a B&B, one cannot always depend on the local community for support; but people from distant areas are perceived as "key" customers with a greater potential for using the business. Therefore the Internet is crucial as a tool for targeting those potential customers outside of the local area.

4.5.3. B&B 3

The B&B owners stated that, moments after launching their website, they recognised the potential for this transforming their business to being profitable and marketable. Adopting technology in the business was noted by these respondents as a “life changing” moment for the growth of the business:

"... We are growing stronger and stronger daily, if I can say we go by days without customers I will be lying... the beauty of this is that we no longer spend much resources on advertising; the website has done enough to sustain us in the market, ours is to update it; this is not for us only, also our customers benefit because they can go online and communicate to us without being present in the building..."

They reported that marketing using the Internet has transformed their business and set them apart from their peers and positioned them as a threat to hotels in the nearby area. They ascribe their business success to adoption of Internet marketing and services.

4.5.4. B&B 4

The owner refers to the Internet as the modern way of accomplishing things. The owner reported that he adopted the Internet after discovering that multinational hotels are able to operate globally through the Internet:

"...I also had an attitude towards this new technology thing, when someone speaks of Internet you think of a huge technological tool that requires so much, until you meet the right people to help you connect, you realise that it’s actually easy to operate, it’s very useful because the benefit is that I don’t have to hire many people to go around and distribute flyers, advertise door to door; just a huge notice board with the website and details saves time. The most important thing in business is time... you don’t have time to go around and knock on people’s door, that I love Internet marketing. Although I’m not saying I will not advertise in other forms like flyers or newspapers; I will but not as frequent like before..."

The participant admitted that, like the owner of B&B 2, the pressure from a decline in customers forced them to look for better ways of marketing the business. Because they have a long-term vision of growing the B&B, they view the Internet as a gateway to their business’s survival and growth. They view the Internet’s ease of use and usefulness as one of their reasons to adopt it.

4.6. Factors that prevent non-adopters use of Internet marketing

Despite the non-adopter B&Bs not employing Internet marketing, some of them indicated they had or still have an interest in utilising the Internet in their business. However they faced some barriers, which resulted in them not adopting Internet marketing in the long-run. These barriers are captured in the excerpts below:

“... But we have been looking for someone who can assist with Internet connectivity but we have not received any reliable person" (Quote 5:2).

“Many people came to my business and promised to help me set up the Internet, but they always disappear, I do not have people to support me to connect to the Internet, I know many people rely on the Internet to get people but I have lost hope with so many promises that I have received but no action" (Quote 6:3).

Respondents B&B 5 and 6 expressed that they could not find someone reliable who could assist them with the installation of the Internet in their respective businesses.

“They want a share, they always want to cut off when you say R200, they will charge R500, and they want to also have a share. They come and promise so many things and they disappear and never come back, they promised to help me with Internet connectivity (but) nothing happened” (Quote 6:4).

Respondent B&B 6 expressed a sense of a barrier to adopting a new approach to business management, such as the use of Internet marketing, based on a perception of the lack of information and knowledge of the technology, and an absence of the means to overcome that lack of knowledge:

“local B&B owners operate in isolation, they are greedy and will not share information, unlike the taxi industry where there is associations and they have
meetings and work together but us we do not meet. Some associations have a budget like when one owner is struggling or is sick they assist one, they refer customers when others do not have space, but here they will never do that, they think they will make you rich so they rather keep the customers to themselves” (Quote 6:9).

“we need to be like other industries like the taxis and remember to lift one another, to find common ground and as black people we need to start thinking like the whites and work together and stop fighting one another. But currently people are not willing to work together” (Quote 6:12).

Respondent B&amp; 6 indicated there was a lack of teamwork among local black B&amp;B owners. Which could suggest some local black B&amp;B owners that have adopted Internet marketing in their businesses do not want to share how they got Internet installed in their businesses with other entrepreneurs.

5. CONCLUSION

The purpose of this paper was to assess the factors that prevent B&amp;B owners from using the Internet to market their establishments, using insights from B&amp;B operators in Bushbuckridge. A review of the literature indicated that technology has significantly transformed the marketing of accommodation businesses. Businesses that use the Internet effectively are likely to become more innovative and responsive to environmental demands and are able to attain competitive advantage. The research findings indicated the negative impact experienced by B&amp;Bs that have not adopted the Internet to advertise their businesses. For instance, some B&amp;Bs that had not adopted Internet marketing experienced long-term vacancies due to a lack of customers, with impacts on profitability and personnel, whereas that was not the case with other B&amp;Bs in the same area that have adopted Internet marketing. The owners of poorly performing establishments attributed this to lack of awareness of the existence of the business and an over-reliance on local customers and walk-ins. It was observed that those B&amp;Bs that have adopted the Internet were able to reach more customers saving time and cost. Where Internet technology was not used, owners stated that this is not because of favour of traditional marketing strategies; but due to lack of adequate information, knowledge, and resources to introduce the Internet in their respective businesses. Understood in the conceptual framework of the factors that determine technology adoption, all B&amp;B owners strongly perceive the usefulness of the technology (PU), but there exist barriers to the perceived ease of use (PEU) of the technology (Davis, 1989). These dynamics are unevenly distributed across the B&amp;B sector in Bushbuckridge, such that some B&amp;B establishments have successfully adopted an Internet-based forms of marketing, with a significant positive impact on their business’s profitability, while others have not, with an equivalent negative impact on the business.

To further explore this topic the following areas are suggested for further research: (1) the relationship between B&amp;B operators and marketing firms to assist in developing marketing packages that will enable businesses to be easily promoted via the Internet, and (2) the role of the government of South Africa, specifically the Department of Tourism, in supporting local B&amp;Bs with access to funding in infrastructure development, information and knowledge training and development.

REFERENCES


THE INFLUENCE OF GENDER AND OPERATIONAL LOCALITY ON ENTREPRENEURIAL KNOWLEDGE AND BUSINESS PERFORMANCE

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Abstract

This study set to examine the influence of gender and entrepreneur's operational locality on entrepreneurial knowledge and business performance. A quantitative approach using a cross sectional survey design is utilised for the study. The participants are made up of 299 micro-entrepreneurs with age ranges from 22 to 39 years old (x = 29.93 age). The findings indicate that male micro-entrepreneurs score significantly higher on areas of planning and risk assessment while micro-entrepreneurs from Delta State of Nigeria have higher significant mean scores in six (general business ideas, business attitude, knowledge of capital requirement sources, knowledge of environmental forces, knowledge of risk assessment and entrepreneurial psychology) of the seven parameters of entrepreneurial knowledge and business performance. The findings show valuable empirical contribution with policy implications for gender and location factors in micro-entrepreneurial growth in developing economy.

Keywords: Entrepreneurial Behaviours, Knowledge Management, Business Performance, Gender, Nigeria

1. INTRODUCTION

Women entrepreneurial role in socio-economic wellbeing, has led to various stakeholders' recognition and support for positive attitudes towards women entrepreneurial development (Women in Africa Doing Business, 2008). Nevertheless, gender inequality is still a big challenge, as literature has shown that the proportion of women participating in entrepreneurship is lower than that of men (Hindle et al., 2009). The existence of a gap between men and women in entrepreneurship has made the study an attractive upsurge among academics (Hughes et al., 2012). One other factor affecting how business thrives is the location, and this is due to the availability of resources and access to customers (Isaksen, 2006). With increase in competitiveness among entrepreneurs, are also the issues of operational location and technological developments, which are expected to place more demands on entrepreneurial agility and commitment to entrepreneurial activities (Ferreira et al., 2013; Huang and Wang, 2011; Lisbon et al., 2011).

Researchers suggest that substantial entrepreneurial knowledge may probably help in the smooth running of business in terms of its continuous operation, growth and success (Lotz and Marais, 2007; Mutanda et al., 2014) and the possible lowering of gender gap. Entrepreneurial experience is also expected to be a vital inking in tapping into knowledge gained from prior ventures in formulating and executing plans (Toft-Kehler et al., 2014), which may then be used to liberate an entrepreneur from idea stock (Eisenhardt and Martin, 2000). It is crucial therefore to understand the impact of operational locality and gender on entrepreneurial knowledge management and business performance.

2. LITERATURE REVIEW

In advancing this study, knowledge spillover theory of entrepreneurship, which starts from the assumption that entrepreneurial decisions are driven by context, that is, knowledge intensity (Acs et al., 2009; Braunerhjelm et al., 2010) will be relied on. The theory posits that context is rich in knowledge and also full of greater degree of uncertainty and entrepreneurial opportunities (Acs and Armington, 2006; Audretsch et al., 2006). The knowledge spillover theory of entrepreneurship holds that entrepreneurial activity is greater when there is greater investment in knowledge while ability to access knowledge spillovers sources is greater for entrepreneurial opportunity (Acs and Armington, 2004). In sum, knowledge spillover theory shows how entrepreneurship can improve growth through overcoming factors that hinder knowledge spillover. It also emphasises the role of individuals in knowledge gatherings activities, which may serve as the breeding ground for entrepreneurial growth.

Research shows that socio-environmental elements exert a different influence on male and female entrepreneurial perceptions (Eddleston and Powell, 2008; Gupta et al., 2009; Kickul et al., 2008; Mueller and Dato-On, 2008); with such influence
weighing more on women than men (Verheul et al., 2005; Watson and Newby, 2005). While Watson (2012) study shows diverse relationships between gender and firm performance, just as studies by Langowitz and Minniti (2007) and Minniti and Nardone (2007) indicate that women perceive fewer opportunities, higher fear of failure, and higher financial barriers than their male counterparts and also that female-led businesses under-performed compare to male-led businesses (Brush et al., 2006; Fairlie and Robb, 2009). Other factors identify include, females’ preference to grow businesses slowly (Jennings and Cash, 2006); greater preferences to avoid risk (Swinney et al., 2006); and not willing to risk personal assets and conservative in selecting growth strategies (Coleman, 2007). Evidence from Ghana suggests that female-owned enterprises are less likely to employ debt financing due to differential access to loan facilities and operating in low-technology industries (Abor and Biekpe, 2006). Moscocco et al. (1991) also contend that the differences between men and women socialization and other experiences may have contributed to differential outcomes in business performance; making female-owned enterprises perform worse than male-owned enterprises.

Research reviews indicate that significant number of small and micro-entrepreneurs blindly run their businesses (Mutanda et al., 2014); lack business and planning skills (vanStel and Storey, 2004); not knowledgeable in financial business matters (Kojo, 2010); have little or limited financial planning skills and do not value the information from financial statements (Alattar et al., 2009). Study by Akande (2011) shows that small businesses fail due to lack of basic business managerial experience as well as poor business record keeping. It means therefore that micro-entrepreneurs, need to possess skills that will enable them to effectively function in the turbulent business environment because most entrepreneurial skills come by learning and practicing (Ezeani et al., 2012).

The basis for the inconsistencies observed in gender unequal entrepreneurship outcomes can be established by focussing on the drive for knowledge and successful performance, as the interaction between the social context and the gender may determine the quest for knowledge and excellent performance. According to social psychology theory of gender (Ridgeway 2011; Ridgeway and Correll 2004), gender status beliefs, which are widely, shared cultural beliefs, generally confer men greater ability and also affect the way potential entrepreneurs are evaluated. The patterns of gender-biased feedback may discourage women from persisting toward an entrepreneurial career and disadvantage them in their quest for social and financial support from potential stakeholders.

Another influencing factor is the geographical location, which Bortamuly et al. (2014) claim is crucial in entrepreneurship development. Possibly because higher competition, higher population density, higher demand for goods and services are contributors to higher entrepreneurship opportunities (Sternberg, 2009), as higher value is assigned to entrepreneurial opportunities in urban locations than available in rural environment (Shane, 2004). According to researches superiority of urban areas entrepreneur over rural area entrepreneur is facilitated by higher expectation of returns, availability of inputs, productive resources, and better infrastructure facilities (Glaeser et al., 2010; Faggio and Silva, 2014). Low population size and low population density result in limited local demand, which deprive rural entrepreneurs from enjoying economies of scale (Bortamuly et al., 2014). Studies also show flourishing entrepreneurship studies, involving urban areas due to localization and urbanization effects (Glaeser et al., 2010) while entrepreneurial studies in the context of rural area are still under researched. The current study sets to investigate how entrepreneurial knowledge and business performance are influenced by operational locality. Delta and Rivers States in this study can be classified as urban areas with the location of most of the oil companies’ offices in Nigeria, while Bayelsa is rural being one of the last created States and with fewer facilities. In addition, Delta State is classified as educational developed while Rivers and Bayelsa States are less educationally developed with Bayelsa State being the lowest in the group (Moti, 2008). The burning questions are: Does location of business operation have any influence of entrepreneurial knowledge and business performance? Are there any gender differences in entrepreneurial knowledge and business performance? To what extents is there interaction between locality and gender on entrepreneurial knowledge and business performance? The following hypotheses will be examined:

1. Male micro-entrepreneurs will significantly score higher on each of the entrepreneurial knowledge factors and business performance than their female counterparts.
2. Micro-entrepreneurs from operational locality of Delta State will score higher on each of the entrepreneurial knowledge factors and business performance than their counterparts from operational localities of Rivers and Bayelsa States.
3. There will be significant interaction between gender and operational locality with male micro-entrepreneurs from Delta State having significant higher scoring than any other grouping on entrepreneurial knowledge and business performance.

3. METHODOLOGY

3.1. Research design

A quantitative approach using cross sectional survey design is utilised for the study due to its flexibility and applicability to quantitative data. This method is considered advantageous, as it allows the measurement of micro-enterprise owners’ entrepreneurial knowledge and business performance through the use of structured item statements, thereby allowing differential comparisons using two ways analysis of variance. Operational locality is categorised into three (3) while gender into two (2); these are the independent variables, while the dependent variables are the eight factors that make-up entrepreneurial knowledge and business performance.

3.2. Participants

The micro-entrepreneurs from three States in Nigeria; Bayelsa, Rivers and Delta, which are contiguously located to one another in the southern
part of Nigeria that is a wetland area with many rivers and waterways. They are mainly minority ethnic groups of Ijaw, Urhobo, Itsekiri, Kalabari, Ogoni, and many others (Ojakorotu and Uzodike, 2007). The participants are engaging in entrepreneurial activities of beauty salons; fashion design; Internet and telecommunication services; leather and footwear; and furniture making for a minimum of 3 years as owners. They are all registered as micro-entrepreneur with the Registrar of Companies, Ministry of Trade and Commerce.

Two hundred and ninety-nine micro-entrepreneurs within the age range 22 to 39 years old with the mean age of 29.93 are the participants. Male micro-entrepreneurs account for 62.2% (192) of the participants; the inability of the female participants to complete the questionnaire properly is responsible for the gap in the usable responses compared with the male participants. One hundred micro-entrepreneurs each from the localities participate in the study. The participants are part of the group of micro-entrepreneurs that are participating in improving programmes of entrepreneurs and do not have prior training experience in entrepreneurship programme or management.

3.3. Instrument

A structured questionnaire design by the researchers is used to gather the data required for this research. The use of questionnaire is considered appropriate because of the assumption that it will assist in translating the research objectives into specific hypothesis. The items and the sources are adapted from literature searches. The questionnaire comprise a 3-item business performance; and a 24-item entrepreneurial knowledge with 8 dimensions: general business ideas (GBI); business attitude (BA); knowledge of project management (KPM); knowledge of capital requirement sources (KCRS); knowledge of environmental forces (KEF); knowledge of risk assessment (KRA); knowledge feedback and business appraisal (KFBA); and entrepreneurial psychology (EP). The question items are tested for reliability by conducting a prior pilot study research on 30 micro-entrepreneurs. The pilot testing reveal the possible problem on performance measurement due to the different business challenges including the target markets which are corrected to enable the participants to respond on the same parameter irrespective of the business sector. For this study, the reliability coefficient alpha of the variables understudy ranged from 0.74 to 0.92.

3.4. Descriptive analysis

Descriptive statistics such as the rate of response, the frequency distribution, the mean and the standard deviation were used at the first stage. The main statistical analysis is two-ways analysis of variance, which is to test for the main and interaction effects. This approach enables the researchers to examine if there is any difference and the extent of interaction between the independent and dependent variables. Three by two ANOVA is done to show the main and interaction effects between the entrepreneurs’ operational localities (3) and gender (2) on business performance and entrepreneurial knowledge.

3.5. Procedure

Prior to the training programme that is designed to promote entrepreneurship in the geographical zone, a structured questionnaire, which is self-administered, is given to the micro-entrepreneurs. Of the 360 questionnaires, which are distributed, only 299 questionnaires are found usable indicating a response rate of 86.98% after screening for missing data and validation process. They are given half an hour to complete the questionnaire. Each questionnaire contains a covering letter inviting respondents to participate voluntarily in the study and the assurance that their individual responses will remain anonymous and confidential. The covering letter also states that completing and returning the questionnaires implies an agreement that their responses can be used for research purposes only.

4. RESULTS

4.1. Descriptive and Result of 3x2 ANOVA

Table 1 and 2 show the means score and standard errors on entrepreneurial knowledge and business performance among micro-entrepreneurs genders and operational localities. The average of the respondents is 29.93 years old with a standard deviation of 3.26. All the micro-entrepreneurs are graduates of higher institutions with most entering micro-entrepreneurial activities due to lack of formal employment.

Table 1. Descriptive summary table of operational localities on entrepreneur knowledge and business performance

<table>
<thead>
<tr>
<th>Bayelsa</th>
<th>Delta</th>
<th>Rivers</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>x</td>
<td>SE</td>
<td>N</td>
</tr>
<tr>
<td>GBI</td>
<td>5.14</td>
<td>.32</td>
</tr>
<tr>
<td>BA</td>
<td>1.41</td>
<td>.28</td>
</tr>
<tr>
<td>KPM</td>
<td>.63</td>
<td>.28</td>
</tr>
<tr>
<td>KCRS</td>
<td>4.36</td>
<td>.39</td>
</tr>
<tr>
<td>KEF</td>
<td>4.86</td>
<td>.44</td>
</tr>
<tr>
<td>KRA</td>
<td>3.85</td>
<td>.32</td>
</tr>
<tr>
<td>KFBA</td>
<td>2.09</td>
<td>.35</td>
</tr>
<tr>
<td>EP</td>
<td>3.24</td>
<td>.31</td>
</tr>
<tr>
<td>Perf</td>
<td>25.58</td>
<td>.37</td>
</tr>
</tbody>
</table>

Note: GBI = Generation of business idea; BA = Business attitude; KPM = Knowledge of project management; KCRS = Knowledge of capital requirement sources; KEF = Knowledge of environmental forces; KRA = Knowledge of risk assessment; KFBA = Knowledge feedback and business appraisal; EP = Entrepreneurial psychology; Perf. = Business performance.

Table 2. Descriptive summary table of gender on entrepreneur knowledge and business performance

<table>
<thead>
<tr>
<th></th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>x</td>
<td>SE</td>
</tr>
<tr>
<td>GBI</td>
<td>6.18</td>
<td>.20</td>
</tr>
<tr>
<td>BA</td>
<td>1.88</td>
<td>.18</td>
</tr>
<tr>
<td>KPM</td>
<td>2.29</td>
<td>.18</td>
</tr>
<tr>
<td>KCRS</td>
<td>3.49</td>
<td>.25</td>
</tr>
<tr>
<td>KEF</td>
<td>4.70</td>
<td>.27</td>
</tr>
<tr>
<td>KRA</td>
<td>3.69</td>
<td>.21</td>
</tr>
<tr>
<td>KFBA</td>
<td>2.24</td>
<td>.22</td>
</tr>
<tr>
<td>EP</td>
<td>4.09</td>
<td>.20</td>
</tr>
<tr>
<td>Perf</td>
<td>32.54</td>
<td>.99</td>
</tr>
</tbody>
</table>
The result of post hoc analysis using LSD, shows significant $x$ difference of $-1.32$ at $p < .01$ between the means score of Delta State micro-entrepreneurs ($x = 6.46$) and Bayelsa State micro-entrepreneurs ($x = 5.14$) on general business ideas.

The mean score of micro-entrepreneurs Delta State ($x = 2.54$) is significantly higher than the mean score of micro-entrepreneurs from Bayelsa State ($x = 1.41$) and Rivers State ($x = 1.30$) on business attitude.

On the knowledge of project management, Rivers State micro-entrepreneurs has significant higher mean score ($x = 3.64$) than Delta State micro-entrepreneurs ($x = 1.80$) and Bayelsa State micro-entrepreneurs ($x = 0.65$); there is also significant mean difference between Delta State and Bayelsa State micro-entrepreneurs.

Delta State and Rivers State micro-entrepreneurs have significant higher mean score of ($x = 6.86$) and ($x = 6.02$) respectively on knowledge of capital requirement sources than Bayelsa State micro-entrepreneurs ($x = 4.56$).

Post hoc analysis further reveals that Delta State and Bayelsa State micro-entrepreneurs have significant higher mean score of ($x = 5.52$) and ($x = 4.86$) respectively on knowledge of environmental forces than Rivers State micro-entrepreneurs low mean score of ($x = 2.90$).

On the knowledge of risk assessment, there is significant higher mean score difference between Delta State micro-entrepreneurs ($x = 4.87$) and Bayelsa State micro-entrepreneurs ($x = 3.85$).

Bayelsa State micro-entrepreneurs mean score ($x = 3.28$) is significantly low on entrepreneurial psychology than Rivers State and Delta State micro-entrepreneurs mean score of ($x = 4.21$) and ($x = 4.36$).

On business performance across the three operational localities, the micro-entrepreneurs from Delta State have significant higher mean score of ($x = 33.59$) than micro-entrepreneurs from Rivers State mean score of ($x = 29.34$) and Bayelsa State mean score of ($x = 25.68$).

In summary, Delta State micro-entrepreneurs have higher significant statistical mean score in six of the seven dimensions of entrepreneurial knowledge (general business ideas, business attitude, knowledge of capital requirement sources, knowledge of environmental forces, knowledge of risk assessment and entrepreneurial psychology), in addition to significant higher mean score on business performance. While Rivers State micro-entrepreneurs have higher significant statistical mean score only on knowledge of project management.

The findings on gender factor reveal significant main effect on general business ideas $F (1, 293) = 4.71, p < 0.05$ with male micro-entrepreneurs report ($x = 6.18$) higher mean score on general business ideas than the female micro-entrepreneurs ($x = 5.43$).

On knowledge of capital requirement sources, male micro-entrepreneurs means score ($x = 6.49$) is significantly higher $F (1, 286) = 10.55, p < 0.00$ than the female micro-entrepreneurs ($x = 5.14$).

The result on knowledge of risk assessment shows significant difference $F (1, 290) = 5.61, p < 0.05$ with micro-entrepreneurs male report ($x = 4.70$) higher mean score than their female counterparts ($x = 3.87$); while knowledge feedback and business appraisal result indicates significant
difference \[ F(1, 292) = 5.96, p < 0.05 \] with male micro-entrepreneurs reporting mean scores higher than female micro-entrepreneurs \[ (x = 2.24) \].

Findings on business attitude, knowledge of project management, knowledge of environmental forces, and entrepreneurial psychology reveal no gender statistical significant gender difference. A further breakdown of gender differences across the three operational localities of Bayelsa, Delta and Rivers reveals that there are significant differences on business performance mean score \[ F(1, 293) = 10.40, p < 0.00 \] with male micro-entrepreneurs having a mean score of \[ (x = 32.24) \] while female micro-entrepreneurs have a mean score of \[ (x = 26.83) \]. However, none of the possible interaction factors are significant in this study.

5. DISCUSSION AND CONCLUSION

The study's findings show partial significant. First, the findings of hypothesis, which investigate gender difference on entrepreneurial knowledge factors and business performance reveal that male micro-entrepreneurs are significantly different on general business ideas, knowledge of capital requirement sources, knowledge of risk assessment, and knowledge feedback and business appraisal than their female counterparts. The lower scoring of female micro-entrepreneurs in areas of calculation and planning tend to reflect the issue of limited planning skills; inability to seek information, lack of basic business management experience, and poor business record keeping as advance by scholars (such as Akande, 2011; Alattar et al., 2009; Mazzarol, and Rivers reveal that there are significant differences on business performance mean score \[ F(1, 293) = 10.40, p < 0.00 \] with male micro-entrepreneurs having a mean score of \[ (x = 32.24) \] while female micro-entrepreneurs have a mean score of \[ (x = 26.83) \]. However, none of the possible interaction factors are significant in this study.

5.1. Conclusion

The study highlight the widely acknowledged importance of entrepreneurial knowledge behaviour. This study identifies the areas where differences are found to be significant between male and female micro-entrepreneurs; these differences specifically show that male micro-entrepreneurs are more than the female counterpart in the areas of general business ideas, Knowledge of capital requirement sources, knowledge risk assessment, Knowledge feedback and business appraisal and business performance. In addition, the study also show differences in operational localities with urban locality micro-entrepreneurs performing better in most of entrepreneurial knowledge dimensions and business performance. Further study is needed not only to ask the question of why but seek to provide implementable solutions.

The findings contribute to empirical studies on entrepreneurial knowledge, business performance, gender and location (urban and rural areas) as it deepens our understanding of individual entrepreneurial knowledge behaviour not only for academic purpose, but also for management interest as well. Thus, stakeholders need to promote equitable access for women and men on resources, knowledge, information and services so as to facilitate the implementation of corrective measures to address noticeable inequalities in access to and control over resources; including proactive measures to improve probable barriers militating entrepreneurial inequity. Also, foster strategies that can promote competitive entrepreneurial growth across operational localities (urban and rural areas) and gender (with women as the focal point, as they are also a valuable part of entrepreneurial diversity).

There is a need for more entrepreneurship education such as skills training, business counselling, and creation of support networks which must be accessible to everyone including the stakeholders in order to improve their professional and technical competence, especially in the areas of programme conception, design, implementation and evaluation for entrepreneurs.

5.2. Limitation

First, the study is limited in the analysis to those who agreed to participate in the training workshop and study, which is also responsible for disparity in figures of female participants. Second, the dataset is
limited by the set of control variables such as the sector composition in micro-enterprise. Future studies can build on our definition of entrepreneurial knowledge so as to directly assess incremental validities of entrepreneurial knowledge variables. A more thorough examination of the gender gap will be an interesting topic for further research such as composition of economic activities, access to loans and taxation as this may provide valuable policy guidance. Further study using comparisons of different methodological approaches in the context of entrepreneurial knowledge measurement and business performance is also desirable.

REFERENCES


PUBLIC SECTOR ACCOUNTING IN THE EDUCATION SYLLABI OF LEADING CHARTERED ACCOUNTANT PROFESSIONAL BODIES: A COMPARATIVE STUDY

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Abstract

Public sector accounting has emerged as an area of concern within the sphere of professional accounting education. The International Federation of Accountants (IFAC) allows its member bodies to apply discretion in the application of public sector accounting education requirements. This study explored the nature and extent to which public sector accounting features in the education syllabi of the leading chartered accountant professional bodies that form part of the IFAC contingent. By following an explorative approach, the study identified international trends within the ambit of public sector accounting education and provides guidance for other professional bodies in assessing the nature and extent of their public sector accounting education requirements.

Keywords: Public Sector, Public Accountability, Accounting, Professional Education, IFAC

1. INTRODUCTION

Public sector accounting has steadily gained in importance following the global financial crisis. Combined with a range of public sector reforms, this impact has placed public administrators under increased pressure to provide service delivery with increased levels of efficiency and transparency (Sciulli & Sims, 2008: 247; Van Wyk, 2011: 1339). Global economic shifts in competitive power have also prompted emerging superpowers to reflect upon their institutions of public account (WEF, 2013). Across developing nations, public accountability remains a serious area of challenge, and as these nations rise in international prominence so too do they realise the importance of enhanced public accountability (NPC, 2011: 23).

In South Africa, the accounting profession has been called on to embrace the responsibility of more directly serving the public interest (SARB, 2013: 6). Chartered accountant professional bodies across the world have realised the need to increase their engagement with the broader socio-economic goals of their respective nations (Sciulli & Sims, 2008; SAICA, 2013).

The International Federation of Accountants (IFAC) allows its member bodies to apply discretion in the application of its public sector accounting education requirements (IAESB, 2014: 10). This study explores the nature and extent of public sector accounting content in the prescribed education syllabi of leading chartered accountant professional bodies (leading professional bodies) that form part of the IFAC contingent. In the section to follow the objectives, scope and limitations of the study are discussed. The section thereafter provides a comprehensive discussion on the theoretical foundations on which this study has been prepared. The methodology applied, along with the empirical findings of the study, is then discussed. The study ends with recommendations, followed by the presentation of conclusions.

2. OBJECTIVES, SCOPE AND LIMITATIONS

This study had two objectives. The first was to provide a literature overview of the trends that are shaping the development of public sector accounting education both in South Africa and abroad. This was achieved through a literature review of the challenges faced by various professional bodies around public sector accounting education together with any educational initiatives they have undertaken to address these challenges. Based on these identified trends, a checklist was developed containing a list of features that leading professional bodies could be expected to have included in their education syllabi. Accordingly, the second objective of the study was to analyse the nature and extent of any public sector accounting features that form part of the prescribed education syllabi of leading professional bodies.

IFAC consists of 175 member bodies and associates spread across 130 countries and jurisdictions (IFAC, 2015). The South African Institute of Chartered Accountants (SAICA) is an
IFAC member body which holds hold mutual recognition (or reciprocity) agreements with eight other IFAC member professional bodies worldwide. SAICA is a member body of the Chartered Accountants Worldwide (CAW) contingent, which consists of the world’s leading professional bodies (CAW, 2015), and is also a member body of the Global Accounting Alliance (GAA), which is made up of the world’s leading accounting institutes (GAA, 2015). The SAICA reciprocity partners are members of CAW, GAA or both. In shaping the scope of this study, cognisance is given to these reciprocity agreements in the context of SAICA’s aim to maintain the relevance and recognisability of its members in the major economies of the world (SAICA, 2014a). Accordingly, the world’s leading professional bodies in the context of this study are considered to be those with which SAICA holds appropriately established mutual recognition agreements. These represent the American Institute of Certified Public Accountants (AICPA),1 the Canadian Institute of Chartered Accountants (CICA), the Hong Kong Institute of Certified Public Accountants (HKICPA), the Institute of Chartered Accountants in Australia (ICAA), the Institute of Chartered Accountants in England and Wales (ICAEW), the Institute of Chartered Accountants in Scotland (ICAS) and the New Zealand Institute of Chartered Accountants (NZICA) (SAICA, 2014b).

Given the study’s focus on the world’s leading professional bodies, it is with care that these results are extrapolated to other professional bodies. It should also be noted that the study does not make reference to the AICPA, which may include aspects of public sector accounting education. The cut-off date for data collection was 30 September 2014.

3. LITERATURE REVIEW

3.1. Development of public sector accounting in South Africa

There is a shortage of professional accountants working in the South African public sector (AGSA, 2013a). In 2013, an investigation commissioned by the World Bank found that an estimated 4% (1 360 of 34 104) of SAICA members work in public sector jobs and this shortage was accordingly described as having a negative impact on the skills available to support financial management roles in public sector entities (World Bank, 2013: 40). This has resulted in the public sector having to frequently outsource aspects of its finance function (Van Wyk, 2007: 263). Another consequence of the aforementioned skills shortage is further described in the report prepared by the Auditor General of South Africa (AGSA) indicating that 5% (13 out of 283) of municipalities received unqualified audit reports for the financial year (World Bank, 2013: 40). The World Bank provided further commentary on the structures behind public sector accounting in South Africa, noting that while South Africa has indeed adopted a number of professional reforms to strengthen the quality of financial reporting and governance in the private sector, important developments in the public sector have yet to be made. The Accounting Standards Board (ASB) in South Africa is the statutory body responsible for issuing public sector accounting standards and currently has in issue Generally Recognised Accounting Standards (GRAP). These are standards that are required to be applied by all public sector entities (except for-profit government business enterprises, which are required to apply International Financial Reporting Standards (IFRS) instead). GRAP standards are accrual-based and are in accordance with the provisions contained in International Public Sector Accounting Standards (IPSAS) and IFRS. It is important to note that national and provincial departments are not yet applying GRAP standards, as the required prerequisites have yet to be put in place by the South African government. For the time being, these departments apply a reporting framework developed by the South African National Treasury (World Bank, 2013: 3).

The consensus for improved practice in public sector accounting has been expressed by IFAC as well. In a recent discussion paper issued by IFAC on the role of the CAW in the need for awareness and suitable knowledge of public sector accounting has been recognised as an important requisite for partnering with decision makers in all spheres of the economy (IFAC, 2013: 10). The application of accrual accounting is further described as requiring “high level skills” from finance officers (Van Wyk, 2006: 22).

Meaningful progress in South African public sector accounting also faces a myriad of challenges that go beyond the academic and regulatory. Institutional structures and economic realities that have evolved over the years now also pose challenges to effective reforms in public sector accounting education. These are discussed in the section to follow.

3.2. Emergence of public sector accounting in the sphere of professional education

According to the World Bank (2013:2), the inclusion of public sector accounting in South African professional syllabi is at present minimal, and these trends are also present internationally (Krah & Aveh, 2013; Miller, 2006; Sculli & Sims, 2008). In the above-quoted study conducted by Sculli and Sims (2008) various reasons for this phenomenon were noted, including those pertaining to limited teaching interest, a lack of student interest as well as a shortage of time and staff expertise in public sector accounting. They also make mention of the varied philosophies that inform the inclusion of public sector accounting in syllabi which are currently designed for application in the private sector. According to one school of thought, it is believed that accounting concepts traditionally taught in universities are applicable to both the private and public sector. In essence it is argued that the nature of accounting elements (and by extension, the accounting application) does not change in relation to the sector to which they are applied (Van Wyk, 2006). In response, however, there is another school of thought holding the belief that both skills and knowledge pertaining to the public sector need to be
specifically incorporated into professional accounting syllabi (AGSA, 2013b: 1).

Professional bodies that are registered with IFAC are required to adhere to a range of member obligations (IFAC, 2014). These obligations are documented by IFAC and prescribe compliance in a number of areas of professional practice, including those relating to international education standards. In this regard, IFAC requires its member bodies to comply with the education standards issued by the Independent Accounting Education Standards Board (IAESB), namely International Education Standards (IESs). Contained in IES 2 (the education standard dealing with member issues relating to initial professional development and technical competence) is paragraph A12, which provides guidance on the inclusion of public sector accounting features in the education syllabi of member bodies. The paragraph (IAESB, 2014: 10) states:

In professional accounting education programs, an IFAC member body may:
(a) include additional competence areas;
(b) increase the level of proficiency for some competence areas; or
(c) develop additional learning outcomes that are not specified in this IES.

The use of the word “may” leaves the educational requirements pertaining to public sector accounting largely to the discretion and judgment of individual bodies. This is evidenced in the remaining wording of paragraph A12, which states (IAESB, 2014: 10):

This may occur when an IFAC member body prepares aspiring professional accountants to work within a particular industry sector (for example, the public sector) or for a particular role (for example, a management accountant or an auditor).

For instance, SAICA’s response to the above entailed an invitation for commentary on its existing competency framework from its Public Sector Committee (PSC) as well from the AGSA (SAICA, 2014c: 2). The PSC importantly noted that the competencies developed for application in the private sector would be equally applicable in the public sector, and accordingly, no new competencies were proposed. However, it did advocate the inclusion of additional knowledge areas in the SAICA syllabus as a means to promote increased involvement of chartered accountants in the public sector. The knowledge areas proposed included an overview of public sector administration, government structure and reporting protocols, an overview of the most important public sector legislation, an overview of different role-players, an introduction to GRAP, performance management, audit of pre-determined objectives, risk management in the public sector and corporate governance in the public sector (SAICA, 2013).

The AGSA provided feedback with a view to the transferability of competencies between the private and public sectors that was different to that of the PSC. Along with additional knowledge areas, it also proposed the inclusion of additional competencies such as the ability to identify risks in the public sector and to specifically apply GRAP to “demystify” the dynamics around public sector accounting (AGSA, 2013b: 2).

SAICA considered these recommendations and developed its new competency framework with changes that accommodate public sector elements.

In implementing these changes, it is important for SAICA to be aware of the educational practices of its foreign counterparts. Equally, it is important for its counterparts to also be aware of the developments being undertaken in South Africa, which they can either advise on or benchmark against.

The room for judgement in respect of public sector accounting content allowed by IFAC accordingly creates the opportunity for research in assessing the educational practices of leading professional bodies. The study’s content analysis therefore provides comparative data on the nature and extent of public sector accounting content in the education syllabi of leading professional bodies.

4. METHODOLOGY

The nature and extent of public sector accounting features were empirically tested through a content analysis of the latest syllabus documents of each leading professional body. These documents were analysed between 1 July 2014 and 30 September 2014. The nature and extent of public sector accounting features of all the leading professional bodies were analysed (100% coverage).

4.1. Population

The content analysis was undertaken in relation to the world’s leading professional bodies. Accordingly, the population for empirical study was SAICA and the eight IFAC member bodies (listed earlier) that hold mutual recognition agreements with SAICA. These professional bodies are considered to be leading professional bodies by virtue of their membership with Chartered Accountants Worldwide (CAW, 2015), the Global Accounting Alliance (GAA, 2015), or both. As noted by SAICA (2014a), the key benefit of these agreements lies in the mobility that its members are offered where they are able to use their professional designation in the respective jurisdictions of these other eight bodies as long as they retain their SAICA designation. This indicates that comparable educational credentials exist among members in the population, which justifies the comparative techniques employed.

4.2. Content analysis

As a technique for comparative analysis, it is agreed that content analysis is an appropriate tool, as evidenced in contemporary accounting research with similar study themes to this one (Haji, Marx & Coetsee, 2014; Krah & Aveh, 2013; Miller, 2006; Sculli & Sims, 2008). In coding the features of public sector accounting in the education syllabi of each leading professional body, the format of analysis employed was as follows:

Table 1. Coding Format of Content Analysis

<table>
<thead>
<tr>
<th>Name of Professional Body</th>
<th>Identified Educational Feature</th>
<th>Present</th>
<th>OR</th>
<th>Absent</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Yes</td>
<td></td>
<td>No</td>
</tr>
</tbody>
</table>

If the identified educational feature is present in the professional body’s syllabus document, the feature is marked as Yes.

If the identified educational feature is absent in the professional body’s syllabus document, the feature is marked as No.
4.3. Research Control

The content analysis was performed by testing the nature and extent of identified educational features in the education syllabi of the leading professional bodies. This was performed in relation to the checklist that was developed through the literature review. The checklist was tested for completeness through discussions with suitably qualified and experienced members of the accounting community, and in the interests of accuracy and reasonableness the results were tabled and independently adjudicated as well.

5. RESEARCH FINDINGS AND INTERPRETATION

This section presents findings on the nature and extent of the public sector accounting features for each of the professional bodies in the population followed by summative findings.

5.1. American Institute of Certified Public Accountants

AICPA provides a comprehensive syllabus document, titled the Content and Skills Specifications for the Uniform Examination (AICPA, 2013), in electronic format, downloadable from the AICPA website. Public sector accounting features were present, but the syllabus document was silent on where such knowledge (education or practice) would be acquired.

The syllabus document made reference to local public sector accounting standards (standards issued by the Governmental Accounting Standards Board), indicated specific aspects that would be examined at an intermediate level and identified the tasks and competencies that students should be able to perform with the public sector knowledge acquired. In addition, public sector features were also found in the auditing discipline, specifically in the area of legislation and regulation. The syllabus document was however silent on where such knowledge would be acquired.

The syllabus document was however silent on where such knowledge would be acquired. The syllabus document did not specify in which environment such knowledge would be acquired.

The syllabus document made reference to local public sector accounting standards, indicated specific aspects that would be examined at the lowest level (Level C) and identified the tasks and competencies that students should be able to perform with the public sector knowledge acquired.

In addition, the syllabus document was silent on where such knowledge would be acquired.

In addition, public sector features were also found in the auditing discipline, specifically in the area of legislation and regulation. The syllabus document was silent on where such knowledge would be acquired.

The syllabus document was however silent on where such knowledge would be acquired.

The syllabus document did not specify in which environment such knowledge would be acquired.

Further, the syllabus documents were silent on where such knowledge would be acquired.

5.3. Canadian Institute of Chartered Accountants

CICA provides a comprehensive syllabus document, titled the UFE Candidates’ Competency Map: Understanding the Professional Competencies Evaluated in the UFE (CICA, 2014), in electronic format, downloadable from the CICA website. Public sector accounting features were present, but the syllabus document did not specify in which environment such knowledge would be acquired.

The syllabus document made reference to local public sector accounting standards, indicated specific aspects that would be examined at the lowest level (Level C) and identified the tasks and competencies that students should be able to perform with the public sector knowledge acquired.

In addition, the syllabus document was silent on where such knowledge would be acquired.

In addition, public sector features were also found in the auditing discipline, specifically in the area of legislation and regulation. The syllabus document was silent on where such knowledge would be acquired.

The syllabus document was however silent on where such knowledge would be acquired.

Further, the syllabus documents were silent on where such knowledge would be acquired.

5.4. South African Institute of Chartered Accountants

In this section, the findings and interpretations of the content analysis are discussed in relation to the syllabus documents of the SAICA.

SAICA provides a comprehensive syllabus document, titled the Competency Framework: Detailed Guidance for the Academic Programme (SAICA, 2014d), in electronic format, downloadable from the SAICA website. While the syllabus document was biased towards the private sector, public sector accounting features were present, including guidance that such knowledge would be acquired in both the education and training environments. The syllabus document made reference to local public sector accounting standards, indicated specific aspects that would be examined at an awareness level and identified the tasks and competencies that students should be able to perform with the public sector knowledge acquired.

In addition, public sector features were also found in the financial management discipline, specifically in the area of decision making and control. The syllabus document reported the inclusion of the public sector as a recent amendment, while identifying the private sector, public practice, public sector and education as the areas in which aspiring chartered accountants would pursue their careers.
While specific references to the appropriate ethical behaviours in the public sector were not found, it is expected that these are implied in the overarching pervasive skills. Other findings also include the provision of a guidance document on the public sector as an additional resource.

5.5. The remaining professional bodies

In this section, the findings and interpretations of the content analysis are discussed in relation to the syllabus documents of:

- Hong Kong Institute of Certified Public Accountants;
- Institute of Chartered Accountants in Australia and the New Zealand Institute of Chartered Accountants;
- Institute of Chartered Accountants in Ireland; and
- Institute of Chartered Accountants in Scotland.

These professional bodies are addressed in one combined section, as they do not have public sector accounting features. Further, the educational requirements of ICAA and NZICA have been developed in conjunction with each other. The prescribed syllabus examined for registration with either body is therefore, for all intents and purpose, the same (ICAA & NZICA, 2014a: 1).

The findings are that these professional bodies did not have public sector accounting features. Membership with HKICPA is conditional upon candidates satisfying a range of academic, work experience and professional education requirements. The assessment process is facilitated through the CPA Qualification Programme (QP), which consists of four module examinations and one final examination (HKICPA, 2014: 1). Inspection of the syllabus documents pertaining to all three examinations (HKICPA, 2014) revealed that no requirements for public sector accounting are prescribed.

It was also found that the ICAS has the shortest syllabus documents of all the leading professional bodies examined in the study. The ICAA and NZICA have public sector references in the auditing and financial management disciplines, specifically in the area of attestation and performance reporting.

5.6. Summative findings

This section summarises and discusses the key findings in relation to the syllabus documents of the leading professional bodies. Table 2 offers a summary of these key findings. The "remaining five" column refers to the combined results of HKICPA, ICAA and NZICA, ICAI and ICAS.

The summative findings reveal diversity in the nature and extent of public sector accounting content in the syllabus documents of the leading professional bodies. The majority of the nine professional bodies (56%) make no reference to public sector accounting, while four of them (44%) do so, but in diverse ways, both as regards the nature and extent of its application and the way it is examined. CICA makes explicit references to ethical behaviours in the public sector (CICA, 2014), while SAICA implies ethical behaviour through its pervasive skills.

![Table 2. Summative findings](image)

<table>
<thead>
<tr>
<th>Issue</th>
<th>AICPA</th>
<th>CICA</th>
<th>ICAEW</th>
<th>SAICA</th>
<th>Remaining</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public sector accounting features specified</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Public sector accounting standards specified</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Examination level of public sector accounting specified?</td>
<td>Yes</td>
<td>Yes</td>
<td>N/A</td>
<td>Yes</td>
<td>N/A</td>
</tr>
<tr>
<td>Public sector accounting competencies described</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Reference to public sector in other disciplines</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No*</td>
</tr>
<tr>
<td>Syllabus document addresses ethics in the public sector</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Syllabus document provides additional resources</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

Note: * ICAA and NZICA did make reference to the public sector in the auditing and financial management disciplines.
6. RECOMMENDATIONS

The findings of the study give rise to the recommendation that professional bodies carefully consider the current state of public sector accounting in their syllabus documents. Individual member bodies could engage meaningfully with government and other public sector regulators in their jurisdictions to contribute insights into the establishment of a public sector accounting regime that effectively contributes to the socio-economic goals of their countries. This could include interdisciplinary collaboration with noted academics and experts in the political, management and public administration spheres, as it is envisioned that engagement of this nature will expose accounting regulators to the practicalities and challenges that face regulation in the public sector. The outcome of this process could be that the status quo remains unchanged, or on the other hand, that more public sector accounting content is included in their syllabus documents.

7. CONCLUSION

The study explored the nature and extent of public sector accounting content in the prescribed education syllabi of leading professional bodies. This was informed by the IFAC principle that allows its member bodies to apply discretion in the application of their public sector accounting education requirements (IAESB, 2014: 10). The study found that diversity exists in the nature and extent of public sector accounting content in the syllabus documents of the leading professional bodies. The majority of the leading professional bodies had no public sector accounting features.

These findings are of significance, as they provide evidence of the current syllabus content of public sector accounting in the leading professional bodies. These findings are of particular use to public sector regulators in understanding the nature and extent of public sector accounting content globally and with reciprocity partners. The study is of specific relevance for Africa, and South Africa, with its challenges in the public sector, as education aims to promote change in behaviour, inform resource allocation that supports short- and long-term value creation, and enhance accountability and stewardship regarding the use of public resources. It is recommended that further research be undertaken on the factors influencing the adoption of public sector accounting in the syllabi of chartered accountant professional bodies, particularly SAICA.

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IMPACT OF CREDIT INFORMATION ON THE BANKS STABILITY: GLOBAL EXPERIENCE AND LESSONS FOR UKRAINE

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Abstract

A quality of the credit portfolio is one of the most important factors of banking system reliability. It is obviously, that there is a direct relationship between this indicator and financial stability of the bank. In turn, the quality of the loan portfolio depends on many factors that are investigated in scientific and educational literature. In this paper, we propose to focus on a group of factors of credit risk that are connected with the availability of information about the borrower. The low efficiency of the national system of collecting information about borrowers in Ukraine in comparison with foreign models was confirmed by the quantitative analysis. This tendency cases the high level of credit risks and low financial stability level of domestic banks. It is necessary to make active efforts on improving the effectiveness of credit bureaus in Ukraine by establishing public credit registry and also to focus on solving other problems associated with the collection and use of information about borrowers.

Keywords: Credit Information, Bank Stability, Loan Portfolio, Debt Collecting

1. INTRODUCTION

System of credit information dissemination is not often considered in scientific literature. This trend could be explained by the fact that this problem has already been solved for developed countries. For example, first credit registries appeared in Western Europe in 30 years of XX century, and the peak of international scientific publications on the subject was about 20 years ago. On the other hand, due to the global financial crisis of 2008-2009, a significant part of banks’ credit portfolios (mainly in developing countries) is not monitoring now. So this countries including Ukraine, must continue to search for systemic solutions seek systemic solutions in the field of improving the management of credit risks. These solutions provide for the improvement of the system of centralized information collection, processing and dissemination. The relevance of this topic is confirmed by attempts to reform the legislation that governing the procedure for collection and dissemination of information about borrowers.

In 2015 the draft law number 3111 [2] was introduced for the Verkhovna Rada of Ukraine review. This draft law provided the establishment and maintenance of the Credit Registry of the National Bank of Ukraine. Information in this register should be accumulated by mandatory submission of relevant information about borrowers by all banks operating in Ukraine. The appearance of the draft law intensified discussions within the expert community and among scientists in the part of necessity to disclosure information about borrowers in Ukraine. Our paper investigates this issue in the light of international experience.

Government body which deals with the accumulation and dissemination of credit information (Public credit registers) operates in many developed countries. It is controlled mainly by the central bank. It should be noted that provision of information in the state database (as opposed to private credit bureau) is mandatory for all borrowers. The legal framework for the functioning of private credit bureaus in our country was founded in 2005 by adopting a special law [3]. However, it provides an opportunity to obtain information by credit bureau from borrower only with the written consent of borrower. In addition, it is not provides the possibility of forming public credit bureau, and not clearly defines the procedure for exchanging information between the credit bureaus. These and other shortcomings make it impossible to create high-quality national mechanism for the formation of comprehensive information on the credit history of borrowers in Ukraine that would provide effective procedures for information exchange between credit bureaus.

Implementation of the quality system of credit information collection and processing will cause long-term effects that will promote formation of positive impulses for credit market development. For example, Tullio Jappelli and Marco Pagano’s in their study identify four main positive effects of credit bureaus functioning: 1) improving the banks’ knowledge of applicants’ characteristics and permission more accurate prediction of their repayment probabilities; 2) reducing the informational rents that banks could otherwise extract from their customers, that accelerates and reduces the cost of credit; 3) improving payment discipline of borrowers because of their awareness.
of reputation (moral) risk from the distribution of the information about absence of payment by credit bureau; 4) elimination of the borrowers' incentive to become over-indebted by drawing credit simultaneously from many banks without any of them realizing. Thus, the task of finding areas for developing credit information processing system in Ukraine is actualized.

2. LITERATURE REVIEW

All research on the problems of this article can be divided into two groups. The first one is publications which examine individual (mainly practical) aspects of the formation and use of credit information. The second one is comprehensive researches and analytical reports of state bodies and NGOs.

We would like to analyze some studies from the first group. The cost-effectiveness of gathering and disseminating of information about the payment discipline of legal entities by the example of a world leader in this field (American company Dun & Bradstreet, that was founded in 1841) was analyzed in the paper [4]. The authors conducted the first practical study aimed to assess the importance of this information in decision-making on credit. It is concluded that usage of company’s database provides improvements in credit risk assessment.

A.Jorge Padilla and Marco Pagano’s [5] placed greater focus on improving the credit discipline of borrowers because of their awareness of the fact that information about possible non-payment of the credit will be available through the mechanism of credit bureaus for majority of creditors. However, sharing more detailed information can reduce this disciplinary effect: borrowers’ incentives to perform may be greater when lenders only disclose past defaults than when they share all their information.

Comparing the efficiency of public and private credit registries is one of the main issues that is considered in the scientific literature and has significant relevance in Ukraine. For example, authors of the report [6] realized a comparative analysis of private credit registries functioning in the European Union according to the following key criteria: ownership structure; clients’ structure; creditors’ participation; type of data stored; additional services provided to creditors; the use of restrictions in the process of collecting information; degree of detail of the information provided; coverage. Notwithstanding the criteria according to which public and private institutions of collecting credit information were compared, authors [1, 6, 8] came to the conclusion that ownership of credit bureaus is not the principal factor that determines its effectiveness. Public credit registries may be more effective in countries where there is no mechanism for dissemination of information through private credit bureau or these mechanisms are primitive and limited.

Employees of the Central Bank of Argentina described the evolution of credit bureaus in their country [9]. Initially the Central Bank formed the basis for credit activity monitoring of largest borrowers, and then all loans of the banking system were included to this base. This experience may be interesting for the National Bank of Ukraine, as it collects via commercial banks certain statistics information about credit transactions and can modify this system for introducing the public credit registry. Authors also examined non-standard direction of using credit bureaus’ information: evaluating the effectiveness of regulatory requirements to the capital adequacy and reserves of the bank. The mathematical model that was developed by scientists showed that it is necessary to strengthen the requirements to capital and reserves for Argentines banks.

Researchers quite often study areas of optimizing using the information that is accumulated and distributed by credit bureau for improving credit risk assessment [10, 11, 13]. In particular, GG Chandler and LE Parker [13] analyzed the impact of the amount of information about the borrower, which may be given by credit bureau, on the reliability of credit risk assessment. The authors a comparative analysis of the credit risk assessment based on five types of input data, which were grouped in terms of information value (from 2 to 16 indicators) obtained from credit bureaus. The authors concluded that the usage of credit bureau data considerably improves results of credit risk assessment. Also positive link between the levels of specification of the information and reliability of ratings was found.

Some authors use credit bureau information to study the institutional framework and legal regulation of certain types of credits. In particular, Simeon Djankova, Caralee Mc Liesha, Andrei Shleiferb realized a comparative analysis of the credit facilities in more than 120 countries. Researchers used data from public and private credit registries [12]. The results of analysis show that key prerequisites for intensification of credit are: establishment of an appropriate regulatory framework concerning the protection of creditors’ rights and functioning of the institutions that collect and disseminate information about borrowers.

The second group of publications allows us to make detailed analysis of the subject of our research. For example, the databases of the central banks, which contain micro (non-aggregated) information about economic agents, were comprehensively reviewed in the report of the Committee on Central Bank Statistics that was published in 2014 in the Bulletin of the Bank for International Settlements [14]. Information of public credit registers is one of the main places among the various statistical and financial reports, surveys and reviews of companies, databases of payment systems and oversight bodies by its characteristics: breadth of coverage, informative value, structuring and usefulness. The report analyzes the experience of public credit information processing systems in Malaysia, Armenia, Ireland, Brazil, Portugal and the EU.

In our opinion the experience of the European Union is the most interesting because of the European vector of Ukraine. The report of the expert group on credit histories [6] provides detailed data that describes the credit European Credit Reporting System. As a whole it is possible to make a conclusion that most countries have both public and private credit registers. Only Luxembourg has no credit register. In the whole European Union, there are more private credit bureaus than public credit registers. In a few countries, there is more than one
credit bureau. In several countries, operates more than one private credit bureau. In addition, the report contains recommendations for further development of credit information processing systems of the EU. Authors made a conclusion that it is inappropriate and unreality to create a single pan-European credit bureau. However, experts work towards more convergence or harmonization in the interpretation of data protection rules and in their practices in order to facilitate the process of cross-border credit data exchange.

The first steps in this direction were made by countries (Portugal, Austria, Belgium, France, Germany, Italy, Spain, Czech Republic and Romania) which have signed the Memorandum of Understanding aiming at facilitating the exchange of credit data between their respective credit registries. In 2003, the Governors of seven European Central Banks signed a Memorandum of Understanding aiming at facilitating the exchange of credit data between their respective private credit registers.

As a result of literature review we can make a conclusion about the availability of alternative versions of forming the system of credit information collection and dissemination. There are key problems that may arise during the process of implementation and development of credit information system: 1) the relationship between public and private mechanisms, the dosage between black and white information sharing; 2) terms and procedure of storing and using of retrospective information; 3) problem of monopolization of information flows; 4) using information for the purpose of identifying business groups; 5) development of cross-border lending; 6) protection of private data; 7) ways of reconciling the interests of public credit registries and private credit bureaus. Effective solution of these problems will create a quality system of credit information.

It is necessary to conduct a quantitative analysis of the effectiveness of the national system of collecting information on borrowers in comparison with foreign models to make informed decisions about further development of this system in Ukraine.

3. METHODOLOGY

To achieve the objectives we have formed the basis of indicators based on indicators published by the World Bank [16]:

1) Bank nonperforming loans to total gross loans (NPL);
2) Depth of credit information index (0=low to 8=high);
3) Private credit bureau coverage (% of adults).

The first indicator is the ratio of bank nonperforming loans (which are not serviced by borrowers) to total gross loans, a measure of bank health and efficiency, helps to identify problems with asset quality in the loan portfolio.

The second indicator is the depth of credit information index. It measures rules affecting the scope, accessibility, and quality of information available through public or private credit registries. The index ranges from 0 to 8. Higher values indicate the availability of more credit information.

The third indicator is private credit bureau coverage. It characterizes the number of individuals or firms listed by a private credit bureau with current information on repayment history, unpaid debts, or credit outstanding as a percentage of the adult population.

In view of the above-described information base of research we can clarify objectives that were set out in Article. The first one is to check whether the depth of credit information and the private credit bureau coverage have the influence on the share of bank nonperforming loans. The second one is to determine whether the direction of relation that was identifying according to first objective depends on the group of countries (cluster).

We used an algorithm that consists of three successive stages to solve these problems. First of all cluster analysis for forming of homogeneous groups of countries was conducted by using analytics software product STATISTICA. Then regression analysis for each cluster was conducted in order to understand how (shape and direction of impact) the dependent variable changes when any one of the independent variables is varied. Thus, cluster analysis was also used to smooth the differences between the levels of averages for the studied countries parameters of different clusters. This formed the premise for a reasonable statistical regression analysis to test hypotheses about the importance of effective communication between the dependent and independent variables.

At the last stage we conducted evaluation of form and strength of the relationship between bank nonperforming loans and soundness of banks with the help of regression analysis. Ten-year statistics data on the above-mentioned indicators for 104 countries (out of 213 countries listed in the official website of the World Bank [16] only 104 have systematic statistics data on these indicators for the period 2005-2014) was used for calculations.

4. RESULTS

As a result of cluster analysis three clusters of countries were highlighted. Then linear regression equations were constructed for each cluster and the population as a whole (equation 1):

\[ y = a_0 + a_1 \cdot x_1 + a_2 \cdot x_2, \]  

where \( y \) - Bank nonperforming loans to total gross loans [%];
\( x_1 \) - Depth of credit information index (0=low to 8=high);
\( x_2 \) - Private credit bureau coverage (% of adults);
\( a_0, a_1, a_2 \) - Regression parameters.

The results of cluster and regression analysis are shown in Table 1. Mainly developed countries (23 countries) are in the cluster 1; the cluster 2 (32 countries) mainly consists of countries with medium level of development; cluster 3 (49 countries) mainly consists of countries with sufficiently low level of socio-economic development, including African and Arab countries and countries of the former Soviet Union.

The higher level of depth of credit information index is observed in cluster 1 (5.57 on average in the 1st cluster against 2.64 in the 3rd cluster). The first cluster also characterized with highest percentage of
private credit bureau coverage (90.06 on average in the 1st cluster against 5.48 in the 3rd cluster) and the lowest value of bank nonperforming loans to total gross loans (3.97 on average in the 1st cluster against 7.17 in the 3rd cluster).

### Table 1. Estimation of relationships by cluster and regression analysis

<table>
<thead>
<tr>
<th></th>
<th>Cluster 1</th>
<th>Cluster 2</th>
<th>Cluster 3</th>
<th>As a whole</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of elements</td>
<td>23</td>
<td>32</td>
<td>49</td>
<td>104</td>
</tr>
<tr>
<td>Countries that were included in cluster</td>
<td>Australia, Britain, Italy, Ireland, Canada, Germany, Norway, USA, Czech Republic, Sweden, Japan and others.</td>
<td>Brazil, Greece, Estonia, Lithuania, Poland, Romania, Russia, Singapore, Slovakia, Slovenia, Thailand, Turkey and others.</td>
<td>Belarus, Bulgaria, Georgia, India, Moldova, Nigeria, Pakistan, Portugal, Tajikistan, Hungary, Uganda, Ukraine and others.</td>
<td></td>
</tr>
<tr>
<td>Bank nonperforming loans to total gross loans (%)</td>
<td>3.97</td>
<td>5.28</td>
<td>7.17</td>
<td>5.88</td>
</tr>
<tr>
<td>Depth of credit information index</td>
<td>5.57</td>
<td>5.13</td>
<td>2.64</td>
<td>4.05</td>
</tr>
<tr>
<td>Private credit bureau coverage</td>
<td>90.06</td>
<td>42.97</td>
<td>5.48</td>
<td>35.72</td>
</tr>
</tbody>
</table>

**Central tendency for ten years in the cluster/population:**

<table>
<thead>
<tr>
<th></th>
<th>Cluster 1</th>
<th>Cluster 2</th>
<th>Cluster 3</th>
<th>As a whole</th>
</tr>
</thead>
<tbody>
<tr>
<td>a0 (t-statistics for a0)</td>
<td>21.62 (2.67)</td>
<td>11.42 (3.13)</td>
<td>9.27 (6.97)</td>
<td>8.049 (21.7)</td>
</tr>
<tr>
<td>a1 (t-statistics for a1)</td>
<td>-1.75 (-1.59)</td>
<td>-0.75 (-1.33)</td>
<td>-0.81 (-1.61)</td>
<td>-0.398 (-4.0)</td>
</tr>
<tr>
<td>a2 (t-statistics for a2)</td>
<td>-0.088 (-1.12)</td>
<td>-0.053 (-0.92)</td>
<td>0.009 (0.067)</td>
<td>-0.016 (-2.4)</td>
</tr>
<tr>
<td>R (F-statistics)</td>
<td>0.43 (2,52)</td>
<td>0.31 (1.49)</td>
<td>0.27 (1.87)</td>
<td>0.22 (26.7)</td>
</tr>
</tbody>
</table>

**Source:** own calculations

As a result of regression analysis the following conclusions were made. There is a statistically significant relation of medium strength when α = 0.05 for the population as a whole. The velocity constant on all 104 countries is: \( y = 8,049 - 0.398 \cdot x1 - 0.016 \cdot x2 \), thus all parameters of equation are statistically significant by Student t-test when α = 0.05.

That is, the greater level of depth of credit information index and percentage of private credit bureau coverage leads to the smaller the share of bank nonperforming loans.

At the same time, direction and power of relation for some clusters are ambiguous and not in conformity to the global trend. So for clusters 1 and 2 direction of indicators x1 and x2 influence on y is one that corresponds to the general population.

However, for cluster 3 the impact direction of factor x2 changes from the back to straight. This tendency means that with increasing percentage of the private credit bureau coverage the percentage of bank nonperforming loans is also increasing. It should be noted that this relation cannot be considered confirmed according to the Student t-statistics. These results are explained by the low average level of private credit bureau coverage in countries that are in the 3rd cluster (about 6% of the adult population). This fact prevents a significant impact on the effectiveness of bank lending in this group of countries.

We would like to make a comparative analysis of the dynamic of studied parameters in the context of studying the situation in Ukraine. The data of neighboring countries and two developed countries were compared (Table 2):

### Table 2. Comparative analysis of indicators of Ukraine and selected countries

<table>
<thead>
<tr>
<th></th>
<th>Belarus</th>
<th>Britain</th>
<th>Poland</th>
<th>Ukraine</th>
<th>Japan</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Bank nonperforming loans to total gross loans (%)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2005</td>
<td>5.1</td>
<td>16.8</td>
<td>4.9</td>
<td>58</td>
<td>1.8</td>
</tr>
<tr>
<td>2010</td>
<td>3.6</td>
<td>4.9</td>
<td>4.9</td>
<td>58</td>
<td>2.5</td>
</tr>
<tr>
<td>2014</td>
<td>4.4</td>
<td>4.9</td>
<td>4.9</td>
<td>58</td>
<td>2.5</td>
</tr>
<tr>
<td><strong>Depth of credit information index</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2005</td>
<td>0</td>
<td>6</td>
<td>4</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>2010</td>
<td>5</td>
<td>6</td>
<td>4</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>2014</td>
<td>6</td>
<td>8</td>
<td>8</td>
<td>7</td>
<td>6</td>
</tr>
<tr>
<td><strong>Private credit bureau coverage</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2005</td>
<td>76.2</td>
<td>38.1</td>
<td>0</td>
<td>61.2</td>
<td></td>
</tr>
<tr>
<td>2010</td>
<td>100</td>
<td>91.7</td>
<td>10.1</td>
<td>76.1</td>
<td></td>
</tr>
<tr>
<td>2014</td>
<td>100</td>
<td>84.5</td>
<td>48</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

**Source:** compiled by author on the base of [16]

Index of bank nonperforming loans to total gross loans in Ukraine, although decreasing, but it is one of the highest in the world (Figure 1). It should be noted that according to the World Bank definition nonperforming loans (NPL) are loans that are past due over 90 days. According to World Bank share nonperforming loans in their total volume in Ukraine is 42% in 2009-2010., but later this assessment was retrospectively reviewed, and now for the same period it reduced more than doubled (10 20%) [16]. However, even taking into account this factor, Ukraine has one of the largest percentages among all countries that provided the data to the World Bank. This index varies within 1-5% in most developed countries.
The difference between 15% of problem loans in crisis, according to the NBU and 42% according to statistics of the World Bank can be explained by different accounting requirements for consideration of debt (the amount of nonperforming loans by international practice determined not for the amount for which it was maturity period, but for all the amount of debt on this loan). In 2014 the NPL index in Ukraine was 19%. It was one of the highest level in the world. It is impossible to predict the improvement of this indicator in Ukraine because of military and political upheavals in Ukraine.

However, Ukraine has demonstrated significant progress in the dynamics of the depth of credit information index for the past 10 years. Index grew up from 0 to 7 (with max = 8). In developed countries, index was high enough and has fluctuated within 6-8 during the study period. In the study period the private credit bureau coverage in Ukraine also rapidly increased from 0 to 48%, but in selected for comparison developed countries the figure is close to 100% (Table 2). As noted earlier in this article, it was done much towards the functioning of private credit bureaus during last ten years in Ukraine. According to information of the National Commission for State Regulation of Financial Services Markets, that conducts single register of the credit bureau, there are 9 credit bureaus with perpetual licenses in Ukraine. Moreover, their number has doubled during recent years. There are one or two private credit bureaus in most European countries (apart from the UK and the EU - 3 and 6 credit bureaus accordingly) [6]. Thus, the trend of increasing the number of private credit bureau in Ukraine is not answerable to international experience, and also complicates the exchange of information between credit bureaus and credit committees.

"Comprehensive Program of the Ukrainian Financial Sector Development up to 2020 " [17] provides development of infrastructure that will guarantee efficient storage and exchange of information about credit history of borrowers (including the development of cooperation between credit bureaus and consolidation of information available to regulator – the National Commission for State Regulation of Financial Services Markets) up to 12/31/2016. But now, in our opinion, this information exchange isn't effective. In order to have information about borrower's credit history, banks have to make several requests to different credit bureaus. This process complicates, slows down and increases the cost of requests processing.

In the context of our study, we consider that it is appropriate to determine the influence level of nonperforming loans on soundness of banks. The data about level of soundness of banks (which is given in paragraph 8.06 of the report published at the World Economic Forum [18]) was used. Study was conducted on the basis of statistical information concerning 113 countries (bank nonperforming loans to total gross loans and soundness of banks). The result of regression analysis is the following model (equation 2, Table 3):

\[ \text{Soundness}_{gr} = a0 + a1 \cdot \text{NPL}, \]  

\[ \text{Soundness}_{gr} = 5.54 - 0.08 \cdot \text{NPL}, \]

Considering the data presented in Table 3, we can make a conclusion that the model is adequate at \( \alpha = 0.05 \) with a statistically significant parameters (equation 3):
the development of credit information systems in Ukraine. Two main tendencies

Insufficient development of standards of the depth level of information about the borrower and lack of availability to the appropriate and reliable information about the borrower has influence on the bank’s credit portfolios quality. This argument is valid in most countries, indicators of which were studied in this paper. However, developing countries (including Ukraine) have the most significant reserve of improving the efficiency of the credit market, based on the improvement of the collection and dissemination of information about borrowers.

Development and implementation of new standards of the provision and exchange of information is one of priorities of further Ukrainian banking system development after a period of its institutional framework reform (2014-2015). These standards will improve the stability of banking system. Also they should be generally consistent with the “General Principles for Credit Reporting” [19], including the organization of information exchange between credit bureaus.

The best world practice should be considered during the process of improving the system of collection and dissemination of information about borrowers.

The guidance provided by countries with similar levels of economic development should be especially interesting for Ukraine. For example, Martin Brown, Tullio Jappelli, Marco Pagano analyzed the impact of information dissemination mechanisms between banks on the efficiency of credit markets in Eastern Europe and the FSU Region. [7] As a result of critical study authors made a conclusion that sharing of this information by banks will increase availability of credit recourses and reduce their costs for business. This relation is stronger for non-transparent companies (compared with transparent) and in countries with insufficient effective legislation.

Martin Brown, Tullio Jappelli, Marco Pagano in another paper considered theoretical approaches to the formation and improvement the system of credit information dissemination in developing countries [1]. The authors outlined following key aspects of this process: 1) negative impact of the credit market segments that are not under effective state control (such as micro-credit by non-banking institutions); 2) lack of protection of creditor rights; 3) necessity need to change loan policy towards substitution of physical collateral by information collateral (quality information of credit bureaus); 4) ensuring the gradual (evolutionary) process of information structure complication that is processed by credit bureaus.

Currently, the draft law number 3111 [2] on the establishment of the Credit Registry of the National Bank of Ukraine was revoked. However, the question about expediency of its introduction in Ukraine continues to be relevant. Some experts point out that the establishment of such register could make functioning of credit bureaus uneconomical, reduce competition between them and reduce the quality of services [1].

In some countries, this problem is solved by limiting the minimum amount and type of credit information which is collected by public credit registry. On the other hand, private credit bureau can quite effectively operate on condition of their specialization in loans to individuals and small businesses.

In our opinion, Ukraine should use international models according to which public credit registries operate in parallel with private credit bureau. In particular, private credit bureaus can provide a greater level of detail for certain types of credits (mostly in small amounts) and provide additional services, and state registers have a broader base of credit histories. As a result, creditors will be able to accurately assess credit risks and to increase the effectiveness of the credit process as a whole.

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INFLATION IN NIGERIA: POSSIBLE DETERMINANTS AND REMEDIES TO TACKLE IT IN NIGERIA

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Abstract

The previous Governor of the Central Bank of Nigeria (CBN) had intended to introduce the N5,000.00 currency bill into the Nigerian economy and claimed that such currency bill would help it manage the exchange rate especially against the dollar. This generated a huge outcry from the public especially economists. The major reason was that this introduction would generate inflation and also because the policy ran counter to the cash-less policy of the Central Bank of Nigeria. But to the Central Bank, there was no economic theory to suggest a currency redenomination could cause inflation. This debate once more threw up a need to reexamine the determinants of inflation in Nigeria. Generally, inflation could be cost push or demand pull but what drives the demand or informs cost quite often differ from one economy to another. This study examined the factors responsible for increasing cost of production and spending behaviour in Nigeria. It was able to identify 13 factors that impact on inflation. However, the degree of impact of each factor is left for another study. The study recommends that government should concentrate on providing social infrastructure that would encourage the private sector to invest and expand output, taking advantage of existing unemployed resources. This would help to stem inflation in Nigeria which is usually caused by scarcity.

Keywords: Inflation, Cost Push, Demand Pull, Determinants

1. BACKGROUND

Nigeria is often referred to as the Giant of Africa, it is the 7th largest populated country in the world with about 167 million people; one out of every 4 persons in West Africa is a Nigerian and Nigeria is the largest country entirely of Negroes. Apart from its abundance of human resources, the country is blessed with large arable lands and mineral resources. These resources include, coal, tin ore, crude oil and gas among others. But it is an underdeveloped economy characterized by high unemployment rate, inflation, poverty, low capacity utilization among many other such factors.

1.1. The Challenge

Inspite of these challenges, the Central Bank of Nigeria in recent times have consistently churned out harsh policies that the bank claims are aimed at cushioning inflation in Nigeria. For instance, on Tuesday, 25th January 2011, the Central Bank increased the Monetary Policy Rate (MPR) by 25 basis points from 6.25 to 6.5 percent to reduce money supply in the economy (See Otto and Nembee, 2011). Between January 2011 to January 2013, the MPR has been increased to 12.5 percent. These increases impact on the prime lending rates of banks, thus affect cost of borrowing and ultimately the cost of production of goods or services in the country. This in turn is likely to impact on total investments output, employment and development. In addition, in 2012, the Central Bank set out to issue N5,000 bill which was publicly resisted because to many such currency denomination was likely to create inflation, more so, because lower currencies of N1, N5, N10 and N50 were to be coined. The Central Bank authorities argued that there were no theoretical basis for such claims. So where do we stand? Is redenomination a determinant of inflation in Nigeria?

1.2. The Objective

Against the aforesaid background, this paper set out to identify factors that drive inflation in Nigeria. The paper used both primary and secondary sources to generate its data. First, literature survey was done. Thereafter a cross sectional survey was carried out among 100 professionals and experts from different parts of the country to identify factors affecting inflation in Nigeria.

1.3. Conceptual Issues

Inflation defines a rise in the general level of prices of goods and services in an economy over a period of time. Inflation may also be defined as a sustained rise in general price levels or a period of persistent rise in prices. The implication is that each unit of the currency in question will buy less than it had previously bought. Inflation could bring about the debasement of the means of exchange.
Historically, infusions of gold or sliver into an economy lead to inflation. According to http://wiki.org/Inflation.com (2012), culled on 25<sup>th</sup> May, 2012, when gold was used as currency, government could collect gold coins melt them down, mix them with other metals such as silver, copper etc and reissue them at the same nominal value. By diluting gold with other metals government could issue more coins without needing to increase the amount of gold used to make them. When the cost of each coin is lowered in this way, government profits from an increased seigniorage. This practice increases the money supply but at the same time the relative value of each is lowered. As the relative value of the coin is lowered, consumers would need to give more coins in exchange for the same goods and services as before. These goods and services experience a price rise as the value of each coin is reduced.

Inflation could be creeping, galloping or hyper. Increases in the quantity of money had occurred in different societies at different times in history.

2. THEORIES OF INFLATION

Several theories have been posited to explain inflation world wide. They include: Demand – pull inflation; Cost – push inflation; Structural inflation; Imported inflation

2.1. The Demand Pull Theories of Inflation

Demand-pull theories of inflation define inflation situations where aggregate demand for goods and services exceed aggregate supply, thereby leading to a general rise in price levels. Usually the shortages create competition on the side of demand for the few available products leading to some kind of informal bidding for available items. The aggregate demand for these goods and services include the private demand for consumers’ goods, business firms and government including final output and inputs.

The demand-pull inflation may also be called surplus demand inflation because it arises from too much money chasing few goods. More often it occurs where there is full employment so that the excess pressure on the factors of production leads to higher prices for the factors, ultimately leading to rise in the cost of production. It could also be a short run phenomenon where demand dynamics were not well anticipated. When there are production constraints, demand beyond the possible output level could also create inflation.

Demand- pull inflation may occur during cyclical booms during or immediately after war, This explains its high rates in Nigeria between 1969 – 1970. The rate of inflation during the war was very high and could have been as high as 20 percent or more. In the Biafran enclave, inflation was in three digits. These may not have been officially reported in their exact forms. In other words, inflation rates in Nigeria are generally believed to be under reported.

The demand pull inflation may be explained using the old or new quantity theory of money or the Keynesian theory. The quantity theory of money attempts to explain the link between money and general price levels. The quantity theory (also referred as monetarists view) emphasize the influence of money supply as prime determinants of inflation while the Keynesians emphasize on non monetary factors such as government expenditure, spending pattern and credits. The classical economist of the 17th Century connected the quantity theory of money to the general rise in prices. The crude quantity theory of money (of classical economy) state that the quantity of money at any given point in time is proportional to rise in prices.

The monetarist school of thought led by Milton Friedman (1942) posits that inflation is ‘always and everywhere a monetary phenomenon and that it is everywhere since increases in the quantity of money always exceeds output’. Irving Fisher’s equation of exchange could be employed to explain the Monetarist view. Fisher (1913) starts the analysis with a single identity that \( MV=PT \). Fisher believes that in every transaction, there is a buyer and seller in the aggregate economy, the value of sales must be equal to the value of receipts. This identity can be mathematically modeled as follows:

\[ MV = PT \]  

(1)

Where \( M \) = Quantity of money (nominal) in circulation; \( V \) = Transaction velocity of money in final expenditures; \( P \) = General price level; \( T \) = Volume of transactions;

Therefore in reviewing the monetarist view and the concept of circulation, Fisher defines price \( P \) as a function of money supply \( (M) \), volume of transactions \( (T) \) and velocity of circulation \( (V) \), i.e

\[ P = F(M,V,T) \]  

(2)

In equation (1), where \( MV = PT \), Fisher assumes \( V \) and \( T \) to be constant variables, so, \( M \) varies directly with \( P \).

\[ P = M \]  

(3)

But Fisher’s equation is its failed to consider the impact of interest rates. It is also doubtful that \( M,V,P \) and \( T \) are fully independent as a change in any of them impacts on the others and can affect inflation.

This made Keynes (1940) to focus on the inflationary gap, Keynes explained that inflationary gap is a process where planned expenditure exceeds the equilibrium in the system, if there is a state of under-employment in the economy, an increase in the money supply will eventually lead to an increase in aggregate demand, output and employment.

But as aggregate demand, output and employment rise further, it impacts on price. When money supply increases beyond full employment, output ceases to rise. The excess money supply leads to an excess demand over supply and leads to an inflationary gap. This to keynes is the true source of inflation. Keynes inflationary gap analysis is illustrated graphically in fig. 1.
Figure 1. Illustration of Keynesians Theory of Demand Pull Inflation

![Diagram of Keynesian Theory of Demand Pull Inflation]

Note: See Onuchuku and Adoghor (2000)

Figure 1 shows the points where full employment (YE\textsuperscript{F}) equilibrates with the total output. It is being represented by a 45° line which cuts through point B. But if there are further increases in aggregate demand, it will cause a shift in expenditure as shown at point E, and this will make the total expenditure to be at YE\textsuperscript{E} while the available output is BAYE (See Onuchuku Adoghor 2000). Keynes has been criticized. The major thrust of critics is that the inflationary gap analysis is focused on the commodity market only and the analysis neglects the role of the factor markets. It is argued that inflation affects both commodity and factor markets because the excess demand caused by the commodity market would have an impact on the factor market. In point, Keynes analysis has two main drawbacks: (a) it lays emphasis on demand (b) it ignores the possibility that a price rise may lead to further increases in aggregate demand, which may in turn lead to further increases in aggregate demand, which may in turn lead to further rise in prices (See Jhinghan 2008).

Figure 2. The Demand Pull Theory of Inflation (Quantity Theory Version)

![Diagram of Demand Pull Theory of Inflation]

Note: See Gbanador (2007)

Figure 2 shows that if the economy is in full employment, the Equilibrium price P\textsubscript{1} cuts the Demand curve D\textsubscript{i} at A. However, further demand as shown in D\textsubscript{2} will raise prices to P\textsubscript{2}. It means that employment, and aggregate supply cannot be increased at the short run to offset the excess demand created by the shift. This is because output and supply are fixed at 0Y\textsubscript{1}.
2.2. Cost – Push Theories of Inflation:

Cost-push defines inflation arising from the supply side. It is often caused by the rising cost of production. This occurs when production costs increase and impact on the prices of the final products. The cost push inflation can also be called the “market power inflation” because the increase in the prices of goods and services originates from the supply side of the economy. These increases may arise from increased wage rates or a fall in productivity which also increases cost of labour output. It may also arise out of other factors of production or cost of inputs such as power supply, transport or raw materials. In Nigeria multiple taxation and corruption are major suspects. These and other factors cumulatively influence the cost structure of products and determine the prices of the final output. Producers would react to rise in input prices by increasing prices of output including their profits margins, since these are usually set at fixed percentage of cost of production. But an increase in the cost of production can force producers to cut down production.

Cost push inflation may also arise as a result of profit motives of producers in monopolistic and Oligopolistic industries. Since there exist a state of imperfection in such industries, their producers could administer their prices through price discrimination techniques.

Figure 3. Diagram Depicting the cost – push Inflation

Figure 3 illustrates inflationary tendencies caused by supply-side factors. Point M, is referred to as the equilibrium point at full employment. At this point, price is P1 and quantity of output is Yf but if the cost of inputs rise (such as increasing wages, rising cost of power supply through removal of fuel subsidy; among others), some suppliers with limited resources could cut production. This will lead to a fall in aggregate output of the particular industry as shown in YN. So, supply moves from S1 to S2YN. This reduction in total supply distorts the full equilibrium position and causes a bidding among demand (i.e. buyers of the good) for the available goods ultimately shooting up the price from P1 to P2 and a new equilibrium point at X. This explanation makes meaning in a market economy where the market is an allocator of economic resources. But another way to explain the cost-push (supply-side) inflation is to look at the behaviour of suppliers. As a result of increasing cost of production (often not peculiar to any producer), suppliers generally shift the burden of increased cost of production to the consumers by way of general price increases. If all suppliers do so, this is likely to lead to general rise in the prices of products. This is more common in imperfect markets.

In Nigeria, cost-push inflation is quite common. Every time government announces a new minimum wage, there is a rise in the prices of goods and services leading to inflation. This often nullifies the gains of the wage rise, leaving the Nigerian worker sometimes poorer than he or she was before the wage rise though, Otto (2011) attributes this to the announcement effect. Examples include the Udoji award of 1973 and the Shehu Shagari’s salaries and wages review of 1980 respectively. Between 1941 and now there has been about 15 of such wage reviews. These wage increases, often are not matched with increases in productivity and so lead to inflationary situations.

A.W Philips (1958) examined the relationship between unemployment and inflation in Britain. He observed that there was an inverse relationship between unemployment and inflation. This is known as the Philip’s curve. He observed that when unemployment rate is high and the wage rates low, inflation will be low because of insufficient demand.
This is a typical feature of an economy in recession because in such situation output shrinks. This was also the scenario in the world in the 1920s and 1930s before the Second World War. On the other hand, a growing economy with increasing output was more likely to be inflationary. This is because the increase in economic activities will call forth various economic factors. The high demand for these factors of production, drive up the cost of factors of production and the cumulative effect of the rise of input (factor) costs lead to increases in output prices. Because these factors are supplied by households, these households are more economically empowered and this empowerment facilitates their ability to bear the cost of the rising output prices. The upshot of Phillips' finding was that a trade off exists between inflation and unemployment: Both are mutually exclusive. If government opts for full employment, it must tolerate some level of inflation but if does not want unemployment, both are mutually exclusive. If the government wishes to have full employment, it must accept some level of inflation. Inflation at a rate that should minimize its growth and full employment objectives.

Table 1. Wage Reviews in Nigeria

<table>
<thead>
<tr>
<th>Commissions</th>
<th>Year of implementation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Bridge Committee</td>
<td>1941</td>
</tr>
<tr>
<td>2 Tudor Davies Comm.</td>
<td>1945</td>
</tr>
<tr>
<td>3 Harajum Comm.</td>
<td>1946</td>
</tr>
<tr>
<td>4 Miley's Comm.</td>
<td>1947</td>
</tr>
<tr>
<td>5 Gorsch Comm.</td>
<td>1955</td>
</tr>
<tr>
<td>6 Menndoe and Morgan's Comm.</td>
<td>1959</td>
</tr>
<tr>
<td>7 Morgan's Comm.</td>
<td>1963</td>
</tr>
<tr>
<td>8 Adebo's Comm.</td>
<td>1970</td>
</tr>
<tr>
<td>9 Udooji's Comm.</td>
<td>1973</td>
</tr>
<tr>
<td>10 Shagari Award</td>
<td>1980</td>
</tr>
<tr>
<td>11 L.R.B. Wage Review</td>
<td>1992</td>
</tr>
<tr>
<td>12 Abdulsalami Wage Review</td>
<td>1999</td>
</tr>
<tr>
<td>13 Obasanjo Wage Review</td>
<td>2001</td>
</tr>
<tr>
<td>14 Yar'Adua Minimum Wage Review</td>
<td>2008</td>
</tr>
<tr>
<td>15 Jonathan Minimum Wage Review</td>
<td>2011</td>
</tr>
</tbody>
</table>

Source: Various

Since the era of Phillips, the fact of stagflation has diminished the significance of Phillips. In many developing economies, inflation and unemployment exist side by side. South American countries especially Brazil exemplified stagflation in the 1970s and 1960s.

2.3. Theories of Structural Inflation

Structural inflation defines inflation that are associated with the process of economic development. This is because the process creates disequilibria through the structural changes which are necessary for development. Theorists believe that inflation is usually associated with economic growth especially in developing countries where institutional and structural constraints are real.

Inflation also has a long-run tendency especially in the industrialized western countries owing mainly to differences in the rate of growth of productivity in the industrial and service sectors. According to Turvey (1951), cited in Jhinghan (2008) inflation arises from the process of competition to maintain total income, total real expenditure and total output. This view is reinforced by Schultz (1959).

Charles Schultz (1959) observed from a study of inflation in United States of America 1955-1957, that price increases were neither caused by demand pull nor cost-push factors but by sectorial shifts in demand. He postulated that since price do not fall in deficient sectors, the excess demand in other sectors will lead to a general price rise in a deficient sector and this will cause an inflationary trend in the economy.

2.4. Imported Inflation

This is a type of inflation suffered by economies with high reliance on imported goods or services. Such inflation could arise from the dumping of goods in the importing economy either as inputs or final output. The high prices of these imported goods are transmitted into the local economy which leads to an inflationary tendency.

A number of channels have been identified through which inflation is transmitted; one of the most efficient anti-inflationary policy in Nigeria would be to increase the domestic supply of goods and services to meet growing demand, if this was possible. But the inelastic demand for foreign goods is a major constraint that must be dealt with. For oil producing countries like Nigeria, inflation could be controlled if crude oil could be refined in the country in the short run and a restructuring of the economy into a more organized system in the long run. An efficient management of the exchange rate can minimize imported inflation.

3. INFLATIONARY TRENDS AND EFFECT IN NIGERIA

Table 2 presents some macroeconomic variables in Nigeria including inflation.

Table 2. Macroeconomic Variables in Nigeria (1980 – 2010)

<table>
<thead>
<tr>
<th>Year</th>
<th>MSO</th>
<th>INT %</th>
<th>INF %</th>
<th>MSS</th>
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<tr>
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<td>3485.9</td>
<td>9.30</td>
<td>16.11</td>
<td>15100</td>
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<tr>
<td>1981</td>
<td>13847.9</td>
<td>10.00</td>
<td>17.4</td>
<td>16161.7</td>
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<tr>
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<td>11.75</td>
<td>6.90</td>
<td>14893.6</td>
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<td>72678.9</td>
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<td>13.00</td>
<td>22.60</td>
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<td>12032.4</td>
<td>11.75</td>
<td>11.00</td>
<td>26277.6</td>
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<tr>
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<td>12.00</td>
<td>13.70</td>
<td>27589.8</td>
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<tr>
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<td>9.70</td>
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<td>13713.9</td>
<td>17.60</td>
<td>31.20</td>
<td>45456.9</td>
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<tr>
<td>1989</td>
<td>14011.5</td>
<td>24.60</td>
<td>44.70</td>
<td>47035</td>
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<td>3.60</td>
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<tr>
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<td>22.88</td>
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<td>19.49</td>
<td>11.60</td>
<td>2814846.1</td>
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<tr>
<td>2006</td>
<td>23035.9</td>
<td>18.70</td>
<td>8.60</td>
<td>4027901.7</td>
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<tr>
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<td>18.36</td>
<td>6.00</td>
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<tr>
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<td>18.70</td>
<td>15.10</td>
<td>8518849.2</td>
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<td>2009</td>
<td>30013.8</td>
<td>22.90</td>
<td>12.10</td>
<td>10767577.8</td>
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<tr>
<td>2010</td>
<td>32281.3</td>
<td>22.51</td>
<td>13.80</td>
<td>11134782.8</td>
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</tbody>
</table>

Source: Central Bank of Nigeria Statistical Bulletin

Key: MSS = Money Supply; MSO = Manufacturing Sector Output; INT = Interest Rate; IFL = Inflation Rate
Inflation poses serious challenge especially in developing countries (see Dornbusch, 1992) including Nigeria. Inflation increase the cost of goods, deepens poverty and makes life difficult for the poor. Inflation in Nigeria keeps soaring inspite of unemployment, figure 4 shows the relative movement of inflation and interest rates in Nigeria between 1980 and 2010. The specific effects of inflation in Nigeria include:

3.1. Planning Problems

Inflation in Nigeria impacts on planning and financial projections. Inflation makes it difficult to estimate the cost of living or cost of production based on current prices, because sooner or later inflation creates cost overrun which distorts these plans. The instability does not encourage foreign investors into the economy.

3.2. Project Execution

Government Projects are often abandoned on account of inflationary pressures in Nigeria. Projects planned on the basis of current prices may soon run into difficulties because inflation may have doubled the assumed prices. These cost over runs makes it difficult for contractors or project executors to continue such projects. This is a major source of uncompleted projects in Nigeria.

3.3. Discourage Savings

An inflationary economy discourages savings, because the real value of the saved sum is eroded by inflation. Thus, it is not efficient to save monies during inflation but savings are critical for investments. Apart from investments the need to address emergent difficulties are ever present with us. And in an economy where access to funds are difficult, this is a great challenge.

3.4. Inequality

Inflation heightens social inequality. Quite often those with head starts tends to benefit more from inflation. Producers take advantage of inflation to increases their profits while workers become casualties. This causes frustration among workers and drive instincts for sharp practices or other survival strategies on the worker. At the same time the over empowered wealthy Nigerian occasioned by inflation uses his access to wealth in a manner that will encourage capital flight from the economy.

3.5. Pensioners and Fixed Income Earners

Fixed income and pension income earners have suffered greatly from inflation in Nigeria. Inflation has eroded their spending abilities greatly. Recently, the Kano state Government came to the rescue of pensioners by increasing their nominal earnings from about N200 monthly to N6,000.00 for the minimum pensioner in order to shore up with inflation. N200.00 was a lot of money many years ago, but that amount may not buy a loaf of bread in Nigeria today nor is it enough to serve as transport fare to where the payment could be made. The fall in real incomes impact negatively on the welfare of fixed income earners.

4. DETERMINANTS OF INFLATION IN NIGERIA

Not withstanding, the general theories that explain inflation worldwide, the survey identified these specific sources of inflation in Nigeria. The sources include:

- Corruption
- Incidence of multiple taxation
- Productivity constraints
- Poor work ethics
- Inadequate social infrastructure
- Deficit financing by Government
- Unplanned wage increases
- Inadequate storage facilities
- Import dependence
- Weak Distribution Mechanism
- High cost of borrowing
- Extra economic factors
4.1. Corruption

It is a known fact that Nigeria is infested with the corruption bug. Its damage to the Nigerian economy is immense. Corruption in Nigeria manifests in different forms, these include extortion from traders and motorists. These in turn pass the burden of such extortions to final consumers. These may be observed at the highways, ports, National borders and even in offices. But, they constitute an unnecessary part of the cost of production in Nigeria. Apart from the usual extortion, there are real offending forms, that chief executives and politicians impose on would be investors or public supported programmes. For example, there is no reason to explain why fuel Premium Motor Spirit (PMS) should be sold beyond N60.00 a litre in Nigeria. Coincidentally, it has been proved that a major source of the high prices paid for fuel is associated with corruption (See Okonjo-Iweala 2012). Apart from the petroleum industry and power supply, many utility providers engage in different forms of sharp practices which ultimately lead to a rise in cost of services. Also those who benefit from sharp practices after tend to spend such sums carelessly. Authors attempt to list out forms of corruption to include (i) bribery (ii) fraud (iii) grand (political) corruption (iv) extortion (v) bureaucratic corruption. But all these impact on cost of output.

4.2. Incidence of Multiple Taxation

The problem of multiple taxation require urgent attention especially in the southern part of Nigeria. There are different tiers of government taxing the same people, the same institutions on similar items. The case is particularly same for companies. The burden of multiple taxes return to consumers as inflation.

4.3. Productivity Constraints

There are structural limitations that affect productivity in Nigeria. For instance, in the agricultural sector, low and obsolete technology is a key limiting factor, poor access to land, use of poor inputs or inputs with poor resistance to disease. All these lead to poor harvests. As a developing society, Nigeria can only boast of few secondary products, thus output is often low. Against limited output, the country has a dense population. This disconnect leads to a situation where there is often competition for available goods and services. This explains why any change in money supply impacts on inflation. The country has capacity to increase output if these constraints are addressed.

4.4. Attitude to Work and Spending Pattern

Over the years, government has been encouraged into many sectors of the economy including sectors traditionally meant for the private sector. This was fueled by the oil boom of the early 1970s. Gradually, a new orientation is observed in Nigeria. Earnings having no bearing with length of training, ability, amount of work done but on the sector of work and the volume of social network. For instance, if a university graduate of 5 years is employed in a multinational oil company, he could afford to employ and pay a number of his contemporaries from his earnings who do the same kind of job in other sectors particularly the civil service. If he gets a political office, his earnings depend on the particular office but if he works in formal sector (ministry) he is paid in 'levels'. Output often has little or nothing to do with earnings. So attitude to work is poor. For some people, there is a feeling of discontent, for others, government work is 'no-body’s business'. And given the large size of government, the impact on output is great. This is further encouraged by institutions which should discourage such poor attitude to work with such aphorisms as work like an ant and eat as elephant,’ do not ‘work as elephant and eat like an ant’. The desire to eat as elephant when you have not worked as elephant encourages attitudes that maximize earnings and prices for minimum output. This drives inflation. Aside this, the spending pattern of many Nigerians is worrisome, many Nigerians enjoy extravagant lifestyles including the consumption of ostentatious goods, naked show of opulence at the private (micro) level. The public sector also get involved in extravagance (See Obiwuru and Udoh, 2011).

4.5. Inadequate Social Infrastructure

The main duties of government include the provision of social infrastructure such as roads, water supply, power, telecommunication, security among others. The provision of these public utilities nets of some cost of production for the private sector and impacts on the cost of final output to the consumer. But in Nigeria, such infrastructure are parlous. In many cases, the investor will need to provide for an alternative source of power, as the public supply is unreliable, the investor may need to construct and maintain the road to the factory, provide alternative supply of water, security among others inspite of huge taxes it may still need to pay. These are the main causes of cost push inflation and uncompetitiveness of locally produced goods and services.

4.6. Deficit Financing by Government

Deficit financing is pervasive in Nigeria, Nigeria depends on oil proceeds to fund it activities and when its expectation are yet to mature, it could borrow. Technically, borrowing may not be harmful, but when an entity persistently overspends its earnings, this becomes a real problem especially if it is spent on recurrent items. Nigeria according to the Radio Nigeria Commentary of 8th January 2013, is owing N6 trillion domestic debt and $5 billion international debt. Besides, government is the biggest borrower from banks in the local economy.

This effectively limits the ability of the private sector to participate in economic activities ultimately affecting total output and marginal prices. In the 1970s government executed white elephant projects, in the 1980s economic restructuring, in the 1990s, transition to civil rule and in the 2000 decade the building of institutions
to strengthen its nascent democratic institutions. These expenditures effectively impact on inflation in Nigeria (see Obiwuru and Udoh, 2011).

4.7. Wage Reviews

Wage reviews are worldwide but in many climes, such reviews are driven by the need to shore up with inflation or to stabilize workers welfare. But in Nigeria especially since wages were deregulated in the 1990s strike actions to press for wage increases have been frequent. Quite often employers are stampeded to wage reviews which are not backed up by productivity. The effect of these is the rise of money supply as against fixed or limited output leading to inflation. Often workers tend to compare their wages with their counterparts in other countries using the extant exchange rate or compare with others in the local economy even in situations where such comparisons do not match.

4.8. Inadequate Storage Facilities

As an agrarian economy, at harvest seasons, excess output need to be preserved for use in times of need. This may be efficiently done using modern technology or storage facilities such as Silos or processed into secondary products, but this is a current challenge in the country. Annually, farmers lose such items as tomatoes, maize, among others to poor storage facilities. This impacts on the morale of farmers as well as total available goods in the market. The effect is scarcity at planting seasons with the consequent rise in prices. The use of obsolete technology has its limitation and there is need for government to encourage pervasive use of home grown technology in the processing of many agricultural output to enhance their shelf life. This will go a long way to keep prices stable.

4.9. Import Dependence

Nigerians have a high penchant for foreign goods. This is partly due to its low industrial status and the flow of economic resources from petroleum products. As at 2008, about N80 billion was targeted for rice imports (a product Nigeria could export). Nigeria imports several agricultural products which she has capacity to be, net exporter for, thus losing substantial revenue from these products (see Otto 2009). Apart from agricultural products, clothes, automobiles and household consumers are imported. Government had tried to encourage the consumption of local goods, but the tendency is that government and its functionaries are good examples of inelasticity in the demand of foreign goods especially health care, transport facilities such as helicopters and airplanes. This dependence has meant that whatever inflation that exists in the international market is imported into the country, so imported inflation is common in Nigeria.

4.10. Distribution Mechanism

There is a penchant among some Nigerians to work like an “ant” and eat like an ‘elephant’. In other words, these people wish minimum work for maximum pay. Because of this penchant there are many people involved in the distribution channel, adding only little value but extracting much in the process. For example, a contract awarded for the construction of a school building to contractor ‘A’ may be sold to ‘B’ by ‘A’, who then sells the contract documents to ‘C’, C sells to ‘D’ who now attempts to execute the project in a way to maximize gains for himself. This explains low capital output ratio in public projects in Nigeria. Similarly, for private sector goods, a lot of middlemen are lined up between the producer or importer and the final consumer. This may include the owner of the license, the actual importer, the wholesaler, the retailer and a lot more. All these tend to increase the cost of the items. This is without prejudice to many rent seeking and corrupt attitudes that may be imposed on the system.

4.11. Currency Re-domination

Between 1st July 1959 when the Central Bank of Nigeria commenced operation and 2013, the Nigerian currency has been partially or wholly re-dominated about twelve times, as follows: 1st July, 1959, 1965, 1968, 1973, 1977, 1981, 1999, 2001, 2005, 2007 and 2012. These include introduction of new currency or the change of existing currencies N100.00, N200.00, N500.00 and N1,000.00 were introduced in December 2009, November, 2000, April 2001 and October 2005 respectively. On February 28, 2007 lower denominations were coined and issued to Bank customers inspite of their protests (See Ezeibe and Onyeagwu. The unit prices of items bought with such denominations rose and had remained high. This snowballed into the prices of other items. This experience has been consistent with such introduction of high denominations.

4.12. High Cost of borrowing

The cost of funds is also a key issue influencing inflation in Nigeria. Capital inadequacy is a constraining factor affecting production in Nigeria. When capital is available its cost is often in the double digits. This high cost is transferred into the cost of output, which the consumer ultimately absorbs. Aside the fact that high cost of borrowing could mean high prices of output, high cost of borrowing discourages investors. It is also a source of unpaid or non-performing loans. Because the interest rates are high and compounding, once total indebtedness become unsustainable, some debtors tend to be discouraged (See Calvo 1992). When many of such situations occur with any bank, the bank may fail, further worsening the economic position of the entire economy.

4.13. Extra-economic Problems

There are several other issues that impact on inflation in Nigeria, these could be social, political, climatic or institutional. For example, the dearth of inputs and factors, encourages market failure in Nigeria. With firms operating as monopolies, oligopolies etc, pricing is manipulated to extract rent incomes. This is further fueled by the premium placed on material trappings by many Nigerians. Aside this the size of the public sector and
A distributive pattern of central economic resources is usually sub optimal.

5. CONCLUSION AND RECOMMENDATION

This work set out to identify the determinants of inflation in Nigeria. It has identified 13 factors and observed that inflation debilitates the purchasing power of many Nigerians especially civil servants and is one reason to explain the frequency of work stoppages and industrial strikes which in turn lead to rising cost of output in Nigeria. Government must take measures to reduce inflation in Nigeria. These measures may include addressing the problem of double taxation, increasing the availability of social infrastructure among others. These will encourage the private sector to invest in the economy and expand output. An expanded output will lead to more employment and lower cost of goods especially if these goods are driven from the private sector. Because of the intensity of corruption associated with the public sector, the private sector should be encouraged into non-sensitive sectors of the economy that can be accommodated by private capital. Stabilizing inflation may also require fiscal correction (See Commander 1992). This can be achieved through cuts in non-capital public spending. Except for security reasons, frequent redenomination of the naira that gulp huge sums of tax payers money should be discouraged, rather such sums should be invested in productive sectors. The Central Bank may also continue with its corrective monetary policies but only after a careful study of the impacts of previous policies.

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Risk assessment and mitigation at the information technology companies

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Abstract
Developing computer software that is free from material defects is the ultimate goal for software developers; however, due to the cost and complexity of software development, it is a goal that is unlikely to be achieved. As a consequence of the inevitable defects that manifest within computer software, the task of software patch management becomes a key focus area for software companies, IT departments, and even end users. Audit departments, as part of their responsibilities, are required to provide assurance on the patching process and therefore need to understand the various decision-making factors. Software flaws that exist within computer systems may put confidential information at risk and may also compromise the availability of such systems. The study investigated the recommended approaches for the task of software patching, with a view to balancing the sometimes conflicting requirements of security and system availability. The study found that there are a number of key aspects that are required to ensure a successful patching process and that the internal auditors of the ‘big four’ South African banks considered most of these factors to be important.

Keywords: Software Patches, Software Patch Management, Software Flaws, Risk Assessment, Risk Mitigation, Confidentiality, Integrity, Availability, Downtime, Information Security

1. INTRODUCTION
There has been a rapid increase in the prevalence of computers and related devices in South Africa (Statistics South Africa, 2012:71). However, it is the greater connectivity between computers brought about by the Internet in the 1990s that really changed the dynamics of how society operates today. This is evidenced by the Internet penetration in South Africa being measured at 35.2% in 2011 and increasing at a steady pace, most notably though mobile phone connectivity (Statistics South Africa, 2012:72).

The greater prevalence of computers, allied to the increase in Internet penetration in the last 15 years, has resulted in a far greater amount of digitally stored information being available to the world’s population. As organisations began to build a web presence in order to both connect with and market to their ever-increasing Internet-based target consumer base, they quickly learned that the threat to Internet-connected systems is very serious. Sommerville (2011:367) notes that “as more and more systems were connected to the Internet, a variety of different external attacks were devised to threaten these systems.”

The effect that these trends have had on the discipline of software engineering has been immense. Prior to the advent of the Internet, when computers were primarily standalone, the only manner in which to exploit a software loophole was to have physical access to the computer. Since the inception of interconnected computers over a wide area network such as the Internet, it is now possible to connect to a computer from the other side of the world in order to exploit a software flaw. This has made it imperative for computer software to be designed in a manner that it is more resistant to malicious attack and hacking, and introduced a new challenge for software engineers to design and implement systems that are secure to address these risks (Sommerville, 2011:367). The Kindsight (2014:3) malware report further highlights these risks by identifying the following trends with respect to virus or malware infections:

- Mobile device malware infections are accelerating, with an increase of 14% noted for the first half of 2014 alone. It is estimated that approximately 15 million devices worldwide may be infected with some form of virus or malware;
- Spyware (software designed to steal personal information) is also on the increase, especially in the mobile phone environment; and
- With respect to computers connected to home networks, it is estimated that approximately 18% of homes may have devices that are infected with malware as at June 2014.

From the above it is evident that the importance of understanding IT risks and the process of software patch management is critical for auditors in assessing these risks and formulating their audit approaches, whether as internal or external audit.
view to identifying the most important aspects required to implement a successful software patching process and the impact thereof on auditors. The methodology followed for the empirical study consists of the analysis of a questionnaire sent to South Africa’s largest banking institutions.

The surveys were sent to the internal audit departments at the big four South African banks. Given the high level of risk maturity in the South African banking environment, these findings may not necessarily represent other industries in South Africa or abroad. The major South African banks were selected as the population for the survey due to the importance of both security and availability considerations to their businesses.

Due to the research population being limited to the financial services (banking) sector, it is probable that patching requirements and approaches may be different for other types of organisations. This is especially true where there are vastly differing levels of risk maturity and risk tolerance across different industries.

3. THEORETICAL BACKGROUND

3.1. Risk management

3.1.1. Risk based auditing

The concept of risk-based auditing is introduced by Griffiths (2005:1), who explains that “risk-based audit is probably the most exciting and significant development in the internal audit profession’s history. It has the potential to catapult the reputation of and the value added by this profession into the stratosphere.” He further expands on the concept to explain what it means when an audit is conducted using a risk-based approach: “The simplest way to think about risk-based audit conceptually is to audit the things that really matter to your organisation. Which are the issues that really matter? Probably those areas that pose the greatest risks” (Griffiths, 2005:5). The concept of risk-based auditing highlights the importance for auditors to assess potential audit risk areas and make recommendations based on the principle of risk.

Due to the fact that patch management is a discipline that emanates from the development of software, it is necessary to consider the impact of software risks. Pressman (2010:745) gives his view on software risk as follows: although there has been considerable debate about the proper definition for software risk, there is general agreement that risk always involves two characteristics: uncertainty that the risk may or may not happen and loss if the risk becomes a reality.

Software patches are implemented to address either a software flaw that results in unexpected or unwanted behaviour or security vulnerability in the software that could compromise the integrity of the software and allow unauthorised access. As a result, security is one of the key drivers behind the need to deploy software patches. Sommerville (2011:369) emphasises the importance of assessing possible losses that might ensue from attacks on assets in systems, and balancing these losses against the costs of security procedures that may reduce these losses. This indicates that risk management is an integral part of any software development initiative, where the developers are constantly balancing the costs of additional development time against the risk of software flaws. The approach of balancing the cost of losses against the cost of additional controls is therefore relevant to any software developer. The costs involved to develop a completely secure software package may be exorbitant, and doing so could possibly be so costly that it may be unaffordable to the end user. This is a reason why software companies may accept that certain security and functionality issues will always be present in the software they create. The trade-off is that fixing these issues after the software is released may be far more economical than attempting to find all problems prior to the software’s release. This is the concept that underpins the practice of software patch management, as it is the reason why patching exists.

The process of risk assessment is an on-going rather than a one-time event, and as such should be considered throughout the lifetime of the system. Thus patch management is one of the key aspects to consider after an application has been delivered to the business.

3.1.2 Risk assessment

Subsequent to the identification of risks, the next step is that of determining how to go about assessing these risks. Rainer, Snyder and Carr (1991:133) note that there are many methodologies currently in use that attempt to measure the loss exposure of assets. These methodologies can be broadly categorised as either quantitative or qualitative.

Most quantitative methods are based on loss exposure as a function of the vulnerability of an asset to a threat multiplied by the probability of the threat becoming a reality (Rainer et al, 1991:133). The most basic and universal approach to assessing risk, as noted by Collier (2009:85), is to use an impact/likelihood matrix. This process is also commonly called risk mapping. The likelihood or probability of occurrence may in the most simplistic form be categorised as high, medium or low. Similarly, impact or consequences in terms of downside risk (threats) or upside risk (opportunities) may also be categorised as high, medium or low.

Qualitative risk analysis methodologies which use risk factors that are not numeric in nature may save time, effort, and expense over quantitative methodologies because IT assets need not have exact monetary values, nor do threats need to have exact probabilities. Furthermore, qualitative methodologies may be useful in identifying gross weaknesses in a risk management portfolio, but may often be imprecise as the variables used (i.e. low, medium, and high) are not always clearly understood by all parties involved in the risk analysis process.

3.1.3 Risk appetite and tolerance

The Information Systems Audit and Control Association (hereafter ISACA) and Collier (2009:69) provide similar definitions for both risk appetite and risk tolerance. Risk appetite is seen as the amount of
Risk a company or other entity is willing to accept in pursuit of its objectives, while risk tolerance is the acceptable variation relative to the achievement of an objective (ISACA, 2009:17). In contrast to risk appetite, risk tolerance is defined as the tolerable deviation from the level set by the risk appetite and business objectives. In other words, this is the acceptable deviation that the organisation will accept, which, for example, could be in the form of overruns of 10% of budget or 20% of time, etc. (ISACA, 2009:17).

It is clear that risk tolerance for software patching will differ from organisation to organisation depending on the extent and significance of IT infrastructure implemented. For purposes of consistency in comparison, this study will focus on the risk posture of large banks in South Africa with regard to software patching.

3.1.4. Risk treatment

Risk treatment has at its core the process of selecting and implementing measures to modify or reduce risk. These can include, among others, risk control/mitigation, risk avoidance, risk transfer and risk financing (e.g. hedging, insurance). Risk treatment, sometimes also called risk response, involves decisions as to whether particular risks should be avoided, reduced, transferred or accepted (Collier, 2009:89). Hopkin (2010:245) also identifies four strategies for addressing risk, referred to as the “Four T’s”: namely, tolerate the risk, treat the risk, transfer the risk (insurance) and terminate the activity giving rise to the risk. While the terms may be slightly different, the objectives are broadly the same. The figure below by Rainer, et.al (1991:132) illustrate the relationship between protection vs. expected loss.

Figure 1. Cost of protection vs. expected loss

When considering whether to implement any software patch, it will be necessary to understand the impact and likelihood of the weakness. For instance, it may not be necessary to implement a software patch that has a low impact and likelihood due to the cost involved as well as the risk of downtime.

3.2. Software defects

3.2.1. Defects in the software development process

Harris (2013:1085) notes that programming code is complex and costly and highlights the need for programmers and application architects to strike a balance between the functionality of the program and ensuring that security requirements are implemented. With respect to software defect removal, Jones (2010:555) notes that there are two distinct processes, the first being development defect removal (when defects are found and removed during software development) and the second being maintenance defect removal (when defects are corrected after the development of the software). It is also noted that the major cost driver for the total cost of ownership (hereafter TCO) of software is that of defect removal (both development and maintenance defect removal). It is claimed that between 30 and 50 percent of every dollar ever spent on software has gone to finding and fixing bugs. Being a significant percentage, it is clear that this area of spending will be placed under huge pressure when software development organisations are seeking to reduce costs.

3.2.2. Software testing

When conducting software testing, the intention is to show that a program does what it is intended to do and to discover any program defects before it is put into use. Normally, programmers carry out some testing of the code they have developed during the programming process. This often reveals defects that must be removed from the program. This is commonly called software debugging. Defect testing and debugging are seen as different processes. While testing establishes the existence of defects, debugging is generally concerned with locating and correcting these defects (Sommerville, 2011:41).

3.2.3. The problem with testing

Software can be extremely complex and as functionality and features increase, so does the level of complexity. There are two main reasons noted in the literature as to why not all the errors in program code are discovered and rectified during testing. The first reason given by Dooley (2011:194) is humans not being perfect. Dooley questions that “If we made mistakes when we wrote the code, why should we assume we won’t make some mistakes when we read
it or try to test and fix it?" While this problem can happen for even small programs, it may be particularly prevalent for larger programs that have upwards of 50,000 lines of code. This is a significant amount of code to review, and as a result, the likelihood of missing a problem is high. The second reason why problems are missed during testing is that, due to their complex nature, programming errors can escape from one testing phase to another and ultimately reach the user. Even small programs have many pathways through the code and many different types of data errors that can occur (Dooley, 2011:194). This is also borne out by the large number of possible programming errors that can manifest themselves, as indicated in Section 3.2 of this study.

3.2.4. Software patches

As has been noted earlier, the software engineering process is not perfect and many different issues of varying severity could still manifest themselves in the final product that is released to the customer. This is where the development of patches by software developers begins. Meyer and Lambert (2007:1) provides a description of what a patch is: “No software program is perfect. As problems and bugs are discovered, the developer or a third party may fix them. This fix is what is referred to as a software patch.”

While critical software patches typically need to be deployed within a short timeframe, it is nevertheless important for organisations to follow a formal process to deploy these patches - this process should aim to ensure that adequate testing has been performed before deployment (Taylor, Allen, Hyatt & Kim, 2005:18). Patching may be a risky operation for a number of reasons such as the fact that patches tend to affect many critical systems libraries and other software used by numerous applications. Patches can also often be significant changes, many times with little documentation describing what they change. Patches also tend to be large and complex operations with even small configuration variances that can cause drastically different results. These factors can make the success rate for patch changes much lower than other changes, thus requiring more comprehensive testing (Taylor et al, 2005:18).

3.3. Software patch management

The literature generally accepted that any effective patching process should follow a number of predetermined steps. Various authors provide a differing number of steps to be executed, but the overall approaches share much similarity. The recommendations will be reviewed and compared in order to determine the best practice requirements for an effective patching process.

Sun Microsystems (2004:6) provides five practices to be considered for any patching strategy. These include: assessing the need to apply patches or update software based on risk, cost, availability and timing; minimising change to the IT environment whenever possible; addressing alert notifications and other critical issues as soon as possible; only making other changes to the IT environment to address known problems; and maintaining the IT environment as currently as is appropriate for the business and application needs. As per these recommended practices, it is evident that there are likely two conflicting factors: firstly, the need to keep the software environment updated, and secondly, to minimise changes to the environment as far as possible. This highlights the complexity in deploying patches in an effective manner.

As the need for a robust patching approach has been established, the focus is now on the required steps to ensure such a process is fully effective. Trent (2004:7) notes that there may be four main steps involved in deploying software patches, namely: assess, identify, evaluate, and plan and deploy. It is noted that these steps may be repeatedly executed as part of the patching process. The IIA (2005:6) suggest that internal auditors should keep up to date on leading IT change and patch management processes and recommend that the organisation adopts these processes. The details within these phases will now be further investigated by assessing the approach taken by various authors.

3.4. Auditing patch management

Auditors, both internal and external, should be aware of how their companies and clients are managing the patch process as this is a key control in securing a company’s data, including financial data. The recent AICPA Statements of Auditing Standards (SAS 104, Due Professional Care in the Performance of Work, and SAS 109, Understanding the Entity and Its Environment and Assessing the Risks of Material Misstatement) as well as the COSO Integrated Framework for Enterprise Risk Management have also increased the emphasis on the responsibility of auditors for assessing risk.

Aside from working toward best practices, organisations should fully engage accountants and auditors in the patch management process, as they may play an important role in ensuring that this key internal control is effective (Meyer & Lambert, 2007:6). It is noted to be especially important that accountants within an organisation, in corporate accounting and internal auditing, as well as external auditors, take an active role in the patch management system. There should also be at least one representative from corporate accounting and internal auditing in the patch management group. Furthermore, external auditors should provide their expertise in designing and evaluating controls to help the patch management group improve the patch management system. Patch management should also not be seen as purely an IT problem, but rather as a key internal control protecting the financial information of a company. (Meyer & Lambert, 2007:6).

4. METHODOLOGY

The literature study provided the foundation for the aspects that were tested empirically through the questionnaires sent to the Internal Audit departments of the big four South African banks.

4.1. Population

Banks are by their nature highly susceptible to fraudulent activity, and they also require a high level of system availability, as customers expect 24/7
availability. With these two factors in mind, the banking industry is an ideal research environment for assessing the approach used to deploy software patches. There is often a large disconnect between deploying patches quickly to avoid security vulnerabilities being exploited and ensuring minimum system downtime resulting either from deploying the patch or from outages relating to insufficient testing of a patch. The Banking Association of South Africa (2012:3) identifies four major banks in South Africa, and it is noted that these four banks represent about 84% of total banking assets. These banks are Standard Bank, which is said to be the largest in terms of assets, with 31%, followed by ABSA (26%), FirstRand (20%) and Nedbank (23%). PwC (2014:30) also name the four largest banks in South Africa as Barclays Africa Group (Previously ABSA), FirstRand, Nedbank and Standard Bank. This is further confirmed by Wikipedia (2015). The survey relating to the software patching practices within their respective organisations was sent to the head of internal audit for each of the four big South African banks. These participants were selected for their thorough knowledge of business practices at their respective organisations.

4.2. Questionnaire design and testing

The questions in the questionnaire were based on the information obtained from the literature study and other internal audit practitioners. The questionnaire was designed to ensure that participants could easily complete the questions. All the questions also provided the opportunity for the participant to provide his/her comment if desired. The participant was able to complete the questionnaire either electronically or manually. Before the questionnaire was sent out, it was tested by a selected group of people consisting of academics and audit practitioners. Testing the questionnaire ensured that the questions were unambiguous and set out logically and that the questionnaire was easy to complete. It was also determined that it would take on average no more than five minutes to complete the questionnaire.

5. RESEARCH FINDINGS AND INTERPRETATION

The objective and findings of each question in the questionnaire will be explained and discussed below:

5.1. Software patching risks

5.1.1. Objective of the question

Two major patching risks are identified in the literature. The first is related to confidentiality or security, which is the risk that manifests when software is compromised by a hacker and confidential information is leaked, as typically occurs when customer or credit card information is compromised. The second risk is that of availability: this risk could manifest either through an attack on software that renders it intentionally unavailable by a hacker, or through a software patch being deployed with insufficient testing such that there are unexpected errors in the software code which cause the software to be unavailable. Question 1 was aimed at identifying which of the two significant patching risks was deemed to be of a higher significance to the big four banks.

5.1.2. Findings

From the responses received, it is evident that the internal auditors of the major South African banks deem the security risk to be more significant in general, as stated by three of the four respondents. While certain South African banks have experienced downtime that has caused customer frustration, it is conceivable that customers would be even more irate and the likelihood of litigation far higher if there were to be a security breach that resulted in customer information being compromised.

<table>
<thead>
<tr>
<th>Which of the following risks resulting from the process of software patching do you deem more significant?</th>
<th>Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Potential security breaches which may result from a software vulnerability.</td>
<td>3</td>
<td>75%</td>
</tr>
<tr>
<td>Unexpected downtime as a result of the patching process, due to a patch that breaks functionality or causes systems to be unavailable.</td>
<td>1</td>
<td>25%</td>
</tr>
</tbody>
</table>

Source: Questionnaire (own calculation)

5.2. Deployment of software patches

5.2.1. Objective of the question

From the literature, a number of patching considerations are mentioned that can impact the decision-making processes relating to software patching. Question 2 was aimed at identifying the patching considerations that are deemed to be most important to the auditors within the big four banks when they assess the adequacy of a software patching process.

5.2.3. Findings

Various literature sources suggest a number of patching factors. The first is whether management signoff on the risk exposure is required in the event that a patch cannot be deployed or is not available. The vast majority of respondents indicated that this would be an important concern when assessing the availability of a software patching process. The second factor is the need to consider any possible unintended consequences when critical patches are rapidly deployed – the most noted consequence is unexpected downtime. Here too, the majority of respondents indicated that it is an important factor to assess from an audit perspective. The third factor is whether, if possible, patches are packaged, tested and then released as part of a formal release cycle. This process is aimed at reducing unexpected consequences of releasing patches outside of formal releases. All of the respondents indicated this to be an important consideration in the assessment of the patching process. The fourth factor is whether sufficient testing is performed to provide a level of confidence for successful patching on production systems. On this factor, all of the respondents indicated that it is a major consideration in their assessments. The fifth factor is whether
consideration is given to whether a threat can be mitigated without the need to apply a software patch, as in certain cases it may be possible to employ a compensating control such as a firewall to mitigate a particular exposure. The responses were mixed on this factor, with two of the four respondents indicating that it is an important consideration, one respondent indicating it as a minor consideration and another as not at all important. The final factor is whether any threat posed by software vulnerability is considered against the ability to provide reliable services (i.e. avoiding downtime). Regarding this factor, all of the respondents indicated it to be of a major consideration in their assessments.

Table 2. Deployment of software patches

<table>
<thead>
<tr>
<th>Which of the following factors do you deem to be important in assessing the need to deploy a software patch:</th>
<th>Total</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Large</td>
<td>Lesser</td>
</tr>
<tr>
<td>Where a patch cannot be deployed or is not available, will relevant stakeholders and IT management be asked to sign off on the risk?</td>
<td>4</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>For critical patches that need to be deployed as a matter of urgency, are unintended consequences considered?</td>
<td>4</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Consideration is given to the next release cycle and where possible, patches are packaged and tested with other updates.</td>
<td>4</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>Sufficient testing is performed to ensure confidence and predictability for patches deployed to production systems.</td>
<td>4</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>Consideration is given to whether the threat can be mitigated without applying the patch or update.</td>
<td>4</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>The materiality of the threat is considered in terms of the ability to deliver safe and reliable service to the business.</td>
<td>4</td>
<td>4</td>
<td>0</td>
</tr>
</tbody>
</table>

Source: Questionnaire (own calculation)

5.3. Software patching risk focus

5.3.1. Objective of the question

In the literature study, with respect to risk management, it was noted that the assessment of risk should form the basis of any decision regarding the patching of software. Question 3 seeks to explore whether the auditors of the big four banks believe that the patching process within their organisations are suitably risk focussed.

5.3.2. Findings

All the responses indicated that the internal auditors at the four major South African banks believed that the software patching process within their organisations could be improved to be more risk focussed. This is supported by the following comment received:

“There is a high priority set on ‘doing patching’, rather than performing a risk assessment and then patching.”

Table 3. Software patching risk focus

<table>
<thead>
<tr>
<th>Do you believe that the software patching process within your organisation is suitably risk focussed?</th>
<th>Total</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Large</td>
<td>Lesser</td>
</tr>
<tr>
<td>Do you believe that the software patching process within your organisation is suitably risk focussed?</td>
<td>4</td>
<td>0</td>
<td>4</td>
</tr>
</tbody>
</table>

Source: Questionnaire (own calculation)

5.4. Software patching programme

5.4.1. Objective of the question

In the literature a number of prerequisites for any patching programme are suggested. Question 4 seeks to identify which of these factors the auditors of the big four banks deem to be most important when developing a software patching programme.

5.4.2. Findings

The literature study identified four important factors that likely contribute significantly to the success of any patching process. The internal audit respondents surveyed were not all of the view that these factors were important to assess during an audit. This may indicate potential gaps in the auditing of the patching process. The majority of respondents were in agreement that the level of security knowledge of IT staff and the IT infrastructure allowing for automation are important considerations that would yield a successful outcome for the patching process. The level of user awareness was not seen to be as important in general. The amount of resources required to perform the patching operation was seen to be of lesser importance by the majority of respondents.

5.5. Testing of software patches

5.5.1. Objective of the question

In the literature it is noted that there are two distinct classifications for software patches based on the results of a formal risk assessment. These two classifications are 'normal' or routine patches and 'emergency' patches. It was noted that emergency patches should typically be deployed within a shorter timeframe than that of a routine patch. Question 5 seeks to identify the approach followed by the big four banks with regard to the testing of these two categories of software patches.
5.6. Patch deployment timeframes

5.6.1. Objective of the question

The results from the literature study clearly indicate the need to perform a thorough risk assessment in order to determine the importance of deploying any particular software patch, as well as the urgency with which the patch should be deployed. Question 6 seeks to identify the method(s) used by the big four South African banks to determine the timeframe within which a particular patch should be deployed.

5.6.2. Findings

In the literature, the process of undertaking a risk assessment involves the assessment of two key factors, namely the impact of a particular risk and the likelihood of this risk materialising. Assessing these two factors for any given software patch can prove difficult for an organisation. Based on the responses received, a hybrid approach is used for all the big four South African banks, whereby the vendor assessment, as well as an internal risk assessment, forms the bases of risk rank and determine the timeframes for patch deployment. This indicates a level of risk maturity higher than what may be seen at other organisations and is likely indicative of the importance that the South African banks place on the discipline of risk management.

The empirical findings indicated that the process of patch management is complex and that there are a number of requirements and considerations that need to be taken into account when building an effective patching process. The recommended approaches provided by the literature would form the basis for the assessments that internal auditors would need to consider when evaluating their organisation's patching process.

The findings indicated that the big four South African banks generally followed a risk-based approach to the assessment of software patching and that most of the recommendations as set out in the literature are seen as important for the internal auditors during their assessments. It was however noted that there may still be scope for an improved risk focus relating to the process of software patch management. Furthermore, the importance of end users in the patching process was not generally regarded as being important which is contrary to the recommendations contained in the literature. This could indicate a potential gap in the audit approach to the assessment of the software patching process.

6. RECOMMENDATIONS AND AREAS FOR FUTURE RESEARCH

The survey results indicated that effectively managing the process of software patch deployment is a complex task which involves a number of factors which need to be evaluated in order to increase the likelihood of a successful outcome. The trade-off of increased security through rapid patch deployment needs to be balanced with the time required to effectively test a patch for system stability. This trade-off is likely to vary depending on the risk rating of the particular application and the risk appetite of the organisation concerned. A thorough
risk management process is therefore advocated based on the findings of the study.

The following areas have been identified where further research may prove useful:

- An analysis of the extent of testing required before the deployment of software patches, based on their criticality rating. This would investigate how to strike a balance between performing sufficient testing and still ensure that a critical patch is deployed quickly.
- Expansion of the survey population to include various industries. Due to the varying levels of risk maturity and risk tolerance across different industries, it is likely that patching requirements and approaches may be vastly different.
- An analysis on the costs versus benefits of undertaking in-house risk assessment of software patches, especially for smaller organisations where there may not already be established risk management capability.

7. CONCLUSION

The study investigated the need for and the recommended approach to the deployment of software patches. It was found that risk management should play an important role in the assessment of any software patch prior to its possible deployment within a production environment. While software vendors may provide a risk rating with each patch released, it is also important for organisations to perform their own assessment of each patch, as their usage profile or configuration may result in a risk rating different to that of the software vendor. Furthermore, there are a number of requirements suggested in the literature for ensuring a successful patching programme. It is important for auditors to be aware of these suggestions during their audits of the software patching process within their organisations.

The empirical study found that within the big four South African banks, auditors were generally in agreement with most of the suggestions made in the literature, with the exception of the role of the end user in the patching process and the need to ascertain which resources are required for deployment of patches. All the respondents also indicated that within their respective organisations, the approach to software patching could benefit from an enhanced risk management focus.

The risk posed by software flaws shows no sign of abating in the near future. As a result, organisations will be required to continually deploy software patches in response to these flaws. A successful patching process is one that is able to patch the vulnerability in the shortest possible timeframe while preventing unnecessary downtime due to an insufficiently tested patch. To achieve this balance, any successful patching process must be suitably risk focussed.

REFERENCES


GOVERNANCE OF THE VENTURE CAPITAL INVESTMENT: FACTORS INFLUENCING SELECTION OF AN IT FIRM

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Abstract

The selection of a firm for venture capital investment is not an easy task for any investor and so it is important to decide certain factors based on which a firm will be selected for the investment. This paper is based on the 104 responses generated through fund managers, venture capitalists, managers of financial institutions, bank managers etc. and examined two important aspects, first the factors used by venture capitalists to evaluate an IT in order to make investment decisions and second the importance of factors across different investors. This study was conducted in 2014 to find out the important aspects affecting decision making process while selecting an Information Technology firm. We have analyzed the qualitative and quantitative aspects suggested by the previous studies and studied the relationship between choice of factors among different investors and assigning weightage for them with respect to screening of an IT firm for investment.

Keywords: Venture Capital Investment, Information Technology, Qualitative and Quantitative Aspects

1. INTRODUCTION

Venture Capital is a fund based financial service which provides a financial base to various sectors of the economy and creates opportunities for economic growth also. The available literature shows that venture capitalists consider various factors while they select any firm for their investment. This has also been viewed that out of the total proposal available, they choose very few for their investment. We conduct a study to find out the important aspects of decision making process, and to determine the most important aspects of decision making process and relative relevance of these factors across the various institutions while selecting an IT firm for investment. Venture capital is also considered as an important key to innovation and financial growth (Gompers and Lerner, 1999; Kortum and Lerner, 2000) and so it has a role to play for growth in any industry. IT sector is a growing sector so this sector is also significantly funded by venture capital investment. It is important to select an appropriate firm for investment. A number of studies have concluded their research e.g. Hoffman (1972), Wells (1974), Poindexter (1976), Dorsey (1977), and Timmons & Gumpert (1982) Tyebjee and Bruno (1984), MacMillan, Siegel, and Subba Narasimha (1985), Ray, (1991); Ray & Turpin, (1993); Fried & Hisrich, (1994); Rah et al., (1996); Pandey & Jang, (1996); Franke et al., (2006) & (2008) and determined various criteria.

The present study reveals two important dimensions. First it determines the important aspects for financing an Information technology firm through venture capital investment and second it study the importance of factors adopted by various institutions and assignment of weightage given to those factors. We have identified 31 questions, divided in to 6 dimensions, based on available literature and floated the questionnaire to various fund managers, venture capitalists, bank managers and other related respondent.

1.1. VC Investment in IT Sector in India

Indian Venture Capital Industry is emerging as an important player of the economy and also providing significant role in the development of all the sectors of the economy by their investment. IT sector has also seen significant funding contributions by venture capital. A report of Cumulative Investment Details of SEBI Registered Venture Capital Funds (VCF) and Foreign Capital Investors (FVCI) shows that the size of total funds committed to this industry was Rs. 8210 crore in 2007. This figure rose up by Rs. 9465 crore in 2008. In the year 2009, this figure was Rs. 10780 crore and rose up to Rs. 13408 crore in the year 2010.

The study is divided into various stages which are as follows:
- Offering a questionnaire to 160 respondents.
- Generating results from 104 respondents (response rate 65%).
- Creation of coding sheet for the responses.
- Running factor analysis to find out the most important criteria for each factor (total of 6 factors).
- Generating ANOVA (analysis of variance) to figure out the similarity and the relevant relationship amongst the factors and to find out the pattern of selecting factors and providing weightage to them (through hypothesis formation).
The present study is classified into four sections which are as follows:
− First section represents the Introduction part.
− Second Section reveals the literature review.
− Third Section focuses on Research Methodology which consist collection of data, source of data collection, research tools, results.
− Fourth Section concludes the study.

2. LITERATURE REVIEW

Many studies in the area of determining and evaluating the decision making criteria of venture capitalists while selecting a firm for investment have concluded their research. Wells’ (1974) first concluded his research in the area of venture capital screening criteria using personal interview with eight Venture Capital companies and emphasized on the criteria of Business proposal, product market, marketing and engineering skills etc. This study was reviewed by Poindexter (1976) using sample size of 97. The study modified and ranked the criteria as quality of Management, expected rate of return, expected risk, management stake in the firm, financial provisions for investor rights, venture development stage, restrictive covenants, interest or dividend rate, present capitalization, investor control, and tax shelter considerations. However in the study the concern about technological risk about IT firm and any other sector was missing.

Tyebjee and Bruno (1981 and 1984) through telephonic interview with 46 venture capital firms emphasized on the factors like significance of market attractiveness, rate of return, managerial skills, stage of venture, size of investment etc. A replica study was conducted by MacMillan, Siegel, and Subba Narasimha (1985) through questionnaire method with 102 venture capital firms using factor and cluster analysis which further came out with few important factors grouped as Entrepreneur personality, Entrepreneur experience, Characteristic of product & services, Market acceptance of the product, Market characteristics & financial consideration with reference to few classification of risk such as management risk, product risk, financial risk etc. We have framed a question by considering these risks as a part of our study specifically for IT sector in India.

MacMillan, Zemann and Subba Narasimha (1987) conducted a study based on 130 respondents through questionnaire using factor & regression analysis which concluded with the relevance of successful attributes of venture capitalist as one of the important evaluation criteria to predict the venture. Khan (1987) in his study generated the results pertaining to nature of product & investee’s desire as factor for screening a deal through 36 venture capital companies. Sandberg (1987) disclosed the relevance of track record relevant to strategy in his study by interviewing 3 respondents.

Hall and Hofer (1993) also studied the perspectives of growth & profitability in industry in his study through semi structured interview with Venture capital firms. Zacharakis and Meyer (1998) capitalized social judgement theory called problem solving and concluded the result related to systematic biases for decision making.

Cumming & Machtosh (2006), Brander et al. (2009) and Munari & Toschi (2010) also focused on economic development aspect for achieving high profit margin as one of the important aim of investment.

2.1. Subject Significance and Gap

Towards Venture Capitalists’ selection criteria many studies have already been conducted than what is the importance of conducting present study. Drawing form the work of previous study, this paper aims to fill following gap:
− It has been observed that no study exists which focuses on sector specific investment criteria of Venture Capitalists.
− Previous studies such as Tyebjee and Bruno (1984), MacMillan, Siegel, and Subba Narasimha (1985), Khan (1987), Sandberg (1987), Hall and Hofer (1993) have concluded various factors that determine the Venture Capitalists selection criteria, but there is no follow up study exist which focuses on VC selection criteria for technology based start ups.
− There seems to be no study which shows the relationship between the selection factors taken by and corresponding weightage of the same among the various investors.

3. SCOPE OF THE STUDY

The main purpose of the study is to understand the selection criteria of venture capital investments and factors for decisions making in IT sector for their overall development. Venture capitalists evaluate a good no. of proposal every year for their investment decision but select very few. The present study gives importance to how do venture capital firms value entrepreneurial ventures and with special reference to IT sector. The overall paper deals with two main aspects:
− What are the most important factors of selection taken by venture capitalists while investment process for technology bases new start ups.
− Detail the relationship among the relevance of various factors taken by venture capitalist.
− Study the relationship among the weightage of various factors.

The findings would provide a base to IT entrepreneurs to become more aware about the quantitative and qualitative criteria of Venture Capitalists while choosing a IT firm for venture capital investment. The study would enable them to make effective business plan for their deal purpose. The study would also be useful to venture capitalists to screen their own process of investment. The findings would be useful for both, IT entrepreneurs as well as Venture Capitalists who are seeking new IT firms for their venture capital funding decision.

4. RESEARCH METHODOLOGY

4.1. Data Collection

We have designed a questionnaire from available literature and collected the responses about the aspects which are the main part of the study. The questionnaire was offered within India to 160 respondents which include fund managers, venture
capitalists, managers of financial institutions, bank managers. This is described in Table 1.

Out of 160 respondents, we were able to get responses from 104 respondents which disclose the response rate of 65%. The collected information through questionnaire is based on the qualitative and quantitative aspect on various dimensions which is a mirror image of previous empirical literature. We used five point likert scale to study the relevance of each aspect. Total 31 questions were asked from the respondents which were grouped in to 6 parts as below:


Table 1. Categories of Respondents

<table>
<thead>
<tr>
<th>Category of Respondent</th>
<th>Category volume</th>
<th>Percentage on total response</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Financial</td>
<td>11</td>
<td>10.58%</td>
</tr>
<tr>
<td>2 Financial Consultants</td>
<td>10</td>
<td>9.62%</td>
</tr>
<tr>
<td>3 Financial Institutions</td>
<td>10</td>
<td>9.62%</td>
</tr>
<tr>
<td>4 Fund Managers</td>
<td>16</td>
<td>15.38</td>
</tr>
<tr>
<td>5 Private Banks</td>
<td>11</td>
<td>10.58%</td>
</tr>
<tr>
<td>6 Public Banks</td>
<td>14</td>
<td>12.50</td>
</tr>
<tr>
<td>7 VC’s</td>
<td>22</td>
<td>21.15</td>
</tr>
<tr>
<td>8 OTHERS</td>
<td>11</td>
<td>10.58%</td>
</tr>
</tbody>
</table>

Source: Compiled from questionnaire

4.2. Research Tool

In order to determine the most important aspects for choosing an IT firm, we used the factor analysis and to find out the study of significance across the selection of factors and the correspondent weightage of the factors, we used the two way ANOVA (analysis of variance).

4.2.1. Factor Analysis

Factor Analysis is used to identify the most important variables by reducing the number of variables without losing the originality of the same. In the present study, total 31 questions were taken in to consideration, based on 6 different dimensions to extract the valuable information. To reduce the number of variables, we used dimension reduction of factor analysis under which factors were extracted through principal component analysis and rotated by Varimax, with Kaiser Normalization till no cross loading. Table 2 represents the outcome of this process.

This process was done by rotating the iteration through statistical analysis and values below .5 were deleted to find out the cross loading situation for identifying the most important aspects of decision making process while selecting an IT firm for investment. Total 31 questions, based on 6 different dimensions were rotated to check the correlation between the variables. As an outcome of this rotation, we identified total 16 variables which we grouped in to 4 factors as per Table 3.

Table 2. Factor Analysis (Rotated Component Matrix)

<table>
<thead>
<tr>
<th>Component</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capable of sustained intense effort</td>
<td>.755</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Able to evaluate and react to risk well</td>
<td>.986</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Personal compatibility to me</td>
<td></td>
<td>.869</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Demonstrated leadership ability</td>
<td>.934</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Track record relevant to venture</td>
<td></td>
<td></td>
<td>.921</td>
<td></td>
</tr>
<tr>
<td>Entrepreneur referred by trustworthy source</td>
<td></td>
<td></td>
<td>.939</td>
<td></td>
</tr>
<tr>
<td>Demonstrated managerial capabilities in general business</td>
<td></td>
<td></td>
<td></td>
<td>.962</td>
</tr>
<tr>
<td>Product has been developed to prototype</td>
<td></td>
<td></td>
<td></td>
<td>.913</td>
</tr>
<tr>
<td>Product has raw material availability</td>
<td></td>
<td></td>
<td></td>
<td>.939</td>
</tr>
<tr>
<td>Market has significant growth rate</td>
<td></td>
<td></td>
<td></td>
<td>.935</td>
</tr>
<tr>
<td>Venture will stimulate existing market</td>
<td></td>
<td></td>
<td></td>
<td>.913</td>
</tr>
<tr>
<td>Familiarity with industry</td>
<td></td>
<td></td>
<td></td>
<td>.962</td>
</tr>
<tr>
<td>Venture provides exit strategies</td>
<td></td>
<td></td>
<td></td>
<td>.986</td>
</tr>
<tr>
<td>Required return of 10 times investment</td>
<td></td>
<td></td>
<td></td>
<td>.780</td>
</tr>
<tr>
<td>Required liquidity and taken public</td>
<td></td>
<td></td>
<td></td>
<td>.986</td>
</tr>
<tr>
<td>Resistance to economic cycles</td>
<td></td>
<td></td>
<td></td>
<td>.934</td>
</tr>
</tbody>
</table>

Note: Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. a. Rotation converged in 5 iterations. b. Rotation converged in 5 iterations

Table 3. Factor Analysis (Symmetric Creation of Factors)

<table>
<thead>
<tr>
<th>Component</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demonstrated leadership ability</td>
<td>.934</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Demonstrated managerial capabilities in general business</td>
<td></td>
<td>.962</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Market has significant growth rate</td>
<td></td>
<td></td>
<td>.935</td>
<td></td>
</tr>
<tr>
<td>Familiarity with industry</td>
<td></td>
<td></td>
<td>.962</td>
<td></td>
</tr>
<tr>
<td>Resistance to economic cycles</td>
<td></td>
<td></td>
<td></td>
<td>.934</td>
</tr>
<tr>
<td>Capable of sustained intense effort</td>
<td>.755</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Able to evaluate and react to risk well</td>
<td></td>
<td>.986</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Venture provides exit strategies</td>
<td></td>
<td></td>
<td>.986</td>
<td></td>
</tr>
<tr>
<td>Required return of 10 times investment</td>
<td></td>
<td></td>
<td></td>
<td>.780</td>
</tr>
<tr>
<td>Required liquidity and taken public</td>
<td></td>
<td></td>
<td></td>
<td>.986</td>
</tr>
<tr>
<td>Personal compatibility to me</td>
<td></td>
<td></td>
<td></td>
<td>.869</td>
</tr>
<tr>
<td>Entrepreneur referred by trustworthy source</td>
<td></td>
<td></td>
<td></td>
<td>.939</td>
</tr>
<tr>
<td>Product has been developed to prototype</td>
<td></td>
<td></td>
<td></td>
<td>.913</td>
</tr>
<tr>
<td>Product has raw material availability</td>
<td></td>
<td></td>
<td></td>
<td>.939</td>
</tr>
<tr>
<td>Venture will stimulate existing market</td>
<td></td>
<td></td>
<td></td>
<td>.913</td>
</tr>
<tr>
<td>Track record relevant to venture</td>
<td></td>
<td></td>
<td></td>
<td>.921</td>
</tr>
</tbody>
</table>

Note: Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization

Table 4 indicates the decoding of four most important factors determined from the process of factor analysis which include total of 16 variables where first factor describes the importance of skill set which an entrepreneur possess for his business expertise and so he uses the same for surviving into the market, second factor focuses on the relevancy
of financial implication and describes the risk-return relationship related with investment, third factor describes the reference part of entrepreneur, source of the same and acceptability of the product into the market, once investment is done and last factor focuses on another important aspect i.e. the track record related to venture and expertise of the same (Sandberg 1987).

5. RESULTS

After applying the factor analysis, we determined 16 variables and grouped under 4 categories. We also studied the correlation among the factors (a correlation matrix is provided as an appendix at the end of the paper). The aim for this approach is to identify the two results which are as follows:

- To determine the most important factors while selecting an IT firm for investment.
- To find out the similarity among the factors given importance while selecting an IT firm for investment and pattern of assigning weightage to the factors.

Factor analysis resulted with the positive results for first aim and for attaining the results for second aim we applied the ANOVA (analysis of variance). Before applying the ANOVA, we formed following hypothesis for the generation of results:

H1: All types of financial institutions give the same importance to all the factors while selecting an IT firm for funding.

H2: All the factors do not differ in terms of their weightage across the different financial institutions.

After forming the hypothesis, we applied two way ANOVA and generated a coding sheet from the given responses. We grouped the types of institutions into eight categories and taken 10 respondents for each category. After grouping, the responses given by concerned respondent were recorded in to coding sheet based on the four factors generated from factor analysis (refer table 3 for the same). An average was taken for the factors individually and total of the average was done at the end. The total of the average was divided by 10 (as described earlier that total of 10 respondents were taken for each category). This activity was done for all eight categories for all four factors. After this, we have generated a new coding sheet based on the value of total average, factor wise and category wise as per Table 5. On this generated coding sheet, two way ANOVA was run to find out the outcome which resulted as follows:

H1: All types of financial institutions give the same importance to all the factors while selecting a firm for funding.

Result: This hypothesis is accepted because f calculated value is < f critical value & p value is > .05.

H2: All the factors do not differ in terms of their weightage across the different financial institutions.

Result: This hypothesis is rejected because f calculated value is > f critical value & p value is < .05. (Refer table 5 for the calculation part of ANOVA).

<table>
<thead>
<tr>
<th>Factors</th>
<th>Factor grouping</th>
<th>Variables</th>
</tr>
</thead>
</table>

Source: Decoded from questionnaire

<table>
<thead>
<tr>
<th>Factors</th>
<th>Financiers</th>
<th>Financial Consultants</th>
<th>Financial Institutions</th>
<th>Fund Managers</th>
<th>Private Banks</th>
<th>Public Banks</th>
<th>VCs</th>
<th>Others</th>
</tr>
</thead>
<tbody>
<tr>
<td>F1</td>
<td>4.36</td>
<td>4.46</td>
<td>4.46</td>
<td>4.34</td>
<td>4.2</td>
<td>4.38</td>
<td>4.32</td>
<td>4.4</td>
</tr>
<tr>
<td>F2</td>
<td>4.14</td>
<td>3.94</td>
<td>4.14</td>
<td>4.02</td>
<td>4.04</td>
<td>3.92</td>
<td>4.12</td>
<td>4.02</td>
</tr>
<tr>
<td>F3</td>
<td>4.26</td>
<td>4.18</td>
<td>4.28</td>
<td>4.22</td>
<td>4.28</td>
<td>4.24</td>
<td>4.26</td>
<td>4.26</td>
</tr>
<tr>
<td>F4</td>
<td>4.5</td>
<td>4.7</td>
<td>4.5</td>
<td>4.5</td>
<td>4.6</td>
<td>4.6</td>
<td>4.4</td>
<td>4.5</td>
</tr>
</tbody>
</table>

Source: Compiled from questionnaire
REFERENCES


6. CONCLUSION

The result of ANOVA (as described in table 6) proofs that when it comes to deciding the factors for selecting an IT firm for investment, the factors should be same among the various financial institutions and the same importance should be given to all those factors but there might be some differences in assigning the weightage for these factors because few institutions give more weightage to few factors and other may vary in their weightage, but all institutions consider same factors for decisions making process.

The present study was based on the ideology of deciding factors and their relative importance while selecting an IT firm for investment. In order to find out the results, we have analyzed the responses of 104 respondents which include fund manager, venture capitalists, managers of financial institutions, bank managers and other related respondent. The main purpose of the present study was to identify the most important aspects of investors and to study the pattern of selecting the factors across different institutions. Our work reveals that the four factors including the skill set of entrepreneur, his capabilities, experience, market potential and sustainability, risk and return associated with the investment, known factor of entrepreneur, product acceptance and track records are those factors which are given most importance while selecting an IT firm for investment decision. We also concluded with the help of analysis of variance technique that different institutions give same importance and choose almost same factors for their screening process but they differ when they assign weightage to them. With reference to present economic conditions, out sample is sufficient enough to conclude the research and communicates necessary information to investors for screening a business and to fund seekers for making their business proposal.

Table 6. ANOVA Results (two-factor without replication)

Table A.1. Correlation of the factors
ASSESSING ORGANISATIONAL GOVERNANCE MATURITY: A RETAIL INDUSTRY CASE STUDY

Hendrik Marius Wessels*, Naomi Wilkinson*

*University of Pretoria, South Africa

Abstract

For any business to operate effectively, a governance framework that operates at the relevant maturity level is required. An organisational governance maturity framework is a tool that leadership can use to determine governance maturity. This study aims to determine whether the organisational governance maturity framework (developed by Wilkinson) can be applied to the selected retail industry organisation to assess the maturity of the organisation’s governance, limited to the ‘leadership’ attribute. Firstly, a high-level literature review on ethical leadership, ethical decision-making, ethical foundation and culture (‘tone at the top’), and organisational governance and maturity was conducted. Secondly, a Johannesburg Stock Exchange (JSE) listed South African-based company was selected for the empirical part of the study using a single case study research design. The empirical results confirmed that the organisational governance maturity framework can be used to determine the maturity level of organisational governance for the selected attribute of ‘leadership’.

Keywords: Corporate Governance, Ethical Leadership, Governance Maturity Assessment, Organisational Governance Maturity Framework

1. INTRODUCTION

It is alarming that the ethical failure of leadership is marked, very often, by unethical decisions, immoral action, or policy that has never been questioned. The people in leadership know that they are in the wrong but are prepared to take the chance of performing an unethical act (Price, 2000:177). Such ethical breakdowns of leadership occurred in, for example, WorldCom, HealthSouth, Parmalat, Elan and Andersen (Donaldson, 2007:534). As a result, governments of the world implemented new measures to address the shortcomings of corporate governance (Coffee, 2002:1403; Melis, 2005:478; Rockness and Rockness, 2005:31; Kuhn and Sutton, 2006:61; Barlaup et al., 2009:183). The United States of America (USA) for example, introduced the Sarbanes-Oxley Act of 2002, which widened the sanctions and penalties for management's unethical behaviour. This rules-based approach, however, did not solve the relationship between management behaviour and rewards (Rockness and Rockness, 2005:51). The European Union (EU) countries and South Africa opted for a more principles-based approach to corporate governance, which is reflected in the third King Report on Governance, hereafter King III (Sama and Shaf, 2005:184; IoD, 2009:5; Wilkinson, 2014:10-11; Wilkinson and Coetzee, 2015:188). The principles-based approach is more end-result orientated or focussed on what is beneficial for the organisation. The embedding of ethical values and principles of fairness, accountability, transparency and responsibility in the organisation’s culture is therefore critical when the principles-based approach is followed (Wilkinson, 2014:47).

Allio (2012:8) argues that after the aforementioned governance reforms corporate failures still persisted. For example, Siemens was seen as ticking all the right boxes in terms of corporate governance and ethical behaviour – they had implemented ethics policies and programmes, had an ethics officer, code of conduct, and operated as a principles-based approach, however, did not solve the relationship between management behaviour and rewards (Rockness and Rockness, 2005:51). The European Union (EU) countries and South Africa opted for a more principles-based approach to corporate governance, which is reflected in the third King Report on Governance, hereafter King III (Sama and Shaf, 2005:184; IoD, 2009:5; Wilkinson, 2014:10-11; Wilkinson and Coetzee, 2015:188). The principles-based approach is more end-result orientated or focussed on what is beneficial for the organisation. The embedding of ethical values and principles of fairness, accountability, transparency and responsibility in the organisation’s culture is therefore critical when the principles-based approach is followed (Wilkinson, 2014:47).
operate (Grant and McGhee, 2014:127-129). Leadership was identified as a solution to give the board purpose, become more effective and work with a strategy. Adding value to the business is linked to the purpose of the board, performance function and effective organisational leadership (Erakovic and Overall, 2010:263: Wilkinson and Coetzee, 2015:187). The importance of the board’s role therefore is seen as providing leadership in the internal functioning, the organisation’s management and the organisation’s external stakeholder relationships (Erakovic and Overall, 2010:250-257).

Goverance is synonymous with leadership and highlights the multidimensional aspect of this concept (Erakovic and Overall, 2010:263: Wilkinson and Coetzee, 2015:187). Leadership can be either transactional or transformational (Allio, 2012:7). The main difference being that transactional leadership is the normal interaction between leaders and followers. Transformational leadership, on the other hand, is promoting the followers’ level of motivation and morale to the optimum level (Allio, 2012:7). Successful leaders have the ability to bring change for better or for worse. Great leaders can change history from Mandela to Hitler. The main difference between these leaders is ethics or the lack there of (Ciulla, 2005:160-161). Ethical behaviour can best be described as ‘good’ or ‘right’ behaviour (Ho, 2011:517). What is perceived as ‘good’ or ‘right' varies between countries, cultures, groups and business industries (Resick et al., 2006:349). This makes it difficult to define ethical behaviour that is universally applicable. King III called on business leaders to govern their organisations more effectively. Effective leadership includes the ethical values of responsibility, accountability, fairness and transparency. Moral duties therefore form the basis for effective leadership, which arises from the concept of Ubuntu (IoD, 2009:9; Wilkinson and Coetzee, 2015:187). It is evident that leaders in the organisation determine the organisation’s ethical foundation (Le Roux, 2010:24-25). Leadership and management use policies and strategies in the organisation to direct management to achieve the organisation’s goals or performance (Wilkinson and Coetzee, 2015:188). The aforementioned forms the organisational governance framework (Nienaber and Svensson, 2013:836-851).

For the leader to govern the organisation more effectively and to establish values and principles in the organisation, they need to establish a governance framework for the organisation (Wilkinson, 2014:14). The organisation should establish a governance framework that is agreed upon between the group’s board and its subsidiary boards (IoD, 2009:29). As such, governance framework refers to ‘embodying certain ideologies' in the organisation (Khomba and Vermaak, 2012:5312). Leaders can use the governance framework as a tool to achieve governance maturity for an organisation and aim to ensure sustainable business practices in so doing (Wilkinson, 2014:119-123; Wilkinson and Coetzee, 2015:190).

One of the pre-requisites to achieve the desired governance maturity in an organisation is continuous measurement. Constant improvements vary to the governance framework of an organisation should ensure relevance and add value to the organisation, and ultimately lead to an organisation which is mature in respect of governance. Leadership is only effective if the leaders know to what extent the organisation has established governance structures, systems and processes, and if these are sustainable (Wilkinson, 2014:177-178: Wilkinson and Coetzee, 2015:190). Wilkinson (2014:162-244) developed an organisational governance maturity framework which highlights the importance of governance maturity by determining where the organisation wants to be in terms of organisational governance maturity, where the organisation currently is, as well as the measures needed to achieve the optimum governance maturity for the organisation.

In this study the aim is to determine whether ‘leadership', the first general attribute of the organisational governance maturity framework developed by Wilkinson (2014: 244-250), can be applied to the selected retail industry organisation – motivation for this sector is provided in the methodology section. By applying the organisational governance maturity framework successfully, evidence is provided that the responsible role-players within the organisation’s governance structures can use the framework as a tool to measure and improve the maturity of the relevant governance attributes.

This article is structured as follows: the research objective, methodology and limitations are elaborated on followed by a high-level literature review on ethical leadership and the role it plays in corporate governance and corporate culture as well as some discussions on key concepts in respect of organisational governance and maturity. Finally, the results of the empirical study are presented followed by the conclusion and relevant recommendations regarding the usefulness of the organisational governance maturity framework.

2. RESEARCH OBJECTIVES, METHODOLOGY AND LIMITATIONS

2.1. Research Objective

The research objective of this study was to determine whether the first general attribute of the organisational governance maturity framework developed by Wilkinson (2014:154), namely leadership (Annexure A), can be applied to the selected retail industry organisation to measure governance maturity related to this attribute.

2.2. Methodology

A qualitative research method was overall applied to this study. Using a qualitative method assisted in the execution of the empirical study, as it acknowledges the complexity of the concept of governance. As also indicated by Creswell (2009:4), this method supports and acknowledges the complexity of the situation or concept. To achieve the research objective mentioned above the detail methodology applied was as follows: Firstly, a high-level literature review was performed on relevant aspects, such as ethical leadership, ethical decision-making, ethical foundation and culture ('tone at the top'), and organisational governance and maturity. These aspects closely relate to the first general attribute in the organisational governance maturity framework.
 Secondly, a Johannesburg Stock Exchange (JSE) listed South African-based company was selected for the study using a case study research design (Yin, 2009:8-14). The case study research design was deemed appropriate for this study for the following reasons (Yin, 2009:8-14): this design can provide valuable input while focussing on issues of ‘how’, ‘why’ and ‘what’ - which correlates with the type of questions asked during the interview; a case study design can be effectively used to provide answers when a thorough and in-depth understanding needs to be obtained regarding a certain concept - in this case governance and more specifically the aspect of leadership.

The company was selected based on being listed as one of the top 100 JSE-listed companies in South Africa and having operations nationally and internationally, making it one of the more ‘influential’ companies from a South African point-of-view. The company is active in three major areas of mobility, firstly: consumer and industrial logistics, secondly: vehicle import, distribution, dealerships, retail, rental and after markets, and thirdly: vehicle related financial services. The company is active in 29 countries in Africa, Europe, SouthAmerica, Australia and the USA. The company operates through five major divisions, which each operate under separate management structures. The company secretary was interviewed using a pre-formulated questionnaire and a pre-study of the company’s Integrated Annual Report. The questions were formulated according to the different criteria used by the organisational governance maturity framework (Annexure A). This was used to determine the level of maturity in respect of the first general attribute of the governance framework. It is deemed important to note at this stage that the level of maturity is influenced by the extent that which the organisation has established adequate governance structures, systems and processes as well as the implementation of and adherence thereto (Wilkinson, 2014:41). An explanation of the five levels of maturity used by Wilkinson (2014:244) being immature, developing, compliant, institutionalised and mature is provided in Annexure A.

2.3. Limitations

As mentioned, the study was limited to the first general attribute of the framework, namely leadership, focusing on decision-making, and ethical foundation and culture (‘tone at the top’). It should further be noted that the assessment was done at the company’s head office by interviewing only the company secretary, as this person is the best source of information when focussing on governance as a collective aspect.

3. LITERATURE REVIEW

Wilkinson and Plant (2012:19) identified the need to develop a governance maturity framework that can be used by the internal audit function and management to assess the effectiveness of an organisation's governance framework. Thereafter, Wilkinson (2014:244-250) developed an organisational governance maturity framework through studying relevant international leading maturity models relating to governance. The governance maturity framework developed uses desirable attributes of leadership, systems, structures, processes, and communication to stakeholders that should be in place at five different maturity levels (immature, developing, compliant, institutionalised and mature). Wilkinson then refined the governance maturity framework by conducting further literature reviews and interviewing key stakeholders at a selected organisation using a case study research design (Wilkinson, 2014:ii-iii). As mentioned previously, this study’s only focus was determining whether part of the framework (only attribute of leadership) developed by Wilkinson (244-250) could be applied in a private sector organisation. Hence, the literature review was limited to a high-level review of the concepts of leadership, decision-making, and ethical foundation and culture (‘tone at the top’) with the inclusion of organisational governance and organisational governance maturity.

3.1. Leadership

This section aims to explain the role of leadership in establishing and maintaining ethical practices in an organisation by means of certain key concepts.

3.1.1. Ethical leadership

Leadership is the backbone of governance. According to Caldwell et al., (2010:498) leadership is a process of motivation, change, influencing and inspiring the leaders and followers to obtain organisational objectives. Pimentel et al., (2010:364–365) define ethical leadership further as ‘...the demonstration of normatively appropriate conduct through personal actions and interpersonal relationships and the promotion of such conduct to followers through two-way communication, reinforcement, and decision making...’.

Leadership with ethical values will be inclined to promote ethical practices in an organisation (Trevino and Brow, 2004:80). Studies on leadership found a strong link between leadership style and values, and those values with ethical practices (Hood, 2003:271; Brown and Treviño, 2006:596-597; Mayer et al., 2009:1-2). Hood (2003:263) studied the relationship of chief executive officer (CEO) values, leadership style, as well as ethical practices in organisations. The study also included four categories of values namely, personal, social, competency-based and morality-based in relation to leadership style and ethical practices. He found the four values played a significant role in transformational leadership, and linking transactional leadership related positively to ‘...morality-based and personal values...’, whereas ‘...laissez-faire leadership negatively related to competency-based values...’ (Hood, 2003:263). This implies that transformational leaders are therefore more effective compared to transactional leadership (Shahin and Zairi, 2007:765).

Banerji and Krishnan’s (2000:405) imperial investigation on ethical preferences of transformational leaders and followers found it was negatively related to a preference for bribery and favouritism. It was further found that ethical leadership had an indirect effect on forming perceptions of the corporation’s ethical climate and organisational commitment. Leadership style
therefore, has a significant influence on the ethical climate in the corporation (Othman and Rahman, 2014:361).

### 3.1.2. Ethical decision-making

Decisions can be best described as ‘...singular, once-off in the moment or the product of many smaller assessments, agreements, and choices.’ (McKenzie et al., 2011:404). Shared decision-making in a business is about conversation. The effectiveness of decision-making is diluted when decision-making conversations are uncoordinated and do not come to a mutual conclusion. The role of leadership in decision-making is to be a role model and coach to individuals and groups to ensure the decision-making process is organised and rational (Schwarber, 2005:1086). As a result, ethics plays a role in decision-making and is based on rules or principles. The leader uses their moral base to determine right or wrong in the decision-making process and therefore the level of ethics applied to the decision (Ho, 2011:519).

### 3.1.3. Ethical foundation and culture ('tone at the top')

Organisations want to be seen as businesses of integrity which promote ethical behaviour (Steinmann, 2008:133; Wilkinson, 2014:167). To achieve this, organisations use codes of ethics and social responsibility programmes. The purpose of the code of ethics and social responsibility programmes in the organisation is to guide staff and management into what behaviour is acceptable and to show the level of commitment of management to ethical behaviour. Leadership needs to communicate the code of ethics and social responsibility programmes to all staff in the organisation and the role they play in implementing these codes and programmes. The effectiveness of the leadership communication will determine the level of implementation success and the effectiveness of the codes and programmes (Wells and Spinks, 1996:28).

From the aforementioned it appears that leadership is key to an organisation's ethical culture. Leaders who take stewardship of an organisations' ethical culture are an example of a leader who embodies and communicates ethics and who set an example for others; set goals wider than just economic goals, and maintain long-term views on all stakeholders (Enderle, 1987:658; Ardichvili et al., 2009:446). Ethical leadership should manifest in all levels of an organisation to ensure effective governance. King III connects ethical leadership with effective board leadership provided they are using ethical foundation as a base (IoD, 2009:19). The CEO’s ethical orientation in relation to the organisation's ethical practices is critical in understanding an organisation’s ethical behaviour (Hood, 2003:263). Management’s role in an organisation is therefore to create an ethical environment as directed by the leadership in the organisation (Banerji and Krishnan, 2000:411). Ethical culture’s real value lies in reducing pressure on individuals in an organisation to behave unethically (Wimbush et al., 1994:644-645). Wimbush et al. (1994:644-645) found that the ethical climate in an organisation increases ethical behaviour and performance of individuals. The individual’s ability to act ethically stems more from the ethical culture of an organisation than the individual’s own characteristics or traits (Chen et al, 1997:855).

The big question is, what is ethical behaviour? Factors such as country, region and group culture mostly determine what people perceive as right and wrong. Managers therefore can expect conflict between the norms of the home country and the country an organisation is doing business in. This will impact on an organisation's code of ethics, the type of social responsibility programmes an organisation implements, and the ethics culture an organisation fosters (Resick et al., 2006:349).

### 3.2. Organisational governance and maturity

Several organisational governance definitions exist, for example Bertelli et al., (2007:96) describes organisational governance as ‘the framework used by the organisation of established internal and external system rights, processes, and controls over management to protect the interest of stakeholders.’ Wilkinson (2014:47) defines organisational governance as a system by which companies are “directed” and “controlled” taking into account the four principles of good governance (responsibility, accountability, fairness and transparency) when dealing with stakeholders. In order to explore the concept of organisational governance, it was necessary to first obtain an understanding of the different key theories as well as approaches to governance.

#### 3.2.1. Shareholder versus stakeholder

Theorists have different views of what corporate social responsibilities should be. The shareholders theory and the stakeholders theory are normative theories formulated to describe the different views on corporate responsibilities and, by implication, business ethics. The two theories are almost the opposite of each other in respect of what they see is ‘right’ in the business environment (Letza et al., 2009: 242-243; Wilkinson, 2014:61-63).

The differences between these theories according to West (2006:433) are the way in which they are applied to an organisation. The shareholder theory originated from Freeman (1994) who defined stakeholder as 'any group or individual who can affect, or is affected by, the achievement of a corporation's purpose.' (Santos and Ansari, 2014:58). The stakeholder theory recognises and incorporates the needs and requirements of the organisation's stakeholders (West, 2006:433). On the other hand, the shareholder theory deems the organisation as a part or extension of the shareholder (Rossouw, 2009:38; Wilkinson, 2014:45-63). Managers, as the agency for the owners, must act only within the best interests of the shareholders (Rossouw, 2009:38). A question mark could be placed on the superiority and priority of any of these normative theories in the current business environment. Normative theories refer to how, or the moral way, stakeholders ought to be treated (Freeman, 1999:233; Letza et al., 2008:22). The normative theories fall short in explaining the current workings and complexities of the ever changing corporate business environment (Letza et
al., 2009:249). Businesses are operating in imperfect markets and hierarchies which require adaptation to the business environment. Governance therefore needs to be dynamic and will continuously change with choices made and complex context within which it operates (Kennerley and Needy, 2003:213; Letza et al., 2009:154; Wilkinson, 2014:86). Flexible and dynamic governance theories, adaptive to future business environment changes and uncertainties, are required. Radical research in this field will aid management in defining business ethics and corporate responsibilities.

3.2.2. Rule-based versus principle-based

The weaknesses of governance were highlighted by the worldwide scandals of organisations such as Enron, WorldCom, ImClone, and Royal Ahold, to name a few. Governments reacted differently to try and remedy the shortcomings of governance and the prevention of corporate ethical abuse. The use of either rule-based or principle-based approaches to address governance or corporate ethical abuse, however, had different degrees of success (Sama and Shoaf, 2005:177; Arjoon, 2006:53; Sergakis, 2013:394; Wilkinson, 2014:47; Wilkinson and Coetzez, 2015:187).

The USA opted for the rule-based approach by introducing the Sarbanes-Oxley Act of 2002 (Sama and Shoaf, 2005:179; Wilkinson, 2014:48:50). Rule-based governance uses legislation to direct businesses on business ethics. A major concern is that businesses equate business ethics with the law. Management can therefore feel as long as they follow the law they are not doing anything 'wrong'. This stems from that the rule of law being seen as the minimum norm and standard to conduct business (Sama and Shoaf, 2005:184). What is legal and what is ethical, overlap and can be equated to believing obeying the law is the same as ethical behaviour. The danger with the aforementioned might be that society’s ethical ways are not necessarily reflected in the law (Sama and Shoaf, 2005:184).

The EU countries and South Africa opted for a more principle-based approach to governance. They see impartiality, transparency, accountability, responsibility, truthfulness, and respect of rights as more than the law. A business has the obligation to design and develop governance structures to adhere to these principles (Sama and Shoaf, 2005:184). The bottom-line is that the best governance principles and practices might not prevent human mistakes, corporate collapse, and/or changes in the environment. Governance by either a rule- or principle-based approach has both strengths and weaknesses and varies from country to country (Zadkovich, 2007:38-39; Wilkinson, 2014:48-50). It lies with the country’s government and stakeholders to determine the optimum corporate governance balance.

3.2.3. Organisational governance maturity

Maturity models are widely used to improve organisational performance (Goldenson et al., 2003:20-22; McKenzie et al., 2011:403; Wilkinson, 2014:19-23; Wilkinson and Coetzez, 2015:190). The maturity model’s purpose is to identify strengths and weaknesses against benchmarked criteria (Khoshgoftar and Osman, 2009:297). Governance maturity in itself refers to an ‘As-Is’ position of an organisation relative to governance and allows selecting a ‘To-Be’ position appropriate for an organisation after analysis of the gaps/shortcomings. A strategy to achieve improvement is then developed to reach the desired level (Guldetopive, 2001:2; Gramling and Hermanson, 2006:38; IoD, 2009:6-49).

An organisation will not always want to obtain the highest level of maturity for governance (Wilkinson, 2014:78). The higher cost incurred for more mature governance structures forces an organisation to evaluate the best balance between cost and benefits to the stakeholders (Solomon and Bryan-Low, 2004:2-4; IoD, 2009:5; Abdullah et al., 2015:405). Other factors that will influence the choice of an organisation’s governance maturity level is the organisation’s size, culture and the complexity of the market it is operating in (Licht, 2000:147; Filatotchev et al., 2006:256; Licht, 2014:1-3). Filatotchev et al., (2006:273) also found that governance parameters are influenced by the strategic threshold of an organisation’s ‘life cycle stage’. An organisation is evolving in its life cycle and the balance changes with wealth protection and wealth creation of governance. The right combination of governance functions may help an organisation to overcome its strategic thresholds. The transition over the threshold is usually accompanied by rebalancing structure and roles of governance within the organisation. The next maturity level in the framework is therefore aimed for by the organisation, as a process of continuous improvement (Wilkinson, 2014:19; Wilkinson and Coetzez, 2015:190-192).

3.3. Conclusion

It was established that ethical leadership and decision-making, both attributes of governance, form an integral part of the ethical culture in a company. Ethical leadership should therefore manifest in all levels of an organisation to ensure effective governance. Maturity frameworks are a way that leadership can assess governance maturity in an organisation. It needs to be further noted that the continuous assessment of governance maturity brings an organisation’s governance framework to an optimal level for the particular business environment it is operating in.

4. RESULTS OF THE EMPIRICAL STUDY

The results of the questions are summarised in Annexure B, accompanied by additional information obtained from the company’s 2014 integrated report. This integrated report was not included in any in-text references or in the list of references as the anonymity of the company selected had to be respected in accordance with relevant ethical requirements. The secretary of the selected company was interviewed to derive at the interview results. The ‘leadership’ attribute was assessed against the criteria of the framework (Annexure A) and rated accordingly, using the interview results (Annexure B).

A structured summary of individual maturity level rating results is presented in table 1. The overall maturity level rating for the specific
attributes decision-making, and ethical foundation and culture (‘tone at the top’) was calculated to determine the current maturity level of the company in section 4.1 (table 2). As mentioned previously, an explanation of the five levels of maturity used by Wilkinson (2014:244) being immature, developing, compliant, institutionalised and mature is provided in Annexure A.

Table 1. Structured summary of individual maturity level rating

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Level of maturity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Who is responsible for the strategic direction and control (leadership)</td>
<td>Mature</td>
</tr>
<tr>
<td>of the company?</td>
<td></td>
</tr>
<tr>
<td>Are the abovementioned individuals/structures also responsible for making</td>
<td></td>
</tr>
<tr>
<td>the key decisions within the company i.e. do they have the necessary</td>
<td>Institutionalised</td>
</tr>
<tr>
<td>delegation authority?</td>
<td></td>
</tr>
<tr>
<td>Explain the process that is used to ensure that the leadership structure</td>
<td>Compliant</td>
</tr>
<tr>
<td>of the company has the necessary skills for effective decision-making.</td>
<td></td>
</tr>
<tr>
<td>Does the organisation have a long- and short-term strategy in place?</td>
<td>Mature</td>
</tr>
<tr>
<td>How are these strategies used (how do they contribute) in the decision-</td>
<td>Institutionalised</td>
</tr>
<tr>
<td>making process?</td>
<td></td>
</tr>
<tr>
<td>Are decisions made at appropriate levels? Please explain.</td>
<td></td>
</tr>
<tr>
<td>Can decisions made be substantiated? Please explain.</td>
<td>Institutionalised</td>
</tr>
<tr>
<td>Are decisions made enforced in a positive manner? Please explain.</td>
<td>Institutionalised</td>
</tr>
<tr>
<td>Is adequate responsibility assigned for decisions made? Please explain.</td>
<td></td>
</tr>
<tr>
<td>How are decisions made, communicated through the company?</td>
<td>Institutionalised</td>
</tr>
<tr>
<td>Ethical foundation and culture (‘tone at the top’)</td>
<td></td>
</tr>
<tr>
<td>How would you describe the ethical culture within the organisation?</td>
<td>Institutionalised</td>
</tr>
<tr>
<td>What board committees are in place? Provide evidence if possible.</td>
<td>Mature</td>
</tr>
<tr>
<td>Does the company have any codes of conduct and/or ethics-related policies</td>
<td></td>
</tr>
<tr>
<td>implemented and to what extent? Provide evidence if possible.</td>
<td>Developing</td>
</tr>
<tr>
<td>What is the board’s role in building and sustaining an ethical culture in</td>
<td>Developing</td>
</tr>
<tr>
<td>the company?</td>
<td></td>
</tr>
<tr>
<td>What is management’s role in building and sustaining an ethical culture</td>
<td>Developing</td>
</tr>
<tr>
<td>in the company?</td>
<td></td>
</tr>
<tr>
<td>Are ethical standards clearly articulated by the board and management to</td>
<td>Developing</td>
</tr>
<tr>
<td>ensure adherence to them in all aspects of the business? Please explain.</td>
<td></td>
</tr>
<tr>
<td>Are the ethical risks and opportunities incorporated in the risk</td>
<td>Institutionalised</td>
</tr>
<tr>
<td>management process?</td>
<td></td>
</tr>
<tr>
<td>Is the internal and external ethics performance aligned around the same</td>
<td>Developing</td>
</tr>
<tr>
<td>ethical standards?</td>
<td></td>
</tr>
<tr>
<td>Are the code of conduct, all ethics programmes, and policies performance</td>
<td>Developing</td>
</tr>
<tr>
<td>assessed, monitored, reported on and disclosed? Please provide detail and</td>
<td></td>
</tr>
<tr>
<td>evidence if possible.</td>
<td></td>
</tr>
<tr>
<td>What does the company have in place to ensure that each director adheres</td>
<td>Institutionalised</td>
</tr>
<tr>
<td>to the duties of a director?</td>
<td></td>
</tr>
<tr>
<td>What mechanisms are in place to ensure that all employees recognise the</td>
<td>Institutionalised</td>
</tr>
<tr>
<td>importance and value of adhering to the ethical programmes etc. within</td>
<td></td>
</tr>
<tr>
<td>the company?</td>
<td></td>
</tr>
<tr>
<td>How are any issues of non-compliance (for any level within the company)</td>
<td>Institutionalised</td>
</tr>
<tr>
<td>dealt with? Provide evidence if possible.</td>
<td></td>
</tr>
<tr>
<td>How does the board ensure that the stakeholder-inclusive approach of</td>
<td>Institutionalised</td>
</tr>
<tr>
<td>governance in the organisation is promoted?</td>
<td></td>
</tr>
<tr>
<td>What is the board’s role in ensuring that financial performance and the</td>
<td>Institutionalised</td>
</tr>
<tr>
<td>impact of the company’s operations on society and the environment are</td>
<td></td>
</tr>
<tr>
<td>taken into account?</td>
<td></td>
</tr>
<tr>
<td>What is the boards approach to protect, enhance and invest in the well-</td>
<td>Compliant</td>
</tr>
<tr>
<td>being of the economy, society and the environment?</td>
<td></td>
</tr>
<tr>
<td>What measurable corporate citizenship programmes are implemented by the</td>
<td>Developing</td>
</tr>
<tr>
<td>board?</td>
<td></td>
</tr>
<tr>
<td>What is the board’s role in ensuring that the company’s performance and</td>
<td>Institutionalised</td>
</tr>
<tr>
<td>interaction with its stakeholders is guided by the Constitution and the</td>
<td></td>
</tr>
<tr>
<td>Bill of Rights?</td>
<td></td>
</tr>
<tr>
<td>Does the board have any collaborative efforts/action in place with</td>
<td>Developing</td>
</tr>
<tr>
<td>stakeholders promoting ethical conduct and good corporate citizenship?</td>
<td></td>
</tr>
</tbody>
</table>

Table 2. Overall maturity level rating

<table>
<thead>
<tr>
<th>Specific Attribute</th>
<th>Immature</th>
<th>Developing</th>
<th>Compliant</th>
<th>Institutionalised</th>
<th>Mature</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decision-making</td>
<td>0</td>
<td>2</td>
<td>3</td>
<td>7</td>
<td>2</td>
<td>10</td>
</tr>
<tr>
<td>%</td>
<td>0</td>
<td>18.18</td>
<td>33.33</td>
<td>70.00</td>
<td>100.00</td>
<td>100.00</td>
</tr>
<tr>
<td>Ethical foundation and culture (‘tone at the top’)</td>
<td>0</td>
<td>10</td>
<td>1</td>
<td>6</td>
<td>1</td>
<td>18</td>
</tr>
<tr>
<td>%</td>
<td>0</td>
<td>55.55</td>
<td>5.56</td>
<td>33.33</td>
<td>5.56</td>
<td>100.00</td>
</tr>
</tbody>
</table>

4.1. Overall maturity level rating per specific attribute

The overall maturity level rating for the specific attributes of decision-making, and ethical foundation and culture (‘tone at the top’) was calculated by adding each level of maturity obtained per question for these attributes. Table 2 provides a depiction of the results.

4.1.1. High-level analysis of the information

The maturity level assessment results in table 2 were analysed for decision-making, and ethical foundation and culture (‘tone at the top’). An interpretation of the results follows:

4.1.2. Decision-making

The ‘mature’ rating for the company’s strategic direction and control (leadership) is found in the public company operating for more than 65 years. The governance structure of the board is well-established with divisional boards and executive committees supporting the board’s strategies and approved budgets. The short- and long-term strategic plans reflect the board’s leadership and direction for the company.

The company is in a continuous process of acquiring new operations such as pharmaceutical distribution and distribution operations across South African borders. On the other hand the
company is selling-off operations, for example in the aviation industry. The continuous change in operations, business cultures and changes in management puts challenges on leadership decisions with regards to the appropriate level of decision-making, assignment of responsibility and the appropriate communication to these operations. The 'institutionalised' rating reflects that leadership is still challenged with what the appropriate level of delegation should be in respect of the different operational units. Past divisional capital expenditure (capex) decisions of the executive resulted in losses to the company and exposure to significant risks being faced by the company. This can be interpreted that lower management does not always fully understand the company’s strategies and risk exposures for their decision-making.

The organisational governance maturity framework indicated that the company can benefit from moving from ‘institutionalised’ to the ‘mature’ level for decision-making.

The assessment for skills and training was rated as ‘compliant’. Training of the executive was identified as lacking and hence as a priority for the board. Training programmes on the lower seniority levels was established and formalised.

The organisational governance maturity framework rating indicated, however, that skills need to be addressed for executive management, especially where the company’s business units are diversified and operates in different countries and cultures. The complexity of the operations necessitates for executives to be properly trained and well skilled in certain specialised fields.

In conclusion, the company assessment results for ‘leadership’ and ‘decision-making’ are rated closely between ‘institutionalised’ and ‘mature’. The exceptions that were noted are training of management and the optimising of delegation between different operations. Management needs to focus on the aforementioned two areas to bring them into line with rest of the maturity level for ‘leadership’ and ‘decision-making’.

4.1.3. Ethical foundation and culture (‘tone at the top’)

The ratings were scattered for ethical foundation and culture. The ratings varied from ‘developing’ to ‘mature’ indicating that the ethical culture is not fully embedded into all the business divisions of the company. The following motivations are presented for the maturity assessment levels:

The company follows the principles of the King III report. The various committees’ structures, as suggested in the King III report, were in place and replicated on divisional levels to address the diversity of the divisions. The maturity assessment for board committees used in the company’s governance process is rated as ‘mature’ for this reason. The effectiveness of the committees was not assessed as it requires a more detailed evaluation that was not included in this assessment. This can affect the rating of the maturity level of the company.

The leadership of the company is committed to improving and maintaining the company’s ethical culture. The assessment of the maturity level is rated as ‘institutionalised’ as the leadership is committed to an ethical way of doing business. The rating is further based on the social and environmental commitments and the measuring thereof is implemented for approved programmes. The company has processes in place to ensure compliance with all laws and regulations of the countries in which they are operational. Furthermore, ethics risks also form part of the company’s risk assessment.

The company’s sustainability programmes are mostly limited to South Africa. The organisational governance maturity framework assessment revealed maturity gaps, especially for the lack of implementing sustainability programmes where business units operate outside of South African borders. The assessment of the company’s maturity level is therefore rated as ‘compliant’.

The board is committed to establish an ethical culture and evidence of this was found in the ethics code and ethics related policies. The ‘tone at the top’ therefore seems to be set, however the communication of ethics is not always optimally rolled-out to all levels of the business. The organisational governance maturity framework assessment of ‘developing’ indicated that the company particularly struggled to implement and monitor ethical codes and policies. Business operations outside South African borders in other African countries required special attention for implementing and monitoring ethical programmes. The implementation of ethical policies and programmes therefore varied from well-embedded to basic policy implementation between divisions and operations. Leadership in the company needs to coordinate ethics policy implementation and monitoring, and implement more ethics programmes, keeping up with the company’s growth and diversity of operations. Cultural differences that affect the ethics of the company need more dedicated attention by the leaders of the company. The IIA SA 2015 Corporate Governance surveyed South African organisations on governance which also included ethics. The survey results found the organisations that set ethical ‘Tone at the top’ were not always successful in allowing the ‘tone’ to filter through the whole organisation (IIA SA, 2015:5).

To conclude the assessment of the attribute ‘ethical foundation and culture’ revealed scattered maturity levels. The results indicate ethical codes and programmes were introduced but the ethical culture within the company remains weak as inadequate communication of ethics is evident. Leadership needs focused action from the board to improve the situation to a pre-determined maturity level.

4.2. Summary of the empirical research and limitations noted in applying the framework

The organisational governance maturity framework was successfully used to determine the leadership maturity of a retail industry organisation. The results revealed different levels of maturity for decision-making, and especially for ethical foundation and culture. The company seems to be struggling with the implementation of their ethical codes and sustainability programmes that are not fully embedded in the culture of the organisation. The leadership of the company needs to focus on a
more structured approach of implementing ethical
codes and programmes.

Whilst applying the first general attribute of the
organisational governance maturity framework some
limitations were noted, namely:
• The accuracy of assessment is limited to the
information provided by the interviewee and the
2014 integrated report of the company.
• The information provided was not audited or
verified.
• The complexity of the company’s
business units in South Africa and outside South
Africa has an impact on the accuracy of assessing
the maturity level overall.
• The framework needs to be adjusted for the
specific organisation and assessed in terms of size,
complexity, et cetera.
• The assessment of maturity will become more
accurate and a more detailed approach is adopted
for example per business unit, division or operation.

The organisational governance maturity
framework is however, a useful tool to give a
preliminary assessment of the current status of the
company’s maturity regarding leadership.

5. CONCLUSION

It has been argued that ethical leadership determines
the ethical culture of an organisation. For the leader
to establish an ethical culture in an organisation it
needs to establish values and principles in the
organisation by using, amongst others, a governance
framework. It was furthermore established (through
the use of the organisational governance maturity
framework) that the leadership of the organisation
has an important role to play when it comes to
improving governance maturity. Leaders need to
continuously measure governance maturity to
ensure the governance framework the company uses
stays relevant, sustainable and optimised for the
changing environment the company is operating in.

It is envisaged that the company leaders and
other stakeholders can use the organisational
governance maturity framework to assess the
maturity level of organisational governance
structures. Not only can it be used to determine the
current maturity level, but it can also determine what
the organisation aims to achieve in terms of
their organisational governance maturity.

To conclude, this empirical study confirmed that
the organisational governance maturity framework (limited to the leadership attribute) can
be used successfully to assess a company’s
governance maturity level in the business
environment it operates in.

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Appendix A

Table A.1. Extract of refined organisational governance maturity framework

<table>
<thead>
<tr>
<th>Attributes</th>
<th>Levels of maturity</th>
</tr>
</thead>
<tbody>
<tr>
<td>General</td>
<td>Specific</td>
</tr>
<tr>
<td>Leadership</td>
<td>Decision-making (OCEG and NACD, 2007; IoD, 2009; Bahrman 2011a and b; ISACA, 2012)</td>
</tr>
<tr>
<td>Immature</td>
<td>• Leadership lacks key skills for effective decision-making. Decisions are not enforced.</td>
</tr>
<tr>
<td>Developing</td>
<td>• Leadership includes basic decision-making skills but lacks strategic vision. Decisions are enforced but cannot be substantiated. Responsibility for decisions made is not assigned.</td>
</tr>
<tr>
<td>Compliant</td>
<td>• Leadership has a short-term view. Decisions are made at the appropriate levels. Responsibility is taken for decisions made.</td>
</tr>
<tr>
<td>Institutionalised</td>
<td>• Leadership has a long-term view. Decisions can be substantiated. Decisions made are understood by all employees.</td>
</tr>
<tr>
<td>Mature</td>
<td>• Informed decision-making takes place at appropriate levels. Decisions are communicated throughout the organisation in a proactive and transparent manner.</td>
</tr>
<tr>
<td>Ethical foundation and culture</td>
<td>(Rossouw and Vuuren, 2003; IRMS 2006; OCEG and NACD, 2007; IIA Research Foundation, 2009; IoD, 2009; Coetzee, 2010; Bahrman 2011a and b; ISACA, 2012)</td>
</tr>
<tr>
<td>Immature</td>
<td>• The importance of ethical leadership is recognised by the majority of management. Ethical culture within the organisation is weak and non-existent.</td>
</tr>
<tr>
<td>Developing</td>
<td>• The importance of ethical leadership is recognised by all stakeholders. Ethical culture within the organisation is inadequate as employees do not recognise the value of adherence and embedding ethics.</td>
</tr>
<tr>
<td>Compliant</td>
<td>• The importance of ethical leadership is recognised by all employees. Ethical culture within the organisation is constant. Monitoring and follow-up of ethics values are performed.</td>
</tr>
<tr>
<td>Institutionalised</td>
<td>• Effective ethical leadership is based on a strong ethical foundation and culture throughout the organisation. All the deliberations, decisions and actions of the leaders are based on the ethical values of responsibility, accountability, fairness and transparency.</td>
</tr>
</tbody>
</table>

Source: Wilkinson, 2014:244

Explanation of levels of maturity as indicated by Wilkinson (2014:135):
• ‘Immature’ recognises that the organisation is totally immature in respect of the specific attributes and does not see the value thereof, or is unaware of these attributes and their importance.
• ‘Developing’ recognises that the organisation is in the process of becoming aware of the existence and importance of the relevant attributes, but if implemented, these attributes may still be questioned and/or ignored.
• ‘Compliant’ recognises that the organisation has implemented the relevant attributes to the extent that it ensures compliance with minimum requirements related to its area of specialisation.
• ‘Institutionalised’ recognises that the organisation realises the importance of pro-active implementation of and adherence to the relevant attributes. The concept of moving beyond compliance is being encouraged and as such, the organisation increasingly recognises the value that could be added by institutionalising these attributes, and attempts to improve their implementation.
• ‘Mature’ recognises that the organisation is mature and the value that can be added by the pro-active implementation of and adherence to the relevant attributes. The importance of these attributes is recognised by all stakeholders and considerable effort is made in the effective institutionalisation of, adherence to and reporting on these attributes.

Annexure B. Questionnaire summary

B.1. Decision-making

Question 1: Who is responsible for the strategic direction and control (leadership) of the company?
The board is responsible for strategic direction, control, and overseeing implementation and management of company policies. The board is well-established and is supported by divisional boards.
Rating: Mature.

Question 2: Are the abovementioned individuals/structures also responsible for making the key decisions within the company, i.e. do they have the necessary delegated authority?
The delegation of authority is to the appropriate level. One exception was noted where capital expenditure approval was not done at divisional level, which could hamper the entrepreneurial side of the business.
Rating: Institutionalised.

Question 3: Explain the process that is used to ensure that the leadership structure of the company has the necessary skills for effective decision-making.
Training on executive level is not formalised in training programmes. Investment in training is more focused on lower level employees and is lacking on the executive level. The transformation process of the executive level is in the beginning phase and is noted as an area where the company is lacking.
Rating: Compliant.
Question 4: Does the organisation have a long- and short-term strategy in place?
The organisation has a 1, 3 and 5 year strategic plan in place, linked to a budget for these periods.
Rating: Mature.

Question 5: How are these strategies used (how do they contribute) in the decision-making process?
The strategy of the company is to focus on the value chain creation to ensure annuity income from its sectors. The purpose is to reduce the effects of cyclic income from the market of the company’s operations.
Rating: Institutionalised.

Question 6: Are decisions made at appropriate levels? Please explain.
There is a comprehensive delegation of authority based on the type of transaction and amount and the associated risk. One exception was noted where capital expenditure approval was not done at divisional level, which could hamper the entrepreneurial side of the business.
Rating: Institutionalised.

Question 7: Can decisions made be substantiated? Please explain.
The decisions are measured against set criteria and corrective action is taken on appropriate levels if required. Decisions are also linked to performance measurement.
Rating: Institutionalised.

Question 8: Are decisions made to enforce in a positive manner? Please explain.
The leadership encourages creativity and responsiveness, and gives competitive necessity. This is incorporated in governance processes. Authorisation for business expansion is, however, limited to group level.
Rating: Institutionalised.

Question 9: Is adequate responsibility assigned for decisions made? Please explain.
The delegation of authority by the board ensures the relevant responsibility matches assigned decisions at divisional level and operational level.
Rating: Institutionalised.

Question 10: How are decisions made, communicated through the company?
The board, through its committees, communicate decisions. The board further utilises the CEO, executive management meetings, e-mails, telecommunication et cetera to communicate and monitor decision implementation.
Rating: Institutionalised.

B.2. Ethical foundation and culture

Question 11: How would you describe the ethical culture within the organisation?
The board and executive management set the ‘tone at the top’. The ethics code explains the ethical values of the group. The company also subscribes to the principles of King III.
Rating: Institutionalised.

Question 12: What board committees are in place? Provide evidence if possible.
Executive committee, Audit committee, Risk committee, Remuneration committee, Social, ethics and sustainability committee, and Asset and liabilities committee. These committees function on group level and are replicated at divisional levels.
Rating: Mature.

Question 13: Does the company have any codes of conduct and/or ethics-related policies implemented and to what extent? Provide evidence if possible.
Ethics policies are in place as well as a code of conduct. Ethics policy implementation varies between operations from very basic to full programmes with continuous monitoring measures.
Rating: Developing.

Question 14: What is the board’s role in building and sustaining an ethical culture in the company?
The board sets the ‘tone at the top’ by implementing policies and creating committees for monitoring. The implementation of the policies, however, is not equally fully implemented throughout the company.
Rating: Developing.

Question 15: What is management’s role in building and sustaining an ethical culture in the company?
Management’s role is to ensure ethical values are implemented in the operations and further to maintain these values. The implementation and monitoring varies between operations, with specific requirements for the type of organisation, operation environment and country requirements.
Rating: Developing.

Question 16: Are ethical standards clearly articulated by the board and management to ensure adherence to them in all aspects of the business? Please explain.
The company operates in 29 countries worldwide. The compliance of ethics varies between operations. It is not standardised for all operations.
Rating: Developing.
Question 17: Are the ethical risks and opportunities incorporated in the risk management process?
Ethical risks are incorporated in the risk management process.
Rating: Institutionalised.

Question 18: Is the internal and external ethics performance aligned around the same ethical standards?
The ethics alignment between internal and external stakeholders is blurry and no structured approach is in place to align ethics between all stakeholders.
Rating: Developing.

Question 19: Are the code of conduct, all ethics programmes, and policies performance assessed, monitored, reported on and disclosed? Please provide details and evidence if possible.
The board has relevant committees in place to assess, monitor, report on and disclose necessary policies and ethics programmes. The committees operate at group and divisional level. The implementation of the policies varies between operations.
Rating: Developing.

Question 20: What does the company have in place to ensure that each director adheres to the duties of a director?
A charter for directors is in place to explain the duties. It forms part of each new director's induction programme. Each director's performance evaluation includes adherence to the charter.
Rating: Institutionalised.

Question 21: What mechanisms are in place to ensure that all employees recognise the importance and value of adhering to the ethical programmes, etc. within the company?
Human resource policies are in place with induction programmes. An ethics policy is in place. Ethics awareness varies between divisions from basic to fully monitored programmes.
Rating: Developing.

Question 22: How are any issues of non-compliance (for any level within the company) dealt with? Provide evidence if possible.
‘Tipp-offs’ is implemented with processes to deal with each case. Disciplinary processes are in place for non-compliance at all levels.
Rating: Institutionalised.

Question 23: How does the board ensure that the stakeholder-inclusive approach of governance in the organisation is promoted?
The board has identified the stakeholder universe. It further details how to communicate/contact the relevant stakeholders. A formal policy for stakeholders approved by the board is not in place.
Rating: Developing.

Question 24: What is the board's role in ensuring that financial performance and the impact of the company's operations on society and the environment are taken into account?
The company reports on the triple bottom-line accounting framework. The board is not only committed to financial results, but includes social and environmental commitments and the measurement thereof. Six areas were identified for focusing and measuring sustainability. The monitoring of these areas has been in place for more than 6 years.
Rating: Institutionalised.

Question 25: What is the board's approach to protect, enhance and invest in the well-being of the economy, society and the environment?
The board identified and invested in 6 areas of sustainability. The programmes are mostly South African focused.
Rating: Compliant

Question 26: What measurable corporate citizenship programmes are implemented by the board?
Measurable programmes are limited to Africa and countries outside Africa have no or limited programmes.
Rating: Developing.

Question 27: Does the board have any collaborative efforts/action in place with stakeholders promoting ethical conduct and good corporate citizenship? Please explain.
Projects with communities are implemented in South Africa, but in Africa and other countries projects are very limited. Ethical collaboration with stakeholders internally is more mature and formalised than with external stakeholders.
Rating: Developing.
DISTRESS RISK AND LEVERAGE PUZZLES: EVIDENCE FROM TAIWAN

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Abstract

Financial distress has been invoked in the asset pricing literature to explain the anomalous patterns in the cross-section of stock returns. The risk of financial distress can be measured using indexes. George and Hwang (2010) suggest that leverage can explain the distress risk puzzle and that firms with high costs choose low leverage to reduce distress intensities and earn high returns. This study investigates whether this relationship exists in the Taiwan market. When examined separately, distress intensity is found to be negatively related to stock returns, but leverage is found to not be significantly related to stock returns. The results are the same when distress intensity and leverage are examined simultaneously. After assessing the robustness by using O-scores, distress risk puzzle is found to exist in the Taiwan market, but the leverage puzzle is not.

Keywords: Leverage Ratio, Bankruptcy Cost, Distress Intensity, Financial Distress

1. INTRODUCTION

Financial distress has been discussed in the asset pricing literature to explain anomalous patterns in the cross-section of stock returns (Chan and Chen, 1991; Fama and French, 1996). Previous studies imply that the risk of the stocks of financially distressed firms cannot be diversified. Fama and French (1993) suggest that two stock market factors related to size and book-to-market equity ratios capture firms’ sensitivities to a systematic distress factor by forming a pricing model. Other studies examine financial distress risk by using indexes, such as the probability of default (PD), and then use the index to measure the risk of firms (Dichev, 1998; Griffin and Lemmon, 2002; Vassalou and Xing, 2004; Campbell, Hilscher, and Szilagyi, 2008; Maria, C. et al, 2011; Claassen et al, 2012). For example, Griffin and Lemmon (2002) use O-score as a proxy to measure the likelihood of bankruptcy (distress risk) and find that high distress risk firms earn low returns, and that low book-to-market ratios mediate this relationship (the so-called "default risk puzzle"). However, these research fail to provide consistent evidence that owners of high distress risk firms receive higher returns.

Globalization has proved to be an inevitable trend in recent decades. The cooperators have faced increasing competition worldwide, increasing the difficulty for firms to have strong performance and profitability. Thus, managers attempt to determine means of maximizing benefits. Bhandari (1988) measures leverage ratio by examining the debt-to-equity ratio and shows a positive relationship between returns and leverage ratio after controlling for beta and firm size. Hsu (2007) suggests that financial leverage is positively associated with stock returns in the Taiwan electronics industry when firms have good profitability. In addition, if the firms are large and have a high growth opportunity, they are assumed to be skillful at utilizing financial leverage to increase operating performance and reduce costs. In such a situation, altering the degree of leverage is a method for increasing firm profit. Generally, high leverage brings high risk, which may be compensated for by high returns. This is a widely accepted view; however, whether this is always the case is the focus of much debate.

As mentioned, most people believe that high leverage leads to high positive returns. However, other empirical evidence indicates a negative relationship between leverage and positive returns. Fama and French (1992) show that a firm’s book-to-market equity ratio can be decomposed into asset and leverage components, and illustrate that the returns are positive to assets, but negative to leverage. George and Hwang (2010) report that returns are negatively related to financial distress intensity (O-score) and the book value of leverage (long-term debts/total assets). According to these studies, the leverage-returns relationship can be explained by frictionless capital market assumptions. The negative relationship between returns and leverage has been called “leverage puzzle.”

Financial distress is a process, and the cost will emerge only when the firms are in distress. Kayhan and Titman (2007) suggest that high distress cost firms will optimally utilize their leverage, but that low distress cost firms will not. George and Hwang (2010) consider the cost of financial distress as a possible explanation of the distress intensity and financial leverage puzzles. High distress cost firms choose low leverage to avoid distress but require high returns. In addition, because high distress cost firms choose low leverage, they have low default probabilities of financial distress whose returns are also negative with default measure. These negative relationships describe the puzzle.
In this paper, the distress risk and leverage puzzles are investigated in terms of the listed, unlisted, and over-the-counter (OTC) companies in Taiwan. In this investigation, financial companies and firms in the 1% and 99% extremes in terms of returns and book-to-market ratios are excluded. Furthermore, year and industry dummies are included to determine whether the puzzles exist after the effects are controlled for. Finally, whether the distress risk and leverage puzzles exist in the Taiwan market is also examined.

According to the literature, two puzzles exist in the Taiwan market: a distress risk puzzle under the control of year and industry dummies and a leverage puzzle under the control of year and industry dummies. However, the leverage puzzle is not found after controlling. We report that the relationship between distress intensity and stock returns is significantly negative whereas that between leverage and returns is nonsignificant. The robustness of these two similarities reveals the index used to measure the distress risk in terms of O-score. Therefore, we suggest that there is a distress risk puzzle in Taiwan but no leverage puzzle, which supports Hypothesis 1 but not Hypothesis 2.

The rest of this paper is organized as follows: Section 2 provides theoretical background and develops empirical hypotheses. Section 3 describes the data collection and analysis. Section 4 presents the empirical results. Section 5 is the conclusion.

2. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

In this section, we first review the literature on the relationships between stock returns and PD (the distress risk puzzle) and between stock returns and financial leverage (the leverage puzzle).

2.1. Distress risk puzzle

Traditionally, the cost of financial distress is closely associated with bankruptcy costs in various types of financial distress. Altman (1993) demonstrates that the probability of bankruptcy is a proxy for firm distress, and there is extensive literature on bankruptcy prediction that provides powerful measures of ex ante bankruptcy risk.

Various studies depict the relationship between financial distress risk and stock returns, and indicate that returns are lower for firms with greater distress intensity (the distress risk puzzle). Dichev (1998) uses the measurements of bankruptcy risk proposed by Ohlson (1980) and Altman (1968), namely the O-score and Z-score, respectively. They then employ Altman’s score to identify the likelihood of firms being in financial distress and find that firms with a high likelihood tend to have low average stock returns. Campbell, Hilscher, and Szilagyi (2008) illustrate that financially distressed firms deliver anomalously low stock returns, as measured using a hazard model. Furthermore, George and Hwang (2010) define distress intensity by using the PD, as proposed by Vassalou and Xing (2004), and the O-score of Ohlson (1980) and use indexes to form portfolios. They conclude that firms with high distress intensity or near default earn low returns.

In addition, previous studies confirm that the measures can predict defaults for individual firms. Therefore, according to the aforementioned studies, we posit the following hypothesis:

Hypothesis 1: The relationship between stock returns and distress intensity is negative.

2.2. Leverage puzzle

Fama and French (1993) suggest that the book-to-market equity ratio captures the sensitivity of a firm to a systematic distress factor. Furthermore, Modigliani and Miller (1958) show that the market beta of equity can be decomposed into a firm’s asset beta and leverage ratio. Similarly, Penman, Richardson, and Tuna (2007) find that returns are negatively related to leverage. In addition, Cal and Zhang (2011) document a significant and negative effect of the change in a firm’s leverage ratio on its stock prices. Caskey, Hughes, and Liu (2012) examine the cross-sectional relationship between leverage and future returns and consider the dynamic nature of capital structure as well as potentially delayed market reactions, and reveal a negative correlation between leverage and future returns. These prior studies all demonstrate the leverage puzzle and, according to their findings, the following hypothesis is posited:

Hypothesis 2: The relationship between stock returns and financial leverage is negative.

3. DATA AND METHODOLOGY

3.1. Data

The data consist of the yearly prices, returns, and other characteristics of all the listed and OTC companies that are included in the Taiwan Economic Journal Database (TEJD). The TEJD data date back to 1986, and the information for the early years is incomplete. Thus, we use the sample period of January 1991 to December 2012. Financial company stocks are excluded from the sample because their leverage is constrained by government regulations that do not apply to nonfinancial companies and because their capital structure is different from that of others which will affect the results. Prices, return data, and financial statement information are all obtained from the TEJD. The return and book-to-market ratio extremes (below 1% and over 99%) are eliminated to smooth the sample.

3.2. Methodology

In this paper, we examine the relationship between leverage and returns and that between default intensity and returns. To measure and compare returns with these different investment strategies, cross-sectional regression is conducted. The samples are divided into three groups. For Hypothesis 1, the samples are classified as having (1) a high or low PD or (2) a high or low O-score (to test for the presence of the distress risk puzzle); for Hypothesis 2, the samples are categorized as having (3) high or low leverage (to test for the presence of the leverage puzzle). We put the strategies on the right side of the equation; thus, the returns can be isolated by hedging (zeroing out) the effect of other strategies and other variables, enabling the study to focus on the effect on returns. Moreover, controlling for the effects of firm size, book-to-market ratio, and returns from the previous year enables us to compare the portfolios simultaneously.

According to George and Hwang (2010), we extend the regression by using year and industry
dummies. The year dummy (DY1992-DY2012) and industry dummy (DInd1-DInd18) are added into regression individually. DY1992 equals 1 in 1992 and 0 in other years; DY1993 equals 1 in 1993 and 0 in other years, etc. Therefore, 21 year dummies are used. Sample industry is divided into 19 groups; DInd1 equals 1 for cement manufacturing industry samples and 0 for the others; DInd2 equals 1 for food industry samples and 0 for the others, etc. Therefore, 18 industry dummies were used.

The dependent variable in these regressions is the year t return for stock we in the portfolio. The independent variables are dummies that indicate whether stock we is held in year t as one of the three portfolios. To control the returns of the previous year and firm size, the independent variables include equity market capitalization, size\_wet-1, and previous year return, R\_wet-1, in the regression. In addition, Fama and French (1993) show that the book-to-market equity ratio captures a firm’s sensitivity to a systematic distress factor. Griffin and Lemmon (2002) suggest that the firms with the highest distress risk include many firms with high book-to-market equity ratios and low past stock returns, but include more firms with low book-to-market equity ratios and high past stock returns. Thus, the ratio of the book and market values of equity, book\_wet-1/mkt\_wet-1, is used to control the influences of book-to-market ratio. Furthermore, according to George and Hwang (2004), momentum can be controlled by applying a 52-week high momentum measurement, which is widely used in the literature to capture momentum effects. As mentioned, the variables R\_wet-1, size\_wet-1, book\_wet-1/mkt\_wet-1, 52wkW\_wet-1, and 52wkL\_wet-1 are control variables.

Suppose that an investor forms portfolios every year and holds these portfolios for the next year, and that the portfolios contain high- and low-leverage firms or high- and low-distress firms, or both. The contribution of the portfolio formed the previous year can be obtained using the following regression:

\[
R\_\text{wet} = \beta_0 + \beta_1R\_\text{wet-1} + \beta_2(\text{book}\_\text{wet-1}/\text{mkt}\_\text{wet-1}) + \beta_3\text{size}\_\text{wet-1} + \beta_452\text{wk}W\_\text{wet-1} + \beta_552\text{wk}L\_\text{wet-1} + \beta_6PD\_\text{wet-1} + \beta_7PD\_H\_\text{wet-1} + \beta_8\text{Lev}\_\text{wet-1} + \beta_9\text{LevH}\_\text{wet-1} + \gamma D\_\text{wet} + \delta D\_\text{Ind}\_\text{wet} + \varepsilon\_\text{wet} \tag{1}
\]

Where R\_\text{wet} = \text{book}\_\text{wet-1}/\text{mkt}\_\text{wet-1}, \text{size}\_\text{wet-1}, 52\text{wkW}\_\text{wet-1}, and 52\text{wkL}\_\text{wet-1} are all control variables and \text{size}\_\text{wet-1} is the natural log of market capitalization. We use the following definitions, adopted from George and Hwang (2010): 52\text{wkW}\_\text{wet-1} (52\text{wkL}\_\text{wet-1}) equals 1 if R\_\text{wet-1}/\text{high}\_\text{wet-1} is ranked among the top (bottom) 20% of all stocks in year t and equals 0 otherwise, where R\_\text{wet-1} is the price for stock we at the end of year t and high\_\text{wet-1} is the highest price for stock we during a given 12-month period. Dummies \text{Lev}\_\text{wet-1} - \text{LevH}\_\text{wet-1} equal 1 if stock we is among the top (bottom) 20% of stocks in year t-1, which is calculated using the ratio of the book value of total debt-to-book value of total assets. Thus, the leverage strategy is formed. The measurement for forming the portfolio of dummies PD\_\text{wet-1} and PDH\_\text{wet-1} are similar to those for the leverage portfolio, equaling 1 if stock we is among the top (bottom) 20% of stocks in year t-1. This means longing the low-leverage stocks and hedging the effects of all control variables to require the pure return of the portfolio. In addition, the difference between \beta_2 - \beta_3 is the return in year t to a zero investment portfolio by longing a low-leverage portfolio and shorting a high-leverage portfolio which has holding for 1 year.

To test the robustness of the distress risk puzzle, we use another index (O-score) as an explanatory variable, as is widely seen in the literature:

\[
R\_\text{wet} = \beta_0 + \beta_1R\_\text{wet-1} + \beta_2(\text{book}\_\text{wet-1}/\text{mkt}\_\text{wet-1}) + \beta_3\text{size}\_\text{wet-1} + \beta_452\text{wk}W\_\text{wet-1} + \beta_552\text{wk}L\_\text{wet-1} + \beta_6\text{Osc}\_\text{Lwet-1} + \beta_7\text{OscH}\_\text{wet-1} + \beta_8\text{Lev}\_\text{wet-1} + \beta_9\text{LevH}\_\text{wet-1} + \gamma D\_\text{wet} + \delta D\_\text{Ind}\_\text{wet} + \varepsilon\_\text{wet} \tag{2}
\]

Where dummies \text{Osc}\_\text{wet-1} and \text{OscH}\_\text{wet-1} are defined by the similarly measurement according to Ohlson (1980) that equals 1 if stock we is among the top (bottom) 20% of stocks in year t-1. However, because the Taiwan market differs from those elsewhere, we use the Taiwan-specific O-score measurement proposed by Li (2006).

4. DESCRIPTIVE STATISTICS

Table 1 details the correlation coefficient of variables used in regression. High leverage refers to the high-leverage dummy (Lev\_H) defined in Eq. (1), and low leverage refers to the low-leverage dummy (Lev\_L) defined in the same equation. Low PD (PD\_L) and high PD (PD\_H) are defined by the lowest and highest 20% ranked by PD according to the Vassalou and Xing (2004) method of estimating distress. Low O-score (Osc\_L) and high O-score (Osc\_H) are defined in the same manner as PD, but the index is computed by referring to Li (2006), who uses accounting variables as explanation variables to predict PD. Nineteen ratios, all from financial statements such as cash flow ratio, debt ratio, accounts receivable turnover, EBIT, EPS, and ROA, are included.

Column 1 of Table 1 shows the correlation between the returns of the portfolios, revealing a significantly negative relationship between the return and high portfolios (high PD, high O-score). The high leverage classification is also negative with returns, but the relationship is nonsignificant. These negative relationships also exist in low portfolios. Column 1 implies that a distress risk puzzle exists in Taiwan but that a leverage puzzle does not because of the non-significance. Next, the low and high leverage data in columns 2 and 3, respectively, are greater for firms with a higher PD (0.350 for low leverage; 0.349 for high leverage). Comparing PDs and O-scores reveals that the relationship is stronger for PD than for O-score (0.349 versus 0.124 for high leverage and high distress index). From the correlation between the two distress indexes in columns 3 and 4, we observe that they are positive (0.128 and 0.291, respectively).
This table represents the descriptive statistics obtained using yearly data from January 1991 to December 2012. The low and high leverage dummies are separated by the firm stocks in the bottom (top) 20% of financial leverage, which are computed using the debt-to-book value of assets. The low and high probability of default (PD) dummies are separated by the firm stocks in the bottom (top) 20% of the distress index (PD), as proposed by Vassalou and Xing (2004). The low and high O-score variables are ranked in the bottom (top) 20% of a different distress risk measurement computed according to the method in Li (2006). ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Table 1. Correlation coefficients

<table>
<thead>
<tr>
<th>Return</th>
<th>Low leverage</th>
<th>High leverage</th>
<th>Low PD</th>
<th>High PD</th>
<th>Low O-score</th>
<th>High O-score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Return</td>
<td>1</td>
<td>0.008</td>
<td>1</td>
<td>-0.124</td>
<td>-0.210***</td>
<td>-0.185***</td>
</tr>
<tr>
<td>Low PD</td>
<td>0.088***</td>
<td>0.350***</td>
<td>1</td>
<td>-0.124</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High PD</td>
<td>-0.222***</td>
<td>-0.210***</td>
<td>-0.349***</td>
<td>-0.242***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low O-score</td>
<td>0.120***</td>
<td>0.008</td>
<td>0.128***</td>
<td>0.136***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High O-score</td>
<td>-0.113***</td>
<td>-0.008</td>
<td>0.124***</td>
<td>-0.141***</td>
<td>-0.291***</td>
<td>-0.242***</td>
</tr>
</tbody>
</table>

Table 2 reports the descriptive statistics of the samples sorted by PD and leverage. The samples are separated into five quintiles by PD (20%, 40%, 60%, 80%, and 100%) and into three quintiles by leverage (33.3%, 66.6%, and 100%). The samples are sorted by year and the number in each category is obtained according to the average of all.

The panel labeled “Last year return” provides the return data for each category after the portfolio is formed. Firms with high distress intensity earned lower returns than those with low distress intensity did, and firms with high leverage have also had the same condition for the past 12 months. The results in the “Market capitalization” panel suggests that firms with low distress risk and high leverage are much larger (NT$33.98 billion) than those with high distress intensity and low leverage. In other words, the firms in the high PD and low leverage category are small firms (NT$1.30 billion). Generally, large firms might have a greater ability to issue debt; however, this debt is typically not utilized efficiently. The panel labeled “Number of firms per year” indicates the distribution of firms in each category. These data show that the firms are clustered in the upper left (low PD, low leverage; 97 firms per year) and lower right (high PD, high leverage; 100 firms per year). The panel reveals that firms typically choose leverage to control financial distress. The “PD” and “Leverage” panels also support this. In the PD panel, the quintile of high distress intensity has the highest financial leverage, and in the leverage panel, the quintile of high financial leverage has the highest PD. These conditions still exist after controlling for leverage and PD (see “All” row).

Table 2. Descriptive statistics

This table presents the descriptive statistics obtained using yearly data from January 1991 to December 2012. The firms are sorted into three categories according to the book value of leverage (debt/asset) and five quintiles based on the probability of default (PD). Each panel reports the time series numeral. The samples are ranked by year and all of them are averaged to acquire the number in each category.

5. EMPIRICAL RESULTS

5.1. Returns, PD, and leverage

Table 3 presents the results of a cross-sectional regression for the distress risk and returns, revealing their relationship in supporting Hypothesis 1. Column (1) indicates that there is a strong and highly significant negative relationship between PD and returns. The coefficient of low PD portfolio and high PD portfolio is 0.062% per year and -0.123% per year, respectively, which hedged the other strategies. Both of these results are significant at the 1% level. The results run counter to generally accepted concepts. The zero investment portfolios are constructed by the long low PD stocks and the short high PD stocks, earning 0.185% per year. Column 2 adds a year dummy to control for the effect of the year in the regression. The results are similar to those in Column 1: two portfolios are still negative and highly significant. Column 3 adds an industry dummy,
classified into 19 categories, to control for the effects caused by different industries. The same results as those in the previous column are yielded. Finally, column 4 adds both year and industry dummies and not only is the coefficient but also significantly improved. The coefficient for the low PD portfolio decreases to 0.031% and that for the high PD portfolio decreases to -0.048%, but they are still significant at the 1% level. Thus, a zero investment portfolio earns 0.079% per year. Furthermore, $R^2$ is increased from 0.078 to 0.355.

Columns 5–8 show the relationship between leverage and returns. High leverage portfolio is formed by the top 20% of all stocks in year $t$–1. The coefficient of high leverage is negative and significant to returns (-0.037% per year at the 1% significance level), and low leverage is positive and weakly significant (0.029% per year at the 10% significance level). A zero investment portfolio is 0.066% per year. In this part, year dummy and industry dummy are added respectively. However, after adding the dummies, the leverage puzzles become nonsignificant, indicating that the relationship between the returns and leverage does not support Hypothesis 2. Moreover, $R^2$ increases from 0.078 to 0.347.

Table 3 also presents the data on leverage and distress index dummies, which are both included in Eq. (1). The table shows that the result is the same as that yielded when combining these two categories, thus supporting Hypothesis 1 but not Hypothesis 2. Leverage is a factor determining PD, which measures the distress intensity; therefore, it is unsurprising that leverage dummies become nonsignificant when both leverage and PD dummies are considered. The results are reported in columns 9–12. The return on a zero investment portfolio, which includes long low distress intensity stocks and short high distress intensity stocks, is 0.206% per year. After controlling for the year and industry dummies, the return on a zero investment portfolio decreases to 0.079%; furthermore, the results become more significant and $R^2$ increases from 0.078 to 0.355.

### Table 3. Returns, PD, and leverage

This table presents the relationships between PD and leverage by using yearly data from January 1991 to December 2012 and by controlling for the previous year’s returns, the book-to-market ratio, and size. The cross-sectional regression is run as follows:

$$\text{PD}_{it} = \beta_0 + \beta_1 \text{PD}_{it-1} + \beta_2 \text{Book}_{it} + \beta_3 \text{Market}_{it} + \beta_4 \text{Size}_{it} + \epsilon$$

Where $\text{PD}_{it}$, $\text{Book}_{it}$, and $\text{Market}_{it}$ are all control variables, and $\text{PD}_{it-1}$ and $\text{Book}_{it-1}$ are the returns and neutral log, respectively, of market capitalization of stock we in year $t-1$. Furthermore, $\text{Book}_{it}$, $\text{Market}_{it}$, and $\text{Size}_{it}$ are computed by the book value of equity to the market value of equity in year $t-1$. The definitions of other variables are as follows: $\text{Size}_{it}$ is the average price of stock we during a given 12-month period. $\text{PD}_{it}$ refers to the number of observations for each model and $R^2$.

### 5.2. Returns, O-score, and leverage

Table 4 reports the robustness results for the distress risk puzzle. Here, the O-score is used to replace the PD, which is another measurement for the distress intensity. The O-score is used in many papers, and unlike PD, is computed by

...
assessing accounting variables; therefore, it is incorporated to test the robustness of the results.

Table 4 is formed by running Eq. (2). Column 1 reveals that the coefficient of the low O-score dummy is 0.164% per year, which is highly significant (t statistic = 9.99) at the 1% level, and that the coefficient of the high O-score dummy is -0.152% per year, which is also highly significant (t statistic = -9.162) at the 1% level. A zero investment portfolio earns 0.306% per year. The year and industry dummies are then added. In Column 4, in which both dummies are controlled for, the coefficient of the high and low O-score dummies is still strongly negative and highly significant. Therefore, the results show that the relationship between leverage and O-score support Hypothesis 1. Moreover, R² increases from 0.095 to 0.357 after controlling for the year and industry dummies.

Columns 9–12 of Table 4 present the financial leverage and O-score dummy results. The relationship between returns and distress intensity is significantly negative, but that between returns and leverage is nonsignificant. Although the year and industry dummies are controlled for, the results remain the same. Furthermore, R² increases from 0.095 to 0.357. As mentioned, the results do not support Hypothesis 2.

### Table 4. Returns, O-scores, and leverage

<table>
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<th>(1)</th>
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<tbody>
<tr>
<td>Intercept</td>
<td>0.013***</td>
<td>0.036***</td>
<td>0.031***</td>
<td>0.037***</td>
<td>0.038***</td>
<td>0.064***</td>
<td>0.058***</td>
<td>0.061***</td>
<td>0.048***</td>
<td>0.050***</td>
<td>0.067***</td>
</tr>
<tr>
<td>R²</td>
<td>0.049***</td>
<td>0.138***</td>
<td>0.147***</td>
<td>0.138***</td>
<td>0.147***</td>
<td>0.147***</td>
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</tr>
<tr>
<td>Year</td>
<td>-0.011***</td>
<td>-0.012***</td>
<td>-0.006***</td>
<td>0.000***</td>
<td>-0.033***</td>
<td>0.012***</td>
<td>-0.012***</td>
<td>-0.012***</td>
<td>0.012***</td>
<td>0.012***</td>
<td>0.012***</td>
</tr>
<tr>
<td>Book-to-market</td>
<td>0.007***</td>
<td>0.019***</td>
<td>0.019***</td>
<td>0.019***</td>
<td>0.019***</td>
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</tr>
<tr>
<td>Size</td>
<td>0.022***</td>
<td>0.028***</td>
<td>0.015***</td>
<td>0.025***</td>
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<tr>
<td>52-week high loser</td>
<td>-0.014***</td>
<td>-0.015***</td>
<td>-0.015***</td>
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<td>-0.015***</td>
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<tr>
<td>52-week high winner</td>
<td>-0.084***</td>
<td>-0.103***</td>
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<td>-0.084***</td>
<td>-0.103***</td>
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<td>-0.103***</td>
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<tr>
<td>Low O-score</td>
<td>0.016***</td>
<td>0.020***</td>
<td>0.019***</td>
<td>0.019***</td>
<td>0.019***</td>
<td>0.024***</td>
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<td>High O-score</td>
<td>-0.152***</td>
<td>-0.114***</td>
<td>-0.148***</td>
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<td>-0.148***</td>
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<td>Low leverage</td>
<td>0.002***</td>
<td>0.003***</td>
<td>0.003***</td>
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<td>0.003***</td>
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<td>0.003***</td>
</tr>
<tr>
<td>High leverage</td>
<td>-0.024***</td>
<td>-0.024***</td>
<td>-0.024***</td>
<td>-0.024***</td>
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<td>-0.024***</td>
<td>-0.024***</td>
<td>-0.024***</td>
</tr>
<tr>
<td>Year dummy</td>
<td>-0.316***</td>
<td>-0.316***</td>
<td>-0.316***</td>
<td>-0.316***</td>
<td>-0.316***</td>
<td>-0.316***</td>
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<td>-0.316***</td>
<td>-0.316***</td>
<td>-0.316***</td>
<td>-0.316***</td>
</tr>
<tr>
<td>Industry dummy</td>
<td>-0.049***</td>
<td>-0.049***</td>
<td>-0.049***</td>
<td>-0.049***</td>
<td>-0.049***</td>
<td>-0.049***</td>
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<td>-0.049***</td>
<td>-0.049***</td>
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</tr>
<tr>
<td>Adjusted R²</td>
<td>0.095</td>
<td>0.134</td>
<td>0.102</td>
<td>0.137</td>
<td>0.078</td>
<td>0.344</td>
<td>0.086</td>
<td>0.347</td>
<td>0.095</td>
<td>0.334</td>
<td>0.102</td>
</tr>
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</table>

Finally, regardless of whether PD or O-score is used as a proxy for distress probability, the results are consistent, indicating that the distress risk puzzle exists in the Taiwan market but that the leverage puzzle does not. We also find R² are smaller (0.086 and 0.102 in Table 3 and Table 4) after only controlling the industry dummies. These results imply that the year dummies would be better than the industry dummies to help explain ‘goodness-of-fit’ between the distress risk or leverage puzzles.

### 6. CONCLUSION

Previous papers have demonstrated that firms with high distress intensity earn low returns when examined using different measurements. In this paper, we investigate whether the distress risk puzzle exists in Taiwan. George and Hwang (2010) suggest that the puzzle can be explained by the book value of leverage. Therefore, we also examine whether the possible explanation of the distress risk puzzle is the leverage puzzle.

First, default probability is used as a proxy for distress intensity to examine the cross-sectional relationship between returns and distress intensity as well as returns and leverage. We find that, if the puzzles are examined separately, the distress risk puzzle exists but the leverage puzzle does not. In addition, the situation is the same when the puzzles are examined simultaneously. Next, the O-score is used to test robustness. The results are similar to those obtained when PD is used as the proxy. Therefore, the results support Hypothesis 1 but do not support Hypothesis 2.

In conclusion, this paper shows that the distress risk puzzle exists in Taiwan, which means...
that firms with high distress intensity earn low stock returns. This finding is consistent with those of Dichev (1998), Griffin and Lemmon (2002), and George and Hwang (2010).

REFERENCES

ALARMING OF EXCHANGE RATE CRISIS: A RISK MANAGEMENT APPROACH

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Abstract

Recently, with increasing volatility of foreign exchange rate, risk management becomes more and more important not only for multinational companies and individuals but also for central governments. This paper attempts to build an econometrics model so as to forecast and manage risks in foreign exchange market, especially during the eve of turbulent periods. By following McNeil and Frey’s (2000) two stage approach called conditional EVT to estimate dynamic VaR commonly used in stock and insurance markets, we extend it by applying a more general asymmetric ARMA-GARCH model to analyze daily foreign exchange dollar-denominated trading data from four countries of different development levels across Asia and Europe for a period of more than 10 years from January 03, 2005 to May 29, 2015, which is certainly representative of global markets. Conventionally, different kinds of backtesting methods are implemented ultimately to evaluate how well the model behaves. Inspiringly, test results show that by taking several specific characteristics (including fat-tails, asymmetry and long-range dependence) of the foreign exchange market return data into consideration, the violation ratio of out-of-sample data can be forecasted very well for both fixed and flexible foreign exchange regimes. Moreover, all of the violations are evenly distributed along the whole period which indicates another favorable property of our model. Meanwhile, we find evidence of asymmetry volatility in all of the studied foreign exchange markets even though the magnitudes of the most of them are weak.

Keywords: Foreign Exchange Crisis, Value-at-Risk, Extreme Value Theory, Asymmetric GARCH, Generalized Pareto Distribution

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We thank Professor Tino Berger in university of Gottingen for his valuable comments in the seminar of international finance

1. INTRODUCTION

Exchange rate crisis is one of the main types of financial crises and has caused devastating impacts on economies. Therefore, lots of empirical and theoretical studies attempt to investigate what kinds of factors can induce crises or more importantly, if there are any standard economic indicators to predict it? Famous papers addressing this issue include Frankel and Rose (1996) and Kaminsky et al (1998). However, Phornchanok and Roy (2013) found that almost all macroeconomic variables have poor predictive ability on extreme exchange rate changes despite of favorable in-sample results.

A second-best way is to investigate the trend of foreign exchange rate data itself since all of the relevant information is conveyed and summarized in the volatility of the exchange rate. Clearly, forecasting ability of this method will decrease drastically with the increase of the prediction length even though backtesting of the asymmetric VaR-GARCH based method in the paper shows that one-day ahead forecast is statistically convincing.

Generally, Value-at-risk (VaR) as a market risk measure is used for such analysis. It refers to the level of financial risk at a given confidence level within investment portfolio over a specific period, for example, days, months or even years. During the past decades, it is suggested by Basel Committee on Banking Supervision (BCBS) for calculating the market risk minimum capital requirement (MCR) which may concretely be contingent on the backtesting performance of banks’ internal models (Ergen, 2015). Hence, accuracy of out-of-sample prediction gradually becomes a key topic both for industry managers and researchers. However, the most commonly used version of VaR requires distribution of the return rate of a certain asset be normal which is not realistic in foreign exchange markets.

During the past several years, several solutions such like historical simulation and GARCH-EVT were developed. However, Pritsker (2006) pointed out that historical simulation-based models are under-responsive to changes in conditional risk. Furio and Climent (2013) retrospect past methods and claim that the GARCH-EVT model behaves better than the GARCH models with Gaussian or student $t$ distributed residuals in stock market. Meanwhile, some other researchers find that a significant characteristic in VaR prediction is the tail-thickness of the data, since remaining features like skewness and dynamic volatility can improve model performance only if the former is taken into consideration (Ergen, 2015). However, in a general scenario or in a specific market, modeling
The rest of the paper is organized as follows. Section 2 briefly illustrates the principle of how different asymmetric GARCH models can be nested with conditional EVT to estimate 99% of VaR. Section 3 presents the empirical counterpart such as descriptive features of the foreign exchange data and formal assessment of the model accuracy is the key subject afterwards. Section 4 concludes the paper, and indicates future study focuses.

2. THEORETICAL FRAMEWORK OF ASYMMETRIC GARCH BASED EVT MODEL

The first subsection describes how EVT can deal with tail related issues i.e. rare events and its advantage over other estimation methods in estimating VaR. In the second subsection, we briefly explore the background of asymmetric GARCH model as well as how it can be integrated into subsection 1.

2.1. POT-EVT

Most statistical methods are concerned with center values of a statistical distribution, and rarely pay attention to extreme values which is a key issue in the risk management area. However, EVT provides a creative way which attempts to construct the best possible tail estimator of the tail area so as to model rare events. In particular, the first challenge facing researchers is what kind of numbers can be defined as rare events. Generally, there are two various criteria to select the so-called extreme values: block maxima model (BMM) and peaks-over-threshold (POT) model. Basically, the former model intends to choose the maximum value in different periods while the latter method considers all large observations which exceed a high threshold. Clearly, the latter method uses the data more efficiently in terms of financial data due to its volatility clustering property (see figure 1). That is, a large number of relevant data are dropped by block maxima model since extreme events follow one another during the foreign exchange crisis period. Therefore, POT-EVT method is applied in this paper to identify extreme values and will be discussed in more details.

If we denote $X$ to be a random variable with unknown underlying distribution $F$, our aim in this analysis is to obtain the tail estimator of $F$. Before doing that, one needs to introduce the concept of conditional excess distributions. Formally, the distribution of excesses over a threshold $u$ has the following function form:

$$F_u(y) = Pr(X - u \leq y \mid X > u), 0 \leq y \leq x_0 - u$$

Where $x_0$ is the right endpoint of $F$. Intuitively, $F(y)$ measures the probability that a loss exceeds the threshold $u$ by at most an amount $y$, given that $X$ is deemed to be an extreme number. Furthermore, we formulate a relationship between the conditional probability and the underlying population through Bayesian formula: for $X-u$,

$$F_u(y) = Pr(X - u \leq y, X > u) = \frac{Pr(X - u \leq y, X > u)}{Pr(X > u)} = \frac{F(x + u) - F(u)}{1 - F(u)}$$

Or after simple manipulation:
\[ F(x) = [1 - F(u)]G_{\xi}(y) + F(u) \quad (3) \]

Note that at the juncture, as long as we can get both an estimator of \( F(u) \) and \( F(y) \), we will naturally get a tail estimator of the underlying population from (3) which is the motivation of EVT. Since \((n-k)/n \) is a sample analogue estimator of \( F(u) \) where \( n, k \) counts the number of whole sample and observations above the threshold \( u \) respectively. Afterwards, it remains to formulate an estimator of \( F(y) \) which is guaranteed by the Pickands-Balkema-de Haan theorem for large enough threshold \( y \) (see Balkema and de Haan (1974); Pickands (1975)). To make the statement much clearer, we denote the theorem formally:

For sufficiently large \( u \), a class of underlying distributions \( F(y) \) can be approximated by the generalized Pareto distribution (GPD):

\[ \sup \left| \frac{F(u) - G_{\xi}(y)}{\varphi} \right| \xrightarrow{n \to \infty} 0 \quad (4) \]

where \( G_{\xi}(y) = \begin{cases} 1 - (1 + \frac{y}{\xi})^{-\frac{1}{\xi}}, & \text{if } \xi \neq 0 \\ 1 - e^{-\frac{y}{\xi}}, & \text{if } \xi = 0 \end{cases} \]

Where \( \xi \) is the shape parameter, while \( \varphi \) the scale parameter. Note that the GPD is heavy-tailed when \( \xi > 0 \), hence it is a desired model to characterize extreme distribution over a high threshold in foreign exchange markets.

Lastly, by plugging the two estimators into (3), we arrive at the tail estimator of \( F \):

\[ F(x) = [1 - F(u)]G_{\xi}(y) + F(u) = 1 - \left[ \frac{k}{n} + \frac{\xi}{\varphi} \left( \frac{x-u}{\xi} \right)^{-\xi} - 1 \right] \quad (5) \]

It is noteworthy that this estimator is only for estimation of the tails \( x-u \) as that of formula (3).

Once we get the estimate from the sample data by applying maximum likelihood, we can immediately measure the level of risk given probability \( q \) by inverting formula (6):

\[ x_q = u + \frac{\varphi}{\xi} \left( \frac{k}{n} \right)^{-\xi} - 1 \quad (6) \]

Which is exactly the estimator of VaR. Clearly, the only thing we need to do is to assign two values \( u \) and \( q \) for the system.

### 2.2. Asymmetric GARCH

As mentioned in section 1, EVT-VaR can only be applied to LiD observations, while the foreign exchange data always exhibits property of dependence especially clustering volatility. Hence, McNeil and Frey (2000) advise to use GARCH model in the first stage to filter the raw data to be LiD residuals which can then be used in the second stage in 2.1. Additionally, in order to accommodate the possibility of asymmetry or say leverage effect, we will replace the basic symmetric GARCH model with a family of asymmetric GARCH models.

#### 2.2.1. EGARCH \((p, q)\) model

Nelson (1991) proposed the exponential GARCH model to account for asymmetric effect:

\[ \log h_t = \omega + \sum_{i=1}^{p} \alpha_i |\varepsilon_{t-i}| + \sum_{i=1}^{q} \gamma_i \varepsilon_{t-i} + \sum_{j=1}^{p} \beta_j \log h_{t-j} \quad (8) \]

Clearly, the parameter \( \gamma \) delivers a leverage effect: if the value is negative, "bad news" will affect the volatility of the future exchange rate more.

#### 2.2.2. GJR-GARCH \((p, q)\) model

Another asymmetric GARCH model introduced by Glosten, Jagannathan, and Runkle (1993) is the GJR-GARCH model which allows for different impacts of lagged positive and negative innovations:

\[ h_t = \omega + \sum_{i=1}^{p} (\alpha_i + \gamma_i \varepsilon_{t-i}) |\varepsilon_{t-i}| + \sum_{j=1}^{q} \beta_j \log h_{t-j} \quad (9) \]

Where \( D_{ij} \) denotes an indicator function. The leverage effect is captured if \( \gamma > 0 \).

#### 2.2.3. PGRACH \((p, q)\) model

The last asymmetric GARCH model named power GARCH was proposed by Ding and Granger (1996) and is shown below:

\[ \sigma_{i}^{q} = \omega + \sum_{i=1}^{p} \alpha_i |\varepsilon_{t-i}|^{q} + \sum_{j=1}^{q} \beta_j \sigma_{i-j}^{q} \quad (10) \]

Note that when \( \delta > 0 \) and \( \gamma > 0 \), past "bad news" will have larger impact on current volatility than past "good news".

### 2.3. Two-stage EVT-VaR

In a more general context, GARCH-type disturbances could also appear on the right-hand side of ARMA regression models, that is, the conditional mean can be an ARMA process:

\[ r_t = \mu_t + \sum_{i=1}^{p} \alpha_i r_{t-i} + \sum_{i=1}^{q} \beta_i \varepsilon_{t-i} + \varepsilon_t = \mu_t + \varepsilon_t \quad (11) \]

Where \( r_t \) denotes daily returns or losses, \( \mu_t = \alpha_0 + \sum_{i=1}^{p} \alpha_i r_{t-i} + \sum_{i=1}^{q} \beta_i \varepsilon_{t-i} \) is the conditional mean, \( \varepsilon_t = \sqrt{h_t} z_t \) and \( h_t \) follows the asymmetric GARCH model discussed in section 2.2.

Referring to the estimation details, even though under regularity conditions, quasi-maximum likelihood estimator (QMLE) satisfies adequately the large sample properties of both consistency and asymptotic normality, if an alternative parametric distribution can be reasonably assumed, maximum likelihood (ML) may outperform QMLE in terms of efficiency. As shown in both table 1 and figure 2, the filtered residuals display specific property of heavy-tailed, which indicates that the innovations \( \varepsilon_t \) in (11) follow general error distribution (GED) rather than
standard normal distribution. Correspondingly, the log-likelihood function of a zero-mean random variable \( e_t \) with conditional variance \( h_t \) will be:

\[
I(\varepsilon_t | \theta, \nu) = \log(v) - \frac{1}{2} e_t^2 / \sqrt{h_t} - \frac{1}{\nu} (1 + \frac{1}{\nu}) \log(2) - \log(\Gamma(\frac{1}{2})) - \frac{1}{2} \log(h_t)
\]

(12)

Where \( \lambda = \frac{\Gamma(1/\nu)}{2^{1/\nu} \Gamma(3/2)} \) and \( V \) is a positive parameter controlling the thickness of the tail.

In case \( \nu = 2 \), the density is equal to the \( N(0, h_t) \) density and the distribution becomes leptokurtic if \( \nu < 2 \). As usual, \( \Theta \) contains the parameters which are of interest such as \( a, b, \alpha, \beta \). Clearly, allowing for an ARMA part considerably extends the range of applications, but it also entails serious technical difficulties since we have to estimate both ARMA and GARCH models simultaneously rather than choosing to fit an ARMA model first and then fit a GARCH model on the ARMA residuals (see Engle (1982)).

After obtaining estimate of the asymmetric ARMA-GARCH parameters, both 1-step ahead conditional mean and conditional variance forecast can be formulated recursively through (8)-(11).

To make things clear, it is necessary to briefly summarize at this juncture. In stage one, we estimate and fit different asymmetric ARMA-GARCH models to return series. In stage two, we get the filtered iid but tail-thickness residuals from stage one and apply EVT theory to characterize the lower tail of the distribution of standardized residuals according to equation (7) and therefore obtain VaR of the residuals. Eventually, by using formula (11), we arrive at a VaR estimate of the original return rate directly. For example, the 1-day VaR is:

\[
\text{VaR}(r_{t+1}) = \mu_{t+1} + \sqrt{h_{t+1}} \text{VaR}(Z_{t+1})
\]

(13)

Where \( \mu_{t+1}, h_{t+1} \) are the one-day ahead forecasts of the conditional mean and variance which can be calculated by minimizing the mean square errors (MSE) as usual. Apparently, if two or more day ahead forecast is needed, it is requires to compute conditional variances as well as the conditional mean recursively according to their different asymmetric GARCH models.

3. EMPIRICAL ANALYSIS

In section 2, we discussed theoretical framework of the paper, in the following, we focus on real data to do the corresponding empirical study of section 2.

3.1. Descriptive statistics of the data

At the beginning, we do some graphical analysis as well as list several basic characteristics to illustrate the necessity of using asymmetric GARCH based two-stage EVT method and GPD to fit the heavy-tailed nature of the data. Precisely, since the observations should be approximately i.i.d for modeling tails of a distribution with a GPD and EVT needs to be fat-tailed distributes, Jarque-Bera and Ljung-Box Q statistics are reported. Data used in this paper is extracted from the Quandl website and includes four countries’ daily exchange rates: Chinese Yuan/Dollar (CNY/USD), Euro/Dollar (EUR/USD), Japanese Yen/Dollar (JPY/USD), and Pound/Dollar (GBP/USD) from January 03, 2005 to May 29, 2015 including around 3710 observations. This time span covers the period of the global financial crisis of 2008-2010, the collapse of the Russian ruble beginning in the second half of 2014 and sharp depreciation of the Yen, Pound and Euro. Therefore, the examination of the effectiveness of VaR prediction will be believable. We define \( r_{j,t} \) to be price changes in market of country \( j \) on day \( t \) for a long position i.e. holding USD. Note that each return is multiplied by 100 without altering intrinsic of the problem:

\[
r_{j,t} = 100 \times \log \frac{P_{j,t}}{P_{j,t-1}}.
\]

(14)

Situations of the four markets are depicted in figure 1:

Figure 1. Price and return of the four different foreign exchange markets

A rough comparison of left and right panels in figure 1 reveals that evidence of asymmetry is insufficient. For instance, volatility during downward periods and upward periods in the market of JPY/USD are almost the same, which is also true in the market of EUR/USD from 2010 to 2012. Hence, checking asymmetry formally becomes necessary in section 3.2. Differently, volatility clustering is clearly detected in the right panel of figure 1.

Moreover, table 1 presents some descriptive statistics of daily returns. As we can see in the first row, sample skewness except EUR/USD is quite different from 0 indicating asymmetry of the return distribution. High kurtosis in the second row shows leptokurtic i.e. tail thickness, both of the features...
suggesting non-normality of the return distribution which is formally identified by a Jarque-Bera normality test in the third row. The much thicker tail phenomenon of China (with kurtosis 42.40) than those of its developed counterparts (with kurtosis less than 10) attracts us, which may reflect its susceptibility to extreme shocks (Kim, 2015). Detailed inspection shows some rationality of this result: Firstly, China reformed its peg regime in July 21, 2005 when under pressure from its major trading partners especially the United States, it moved into a supply-demand based managed peg system and began to allow the RMB to gradually appreciate over the next three years. Until June 2013, the RMB appreciated more than forty percent on a real (inflation-adjusted) basis against the US dollars. This event can also be identified on the right panel of figure 1. Secondly, many papers show that emerging countries such as those in Asian and Latin American countries tend to share fat tailed in their foreign exchange market compared with their developed counterparts due to their vulnerability to both internal and external shocks as well as poor management ability. (Frigyes Ferdinand Heinz and Desislava Rusinova, 2015;Kim, 2015). Thirdly, from figure 1 we can clearly find that volatility of the developed group are much higher than that of China, therefore, the same magnitude of a certain event may be extreme for China but not for the other three in a relative sense such as the global economic crisis in 2008.

Like most financial return series, data in foreign exchange markets also exhibits some degree of autocorrelation and volatility clustering referring to values of Q (16) and Q(2.16). For the sake of deliberate specific properties such as non-normality and the nature of tail-thickness can also be directly confirmed through the Q-Q plot in figure 2.

In summary, the descriptive statistics motivate us to search for new methods (i.e. asymmetric EVT-GARCH based VaR) to replace the typical models (with kurtosis 42.40) than those of its developed counterparts (with kurtosis less than 10) attracts us, which may reflect its susceptibility to extreme shocks (Kim, 2015). Importantly, values of $\gamma$ how that most of the leverage parameters are significant from 0, even though the magnitude is weak. Consequently, asymmetry does exist in the four foreign exchange markets. A dominating explanation for the weakness lies on the two-sided nature of exchange rates, namely, a positive return shock to one currency is a negative shock for the other position. This can also be validated by coexistence of both positive and negative values of $\gamma_i$ in table 2. Unsurprisingly, values of $\gamma$ for CNY/USD is much smaller than those of other currencies reflecting China’s managed exchange rate regime i.e. hybrid of fixed and floating.

Table 1. Diagonal statistics of the raw foreign exchange returns

<table>
<thead>
<tr>
<th>Parameters</th>
<th>CNY/USD</th>
<th>JPY/USD</th>
<th>EUR/USD</th>
<th>GBP/USD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skewness</td>
<td>0.40</td>
<td>0.21</td>
<td>-0.04</td>
<td>-0.47</td>
</tr>
<tr>
<td>Kurtosis</td>
<td>42.40</td>
<td>6.37</td>
<td>5.81</td>
<td>8.42</td>
</tr>
<tr>
<td>Jarque-Bera</td>
<td>177702</td>
<td>1295</td>
<td>953</td>
<td>3429</td>
</tr>
<tr>
<td>Q(16)</td>
<td>438.38</td>
<td>791.45</td>
<td>705.50</td>
<td>952.34</td>
</tr>
<tr>
<td>Q2(16)</td>
<td>269.96</td>
<td>782.20</td>
<td>1028.64</td>
<td>2513.43</td>
</tr>
</tbody>
</table>

Note: kurtosis for a normal distribution is 3

In the following, we will divide the whole sample into two parts. The first part (January 03, 2005 to May 29, 2014) is used for model construction while the second part (from June 02, 2014 to May 29, 2015) for prediction accuracy evaluation in part 3.4.

3.2. Model Estimation

As illustrated previously, we need to firstly get filtered iid standardized residuals through specifying the asymmetric GARCH model. Table 2 below lists the most proper fitted models of the four different markets mainly based on the criteria of AIC and FPE. Note that, since our interest here centers on prediction ability but not structural analysis, other criteria such as HQ and SC may be inferior in this scenario.

Figure 2. Normality test by applying Q-Q plot

In summary, the descriptive statistics motivate us to search for new methods (i.e. asymmetric EVT-GARCH based VaR) to replace the typical models (with kurtosis 42.40) than those of its developed counterparts (with kurtosis less than 10) attracts us, which may reflect its susceptibility to extreme shocks (Kim, 2015). Importantly, values of $\gamma$ how that most of the leverage parameters are significant from 0, even though the magnitude is weak. Consequently, asymmetry does exist in the four foreign exchange markets. A dominating explanation for the weakness lies on the two-sided nature of exchange rates, namely, a positive return shock to one currency is a negative shock for the other position. This can also be validated by coexistence of both positive and negative values of $\gamma_i$ in table 2. Unsurprisingly, value of $\gamma$ for CNY/USD is much smaller than those of other currencies reflecting China’s managed exchange rate regime i.e. hybrid of fixed and floating.

Table 2. Model specification and parameter estimate

<table>
<thead>
<tr>
<th>Parameters</th>
<th>CNY/USD</th>
<th>JPY/USD</th>
<th>EUR/USD</th>
<th>GBP/USD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Con.mean</td>
<td>a0</td>
<td>a1</td>
<td>b1</td>
<td>W</td>
</tr>
<tr>
<td></td>
<td>0.0056</td>
<td>-0.0046</td>
<td>0.0180</td>
<td>-0.0012</td>
</tr>
<tr>
<td></td>
<td>(0.0702)</td>
<td>(0.0913)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a1</td>
<td>0.095</td>
<td>0.134</td>
<td>0.133</td>
<td>0.195</td>
</tr>
<tr>
<td>b1</td>
<td>0.55</td>
<td>0.069</td>
<td>0.052</td>
<td>0.550</td>
</tr>
<tr>
<td>W</td>
<td>-0.771</td>
<td>0.004</td>
<td>0.008</td>
<td>0.001</td>
</tr>
<tr>
<td></td>
<td>(0.0861)</td>
<td></td>
<td></td>
<td>(0.0994)</td>
</tr>
<tr>
<td>a0</td>
<td>0.588</td>
<td>0.319</td>
<td>0.063</td>
<td>0.076</td>
</tr>
<tr>
<td>a1</td>
<td>0.006</td>
<td>-0.012</td>
<td>0.027</td>
<td>-0.022</td>
</tr>
<tr>
<td>b1</td>
<td>0.85</td>
<td>0.934</td>
<td>0.791</td>
<td>0.934</td>
</tr>
<tr>
<td>W</td>
<td>0.485</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note that the fitted models are ARMA(1,1)-EGARCH(1,1), ARMA(1,1)-EGARCH(1,1), ARMA(1,1)-PGARCH(1,1) and ARMA(1,1)-GJRGARCH(1,1) respectively. p values are shown in parentheses only when not significant at the 5% level.

There exist two popular theories to explain why the asymmetry $\gamma$ varies among different countries just as shown in Table2 that asymmetry effect being much smaller for Yuan/USD compared with others. Firstly, given the super economic and trade volumes between the US and China, Yuan and USD act as base currencies to each other. For example, most of the trade enterprises use either US dollars or Chinese...
Yuan to measure their benefits and losses while for case of GBP, more companies may calculate their profits in US dollars. Hence, a large volatility of GBP/USD will cause the sale of GBP-denominated assets, which leads to the devaluation of the pound. But for US and China, a volatility of Yuan/USD will make Chinese to sell USD-denominated assets and Americans to sell EUR-denominated assets and therefore the asymmetry between China and the US is weaker. Secondly, even though the Chinese government allowed the Yuan to move to an unknown basket of currencies peg, it only requires the value of the Yuan to fluctuate 0.3% per day over the previous day closing price which can be verified in figure 1.

Once the relevant parameters constituting the conditional mean $\mu_i$ and conditional variance $\sigma_i^2$ are estimated, we can immediately apply (8)-(11) to calculate the standardized residuals:

$$ z_i = (y_i - \mu_i) / \sigma_i $$

Likewise, autocorrelation and normality diagnosis of standardized residuals are presented in Table 3. As expected, bad property like serial correlation or volatility clustering disappears through examining $Q(16)$ and $Q'(16)$. However, non-normality or tail-thickness of the data still exists from indicators of skewness, kurtosis or Jarque-Bera. In consideration of the two features of standardized errors, POT-GPD based EVT in stage 2 is reasonably motivated.

### 3.3. POT-based EVT

The implementation of POT involves the following steps: select the and then fit the GPD function to the exceedances over $u$ and finally compute point estimates as well as interval estimates of VaR.

$$ \log(\xi, \psi | y) = \begin{cases} -n \log(\psi) - \left(1 + \frac{1}{\xi} \right) \sum_{i=1}^{n} \log(1 + \frac{\xi}{\psi} y_i) & \text{if } \xi \neq 0 \\ -n \log(\psi) - \frac{1}{\psi} \sum_{i=1}^{n} y_i & \text{if } \xi = 0 \end{cases} $$

On a regular basis, $\xi$, $\psi$ are estimated by maximizing the log-likelihood function as shown in table 4. Correspondingly, figure 3 plots how well the estimated GPD could fit exceedances of the lower tails. Note that in table 4, positive values of $\xi$ indicate tail-thickness of the residuals and therefore the plausibility of using EVT.

#### 3.3.1. Selection of threshold $u$

As discussed in Pickands-Balkema-de Haan theorem, the shape parameter and scale parameter estimators are functions of the selected threshold $u$ which will be determined in this subsection. Intuitively, choice of $u$ is a not a matter of science but a matter of art in balancing trade-off between being unbiased and small variance of the estimators; on the one hand, if $u$ is high enough, then, Pickands-Balkema-de Haan theorem mentioned above is well satisfied, we can therefore apply GPD to fit the exceedances. However, as $u$ gets larger and larger, there will be fewer observations left for the estimation of the parameters of the tail distribution function which will definitely increase the variance of the estimator.

Nevertheless, the issue of determining the fraction of data belonging to the tail is discussed by Danielsson et al. (2001). A subjective and popular tool is to plot the mean excess against $u$ and choose threshold $u^*$ which has the smallest mean excess value. Intuitively, a larger mean excess value parallels to larger bias of the GPD estimator. Particularly, the mean excess function (MEF) for the GPD with parameter $\xi < 1$ is:

$$ e(u) = E(X - u | X > u) = \frac{\psi + 2U}{1 - \xi} - \psi + \xi u > 0 $$

And a sample analogue estimator of the MEF is given by

$$ e(u) = \frac{\sum_{i=k}^{n}(X_i - u)}{n - k + 1} $$

As tabulated in Table 4, exceedances of each market account for around 10% of the whole sample. Hence, the tail sample is enough according to McNeil and Frey (2000).

#### 3.3.2. MLE of GPD parameters

As guaranteed by Pickands-Balkema-de Haan theorem, extreme values should approximately follow GPD. That is, for a sample $y = \{y_1, ..., y_n\}$ where $y = Z \cdot u^*$ and $Z$ is the standardized residual, the log-likelihood function $\log(\xi, \psi | y)$ for the GPD is the logarithm of the joint density of the n observations:

$$ \log(\xi, \psi | y) = \begin{cases} -n \log(\psi) - \left(1 + \frac{1}{\xi} \right) \sum_{i=1}^{n} \log(1 + \frac{\xi}{\psi} y_i) & \text{if } \xi \neq 0 \\ -n \log(\psi) - \frac{1}{\psi} \sum_{i=1}^{n} y_i & \text{if } \xi = 0 \end{cases} $$

### Table 3. Diagonal statistics of the standardized errors

<table>
<thead>
<tr>
<th></th>
<th>CNY/USD</th>
<th>JPY/USD</th>
<th>EUR/USD</th>
<th>GBP/USD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skewness</td>
<td>0.053</td>
<td>0.132</td>
<td>0.313</td>
<td>-0.053</td>
</tr>
<tr>
<td>Kurtosis</td>
<td>1.492</td>
<td>5.26</td>
<td>8.00</td>
<td>8.95</td>
</tr>
<tr>
<td>Jarque-Bera</td>
<td>34297</td>
<td>17.30</td>
<td>11.3</td>
<td>0.49</td>
</tr>
<tr>
<td>$Q(16)$</td>
<td>2.97</td>
<td>13.50</td>
<td>23.58</td>
<td>5.99</td>
</tr>
<tr>
<td>$Q'(16)$</td>
<td>2.97</td>
<td>13.50</td>
<td>23.58</td>
<td>5.99</td>
</tr>
</tbody>
</table>

Note: $p$-values are shown in the parentheses

### Table 4. Estimated parameters of GPD distribution

<table>
<thead>
<tr>
<th></th>
<th>CNY/USD</th>
<th>JPY/USD</th>
<th>EUR/USD</th>
<th>GBP/USD</th>
</tr>
</thead>
<tbody>
<tr>
<td>EVT threshold</td>
<td>0.05</td>
<td>0.5</td>
<td>0.49</td>
<td>0.45</td>
</tr>
<tr>
<td>% of exceedance</td>
<td>11.6</td>
<td>9.4</td>
<td>11.3</td>
<td>10.6</td>
</tr>
<tr>
<td>Shape parameter</td>
<td>0.19</td>
<td>0.12</td>
<td>0.217</td>
<td>0.26</td>
</tr>
<tr>
<td>Scale parameter</td>
<td>0.04</td>
<td>0.04</td>
<td>0.287</td>
<td>0.22</td>
</tr>
</tbody>
</table>
Figure 3. GPD fitted to the left tail exceedances above their corresponding threshold

Given the estimated GPD, high quantiles VaR can now be directly calculated from formula (7) by substituting $\xi$, $\psi$ with their estimates.

### 3.3.3. VaR forecasting

At this point, we just estimated VaR of the standardized errors. In order to obtain VaR estimate of the daily returns, it remains to be seen the links between the two values by utilizing equation (13) derived from asymmetric ARMA-GARCH model. Results are reported in table 5 and table 6, e.g. in market of JPY/USD and CNY/USD, with probability 0.01, loss of a long position (holding USD) will exceed the 1.202%, 0.194% respectively.

To do comparison, we would also like to report another commonly used risk measure named expected shortfall (ES) proposed by Artzner et al (1999). Formally, if we define $L$ as the level of losses, ES is denoted as $E(L | L > \text{VaR})$. It is easy to see that ES measures the tail conditional expectation which is exactly the average loss exceeding VaR. Similarly, by replacing $\text{VaR}(Z)_q$ in equation (13) with $E(L | L < \text{VaR}(Z)_q)$, we arrive at the formula of ES for daily returns:

$$\text{VaR}(r)_q^{\text{ES}} = \mu_\alpha + \sqrt{\hat{h}_\alpha} E(Z | Z < \text{VaR}(Z)_q)$$ (19)

Furthermore, confidence intervals could provide additional information regarding the accuracy of the point estimates, single confidence intervals are considered by using a bootstrap method or log-likelihood based method as that in Gilli (2006). Given the fact that bootstrap method does not depend on asymptotic theory, it may be more reliable under small sample circumstance.

As we can see from the last row of table 5, the corresponding expected loss in CNY/USD market is 2.85%. That is, on average, loss in situations where drops exceed 0.194% is 0.285%.

### Table 5. Point estimates, maximum likelihood (ML) and bootstrap (BC) confidence intervals at 95% confidence level for the CNY/USD market

<table>
<thead>
<tr>
<th></th>
<th>Lower bound</th>
<th>Point estimate</th>
<th>Upper bound</th>
</tr>
</thead>
<tbody>
<tr>
<td>VaR</td>
<td>BC</td>
<td>ML</td>
<td>BC</td>
</tr>
<tr>
<td>Left tail</td>
<td>0.178</td>
<td>0.175</td>
<td>0.194</td>
</tr>
<tr>
<td>ES</td>
<td>0.247</td>
<td>0.243</td>
<td>0.285</td>
</tr>
</tbody>
</table>

For simplicity, only point estimates of the markets remained are listed below:

### Table 6. Point estimates for the remained three markets

<table>
<thead>
<tr>
<th></th>
<th>JPY/USD</th>
<th>EUR/USD</th>
<th>GBP/USD</th>
</tr>
</thead>
<tbody>
<tr>
<td>VaR</td>
<td>1.202</td>
<td>1.221</td>
<td>1.201</td>
</tr>
<tr>
<td>ES</td>
<td>1.614</td>
<td>1.658</td>
<td>1.789</td>
</tr>
</tbody>
</table>

Interestingly, risks of the latter three countries are quite distinct from those of China: they are much more risk exposed. This result is also logical without intuition: since the in-sample date end on May 29, 2014, detailed price trends from January 01, 2014 to June 2, 2014 are reported below: as we can see in figure 4, CNY was depreciating most of the time during first half of 2014 while others showed the opposite which increases the risks of holding USD against JPY, EUR or GBP and therefore leading higher VaR forecasting values.

### Figure 4. Detailed price trends from January 01, 2014 to June 2, 2014

#### 3.4. Backtesting

Note that checking model accuracy is not equivalent to evaluating forecast ability is another thing, even though the two targets overlap to some extent. Actually, in terms of practical application, managers prefer to care more about the latter more than the former. Hence, in this subsection, we test how our model will behave in reality by adapting out-of-sample from June 02, 2014 to May 29, 2015. A method of rolling the data is employed and illustrated below:

### Figure 5. Illustration of rolling data

Where m is the number of the in-sample data. However, reselecting model order and re-estimating
model parameters (including multiple different ARMA-GARCH parameters as well as threshold and parameters of GPD) every time we roll the data is quite demanding. Luckily, as suggested by McNeil and Frey (2000), by applying the same model specification and meanwhile setting uniform threshold as 10 percentile of the data, we can still check prediction accuracy without losing too much credibility. Namely, corresponding specifications like ARMA(1,1)-EGARCH(1,1) , ARMA(1,1)-GARCH(1,1) and ARMA(1,1)-GJR-GARCH(1,1) for CNY/USD, JPY/USD, EUR/USD and GBP/USD will be accepted throughout.

Afterwards, asymmetric ARMA-GARCH based 1-day ahead VaR forecast is depicted in figure 5.

In the following, backtesting is introduced step by step: from intuitive value comparison to statistical tests and lastly we develop it to be based on various forms of loss functions given that magnitude of exceedance helps to view forecasting ability differently.

**Figure 6. VaR(r) forecast and returns of the out-of-sample period (June 02, 2014 to May 29, 2015)**

### 3.4.1. Informal violence ratio inspection

In order to deepen the understanding of figure 6 and accordingly have a basic cognition about the prediction effectiveness, the concept of violence ratio (VR) is introduced. Briefly, violation happens when the real returns beyond its corresponding forecast value and violation ratio or the failure ratio is the ratio of violations to number of out-of-sample (Jorion, 2001). If the constructed model is accurate, VR would be coincident with the chosen significance level i.e. 1% in our case by a statistical view. Or equivalently, expected violations are around 3 to 4 among the 365 days forecast period.

As we can see from both figure 6 and table 7, most of the markets are empirically in line with theory even though some of the returns hit exactly the VaR bound. It is apparent that a much higher violation ratio implies the risk is not properly hedged while a much lower VR does not signify a better management even though risk is controlled very well, since the holder of the asset suffers an opportunity cost of the interest rate (Gencay et al.2003).

**Table 7. Failures of prediction at significance level 1% and 0.5% (long position)**

<table>
<thead>
<tr>
<th></th>
<th>CNY/USD</th>
<th>JPY/USD</th>
<th>EUR/USD</th>
<th>GBP/USD</th>
</tr>
</thead>
<tbody>
<tr>
<td>1% Violations</td>
<td>4.38</td>
<td>3.29</td>
<td>4.01</td>
<td>3.28</td>
</tr>
<tr>
<td>0.5% Violations</td>
<td>1.92</td>
<td>1.68</td>
<td>1.87</td>
<td>1.71</td>
</tr>
</tbody>
</table>

However, VR is only a rough measurement, in order to statistically determine whether empirical and theoretical VRs are significantly different with each other, we adopt the standard test put forward by Christoffersen (1998) as well as Kupiec (1995).

### 3.4.2. Unconditional coverage

In principle, to carry out every statistical test, we have to build a statistic generated from the simple value of VR. As we know, under the assumption that model is accurate, each realized return outcome produces a VaR violation with probability \( \alpha \) which is exactly the significance level. Hence, the number of violations can be viewed as a Bernoulli experiment which can be approximated with a normal distribution. We assume length of the out-of-sample is \( T \) and number of violations during this period is \( S \), then

\[
\frac{S - \alpha T}{\sqrt{\alpha(1-\alpha)T}} \overset{d}{\rightarrow} N(0,1)
\]

Maximum likelihood estimator of VR can be written as \( VR_{MLE} = S/T \), and the likelihood ratio statistic is denoted as:

\[
LR_m = -2(\ln L(\alpha, S) - \ln L(VR_{MLE}, S))
\]

Where \( L(\alpha, S) = \alpha^S (1-\alpha)^{T-S} \). It can be shown that under the null hypothesis (i.e. \( \alpha \) and VR are statistically the same) and regularity conditions, the LR statistic follows a chi-square distribution with one degree of freedom. In view of the similarities, we notice the other two commonly used unconditional
coverage statistics: POF-test (proportion of failures) and TUFF-test (time until first failure) also follow a χ² distribution.

3.4.3. Conditional coverage

The best known test called conditional coverage was proposed by Christoffersen (1998). It not only pays attention to VR but also sheds new light on clustered exceptions i.e. the null hypothesis implies that a violation today should not depend on whether or not a violation occurred on the previous day. Clearly, the joint test is more valid, since in reality large losses occurring in clustering periods are more likely to lead to disastrous events than individual exceptions taking place evenly during the whole period. For ease of exposition, we omit the details of an independence test and only conclude that the LR statistic also follows a chi square distribution with one degree of freedom.

Formally, the joint statistic is as follows:

\[ LR_{cc} = LR_{uc} + LR_{ind} \]  (22)

It is worth noting, however, even when our model passes the joint test it may still be rejected according to the single independence test or unconditional coverage test. Hence, table 8 reports all of the test results.

### Table 8. Backtesting Value-at-Risk

<table>
<thead>
<tr>
<th>Currency</th>
<th>MSE</th>
<th>MAD</th>
<th>MLAE</th>
</tr>
</thead>
<tbody>
<tr>
<td>CNY/USD</td>
<td>0.0008</td>
<td>0.0054</td>
<td>0.0032</td>
</tr>
<tr>
<td>JPY/USD</td>
<td>0.0015</td>
<td>0.0039</td>
<td>0.0057</td>
</tr>
<tr>
<td>EUR/USD</td>
<td>0.0035</td>
<td>0.0077</td>
<td>0.0097</td>
</tr>
<tr>
<td>GBP/USD</td>
<td>-7.3111</td>
<td>-5.5862</td>
<td>-4.8088</td>
</tr>
</tbody>
</table>

Note: p-values are in the parentheses, and all of the statistics are insignificant at level of 5%.

As we can see from table 8, almost all independence statistic are statistically equal to 0, which indicates non-existence of violation clustering and it can also be verified intuitively by figure 5. In this case, \( LR_{cc} = LR_{ind} \). In summary, the statistical analysis (including both joint and separate tests) shows evidence in favor of the null hypothesis: 1. Realized VR is insignificantly different from significance levels; 2. Violations are independent exceptions i.e. the null hypothesis implies that a violation today should not depend on whether or not a violation occurred on the previous day. Clearly, the joint test is more valid, since in reality large losses occurring in clustering periods are more likely to lead to disastrous events than individual exceptions taking place evenly during the whole period. For ease of exposition, we omit the details of an independence test and only conclude that the LR statistic also follows a chi square distribution with one degree of freedom.

### 3.4.4. Loss function based model evaluation

As mentioned previously, the magnitude of the violations may be more important in practice. Let \( f_r \) denote the vector of the realized volatility and \( f_t \) the vector of forecasted VaR. In the following we list several commonly used loss functions vary from mean square error (MSE), mean absolute deviation (MAD) to mean logarithm of absolute error (MLAE) in order to reflect specific concerns about the same method:

\[
MSE = \frac{1}{T} \sum_{t=1}^{T} (f_t - r_t)^2
\]

\[
MAD = \frac{1}{T} \sum_{t=1}^{T} |f_t - r_t|
\]

\[
MLAE = \frac{1}{T} \sum_{t=1}^{T} \log |f_t - r_t|
\]

### Table 9. Volatility Loss Functions

<table>
<thead>
<tr>
<th>Currency</th>
<th>MSE</th>
<th>MAD</th>
<th>MLAE</th>
</tr>
</thead>
<tbody>
<tr>
<td>CNY/USD</td>
<td>0.0008</td>
<td>0.0054</td>
<td>0.0032</td>
</tr>
<tr>
<td>JPY/USD</td>
<td>0.0015</td>
<td>0.0039</td>
<td>0.0057</td>
</tr>
<tr>
<td>EUR/USD</td>
<td>0.0035</td>
<td>0.0077</td>
<td>0.0097</td>
</tr>
<tr>
<td>GBP/USD</td>
<td>-7.3111</td>
<td>-5.5862</td>
<td>-4.8088</td>
</tr>
</tbody>
</table>

Similarly, the model also performs very well in terms of loss functions.

4. CONCLUSION

This paper introduces a more general asymmetric VaR-GARCH based tool to forecast risks of four different kinds of currencies as that of McNeil and Frey (2000). In step one, an asymmetric ARMA-GARCH model is used to foreign exchange market returns and residuals are obtained. In the second step, the extracted i.id residuals are modeled using the GPD.

As expected, by taking certain data properties such as asymmetry, heteroscedasticity, non-normality and tail-thickness into consideration, the model successfully passes all of the conventional backtesting. Therefore, it can be reasonably used in practice as an objective early warning system especially before a currency catastrophe which can be referred to make instant financial and economic policies.

Also, based on the findings of asymmetric volatility in foreign exchange markets and those in other mentioned papers, we are able to draw a conclusion that the property of asymmetry not only depends on the specific time period observed and market used. Furthermore, under the assumption that if central banks’ intervention effect dominates the base-currency effect, we can roughly say that Chinese government may not implement currency manipulation to keep Yuan being undervalued. This is because many papers have shown that manipulations generate higher volatility (Galati et al 2005; Frenkel et al. 2005), their intervention on one side of the foreign exchange market but not the other will lead larger asymmetric. On the other hand, if base-currency effect dominates the central banks’ intervention effect since the two giants share similar economic size and condition, we still cannot

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2 Even though the model can only perform well with short term forecasts, it is better than doing nothing to avert a crisis especially on the eve of such an event.
confidently accuse China of manipulating its currency since we know nothing about the magnitude of base-currency effect.

In the future, more attention should be paid towards evaluating the effects of an even more general model by considering vector-GARCH cases, so that we can include more economic variables according to economic theory (e.g. real interest rate) since it essentially integrates the two different methods discussed in section 1 together.

REFERENCES


