Innovations

Insurance Industry Performance and Potential Capital Market Development Nexus In Ethiopia: The Application of AHP And DEMATEL Multi-Criteria Decision Models

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Abstract

The study investigated the interdependence between insurance industry performance and potential capital market development in an emerging market context. AHP and DEMATEL multi-criteria decision models were employed to measure a level of importance and establish interdependence. Ordered with their weighted criteria score the paper identified profitability, operating growth, solvency, asset quality, and management soundness as key insurance industry performance indicators. The center cause score indicates profitability, trade volume, market capitalization, operating growth, asset quality, solvency, and management soundness, respectively assume a central position in the insurance-capital market interaction. The study also projects solvency, management soundness, and asset quality as cause group and market capitalization, trade volume, profitability, and operating growth as an affect group. The paper concludes unidirectional influence from the insurance sector to capital market development in the insurance industry-capital market interplay. The study contributed by introducing a methodology to analyze the potential implication of introducing and developing capital markets in a financial institution dominated systems which is the characteristic feature of most African economies and a critical policy decision to promote economic development.

Keywords: *1. Insurance industry 2. Performance 3. Capital market development*

JEL Code*: N27; G22; E44*

I. Introduction

Insurance influences macro-economic liquidity at least in three ways: by diversifying risks. decreasing financial intermediation cost, and being a source of liquidity crisis and systematic risk (Trainar, 2001). The insurance industry meets a significant proportion of corporate demand for stock exchange finance (Sawadogo & Guerineau, 2016). Their participation as credible institutional investors is also of paramount importance in enhancing the reputation of capital markets in the eyes of the investing public. Moreover, the growing role of insurance companies towards greater institutional investment and financial intermediation instills investor confidence and lends credibility to market information regarding the quality of market securities. The enhanced credibility of market information is taken as a positive signal to the market that lets security prices go up improving the overall economic efficiency.

The financial system is largely known to be complex in structure and function with crucial significance to capital formation (Pilbeam, 2018; De Haan, Schoenmaker, & Wierts, 2020). It involves three distinct and yet interdependent functions: saving, finance, and investments. Components of the financial system also interact in three ways: compete, complement, and co-evolve (Cherif, 2020; Balachandran & Williams, 2018; Song & Thakor, 2010). The system is composed of financial institutions (banks, insurance companies, mutual funds), markets (stock and bond markets), and regulatory bodies (central banks and security commissions). It operates under a strict regulatory framework aided with a complex and dynamic set of rules, regulations, procedures, policies, and practices that are of crucial significance to capital formation.

The financial system plays a major role in the economy by making it possible for households, companies, and governments to access the highly needed capital for economic development, employment generation, and poverty alleviation (Rogers, 2018). However, most developing countries lack the integration among different components of the financial system which compromises stability and undermines development aspirations (Friedman, 2000).

Financial institutions and capital markets are the most important and highly regulated economic entities in the globalized world. Their operations are strictly and routinely scrutinized at least for two important reasons: most of their asset is public money and their sickness and strength sickens and solidifies national and global economies alike. Nonetheless, capital markets contribute to economic development by offering a platform for quick and efficient security trading that reduces ownership concentration and expedites privatization efforts that in turn improve corporate governance practices. It also offers the opportunity to raise equity finance, adjust the capital structure to the optimal position, and improve accounting and auditing standards. It is also instrumental in facilitating long-term asset management of insurance companies and pension funds (Chewaka, 2014). Moreover, efficient capital markets bring private sector development, relief to liquidity constraints,

growth in remittance volume, competition within the financial sector, and reward to sound economic policies & proper conduct of monetary policy (Ruecker & Shiferaw, 2011).

The rationale for introducing capital markets thus is to mobilize resources to fund projects with capital needs and capitalize on their risk-sharing behavior with a financial institution that promotes financial system stability and contributes to economic growth (Bremus & Stelten, 2017; Francis, Hasan, & Ofori, 2015). Extant literature shows a long-run co-integrating relationship between capital market development and economic growth (Coşkun, Seven, Ertuğrul, & Ulussever, 2017) but the relationship between capital market development and financial institution performance is mixed.

There is a growing research interest in investigating the relationship between financial market development and insurance industry performance (Lee, Huang, & Yin, 2013). However, the claims among various scholars are inconsistent, competing, conflicting, and often contradictory. Some claim a competitive relationship (Constantinescu & Alexandru, 2013) while others claim complementary and co-evolutionary association (Sawadogo & Guerineau, 2016; Masci, Tejerina, & Webb, 2007; Impavido, Musalem, & Catalan, 2000). Still, others claim weak or no significant relationship (Constantinescu & Alexandru, 2013), and with a complete shift to this a few claim role convergence (Cummins & Weiss, 2009; Kampa & Siegert, 2010; Schiro & Steinberg, 2008). Few also claim causality than interdependence (Scott, 2002; Piljan, Cogoljević, & Piljan, 2015; Tahmasebi, Tahmasebi, Tahmasebi, & Mowlaie, 2016). Few emphasize context-sensitivity: different results for different economic development contexts (Arena, 2008; Berry-Stölzle, Hoyt, & Wende, 2013; Sawadogo & Guerineau, 2016). The direction of causality appears to differ across countries (Lee et al., 2013).

Various methodologies were used by extant literature including pooled mean group (PMG) technique, traditional VAR and Granger causality (Hou & Cheng, 2017; Toda & Yamamoto, 1995; Lee et al., 2013) but none employed AHP and DEMATEL together, methodologies used to calculate criteria weights and measure interdependence, respectively. It is worth recognizing that few employed only AHP to analyze the criteria weights of financial institution performance indicators (Stankevičienė & Mencaitė, 2012; Saeedpoor, Vafadarnikjoo, Mobin, & Rastegari, 2015; Bagheri, 2016; Mandić, Delibašić, Knežević, & Benković, 2017) but not DEMATEL. DEMATEL is one of the best optimization methodologies used to investigate and solve complicated and intertwined problems. It works by analyzing interdependence among factors and aid in the development of a map that reflects relative relationships (Si, You, Liu, & Zhang, 2018). Unfortunately, though DEMATEL is a powerful criterion interaction analytical model, it is not widely applied in factor interdependence analysis studies (Gölcük & Baykasoğlu, 2016; Kijewska, Torbacki, & Iwan, 2018).

Moreover, none of the studies investigated the potential interplay between financial markets and institutions, especially in a developing economy context, a study that brings forth valuable policy inputs before strategic policy decisions are made. This can be considered as timely research for policy input as Ethiopia is heading to introduce its capital market soon. Given that, Ethiopia is about to introduce the capital market, exploring the potential interplay between existing financial institutions and the to be introduced capital markets is believed to have paramount importance which otherwise will have unintended and detrimental effects. Such endeavor helps financial institutions to get ready and tap potential benefits and withstand possible setbacks.

This study, therefore, explores the projected interdependence between existing insurance industry performance and forthcoming capital market introduction by importing AHP and DEMATEL multi-criteria decision-making models from the decision science discipline.

The remainder of this paper is organized as follows. The following section presents a review of extant literature. The third section recounts the history of the primary capital market in Ethiopia. Section four introduces the empirical approach employed to analyze the results presented and discussed in section five. Conclusions are drawn and policy implications are provided in the final section.

II. Literature Review

A plethora of studies examined the relationship between insurance market performance and real sector development at a global level (Hou & Cheng, 2017; Arcand, Berkes, & Panizza, 2015; Arena, 2008; Dickinson, 1998), in developed economies (Lee et al., 2013; Pradhan, Arvin, & Norman, 2015; Haiss & Sümegi, 2008) and developing economies (Alhassan, 2016; Khurshed & Ghosh, 2013; Ćurak, Lončar, & Poposki, 2009; Sadhak, 2006). Evidence shows mostly uni-directional causality from insurance market development to economic growth (Pradhan et al., 2015; Haiss & Sümegi, 2008; Ćurak et al., 2009; Arena, 2008) and a few bi-directional causalities (Alhassan, 2016; Sadhak, 2006). Moreover, "insurance industry development affects growth predominantly through productivity improvement in developed countries, while in developing countries it promotes capital accumulation" (Azman-Saini & Smith, 2011 p.1).

The theoretical foundation of the relationship between finance and economic growth dates back to the early discussions of Bagehot (1873) who reasoned financial systems play a critical role in facilitating resource mobilization and fuelling economic growth. Following this classical work, the finance-led growth hypothesis (Schumpeter, 1911), the growth-led finance hypothesis (Robinson, 1952), the theory of financial liberalization (MeKinnon, 1973), and the market feedback hypothesis (Shaw, 1973) were proposed.

Schumpeter (1911) in his finance-led growth hypothesis argued services provided by financial institutions are the main drivers of innovation and economic growth (Ohwofasa & Aiyedogbon, 2013). Challenging Schumpeter's (1911) hypothesis, Robinson (1952) proposed a growth-led finance hypothesis proclaiming a country experiencing high growth in its economy is likely to experience increased demand for certain financial instruments that open the opportunity to develop financial markets and institutions. Robinson (1952) maintains where enterprise development leads, finance follows.

Later, Me Kinnon (1973) proposed the theory of financial liberalization. He argued financial liberalization improves savings through increased financial intermediation of savers and traders that subsequently promote investment and foster economic growth (Kaminsky & Schmukler, 2003). The theory assumes that interest rates brought by liberalization, are seen to contribute to more efficient resource allocation, increased investment, and economic growth. In so doing, they linked capital market deepening with financial market liberalization which in turn influences financial sector performance. However, financial liberalization may also bring financial uncertainty and low economic development.

The other theory is the market feedback hypothesis introduced by Shaw (1973) which assumes a bi-directional relationship between economic growth and financial sector development: the financial sector develops as a result of economic growth which also stimulates real economic growth (Akinlo & Egbetunde, 2010) backing both the supply leading and demand following hypotheses (Levine, 1999).

In summary, the finance-growth debate takes two dimensions: finance-growth nexus and financial structure-growth nexus. Some researchers, however, argue that finance is irrelevant for economic growth as factors other than finance could explain the process of economic development (Robinson,1952; Lucas, 1988; Choe & Moosa, 1999). After a thorough examination of the arguments of Bagehot (1873), Schumpeter (1911), and Robinson (1952), Patrick (1966) concluded both supply-leading and demand-following relationships between finance and real sector growth yet the degree of influence may vary for developing and developed economies. For example, Mashayekhi& Fernandes (2007) posits developing economies are more influenced by supply-leading relationships.

Nonetheless, a non-linear, balanced, and measured growth relationship between financial and real sectors makes their interdependence more effective and healthier. Otherwise, a very rapid and sharply fluctuating financial development has asymmetric and negative effects on real sector growth (Ductor & Grechyna, 2015; Aizenman, Pinto, & Sushko, 2013). Moreover, real sectors are adversely affected by financial sector contractions and not helped by their expansions emphasizing the need for a measured, and coevolutionary growth relationship (Aizenman et al., 2013; Cecchetti & Kharroubi, 2015; Boyd & Smith, 1996). It is worth noting

that financial innovation is a dynamic process that influences and is influenced by real sector development (Boyd & Smith, 1996) which the current complex world economy needs most.

Insurance Market and Capital Market Development Interplay

The complementary relationship between insurance market and capital market development

Several studies analyzed the effect of insurance market performance on economic growth while little has been known about its direct impact on capital market development (Sawadogo & Guerineau, 2016). Insurance companies encourage investment in capital markets with their strong surveillance service (Masci et al., 2007) and the long-term nature of their capital structure makes them important investors in capital markets which establishes their relationship with capital markets as complementary than competitive. Their participation in capital markets as institutional investors also boosts other investors' confidence and encourages them to invest more aided with their intuitive assessment of the economy. Also, Impavido et al (2000) posit the development of insurance companies significantly contributed to the development of capital markets.

Therefore, it can be considered that insurance market development plays a primordial role in the development of the capital market through risk management, savings allocation, and market growth (Sawadogo & Guerineau, 2016). However, the impact hinges on the overall level of development, education, demographic structure, and the legal environment of specific countries (Impavido, Musalem, &Tressel, 2003). On the other hand, capital markets also enhance the risk-sharing capacity of insurance markets and the scope of risks that are insurable (Penalva Zuasti, 2008). This improves the allocative efficiency of the economy (Pagano, 1993). Moreover, insurance risks can also be transferred to capital markets through the securitization of assets. " An insurance company transfers underwriting risks to the capital markets by transforming underwriting cash flows into tradeable financial securities" (De Mey, 2007 p. 37).

The competitive relationship between insurance market and capital market development

Financial institutions and markets compete for financial resources. Sometimes participation in one limits the capacity to participate in the other, especially in developing countries where people are short of adequate income to participate in various investment opportunities. Nonetheless, in addition to the theoretical complexity, empirical evidence on competition in the financial sector is scarce and sometimes unclear (Claessens, 2009).

Financial institutions and markets compete for allocative, productive, and dynamic efficiency of capital investments through risk-sharing service, generating information feedback, reducing information asymmetry, creating financial innovation incentives to reduce regulatory costs, protecting client information and privacy, consolidating R&D incentives

(Mattana & Panetti, 2014; Lumpkin, 2010; Claessens, 2009; Boosone & Lee, 2004). Consequently, competition in the financial system encourages reducing transaction cost & moral hazard consequences, improved access and quality of financial services, and stability.

However, the competition in the financial sector cannot be unbridled as it can be in the real sector (Claessens, 2009). Unfettered competition in the financial sector can be a major threat to the primary goal of the stability of the financial system. Thus stability than efficiency shall be the emphasis of financial regulation (Heremans & Pacces, 2000; Van Cayseele, 1992).

Performance of Insurance Companies

Different authors considered different factors as key insurance performance indicators in their studies. They based extant literature to select performance criteria (see Radhika & Satuluri, 2019; Wanjugu, 2014; Burca & Batrinca, 2014; Sambasivam & Ayele, 2013; Valahzaghard & Ferdousnejhad, 2013; Almajali, Alamro, & Al-Soub, 2012). However, key performance indicators are not the same in developing and developed economies; in economies that are higher and lower in financial inclusion index; in fast-growing and slowing economies, etc. Some of the factors used to analyze the performance of insurance companies in extant literature include leverage, liquidity, management competence, underwriting risk, risk-retention ratio, solvency margin, efficiency, profitability, asset growth rate, etc (Ercan & Onder, 2016; Akotey, Sackey, Amoah, & Manso, 2013; Mandić et. al, 2017; Burca & Batrinca, 2014).

What we can fairly infer from above is context matters and the selection of key performance indicators of insurance companies depends on the economic and financial development stage of the countries where such financial institutions operate. Thus, getting a first-hand judgment of leading industry experts and executives improves the relevance of factors used and the precision of calculated weights. Due to the uncertainty and complexity of the global market, an exponential increase in the flow of information, identification, and measurement of KPIs is no easy task. In such circumstances, the traditional performance identification and measurement approaches do not bear satisfactory results. However, the fuzzy analytical hierarchy process approach has been successful to overcome this problem (Mandić et. al, 2017).

III. History of Capital Market Development in Ethiopia

Investors raise long-term funds in the capital market by issuing securities and other financial instruments. New securities are sold in primary markets through underwriters and existing ones are traded in secondary markets either on capital markets or over-the-counter (Ruecker & Shiferaw, 2011).

Global Perspective in the Evolution of Capital Markets

Though there were markets that possess certain characteristics of stock markets in Bruges, Flanders, Ghent, and Rotterdam in the Netherlands that hosted their own "stock" market systems in the 1400s and 1500s, there is a consensus that the world's first stock market system was started in Antwerp, the then commercial center of Belgium and home for the influential Van der Beurze family. However, due to the lack of effective regulation, it could not last long. The stock market system was a passive phenomenon until the London Stock Exchange was founded in 1801 as the first stock exchange followed by the New York Stock Exchange in 1817 (Nyasha & Odhiambo, 2013). In recent times, stock markets are hugely contributing to economic growth by mobilizing global resources with the capacity to fund mega projects (Francis et. al., 2015; Bremus & Stelten, 2017).

Capital Market Development in Ethiopia

The history of the capital market in Ethiopia dates back to the Imperial period during which Ethiopia inaugurated the "Addis Ababa Share Dealing Group" around 1960. From 1960 to 1974 share companies including Addis Ababa Bank, Ethiopian Abattoirs, Bottling Company of Ethiopia, Indo-Ethiopian Textiles, HVA Ethiopia, and Tendaho Plantations flourished and shares were traded by the National Bank of Ethiopia through this Group. Also, financial institutions such as Addis Ababa Bank, the Commercial Bank of Ethiopia, and the Ethiopian Investment Corporation played an intermediary role in transferring and delivery of traded shares in the form of over-the-counter share dealing services during the Imperial period.

However, the stock market was put to an end with the rising of the military regime to power in 1974 (Geda, Addison, & Alemu, 2017; Jalata, 2014). Since then, there is a trifling effort to establish a capital market in Ethiopia. For example, there was a private sector initiative to establish the Addis Ababa Stock Market in 2001 with the support of IFC though not successful because of a lack of government commitment. Recently, the incumbent government demonstrated its commitment to establish a capital market by directing the central bank to undertake a feasibility study and prepare the required policies and regulations for its efficient functioning.

Ethiopia's financial sector is relatively small, closed, and less developed than its neighbors though significant development steps were taken after the end of the military regime in 1991. Until 2017, 80-billion-birr worth of shares have been sold in Ethiopia though the government owns the largest bank and controls interest rates (Ruecker & Shiferaw, 2011) of the bank-dominated financial system. Banks as key players deal with short-term finance, fulfill temporary cash requirements, and long-term physical investment needs.

Ethiopia is one of the developing countries whose financial system is bank-dominated and not robust enough to promote investment and absorb possible economic shocks. Of course, the debate on whether markets or bank-based intermediaries are more effective is yet

unsettled and remains to be a hot topic among financial economists. Research shows financial systems tend to be more market-based in higher-income countries and countries with a common law tradition, strong protection of shareholder rights, good accounting standards, low levels of corruption, and no explicit deposit insurance.

Both market and bank-based financial systems have relative advantages and disadvantages. In bank-based systems, banks play a leading role in mobilizing savings, allocating capital, overseeing the investment decisions of corporate managers, and providing risk management vehicles while market-based systems share center stage with banks in channeling savings to those with productive investment opportunities, exerting corporate control, and modernizing risk management (Allen & Gale, 2011; Demirguc-Kunt & Levine, 2001).

IV. Empirical Design and Approach

This paper used a sequential and quantitative dominated mixed approach to identify and rank insurance companies' performance measures and study interdependence with capital market development. Capitalizing on insights gained from extant literature and perspectives from expert interviews, we developed a questionnaire to be filled by Insurance CEOs, Finance Chiefs, and Directors that have a direct role in the management of insurance companies and sufficient knowledge and investment experience regarding capital market instruments and their valuation. Twelve experts with at least 15 years of experience and top management service in the financial sector were used to fill the AHP and DEMATEL instruments. Using the data from the questionnaire, we were able to calculate insurance performance criteria weights in the Ethiopian insurance industry and analyze the relationships with capital market development

Multi-criteria decision-making models of Analytic Hierarchy Process (AHP) and Decision-Making Trial and Evaluation Laboratory (DEMATEL) were employed to rank performance indicators of insurance companies and analyze their interdependence with capital market development, respectively. AHP breaks down performance indicators and constructs hierarchies with unidirectional relationships between levels (De Felice & Petrillo, 2014).

DEMATEL was used to build a pairwise influential network relation map (INRM). INRM was used to detect the interrelationships among evaluation dimensions and criteria. Besides, DEMATEL was used to identify the level of influence of each criterion over others. The values of these influence levels were used as the basis for determining weights of criteria that derive relative importance in the system.

AHP Model

AHP is a versatile model that can be used to shape ideas, develop and test hypotheses, conduct sensitivity analysis (Saaty, 1980). We used Saaty's nine scales to calculate criteria weights and followed its three-step process (Table 1 and Table 2).

Table 1. Insurance companies' performance criteria and sub-criteria

Goal	Criteria	Sub criteria
Measure insurance company performance	C1 Profitability	*P1Net asset yield*
		P2 Total return on asset
		P3 Income margins
		P4 Profit margin
		P5 Return on investment
	C2 Operating growth	*O1 the state-owned capital preservation and appreciation rate*
		O2 profit growth rate
		O3 economic profit margins
	C3 Asset quality	*A1 tangibility asset*
		A2 recognized asset rate
		A3 accounts receivable ratio
	C4 Solvency	*S1 solvency adequacy ratio*
	C5 Management soundness	*M1Premium per employee*
		M2 Asset per employee

Table 2. List of capital market (CM) performance measurement criteria

Goal	Criteria	Sub criteria
Measure CM performa	C1- market capitalization	MC = current market price per share * Total number of outstanding shares
	C2 - trade volume	*TV= (monthly birr volume) / (sum of the absolute value of daily percentage changes in stock price)*

For a general AHP application, we can consider that A_1, A_2,…, Am denote the set of elements, while a_{ij} represents a quantified judgment on a pair of A_i, A_j. Through the 9-value scale for pairwise comparisons, this yield an [m x m] matrix A as follows:

A=aij=		**A_1**	**A_2**	**….**	**A_m**
	A_1	1	a_{12}	….	a_{1m}
	A_2	$1/a_{12}$	1	….	a_{2m}
	….	….	….	….	….
	A_m	$1/a_{1m}$	$1/a_{2m}$	….	1

Where, $a_{ij} > 0$ (i, j = 1, 2,..,m),
$a_{ii} = 1$ (i = 1, 2,…,m), and
$a_{ij} = 1/a_{ji}$(1; 2;…,m).

A is a positive reciprocal matrix. The result of the comparison is the so-called dominance coefficient a_{ij} that represents the relative importance of the component on a row (i) over the component on column (j), i.e., $a_{ij}=w_i/w_j$.

The pairwise comparisons can be represented in the form of a matrix. A score of 1 represents the equal importance of two components and 9 represents the extreme importance of component i over component j. In matrix A, the problem becomes one of assigning to the elements A_1, A_2,…,A_m a set of numerical weights w_1, w_2,…,w_m that reflects the recorded judgments. If A is a consistency matrix, the relations between weights w_i, w_j, and judgments a_{ij} are simply given by $a_{ij} = w_i/w_j$ (for i,j = 1, 2.. m). If matrix w is a non-zero vector, there is a λ_{max} of $A_w = \lambda_{maxw}$, which is the largest eigenvalue of matrix A.

If matrix A is perfectly consistent, then λ_{maxw} = m. But given that a_{ij} denotes the subjective judgment of decision-makers, who give comparison and appraisal, with the actual value (w_i/w_j) having a certain degree of variation. Therefore, $A_x = \lambda_{maxw}$ cannot be set up. So the judgment matrix of the traditional AHP always needs to be revised for its consistency.

STEP 2: Priority vector. After all pairwise comparison is completed, the priority weight vector (w) is computed as the unique solution of $A_w = \lambda_{maxw}$, where λ_{max} is the largest eigenvalue of matrix A.

STEP 3: Consistency index estimation. Saaty (1990) proposed utilizing the consistency index (CI) to verify the consistency of the comparison matrix. The consistency index (CI) and (CR) of the derived weights could then be calculated by:

$CI = (\lambda_{max} - n)/ n-1$
$CR=CI/RI$
In general, if CR is less than 0.10, the satisfaction of judgments may be derived.

DEMATEL Model

Since its development in 1974 byFontela&Gabus, DEMATEL is used to evaluate the way and the power of the relationship between the variables (Chen, 2016) and was employed to evaluate the performance of various complex problems (see Luthra, Govindan, &, Mangla, 2017; Büyüközkan, Güleryüz, & Karpak, 2017; Zhou, Shi, Deng, & Deng, 2017; Supeekit, Somboonwiwat, & Kritchanchai, 2016). This study followed Bacudio et. al., (2016) to measure the interdependence of variables using DEMATEL.

Step 1: Initial direct relation matrix is generated. This matrix is illustrated in Equation 1. The matrix is created based on the opinions of the experts.

$$A_k = \begin{bmatrix} 0 \cdots a_{1nk} \\ \vdots \ddots \vdots \\ a_{n1k} \cdots 0 \end{bmatrix} \quad \ldots\ldots(1)$$

Step 2: Initial influence matrix is calculated

Step 3: Direct relation matrix is normalized.

$B = [b_{ij}] = A/max\sum^{n}_{j=1} a^{ij}$ ……(2)

Where "b_{ij}" takes values between 0 and 1.

Step 4: Total relation matrix is developed.

$C = [c_{ij}] = (I - B)^{-1}$ …… (3)

Where "C" represents the total relation matrix, and "I" gives information about the identity matrix.

Step 5: The prominence (D+E) and cause-effect (D-E) values are calculated. For this purpose, Equations 4 and 5 are taken into consideration.

$D = [d_{ij}]_1 = [\sum^{n}_{j=1} c_{ijij}]_{nx1}$ ……(4)

$E = [e_{ij}]_{1xn} = [\sum^{n}_{j=1} c_{ijij}]_{nx1}$ ……(5)

Step 6: Inner dependence matrix is defined. In this process, entries, which are less than the threshold value, are eliminated. The threshold value can be calculated as follows:

$a = \sum^{n}_{j=1}\sum^{n}_{i=1} n_c/n^2$ ……(6)

V. Results and Discussion

Tables 3 and 4 indicate ranked insurance companies' performance indicators and their interdependence with capital market development, respectively.

Results presented in order of their importance indicate profitability, operating growth, solvency, asset quality, and management soundness appear to be the key performance indicators of the insurance industry in Ethiopia (Table 3). The DEMATEL interdependence analysis between capital market and insurance industry performance indicators suggests capital market development will benefit from insurance industry performance through reduced information asymmetry, improved investor confidence & corporate governance practice, and insurance industry participation as an institutional investor. We thus expect a unidirectional influence from insurance to capital market than a complementary relationship. Therefore, we can deduce that the capital market will benefit from the insurance industry participation in Ethiopia.

Table 3. Ranked performance indicators of insurance companies

Criteria Label	Criteria name	Criteria weight	Sub criteria label	Sub Criteria weight
C1	Profitability	0.557	*P5*	*0.489*
			P2	*0.254*
			P1	*0.146*
			P3	*0.068*
			P4	*0.043*
C2	Operating growth	0.220	*O1*	*0.7235*
			O3	*0.1932*
			O2	*0.0833*
C4	Solvency	0.108	*Solvency ratio*	
C3	Asset quality	0.082	*A1*	*0.7235*
			A2	*0.1932*
			A3	*0.0833*
C5	Management soundness	0.033	*M2*	*0.8333*
			M1	*0.1667*

The DEMATEL center cause score indicates (in order of their importance) insurance profitability, capital market trade volume, market capitalization, insurance operating growth, asset quality, solvency, and management soundness to have a prominent role in integrating capital market development and insurance industry performance (Table 4).

Table 4. Insurance - market interdependence: influence(D), affected (R), center (D+R), and cause (D-R)

	D	R	D+R	D-R
Market capitalization	5.3725	7.4943	12.8668	-2.1218
Trade volume	5.4175	7.4942	12.9117	-2.0767
Profitability	6.2747	6.8656	13.1403	-0.5909
Operating growth	6.6017	4.8638	11.4655	1.7379
Solvency	6.0224	4.0005	10.0229	2.0219
Asset quality	4.7192	5.5947	10.3139	-0.8755
Management soundness	5.7752	3.8701	9.6453	1.9051

Profitability appears to be the single most important performance indicator of insurance companies in Ethiopia with a calculated criteria weight of 0.557. This indicates a profitable insurance company is the one preferred by investors over other insurance companies that are in a better position in all other insurance company performance indicators including operating growth, solvency, asset quality, and management soundness. This might pinpoint

the struggle to make a profit, the prevalence of stiff and unhealthy competition (Alhassan, Addisson, & Asamoah, 2015), low customer satisfaction in claim settlement (Gonga & Sasaka, 2017), low demand for insurance products (Outreville, 1990), poor indigenous product innovation capability (Njegomir & Rihter, 2013), and thus the need for developing complementary capital markets for the industry to grow better.

The DEMATEL result predicts insurance industry profitability will be more affected by the system than it affects the system having a cause degree of -0.5909. However, insurance profitability is projected to be the most prominent factor that promotes the interdependence between insurance industry performance and capital market development having the maximum center cause value of 13.1403. insurance profitability will not be exogenously affected by capital market development but mainly will be endogenously influenced by solvency, management soundness, and operating growth. The result emphasizes the need to improve the solvency of insurance companies to the extent that they can settle claims that are currently the source of huge customer dissatisfaction. As the system will be more sophisticated and complicated than it appears now with the introduction of capital markets, insurance companies need to invest in developing their human capital. To seize the growth opportunities and deal with the immense challenges that come with the introduction of capital markets, insurance companies need to adequately invest in human capital development.

Operating growth surfaced to be the second most important factor that indicates insurance industry performance with a calculated criteria weight of 0.220. The result shows that operating growth is an important indicator of insurance industry performance though it stands far low compared to the criteria weight score of profitability. Nonetheless, it is not at all a surprise that operating growth is indeed the second key performance indicator of insurance companies as it has got its roots in enhanced marketing skills, lowered service costs, efficient claim settlement, and increased customer satisfaction, Operating growth is the fourth prominent factor that has a role in integrating insurance industry with capital market development. Nonetheless, the DEMATEL result projects operating growth will affect the system more than the system will affect it with a cause degree score of 1.7379. The required market-oriented approaches and efficiency-centered services with the introduction of capital markets by regulators will have a spillover effect to influence capital market development and even endogenous factors including profitability and asset quality. Moreover, operating growth with a prominence score (D+R) of 11.4655, is the fourth influential factor in the insurance–capital market interaction.

Solvency is ranked as the third key indicator of insurance industry performance in Ethiopia. It is the capital required to prevent possible liquidity and bankruptcy problems (Yildırım & Çakar, 2015). Solvency is widely known to be a problem for small insurance companies as it

requires an adequate capacity to absorb insured claims. This is a characteristic feature of most private insurance companies in Ethiopia.

Moreover, the DEMATEL result predicts insurance solvency to influence the system more than the system influences it with the highest cause degree score of 2.0219. The highest positive D-R score makes it the leading cause group in the system. A plausible explanation for this would be insurance companies will invest their liquid assets in the capital market which boosts the confidence of other institutional and private investors. This also opens a window of opportunity for insurance companies to raise their required rate of return which they are not able to do due to lack of secondary capital market where they can easily buy and sell securities without being insolvent. However, given that its prominence score is one of the lowest in the system with a D+R value of 10.0229, its capacity to interconnect the insurance-capital market is weak. The explanation could be it influences other factors in the system while other factors don't influence much undermining its overall position in the system.

Asset quality mainly explained by tangible assets in the Ethiopian insurance industry is the fourth key performance indicator of insurance performance as reflected in the calculated criteria weight score. It is also one of the commonly identified key performance indicators in the extant literature (see Mehari & Aemiro, 2013; Fenn & Cole, 1994). Based on the DEMATEL result, asset quality is projected to be the affected group in the insurance industry performance and capital market development relationship. It will more be affected by the system than it affects the system with a -0.8755 cause center score. Nonetheless, its prominence score (D+R) is 10.3139 the fifth in the loop. This implies asset quality is not in a strong position to influence the insurance-capital market interdependence in the Ethiopian financial system.

Asset quality will not be exogenously influenced by market capitalization and trade volume. However, there is adequate evidence in the literature on the exogenous influence of announcing a junk bond investment by insurance companies on their asset quality (Cowan & Power, 2001; Fenn & Cole, 1994). Insurance asset quality is projected to be endogenously (insurance-specific) affected by solvency, management soundness, and operating growth, respectively when ordered by the degree of influence each factor will be having.

Management soundness in the Ethiopian insurance industry is the fifth key performance indicator. Compared to the other KPIs its weighted criteria score indicates it is a relatively far less powerful performance indicator having a calculated criteria weight of less than 5% (0.033). This indicates investors don't focus much on the management soundness of their company as long as, for example, the company is profitable, operationally growing, and solvent. Given that management soundness is measured with asset per employee, the focus

of investors seems rather on return on investment. This implicates investors' interest lies in organizational profitability than productivity.

The DEMATEL result projects insurance company management soundness influencing the system more than it gets influenced by the system with a cause degree score of1.9051, the second-highest next to solvency making it the second leading cause group in the system. The possible explanation for this is in the long-run productivity matters. Nonetheless, management soundness has the lowest center cause score (D+R) of 9.6453, placing it to assume the last position in the insurance-capital market interaction. This implies that though it affects other factors more than other factors affect it, its overall position in the financial system is the least. The implication is management soundness has little interaction with other factors in the system

In general, though management soundness has low relative importance within the insurance-specific factors, its importance will increase with the development of capital markets. The result corroborates with extant literature that posits soundness significantly affects firm-specific factors in influencing the performance of insurance companies listed on a stock exchange (Almajali et.al, 2012).

VI. Conclusion and Policy Implication

Conclusion

The finance-growth debate has evolved over the years, initiating several theories and hypotheses including financial liberalization, finance-led growth; growth-led finance; market feedback; bank-based, and market-based. Extant literature indicates mixed interdependence between insurance industry performance and capital market: competitive, complementary, and co-evolution.

Given that insurance industry performance is the epicenter of the cause group through solvency, operating growth, and management soundness and the capital market falls under the affected group, we conclude a unidirectional influence relationship in the insurance-capital market interaction: insurance industry performance affects capital market development but not the other way. The insurance industry will have little to gain from future capital market development in Ethiopia. Second, we conclude, Finance-led Growth Hypothesis supports insurance-capital market interaction in Ethiopia than market feedback or bi-directional hypothesis. Third, we conclude maximizing profitability defines insurance industry performance as it accounts for more than fifty-five percent of overall performance.

Policy Implications

Given that profitability is the single most important performance measure of the insurance industry, the national bank of Ethiopia, the regulatory agencies that regulate and supervise

insurance companies need to initiate a policy measure that balances shareholder value maximization and other stakeholder value optimization. Maximizing shareholder value shall not be realized at the expense of other stakeholders. If such moves are not disciplined, in the long run, it will hurt that insurance industry than it hurts other stakeholders. For example, solvency defines insurance companies' ability to settle claims, and if claims are not settled efficiently, it will let the customers bankrupt which in the long run destroys the industry.

The central bank also needs to initiate a policy measure that promotes and recognizes management soundness given that it define about three percent of the industry's performance. Sound management is the basis for sustained growth. Thus, the central bank shall take a policy measure that balances profitability and productivity as making a profit (short-run phenomenon) without being productive hampers long-term growth as this is a temporary achievement made at the expense of customers and employees.

The competent regulatory agency also needs to design mechanisms whereby the insurance industry also benefits from its interaction with the capital market. There could be policy-supported measures that encourage insurance industry participation in capital markets including asset securitization. The policy support is needed not to help insurance companies but to reap macroeconomic benefits from their participation in capital markets. The participation of insurance companies as institutional investors encourages other institutional and private investors' participation through improved corporate governance practices, narrowing of information asymmetry problems, among others.

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