RELATIONSHIP BETWEEN FINANCIAL DEVELOPMENT AND LOGISTICS PERFORMANCE AND THEIR EFFECTS ON THE COMPETITIVENESS: AN EMPIRICAL CROSS-COUNTRY STUDY

A THESIS SUBMITTED TO
THE GRADUATE SCHOOL OF SOCIAL SCIENCES
OF
MIDDLE EAST TECHNICAL UNIVERSITY

BY

LEVENT ÖZDEMİR

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR
THE DEGREE OF DOCTOR OF PHILOSOPHY
IN
THE DEPARTMENT OF BUSINESS ADMINISTRATION

APRIL 2017

Approval of the Graduate School of Social Sciences

_____

Prof.Dr. Tülin Gençöz
Director

I certify that this thesis satisfies all the requirements as a thesis for the degree of Doctor of Philosophy.

_____

Prof.Dr. Z. Nuray Güner
Head of Department

This is to certify that we have read this thesis and that in our opinion it is fully adequate, in scope and quality, as a thesis for the degree of Doctor of Philosophy.

_____

Assoc.Prof.Dr. H.Engin Küçükkaya
Supervisor

Examining Committee Members

Prof.Dr. Z.Nuray Güner	(METU, BA)	_____
Assoc.Prof.Dr.H.Engin Küçükkaya	(METU, BA)	_____
Prof.Dr. Cengiz Yılmaz	(METU, BA)	_____
Prof.Dr. Ramazan Aktaş	(TOBB UET, BA)	_____
Assist.Prof.Dr. Gültekin Kuyzu	(TOBB UET, IE)	_____

I hereby declare that all information in this document has been obtained and presented in accordance with academic rules and ethical conduct. I also declare that, as required by these rules and conduct, I have fully cited and referenced all material and results that are not original to this work.

Name, Last name : Levent Özdemir

Signature :

ABSTRACT

RELATIONSHIP BETWEEN FINANCIAL DEVELOPMENT
AND LOGISTICS PERFORMANCE AND THEIR EFFECTS ON
THE COMPETITIVENESS:
AN EMPIRICAL CROSS-COUNTRY STUDY

Özdemir, Levent
Ph.D., Department of Business Administration
Supervisor : Assoc.Prof.Dr. H.Engin Küçükkaya

April 2017, 202 pages

Well-functioning financial system efficiently produce information about possible investments to allocate capital, monitor firms after allocating capital, facilitate risk management, mobilize savings and ease the exchange of goods/services. These services significantly affect the countries' efficiency of logistics which is backbone of trade. As financial development enables the logisticians to access various financial products and services to finance capital assets, working capital and inventory; to insure or help to hedge various risks/uncertainties; and to ease exchange of goods, services and information. In turn, increased logistics performance boosts global competitiveness of the country. Although theory postulates this chain linkage, the empirical studies examining the relationship is limited. In this study we simultaneously test whether the countries' governance quality and superior financial development lead to better logistics performance, in turn result in higher global competitiveness by using PLS-SEM method. The results support the conceptual relationshipsby reflecting that each hypothesis in the model is significant at 1% level. That is, governance quality

positively affects financial development, logistics performance and global competitiveness. Likewise well-functioning accessible and efficient financial institutions and markets have significant and positive contribution to logistics performance of countries. Lastly, the higher logistics performance spurs global competitiveness of countries. Additionally, the results indicate that financial depth has the largest effect on logistics performance; where financial access has the largest effect on global competitiveness.

Keywords: Financial development, logistics performance, competitiveness.

ÖZ

FİNANSAL GELİŞMİŞLİK VE LOJİSTİK PERFORMANS ARASINDAKİ İLİŞKİ VE ÜLKELERİN REKABET GÜÇLERİNE ETKİLERİ: ÜLKELER BAZINDA AMPİRİK ÇALIŞMA

Özdemir, Levent
Doktora, İşletme Bölümü
Tez Yöneticisi : Doç.Dr. H.Engin Küçükkaya

Nisan 2017, 202 sayfa

Finansal olarak gelişmiş ülkelerde, finansal sistem en iyi yatırımları belirleyerek kaynak tahsis etmek için bilgi üretir, kaynak tahsisi sağladıktan sonra firmaları gözlemler, risk yönetimini kolaylaştırır, malzeme ve hizmet alış-verişini kolaylaştırır. Bu finansal ürün ve hizmetler ticaretin bel kemiği olan lojistik hizmetleri önemli derecede etkiler. Çünkü finansal olarak gelişmiş ülkelerde lojistikçiler kredi ihtiyaçlarını finanse etmek için derin ve geniş finansal ürün ve hizmetlere kolaylıkla ulaşabilirler, sigortacılık hizmetlerinden yararlanabilirler, risk yönetimi için finansal türev piyasalarından istifade edebilirler ve ticaretindeki kolaylıklardan fayda sağlarlar. Bu ilişkinin sonucunda yüksek lojistik performans ülkelerin rekabet güçlerinin artmasını sağlar. Söz konusu bu ilişki teorik olarak öngörülmesine rağmen bu teoriyi destekleyen ampirik çalışma henüz yoktur. Bu nedenle ülkelerin yönetim kalitesi, finansal gelişmişlikleri, lojistik performansları ve rekabet güçlerini analiz eden bir model kurularak aralarındaki eş zamanlı ilişki Kısmı En Küçük Kareler Yapısal Eşitlik Modellemesi (PLS-SEM) metoduyla ölçülmüştür. Analiz sonuçları modelde önerilen her bir hipotezin %1 hata seviyesinde geçerli olduğunu göstermiştir. Yani, ülkelerin yönetim kalitesi, finansal gelişmişlik, lojistik performans

ve rekabet gücü üzerinde etkilidir. Aynı zamanda derin, ulaşılabilir ve etkin finansal piyasalar ülkelerin lojistik performansları üzerinde etkili olduğu görülmüştür. Lojistik performansın ise ülkelerin rekabet güçleri üzerinde etkili olduğu test sonuçlarından anlaşılmıştır. İlave olarak finansal derinliğin lojistik performans üzerinde, finansal ulaşılabilirliğin ise ülkelerin rekabet gücü üzerinde etkisinin finansal gelişmişliğin diğer faktörlerine göre fazla olduğu sonucu elde edilmiştir.

Anahtar Kelimeler: Finansal gelişmişlik, lojistik, rekabet gücü.

To My Family

ACKNOWLEDGMENTS

I would like to thank my parents. I remember with respect and mercy my father, İdris Usta, who passed away during my PhD study.

I would like to express my profound gratitude to my wife Ayşe, my daughter Başak and my son Türker for their support me during PhD study years and moreover through my professional career. Words cannot express how grateful I am to my wife. Thanks to her unwavering support and continuous encouragement, I was able to follow this PhD program.

I would like to offer my cordial thanks to Dr.Engin Küçükkaya, my thesis supervisor. He gave me intellectual freedom in my work and he supported me to with his comments and experience. Moreover he encouraged me with his friendly approach, critical comments and correction of the thesis.

I want to express my thanks to Dr.Z.Nuray Güner, Dr.Seza Danışoğlu, Dr.Uğur Soytaş, Dr.Adil Oran, Dr.Ramazan Sarı, Dr.Cengiz Yılmaz, Dr.Hande Ayaydın and Dr.Özlem Özdemir. They have provided a friendly and cooperative atmosphere at Department of Business Administration. They always have given useful feedback and insightful comments on my work during the PhD study.

I would like to express my gratitude to my ex-supervisor Retired Colonel Ersin Yaman who encouraged me to follow a PhD program. Even during busy working days, he motivated me to participate in PhD classes.

I was fortunate to have a cheerful group of life-time friends in PhD classes, Ecenur Uğurlu, Onur Tekel, Bahadır Güler, Beyza Mina Ordu and Barış Kocaarslan. I am gratefully indebted to their valuable friendship.

Last but not the least, I would like to thank the members of the examining committee who are participated from TOBB UET, Dr. Ramazan AKTAŞ and Dr. Gültekin Kuyzu.

TABLE OF CONTENTS

PLAGIRISM iii
ABSTRACT iv
ÖZ vi
DEDICATION viii
ACKNOWLEDGMENTS ix
TABLE OF CONTENTS x
LIST OF FIGURES xiii
LIST OF TABLES xv
LIST OF ABBREVIATIONS xvii
CHAPTER
1.INTRODUCTION 1
2.FINANCIAL INTERMEDIATION AND LOGISTICS 8
2.1. Financial Intermediation Theories 8
2.2. Financial System 18
2.3. Financial Development 20
2.4. Main Functions of Financial Service Providers 23
2.4.1. Producing Information and Allocation of Capital 24
2.4.2. Monitoring Firms and Exerting Corporate Governance 24
2.4.3. Facilitating the Trading, Diversification, and Management of Risk. 25
2.4.4. Mobilizing and Pooling Savings 26
2.4.5. Easing the Exchange 26
2.5. Measurement of Financial Development 27
2.5.1. Measurement of Financial Depth 30
2.5.2. Measurement of Financial Access 31
2.5.3. Measurement of Financial Efficiency 34
2.5.4. Measurement of Financial Stability 35
2.6. Importance of Logistics 36
2.6.1. Definition of Logistics 36
2.6.2. Scope of Logistics 38
2.6.3. Relationship between Logistics and Supply Chain Management .. 40

2.6.4. Measurement of Logistics Performance 41
3.RELATIONSHIP AMONG THE VARIABLES.....44
3.1. Relationship between Governance Quality and Financial Development 44
3.2. Relationship between Governance Quality and Logistics Performance..... 47
3.3. Relationship between Financial Development and Logistics Performance..... 48
3.4. Relationship between Governance Quality and Global Competitiveness..... 58
3.5. Relationship between Financial Development and Global Competitiveness..... 59
3.6. Relationship between Logistics Performance and Global Competitiveness..... 61
4.HYPOTHESES, DATA AND METHODOLOGY.....63
4.1. Hypothesis Development..... 63
4.2. Data..... 69
4.2.1. General..... 69
4.2.2. State Governance Quality Indicators..... 70
4.2.3. Logistics Performance Indicators 72
3.2.4. Global Competitiveness Indicators..... 73
4.2.5. Financial Development Data and Construction of Indices..... 75
4.3. Methodology..... 86
4.3.1. Structural Equation Modeling Overview..... 86
4.3.2. Comparison of PLS-SEM and CB-SEM..... 88
4.3.3. The PLS-SEM Algorithm 89
4.3.4. Evaluation of PLS-SEM Measurement and Structural Models..... 94
4.3.5. PLS-SEM Software 100
5.ANALYSIS AND RESULTS 101
5.1. Simple Linear Regression..... 101
5.2 PLS-SEM Results..... 110
5.2.1. Financial Development and Logistics Performance..... 110
5.2.2. Relationship between Dimensions of Financial Development and Logistics Performance 128
6.CONCLUSION.....143
BIBLIOGRAPHY.....149

APPENDICES 168
A. Name of the Countries Added into Analysis 168
B. WEF's Global Competitiveness Indicators 169
C. Missing Data of Financial Development Indicators 174
D. Data Distribution 175
E. Principal Components Analysis Eigenvalues 176
F. Statistics for Outer Loadings 177
G. Statistics for Structural Model 178
H. PLS-SEM Indirect Effects 179
I. PLS-SEM Total Effects 180
J. PLS-SEM Indirect Effect and Total Effects Statistical Information 181
K. HTMT Confidence Intervals 182
L. CURRICULUM VITAE 183
M. TURKISH SUMMARY / TÜRKÇE ÖZET 185
N. TEZ FOTOKOPİSİ İZİN FORMU 202

LIST OF FIGURES

FIGURES

Figure 1. An overview of the financial system 19
Figure 2. Financial Development Effect on Economic Growth 23
Figure 3. Income correlates with deposit accounts in commercial banks. 32
Figure 4. In developed countries accessing financial services is more easier. 33
Figure 5. Logistics Service Point in Supply Chain System 39
Figure 6. Main Logistics Services in Supply Chain System 40
Figure 7. Logistics Performance Indicators 41
Figure 8. The World Bank's Logistics Performance Indicators 42
Figure 9. Interrelationship between Finance and Logistics fields 52
Figure 10. The integration of finance and logistics in SCM literature 54
Figure 11. Financial Depth versus financial access. 66
Figure 12. Financial Depth versus Financial efficiency. 66
Figure 13. Financial Access versus Financial Efficiency. 66
Figure 14. Proposed hypotheses and inner structural model. 69
Figure 15. Dimensions of Financial Development 76
Figure 16. Example of PLS-SEM 92
Figure 17. Evaluation of PLS-SEM Measurement and Structural Models 94
Figure 18. Relation between Governance Quality and Financial Development ... 103
Figure 19. Relation between Governance Quality and Logistics Performance 104
Figure 20. Relation between Governance Quality and Global Competitiveness .. 105
Figure 21. Relation between Financial Development Scores and Logistics Performance Scores for year 2012. 107
Figure 22. Relation between Financial Development Scores and Global Competitiveness Scores for year 2012. 108
Figure 23. Relation between Logistics Performance Scores and Global Competitiveness Scores for year 2012. 109
Figure 24. Proposed Hypotheses 110
Figure 25. PLS-SEM Estimation for the Model. 111
Figure 26. Values of PLS-SEM Internal Consistency Reliability 112
Figure 27. Redundancy Analysis of Formative Financial Development Construct 118

Figure 28. Inner VIF Values for Assessment of Structural Model 120
Figure 29. PLS-SEM Path Coefficients and T-Statistics 121
Figure 30. PLS-SEM R^2 Results 123
Figure 31. PLS-SEM with Financial Depth Path Coefficients and T-Statistics 132
Figure 32. PLS-SEM with Financial Access Path Coefficients and T-Statistics 136
Figure 33. PLS-SEM with Financial Efficiency Path Coefficients and T-Statistics . 140

LIST OF TABLES

TABLES

Table 1. 4x2 Matrix of Financial System Characteristics 29
Table 2. List of Testable Hypotheses 68
Table 3. Description of State Governance Quality Variables 71
Table 4. Description of Logistics Performance Variables. 73
Table 5. Description of Global Competitiveness Variables. 75
Table 6. Variables of Financial Depth 77
Table 7. Variables of Financial Access 78
Table 8. Variables of Financial Efficiency 79
Table 9. KMO and Bartlett's Test of Sphericity 83
Table 10. PCA Weights for Financial Depth 84
Table 11. PCA Weights for Financial Access 85
Table 12. PCA Weights for Financial Efficiency 85
Table 13. Organization of Multivariate Methods 87
Table 14. Stages and Steps of PLS-Algorithm Calculation 93
Table 15. Results Summary for PLS-SEM Convergent Validity 113
Table 16. Cross-Loadings for Reflective Measurement Models 114
Table 17. Fornell-Larcker Criterion for Reflective Measurement Models 115
Table 18. Heterotrait-Monotrait Ratio (HTMT) Results 116
Table 19. Bootstrapping Results of Confidence Intervals for HTMT 116
Table 20. VIF Values for Financial Development Indicators 118
Table 21. Outer Weights Significance Test Results 119
Table 22. PLS-SEM f^2 Results 124
Table 23. PLS-SEM Q^2 Values 125
Table 24. PLS-SEM q^2 Values 126
Table 25. Significance Analysis of the Direct and Indirect Effects 127
Table 26. Results Summary for Reflective Measurement Model with Financial Depth 131
Table 27. PSL-SEM with Financial Depth Structural Model Metrics 132
Table 28. Results Summary for Reflective Measurement Model with Financial Access 135

Table 29. PSL-SEM with Financial Access Structural Model Metrics 136
Table 30. Results Summary for Reflective Measurement Model with Financial Efficiency 139
Table 31. PSL-SEM with Financial Efficiency Structural Model Metrics 141
Table 32. Summary of Effects 141

LIST OF ABBREVIATIONS

ACC	Financial Access
AVE	Average Variance Extracted
BITRE	Australian Bureau of Infrastructure, Transport and Regional Economics
CB-SEM	Covariance Based – Structural Equation Modeling
CGAP	Consultative Group to Assist the Poor
CSCMP	Council of Supply Chain Management Professionals
DPH	Financial Depth
EFF	Financial Efficiency
FD	Financial Development
GC	Global Competitiveness
GCI	Global Competitiveness Index
GCR	Global Competitiveness Report
GQ	Governance Quality
GDP	Gross Domestic Product
HTMT	Heterotrait - monotrait
KMO	Kaiser-Meyer-Olkin test
LM	Logistics Management
LP	Logistics Performance
LPI	Logistics Performance Index
OECD	Organization for Economic Cooperation and Development
OLS	Ordinary Least Squares
PCA	Principal Component Analysis
PLS	Partial Least Squares
PLS-SEM	Partial Least Squares-Structural Equation Modeling
SC	Supply Chain
SCF	Supply Chain Financing
SCM	Supply Chain Management
SEM	Structural Equation Modeling

VIF	Variance Inflation Factor
WB	The World Bank
WTO	World Trade Organization

CHAPTER 1

INTRODUCTION

> *Finance matters, both when it functions well and when it functions poorly. Supported by robust policies and systems, finance works quietly in the background, contributing to economic growth and poverty reduction. However, impaired by poor sector policies, unsound markets, and imprudent institutions, finance can lay the foundation for financial crises, destabilizing economies, hindering economic growth, and jeopardizing hard-won development gains among the most vulnerable. Fostering sustainable financial development and improving the performance of financial systems depends on numerous institutional factors and stakeholders.*
>
> *J.Yong Kim, World Bank Group President (World Bank, 2013, p.xi)*

As mentioned by President of the World Bank Group fostering sustainable financial development and improving the performance of financial systems depend on numerous political, regulatory, social and environmental factors. Effectiveness of the government bureaucracy, political stability, voice and accountability in political system, regulations quality and consistency, rule of law and the government officials' commitment to fight against corruption are the significant drivers of financial development (Beck et al., 2006). If there is no political stability in a country, accounting and reporting standards are not high or if it suffers from corruption, fraud, cronyism, mismanagement, lack of transparency, the financial intermediaries and markets cannot efficiently provide the financial services to the real sector. Thereby, financial institutions and markets cannot have full capability to choose the possible best projects to allocate capital. That is, governance quality has a significant effect on financial development of the countries; moreover, it is a prerequisite for financial development.

Financial development, on the other side, has significant impact on the countries or regions' macroeconomic environment, institutions, educational quality, labor and goods market efficiency, technological development, business innovation and sophistication. All these factors drive the level of the global competitiveness of the countries or regions. The Global Competitiveness Report (GCR) published by the World Economic Forum (WEF) over 35 years defines the term of

competitiveness as *"the set of institutions, policies and factors that determine the level of productivity of a country (WEF, 2015, p.35)."* The productivity level refers the level of prosperity of a society and it determines the rate of return captured by investments in an economy, which in turn are the essential drivers of its growth rates (WEF, 2014). In general, raising the level of productivity increases potential output and therefore contributes to boosting overall growth (WEF, 2015). Obviously, highly competitive countries are able to manage their economic and human resources effectively and they can produce high level of income for their citizens. Thereby, living standards of the society increases in the economy when level of global competitiveness escalates.

Scholars show that not only financial development and state governance quality stimulate countries or regions' global competitiveness, but also logistics performance has significant impact on the countries' economic development and competitiveness factors (Fawcett et al., 2011; Fawcett and Waller, 2013; Subramanian, 2012; Chen and Novy, 2011; Slovaki et al., 2012). Fawcett et al. (2011) state that *"modern logistics make global business and economic development possible* (p.116)." Because logistics enable movement of products, services and information to the desired point in a safe, punctual and traceable manner while providing cost efficiency when producing, trading, sustaining or recycling. Thereby logistics touches every cell of the firm or organization and moreover, it provides crucial support for all industries which produce goods, services and information.

Moreover, logistics is backbone of trade, thereby scholars, such as Kleindorfer and Visvikis (2007), point out importance of logistics for domestic and international trade. They argue that logistics is a key enabling factor for trade in linking manufacturing sources within regional or global markets. It connects the producers and the consumers in the domestic and global markets and helps to achieve high level productivity and welfare for the society. If produced goods, service and information cannot be moved to the customer or market reliably, safely, cheaply and on time, it is meaningless to have low production cost or efficient production strategies. Therefore, facilitated exchange of goods and services and enhanced productivity require superior logistics performance such as reliable and sufficient logistics infrastructure, punctual shipments and deliveries, high quality logistics services, less bureaucracy in paper works and custom process. Hence the industries which produce goods, service or information depend on efficient logistics for their success. For that reason if logistics function in a market as it should, it is

basis upon which economies are built and moreover it is central the competitiveness of countries (Arvis et al., 2016).

In this context, awareness towards the effect of logistics performance on the countries or regions' competitiveness, in general, and economic growth, in particular, has increased in recent years. Importance of logistics for global competitiveness have been stressed in several documentations such as, the World Bank supported, Connecting to Complete Trade Logistics in the Global Economy reports (Arvis et al., 2007, 2010, 2012, 2014 and 2016) and OECD reports like Latin American Economic Outlook 2014: Logistics and Competitiveness for Development. These reports refer that well-functioning logistics system is a prerequisite for high level global competitiveness of the countries.

However, logistics industry is exposed to a myriad of risks, threats and uncertainties (Zhen et al., 2016) such as transportation, exchange, payment and cargo risks, infrastructure inefficiency, capital requirements for investment, warehousing or inventory etc. Moreover, in the last few decades, logistics industry has become more complex as various social, financial, safety, environmental and other regulations have affected and changed process of it mostly due to increased and sophisticated international trade and globalization. Thus, the late Prof. Donald J. Bowersox defines 1990s as "Logistics Renaissance" arguing that there have been more changes in the process of logistics industry recently than in all the decades since the industry revolution (Goldby and Zinn, 2016). In short, all these changes have escalated numbers and magnitude of the risks, threats and uncertainties for logistics industry. But financial institutions and markets have provided various remedies and support to logistics industry to deal with risks, threats and uncertainties.

Literature theoretically points out importance of efficient financial intermediation for superior logistics and supply chain management performance (Ellram, 1991; Bowersox & Closs, 1996; Mentzer et al., 2004; Fugate et al., 2010; Gupta and Dutta 2011). The studies typically point out importance of specific financial products and services for higher logistics performance of firms or countries.

There are several connections which link financial intermediation with logistics activities. For instance, importance of insurance products provided by financial institutions to logistics industry is beyond the question as a well-functioning logistics industry is unthinkable without insurance (Cavinato, 2004; Choi et al., 2016; Zhen et al., 2016). Coverage of insurance provided by the financial

institutions typically includes physical movement of goods, services and information such as transportation insurance, loss, damage or undelivered goods coverage (Shcramm, 2012). Moreover, insurance coverage not only provides solutions to catastrophic risks such as fire, flood, collision, terrorism, war, strikes, civil unrest, but also it provides remedies for business disruption (Zhen et al., 2016), financial risks and uncertainties such as accounts receivable insurance, documentary collection applications or export credit insurance and etc. Thus high logistics performance is only possible with well-functioning insurance companies.

Logistics is a capital heavy industry typically requires warehouses, trucks, cranes, handling machines, larger containers, cold-chain transportation vehicles, bigger ships and aircrafts (Bidgoli, 2010). It also depends on expensive infrastructure such as roads, ports, railroads and airports. In financially developed markets, the logisticians can reach the more competitive and cost efficient financial resources to finance these capital requirements. Drobetz et al. (2013) state that significant part of shipping industry is financed by debt capital markets. PriceWaterhousCoopers (2013) also points out that the aviation industry recently begin to finance their requirements from government backed funds and institutional investors such as sovereign wealth funds, insurance companies, pension funds and private equity funds rather than traditional financial institutions such as banks. On the other side, a globally important financial intermediary, ING Bank, advertises in its webpage that it has many years experience providing funds for big logistics infrastructures such as constructing railroads and acquisition of rail equipments.

The logistics enterprises have to manage their working capital and inventory at optimal level to forward and reverse flow of goods and services. Financial institutions and markets provide important products and services to them by providing funds for their working capital and inventory requirements. Buzacott and Zhang (2004) and Hofmann (2009) stress interrelationship between financial institutions and logistics industry about inventory management. Hofmann and Kotzab (2010) provide conceptual view to show financial institutions' contribution to working capital management and cash management in logistics and supply chains. Protopappa-Sieke and Seifert (2010) emphasize that improved cash flows may reduce suppliers' financial constraints and improve enterprises logistics performance.

International shipping industry is vulnerable to significant operational and commercial risks which occur due to high volatility in freight rates and vessel prices as well as in operating and capital cost (Alizadeh et al., 2015). Derivatives market

provides instruments such as forward freights agreements, futures and freights options to hedge against these logistics risks. Kleindorfer and Visvikis (2007) reiterate that risk management products based on derivatives such as futures, forward, options and swaps are the backbone for risk management and contracting in logistics industry. Similarly Kavussanos and Visvikis (2006) point out that thanks to the derivative products, maritime logistics can secure their future income and can reduce their uncertainty and volatility. Hertwig and Rau (2010) argue that the derivatives products are not only crucial for maritime logistics, but also it is significantly important for air cargo industry.

Recently, scholars and finance and logistics enterprises underline importance of sophisticated financial products and services for logistics industry. For instance, Gomm (2010) conceptualize logistics and finance relationship and argues that logistics management and finance operations are intertwined in Supply Chain Management. Likewise, Canada's state-owned enterprise, Export Development Canada (EDC) assert that to be competitive in trade, especially in logistics, Canada has to have increasingly flexible and sophisticated financial intermediation (Poloz, 2012). Similarly, DHL (n.d.), German Logistics Company, mentions that recently new financial products developed under financial engineering due to increased risks in global logistics.

Importance of high level logistics performance for global competitiveness of the countries stems from the chain linkage between logistics and financial development. As at least theoretically, high level financial development spurs productivity (Greenwood and Smith, 1997), facilitates trade, mitigates risk and provides capital (Levine, 1997, 2005). Then, all these financial functions require organized and coordinated set of activities to flow and storage of goods, services and information between the producers to the consumers (OECD, 2014). Otherwise the countries cannot benefit from high level productivity and facilitated trade. Hence, high level financial development promotes superior logistics performance resulting high level competitiveness in globe.

However, efficiency and performance of logistics differ across countries. Variations in time, cost and bureaucratic burden across nations stem from differences in the quality and cost of infrastructure services as well as differences in policies, procedures, and institutions (Hausman et al., 2005). The Trading Across Borders indicators in Doing Business 2012 Report reveals the documents, time and cost required for logistics process of exporting and importing (World Bank, 2012). The report shows that in Hong Kong it takes 5 days and $575 to export a

dry-cargo which is 20-foot full container load and weighs 10 tons, in Netherlands 6 days and $895, in Turkey 14 days and $990, while in Venezuela 49 days and $2590 (World Bank, 2012). In addition, exporting a 20-foot full container requires 4 documents, asked by custom authorities for purpose of preferential treatment, in Hong Kong and Netherlands, 7 documents in Turkey and 8 documents in Venezuela. On the other side, WEF's Financial Development Report 2012 provides a score and rank for breadth, depth and efficiency of 62 leading financial systems and capital markets. According to this report, Hong Kong is the best with 5.31 points over 7, Netherlands is in 9th place with 4.73, Turkey is in 42nd place with 3.27 points and lastly Venezuela is in the bottom, 62nd place, with 2.37 points. When Doing Business Report's logistics process in exports results and WEF's Financial Development Rankings are compared, financially developed countries are generally at the top of both lists and developing countries are generally lag behind.

Thus, the countries' financial development and logistics performance correlation begs the question whether financial development spurs logistics performance. As even though theory stresses importance of financial intermediation and markets for logistics industry (Shcramm, 2012, Alizadeh et al., 2015; Hertwig and Rau, 2010, Kleindorfer and Visvikis, 2007, Buzacott and Zhang, 2004; Hofmann, 2009), empirical studies available to analyze this relationship is so limited. Hence the focal point of this doctoral thesis is to cover the gap, whether there is any empirical relation between financial development and their logistics performance.

Therefore, to understand the linkage, we take into consideration the countries' governance quality and their impact on their global competitiveness factors. As financial intermediaries and markets call for a stable, sound, social and political environment to flourish, the countries belonging to well-functioning democratic and political government systems are able to develop sophisticated financial institutions and markets. Then well-functioning financial systems, which are typically depth, accessible and efficient, could produce information about possible investment and allocate capital based on this assessment. Moreover after allocation of capital they monitor the entrepreneur and exert corporate control while facilitating and helping to management of risk, providing liquidity and easing the exchange of goods and services. All these services provide significant value to logistic industry as it is a capital-intense and subjected to various risks such as operational, financial and natural risks. As a result, well-functioning sophisticated financial system promotes logistics performance which spurs economic growth by

entering new markets, promoting competition, in result increasing global competitiveness of the society.

In this sense, purpose of this doctoral thesis is to analyze empirically the relationship between countries' financial development and logistics performance by taking into account state governance quality and their global competitiveness factors. The research questions are:

Do the countries' quality of state governance and superior financial development lead to better logistics performance, in which, in turn, results in higher global competitiveness?

Are countries' financial depth, access and efficiency positively associated with their logistics performance and global competitiveness?

We examine the relations between the variables one by one using OLS regression analysis. Then to simultaneously examine relationship among governance quality, financial development, logistics performance global competitiveness, Partial Least Squares-Structural Equation Modeling (PLS-SEM) is used. We construct a model in which countries' governance quality affects their financial development, logistics performance and global competitiveness. Financial development also improves both logistics performance and global competitiveness and lastly logistics performance boosts global competitiveness.

Policymakers around globe should understand the association between financial development and logistics performance of the countries. As postulated by the theory and supported by this thesis, there is a positive and significant association between financial development and logistics performance. Thus, the countries should launch specific incentives to improve their governance quality and financial system to increase their logistics performance and in turn, global competitiveness.

The thesis proceeds as follows. In Chapter I, theory of financial intermediation, financial development and logistics is presented. In Chapter II, relationship among governance quality, financial development, logistics performance and global competitiveness of the countries is discussed. Hypotheses, data and methodology are stated in Chapter III. Analysis with results and conclusion are presented in Chapter IV and Chapter V, respectively.

CHAPTER 2

FINANCIAL INTERMEDIATION AND LOGISTICS

2.1. Financial Intermediation Theories

The theory which attempts to explain the raison d'être of financial intermediaries and their purpose is built on Akerlof's (1970) seminal paper which recognizes the critical role of information asymmetry in markets. Akerlof (1970) argues that if one of the transacting parties has superior information than other parties concerning value of the transaction, there will be inefficiency; good used cars will leave only lemons behind. These financial asymmetries are especially pronounced in financial markets.

Following Akerlof's (1970) seminal paper, Leland and Pyle (1977) assert that informational asymmetry is the primary reason of existence of the financial intermediaries. They are the first to propose information asymmetry as raison d'être of the financial intermediation. Much of the recent financial intermediation literature springs from their contribution (Santomero, 1984). Leland and Pyle (1977) argue that the borrowers know more than the lenders about their own projects for which they seek credit. The lenders would benefit from knowing about true characteristics of the borrowers' projects, however; moral hazard prevents information exchange between the market participants. Because the borrowers would get substantial rewards by exaggerating positive qualities of their projects and verifying true characteristics of them could be costly or impossible for the lenders. Nevertheless Leland and Pyle (1977) argue that financial intermediation can deal with information asymmetry in financial markets. Financial intermediaries can gather and sell information about particular class of assets which are typically related to individuals, especially if there are some economies of scale. Even though, public goods and credibility of information, are two potential problems which can hamper firms selling information directly to investors, however; financial intermediaries can overcome these problems. Because problem of public goods will be avoided as the firm's information is embodied in a private good, the returns from its portfolio and

the intermediary does not need to reveal its portfolio. In addition, an intermediary could signal its credibility of information by investing its wealth in assets about which it has special knowledge. On the other side, uninformed market participant would not find it worthwhile to imitate because of the risk. Thus, Leland and Pyle's (1977) article is the first suggesting that financial intermediation is a cure for information asymmetry. Diamond (1984) underscores that Leland and Pyle's theory is incomplete as it does not confirm that the cost of deadweight loss of information producers is lower than benefits obtained. Thus Diamond (1984) extends Leland and Pyle's model and shows that the results of delegated monitoring intermediation model are consistent with the extension of the Leland and Pyle (1977) analysis.

Benston and Smith (1976) criticize the classical view on financial intermediaries which views these financial institutions as passive channels through which monetary policy is affected. Even, some peripheral points about financial intermediation such as the rates, allocation of credits and reserve ratios were studied. Benston and Smith (1976) argue that the classical approach seems to forget that these institutions are also firms, trying to optimize their objectives. Financial intermediaries produce and transact financial commodities and exist sustainably in that business in the market, even regulated. If there is such an existence, first there should be a demand for such commodities. Second, there should be a supply to satisfy that demand, and the important question here is that why specialized companies play the supplier role for these commodities. In short, Benston and Smith (1976) assert that the answer of why financial intermediaries exist is the transaction costs and hence it is the major reason for the demand for financial commodities. Because financial intermediaries, specialized firms, supply these commodities to enjoy economies of scale coming from specialization, to lower costs of gathering information and to reduce search costs.

Campbell and Kracaw (1980) emphasize that information production role of intermediation, contrary to the supposition of Leland and Pyle, is not sufficient to resolve appropriability and moral hazard intrinsic in the market for information. Their hypothesis is that financial intermediaries emerge as the information producers because the production of information, the protection of confidentiality, the provision of transactions services, as well as other intermediary services, are naturally complimentary activities. In addition, Campbell and Kracaw (1980) also demonstrate that initial wealth endowments can be solution to the appropriability and moral hazard problems in that they function as a guarantee of the reliability of information. Campbell and Kracaw (1980) argue that the market believes the

signals of those who have a sufficient wealth endowment in the market that they have no incentive to misrepresent their information.

Diamond (1984) postulates a financial intermediation theory for the existence of the intermediaries. In his model, the intermediary obtains funds from the depositors to lend to the entrepreneurs with the project and is delegated the task of monitoring the outcomes of the projects on behalf of the depositors. Mission of monitoring is delegated to the specialized intermediaries, banks due to cost of it. The fact that it has an extensive cost benefits in collecting this information as the alternative is either duplication of effort if each lender monitors directly, or a free-rider problem, in which case no lender monitors. Purpose of the monitoring is to produce information about the borrower's output. Because in Diamond's (1984) model, there is an ex post information asymmetry between the borrowers and the lenders due to that the borrowers know how much their project has produced and the lenders are at a disadvantage. To deal with this disadvantage, the intermediary supposed to choose an incentive contract such that it has incentives to monitor the information, make proper use of it, and make sufficient payments to lenders to attract deposits. However these incentives are costly, thus Diamond (1984) argues that diversification is useful method to decrease these costs. He stresses that as the intermediary increases the number of loans to the projects, whose returns are independent or not perfectly correlated the probability of deadweight penalties such as the bankruptcy cost decreases which implies lower delegation cost. In short, financial intermediation becomes viable, considering all related costs, if the number of loans increase.

Some papers have investigated reasons of existence of financial intermediation literature by centering upon the banks rather than general financial intermediation concept. For instance, Santomero (1984) generalizes the financial intermediation literature on banking model and assesses the understanding of the banking firm's optimal behavior. He argues that there are solely three approaches to the question of why internal financial institutions exist in the financial market. The first approach cites the role played by banks as asset transformation. In this view banks have two main functions as asset diversification and asset evaluation. In asset diversification role, as presented by Klein (1973) and Benston and Smith (1976), the bank transforms the large-denomination financial assets into smaller units. In the asset evaluation role, the bank is fundamentally an evaluator of credit risk for the uninitiated depositor. That is, the banks function as a filter to evaluate signals in a financial environment with limited information. Financial agents are

either pathologically honest or dishonest, but due to information asymmetry between these parts, the financial participants do not able to evaluate the quality of signals or the honesty of agents. Thus, as referred by Leland and Pyle (1977), the banks and the financial intermediaries emerge to deal with this information asymmetry by evaluating and trading the financial assets. The second approach refers the nature of the liabilities issued and their central function in a monetary economy. In fact, the existence of a medium of exchange creates an opportunity for its issuer to gain some form of seigniorage. The last approach stresses the two-sided nature of these financial intermediaries as critical in any explanation of their behavior. As a result, Santomero (1984) argues that the banks exist for both asset and liabilities side of the balance sheets.

Allen and Santomero (1998) posit that traditional financial intermediation theories are based on the transaction cost (Benston and Smith, 1976) and asymmetric information (Leland and Pyle, 1977; Campbell and Kracaw, 1980). These theories are designed to explain the institutions which assume deposits and issue insurance policies and transfer funds to the firms. However, financial system in many countries has changed significantly since Akerlof's (1977) seminal article which combines information asymmetry and financial intermediation. Hence Allen and Santomero (1998) argue that over this 30-year length period many traditional markets have significantly changed and new markets have come into existence. They present evidence which suggests that while transaction cost and asymmetric information may once have been central to the role of intermediaries, they have become increasingly less relevant. That is, the transaction costs have decreased and information has become affordable and more reachable. However, these significant changes have not reduced importance of the financial intermediations. Moreover, during this period the financial intermediaries have become more important in the markets and account for a very large majority the trading in new markets. Hence, traditional financial intermediation theories based on the transaction cost and information asymmetry are unable to explain raison d'être of the financial intermediaries in contemporary times. For that reason, they offer that reason of existence of financial intermediation on contemporary times are risk management and participation cost. As risk management has become a key area of intermediary activity, even though traditional intermediation theory has offered little to explain why institutions should perform this function. In addition, they argue that the financial markets have become complete maze during last 30 years and the facilitation of participation in the sector is an important service provided by the

financial intermediaries. Allen and Santomero (1998) underline that reducing participation costs, which are the costs of learning about effectively using financial markets as well as participating in them on a day to day basis, has a vital importance in understanding the changes that have taken place.

However, Scholtens and Wensveen (2000) criticize Allen and Santomero (1998) which argue that reasons d'être of financial intermediaries are risk transfer and participation cost. According to Scholtens and Wensveen (2000), the financial intermediaries perform gradually more sophisticated functions in the modern and the complex economies. However, asymmetric information and transaction costs seem to be still important elements in intermediation processes for these sophisticated financial intermediaries. Likewise, contrary to as cited by Allen and Santomero (1998), risk management is not a new concept which has emerged in the 1960s or 1970s. Hence financial intermediaries taking deposits and serving credits have still the traditional risk transfer role as it is already in the nature of financial intermediation. Merchants in Renaissance already managed their financial risks through insurers of their goods travelling overseas. In addition, even though participation cost can be relevant in understanding new roles of the financial intermediary, it does not able to explain the drastic changes in the financial markets such as the widespread use of the financial derivatives and dramatic rise of the mutual funds. Thus, in short, they argue that the financial intermediaries have emerged to deal with the market imperfections which are a result of informational asymmetries. Financial intermediaries may reduce the information and the transaction costs within the economy in the new era, but they still have to make do with agency problems and with moral hazard and adverse selection. In bottom line, according to Scholtens and Wensveen (2000), the theory of the financial intermediation needs to have the dynamic process of the financial innovation and market differentiation at its basis in new century.

Bhattacharya and Thakor (1993) review the theory of the financial intermediation by focusing on the role of the financial intermediations in providing brokerage and qualitative asset transformation services. A broker brings together the capital providers and the users of capital without changing the nature of the claim being transact. This kind of financial intermediaries provide services such as transactions services, financial advice, screening, certification, origination, issuance and trust activates and etc. According to Bhattacharya and Thakor (1993) the advantages of the brokerage arises from a cost advantage of information. Because a broker has able to interpret subtle signals and the broker can exploit

cross sectional and temporal reusability of information. On the other side, the financial intermediaries functioning as qualitative asset transformer process risk in altering the attributes of the claim. They provide services such as term maturity, financing assets with longer maturity than liabilities, divisibility, liquidity, credit risk and etc. The financial intermediaries often specialize in the provision of one or more of these services. For instance, depository banks provide most of these services, whereas non-depository financial intermediaries such as investment banks, insurance companies tend to specialize more narrowly. Battacharya and Thakor (1993) built their argument on Leland and Pyle's (1977) seminal article and they argue that information asymmetry is the most basic form of transactions costs and information-based theories explaining reason d'être of financial intermediaries. They argue that financial intermediation is a response to the inability of market-mediated mechanisms to efficiently resolve informational problems. Also they note that the welfare of the transacting parties improve when they use banks. As James (1987) provides evidence for this hypothesis by empirically and his results indicate that the borrowers make abnormal returns when they announce banks loans; however, announcement of the nonbank debt announcement cannot provide similar returns.

Reputation gaining process of borrowers and intermediaries are examined by some scholars. For instance, Chemmanur and Fulghieri (1994a, 1994b) examine reputation gaining process of the financial intermediaries. Similarly, Diamond's (1991) model determines the reputation gaining process of the borrowers which depicts choice between borrowing directly by issuing bond and borrowing through a bank that monitors the loans to alleviate moral hazard problem. Diamond (1991) theorizes that the new borrowers such as young firms initially borrow from the banks with high cost of capital for a while. During this process, the banks monitor these firms by recording credit history for each firm which is seen as a predictor of future action of the firm. After obtaining sufficient credit rating the firms are able to issue bonds without being monitored and they benefit from lower cost of capital. Diamond (1991) defines the reputation gaining process as "life cycle" process. His model assumes long term contracting relationship between the borrower and the bank. The borrowers want to borrow repeatedly and they care the effects of future information generated by being monitored by the bank. In Diamond's (1991) model there are three types of firms. First is Type (G) firm, it has good projects. Second is Type (B) firm, it has bad projects. Third is Type (BG) firm, it has choice between bad and good projects. If the bank knew the actual type of the firm, its debt would

be priced accordingly. During the monitoring period, the bank can learn the type of the firm with a fixed type by observing whether there has been a default. Interestingly, Diamond (1991) emphasizes that only the borrowers with middle credit ratings rely on the bank loans. Because reputation effect eliminates the need for monitoring when the value of the future profits lost due to the information revealed by defaulting on the debt is gross. In addition, the borrowers with high credit rating have lower cost of capital and these kinds of firms want to maintain to retain high credit ratings to keep higher present value of future profits. Thus, these firms with higher credit rating do not need being monitored. In the same way, the firms with low credit rating have less to lose if they signal bad news about their projects by defaulting and they have less to lose they are captured by being monitored. Therefore, Diamond (1991) argues that the firms with BG type projects borrow from the banks and then the banks monitor them. Additionally, Diamond (1991) implies the coexistence of bond markets and banks for different type of the firms.

Even though Leland and Pyle (1977), Campbell and Kracaw (1980) and more others have postulated theories about role of the financial intermediaries of information production, they have said little about credibility of the intermediaries in their studies. Hence, Chemmanur and Fulghieri (1994a) have developed a model to highlight importance of credibility of the banks by showing the firm's choice between getting the bank loans and issuing bond to finance their projects. In case of financial distress, the borrowers can renegotiate their debts. Thus, the banks have desire to acquire reputation to make the right renegotiation versus liquidation; as a consequence, they devote a larger amount of resources to produce information about financial distressed firms. The scholars show that the borrowers with high probability of being in financial distress prefer bank loans, despite the fact that banks charge them higher interest rate compared to the bond market. The reason for why they choose to pay higher interest rate for bank loans is due to the banks' reputation for flexibility in dealing with firms in financial distress. On the other hand, relatively less financially distressed firms choose to issue publicly traded debt with lower interest rate.

Like Chemmanur and Fulghieri (1994a), a couple of studies have examined the choice between the bank loans and the publicly traded loans. For example, Diamond (1991) develops a model in which focuses on reputation acquisition by the borrowers. The firms get reputation by using the bank-monitored debt and then they switch to issue publicly traded debt to save monitoring cost. It differs from

Chemmanur and Fulghieri's (1994a) model in that point, Diamond's (1991) model assumes that the banks are able to monitor the borrowers, while the bondholders are unable to do so. Thus, in Diamond's (1991) model, the borrowers do not choose value reducing action as they do not want to harm their reputation. But in Chemmanur and Fulghieri's (1994a) model the reputation is acquired by banks rather than borrowers. Thanks to this reputation the banks credibly promise the borrowers to make better renegotiation versus liquidation decisions in case of the borrower is in financial distress. In this study, the banks are long-term player and they have a desire to acquire reputation for making the right negotiation versus liquidation decision which results in their devoting more resources to evaluating the firms compared to the bondholders.

Chemmanur and Fulghieri (1994b) also have offered a model to analyze reputation acquisition aspect of the investment banks in the equity market in solving information asymmetry and providing credible information to the market. In stock market, the entrepreneurs sell their shares in an asymmetrically informed environment, either directly, or using an investment bank. Investment banks, who interact repeatedly with the stock market, underwrite stock issues. Thus, the investment banks are the information producers, they analyze and evaluate the entrepreneurs' projects and report to the investors, in return for a fee. Ordinary investors in stock market determine the market value of the equity. As they do not observe the amount of resources investment banks allocate to assessing the entrepreneurs' projects. That is, the ordinary investors do not know how strict standards are set by the investment bank when they are recommending investment in a firm. Thus to deal with this asymmetric information, the investors pay attention to the investment banks' past performance to assess their credibility. Because the quality of firms in which investment banks have previously sold stocks, valuing the stock they have marketed signal credibility of investment banks. In bottom line, the reputation acquired by the investment banks has gross importance to show credibility of them as the information producers.

Some economies are bank-based and have small or non-existent stock markets such as Baltic countries; on the other side, some economies have sound stock markets which are mostly preferred by the managers for financing such as US market. Dow and Gorton (1997) present a model of stock market which has an information production role and a monitoring role. They point out that stock prices are informative if the investors trade on their information about the entrepreneurs' project. That is, the investors produce information and trade on it; hence their

information is incorporated in stock prices. Thus, the managers learn from prices and they use stock market prices to make capital budget decision. In their study, Dow and Gorton (1997) also present that a bank can also execute these functions and they assert that the banks and stock markets are alternative institutions.

Banks hold highly illiquid assets which are funded largely with deposits. On the other side, contrary to illiquid bank assets, deposits, which represent bank liabilities, are liquid and withdrawable on demand. Banks exchange short term liabilities (deposits) with long term assets (loans). This process called qualitative asset transformation, a bank absorbs risks by issuing claims on its total assets with different characteristics from those encountered in its loan portfolio. (Greenbaum and Thakor, 1995).

Boot (2000) asserts that the banks' assets are illiquid due to their information sensitivity and in originating and pricing loans, banks obtain proprietary information. Then subsequently monitoring the borrowers provides additional private information during time period. Leland and Pyle (1977), Bhattarcharya and Thakor (1993) and some others have stressed that asymmetric information provide the most agreed explanation for the existence of financial intermediaries. Thus, Boot (2000) claims that thanks to relationship banking banks can access information about borrowers and it provides comparative advantages to them. Boot (2000) defines relationship banking as the provision of financial services by a financial intermediary that first banks invests in obtaining customer-specific information, often proprietary in nature (proprietary information); and then evaluates the profitability of these investments through multiple interactions with the same customer over time and/or across products. According to Boot's (2000) model the intermediary gathers information beyond readily available public information when it provides screening and/or monitoring services. Moreover, the information can be used in multiple interactions with the same customer, creating an opportunity to benefit from intertemporal information reusability and it remains confidential. Boot (2000) reports that the focus of the relationship banking is not just the banks, relationship banking activities also include the nonbank financial intermediaries. Thus in this sense using the relationship intermediation rather than the relationship banks term is more appropriate to use.

In the bottom line of financial intermediation literature review, Clause and Glimse (2003) argue that financial intermediaries contribute the efficient and effective functioning of capital and money markets and any factors that affect the

amount of credit channeled through financial intermediaries can have important macroeconomic effects.

Briefly, there are two motives in the literature that formally explain the reason d'être of the financial intermediaries. The first motive emphasizes the financial intermediary's information production role. The second motive points out existence of transactions costs. In both cases, the intermediaries specialize in collecting information, evaluating projects, monitoring borrower's performance and sharing risks. In a similar way, financial intermediation can reduce the cost of channeling funds between the parties of the borrowers and the lenders, leading to a more efficient allocation of resources (Clause and Glimse, 2003).

Lastly, Allen (2001) asks "Do financial institutions matter?" in American Finance Association Presidential addressing speech in 2000. He highlights the importance of financial institutions such as the banks, insurance companies, pension funds, and mutual funds on asset pricing and on corporate finance in the addressing speech. In the life of most regular people have pervasive dealings with some kind of the financial institutions such as with banks and insurance companies, pension funds and mutual funds. Even though the financial institutions substantially take part in the investors, corporate finance and asset pricing theory; finance theory pays less attention finance institutions than they deserved. Thus, the author concludes that the financial institutions do matter for the investors, corporate finance and asset pricing theory as they create an agency problem, and they have a role in providing liquidity.

Therefore, the financial intermediaries perform several tasks according to literature reviewed above, which in these services can be offered by a specialized financial intermediary or can be conducted by several types of them. In short, financial intermediaries serve for;

a. Mitigation of information asymmetry, this is the most obvious task of them,

b. Transaction cost reduction, as financial intermediaries benefit from economies of scale to execute financial transactions at lower prices than individual investors,

c. Information production and processing, as financial intermediaries not only mitigates information asymmetry but also produces and process information on behalf of individual investors,

d. Monitoring the borrowers, whereby the financial intermediaries act as a delegated monitor on behalf of depositors,

e. Maturity transformation, some financial intermediaries accept short term deposits from savers to finance long term loans,

f. Liquidity transformation refers that some financial intermediaries, banks, fund illiquid loans with liquid deposits,

g. Denomination transformation (or asset transformation) refers some financial intermediaries convert small denomination deposits to large denomination loans.

h. Payment services refers that some financial intermediaries provide services as transfer of funds between agents which facilitates the trade and payment of goods and services between them.

2.2. Financial System

A country's financial system consists of the institutions and the markets that interact, typically in a complex manner, for the goal of mobilizing funds for investment, providing facilities and payment system for the financing of the commercial activities. Allen, Chui and Maddaloni (2004) present an overview of a financial system which can be seen at Figure-1. Households and firms are the primary source of funds for investment. These lenders provide capital to the ultimate borrowers typically the firms, governments and households, in two channels. The first channel is the financial institutions such as the banks, insurance companies and other financial institutions. The second channel is the financial markets such as stock markets, bond markets and money markets. Mishkin (2006) defines the first channel financing as indirect finance and the second channel is direct finance. Mishkin (2006) also states that financial institutions can provide funds for financial markets.

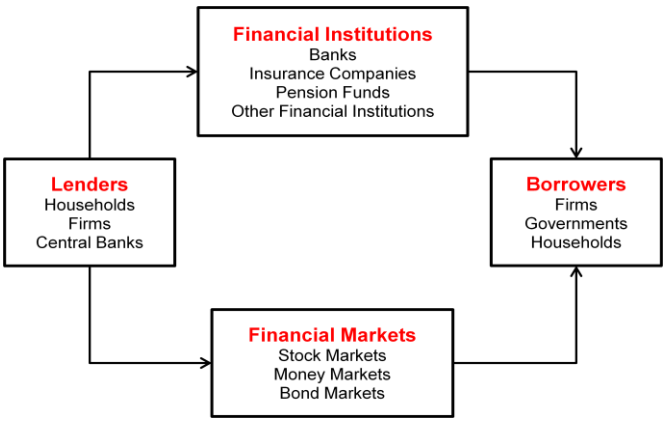


Figure 1. An overview of the financial system (Source: Allen, Chui and Maddaloni, 2004, p.491)

The role of the financial institutional units is primarily to intermediate between those who have funds but not have the project and those who have the project but not have fund. This exchange typically involves transforming and managing risk. Especially for deposit takers, risk arises from its role in maturity transformation, where its liabilities, such as demand deposits, are typically short term, but its assets, such as loans, have a longer maturity and are often illiquid. During this intermediation process, role of the banks are central. Because they provide convenient locations for the placement and borrowing of funds to the investors and the rest of the economy. They also provide payment services for the entities and individuals for conduct of their business. Thus well-functioning banking system is crucial for all financial and nonfinancial entities and the financial system as a whole (International Monetary Fund (IMF), 2006). A country's other key financial intermediaries include its insurance companies, saving institutions, pension and mutual funds and similar financial auxiliaries.

A financial market is defined as a market where financial claims can be traded under established rules of conduct and able to facilitate the management and transformation of risk. The types of financial market include stock markets, money markets, bond markets, derivatives markets, commodity markets and the exchange markets. Stock markets are the most known markets where equity securities are traded. It is an important market as providing capital to the issuer and providing benefits to the investor from growth of the issuer's business through increase in market value of claim and dividend payments.

Money market refers to the market where short term lending and borrowing funds among a range of participants are possible. Money market instruments cover

treasury bills, certificates of deposits, banker's acceptance, commercial papers and central bank bills. Typically money market instrument are have short term maturity which is less than one year. Contrary to money market, bond market refers a market where long term instruments are traded. Thanks to bond markets, the issuer can obtain longer term debt while providing the investors with an opportunity to buy and sell the debt securities.

Financial derivatives market is market where the instruments are used to trade financial risk such as interest rate risk, exchange rate risk those more able to willing to bear them (IMF, 2006).

2.3. Financial Development

As mentioned in the financial intermediation part, financial markets are imperfect due to market frictions such as information asymmetry and transaction costs. Thus, information is not truly and quickly disclosed to all market participants to determine the best investments. There are costs and uncertainties related with writing and enforcing financial contracts and transacting goods, services and financial instruments. Because of these costs of market imperfections, there are incentives for the emergence of financial intermediaries, markets and contracts (Levine, 1997, 2005; WEF 2012a).

Even though financial intermediaries do not completely eliminate the market frictions, they can mitigate them. However some markets are relatively better at developing financial systems to reduce these costs than others. That is, some markets can alleviate market imperfections which inhibit the channel of savings of nation's citizens to the best projects and ideas which can lead to economic growth. On the other side, some financial systems perform poorly; they hinder economic growth, curtail economic opportunities, and destabilize economies (Levine, 1997, 2005).

According to Cihak et al. (2012) financial development occurs when financial intermediaries and markets ease these market imperfections and lessen the cost and the uncertainties associated with market imperfections when channeling the resources saved by the households to their most productive uses.

In a similar way but with different words, Reuttner and Glass (2012) define financial development as the policies, factors and the institutions that lead to the efficient intermediation and effective financial markets, as well as deep and broad access to capital and financial services. According to this definition efficiency and

effectiveness of the financial institutions and markets and moreover depth and accessibility of the services are stressed. Thus financially developed countries are benefit from the improvements in the main functions of financial system than financially less developed countries.

The World Bank (n.d.) webpage states that financial development occurs when the financial instruments, markets, and intermediaries ease the effects of information, enforcement, and transactions costs and therefore do a correspondingly better job at providing the key functions of the financial sector in the economy. In the following parts what kind of functions are provided by financial intermediaries and how to measure financial development is reviewed.

The relationship between financial intermediation and economic growth has been examined over the last two centuries. The literature strongly accentuates positive ties between them. Research on the role of financial development and economic development goes back to Bagehot's (1873) seminal paper "Lombard Street: A Description of the Money Market" which highlights importance of well-organized and sound capital markets for economic growth in England. Later, Schumpeter (1912) argues importance of banking system for economic growth. Goldsmith (1969) empirically documented a significant and positive correlation between financial development and the level of economic growth by using thirty-five countries data from 1860 to 1963. Hicks (1969) also emphasizes that financial system ignited industrialization in England as facilitating application of new technologies. In 1970s, McKinnon (1973) and Shaw (1973) underscore that financial impediments such as financial distresses likely hamper economic growth by preventing financial intermediation from channeling the resources into the most productive usage and also by hindering mobilization of the amount of savings to investment. Then in 1980s, Stiglitz (1985) and Boyd and Prescott (1986) stress importance of banking sector development by arguing its important role in promoting economic growth as the banks are better than equity markets when it comes to capital allocation.

King and Levine (1993) are the first to examine the ties between financial intermediation and long-run economic growth by using cross-country regression data which covers eighty countries from 1960 to 1989. They found that banking sector development is strongly associated with real per capita GDP growth and the rate of physical capital accumulation in the long run. Moreover, they also argue that financial development is robustly correlated with future rates of economic growth. Rajan and Zingales (1998) show that causality runs form financial development to

economic growth. Atje and Jovanovic (1993), Levine (1997, 2005), Levine and Zervos (1998), Beck, Levine, and Loayza (2000), Rousseau and Wachtel (2000) and Beck and Levine (2003) and many others strongly exhibit that financial development is strongly correlated with economic growth. More importantly, they also point out that equity market liquidity and banking sector development both predict the future economic growth rate of the economy. Following them, Beck and Levine (2004) examine the impact of stock markets and the banks on economic development using a panel data set for the period 1976–1998. They find that stock markets and the banks positively influence the process of economic growth even though controlling for country specific effects.

Even though classical growth literature postulates strong positive ties between financial development and economic growth, recent empirical studies, such as Rousseau and Wachtel (2011) argue that the finance-growth relationship is not firmly entrenched in the recent empirical literature. On the other side, Khan, Senhadji, and Smith (2001), Nili and Rastad (2007) and Barajas, Chami, and Yousefi (2013) argue that contribution of level of the financial intermediation to economic growth differs accross income levels, countries and even regions. Arcand, Berkes, and Panizza (2012) examine whether there is a threshold above which financial development no longer has positive effect on economic development. As a result, they postulate “too much finance effect” by arguing that if credit to the private sector reaches 100% of GDP, finance starts having negative effect on economic growth.

Aizenman, Jinjarak, and Park (2015) analyze the financial development and economic growth ties in 41 economies, including East Asian and Latin American economies for a comparison regions. They find that the impact of financial development on growth is non-linear and it has heterogeneous effect across regions and sectors. Peia and Rosbach (2015) examine cointegration and causality between financial development and economic growth for 22 advanced economies. They find that stock market development causes economic development, while reserve causality is mostly present between the banking sector and development and output growth. Moreover they suggest that the direction of causality between finance and growth is different at high level of development.

Lastly, Sahay et al. (2015) show that there is a significant, bell-shaped relationship between financial development and growth. They analyze a sample of 128 countries over 1980-2013 and they find that financial development increases growth, however, the effects weaken at higher level of financial development and

eventually become negative. As depicted at Figure-2, in emerging markets such as Morocco effect of financial development on economic growth is larger than as of developed markets such as U.S.A. and Japan.

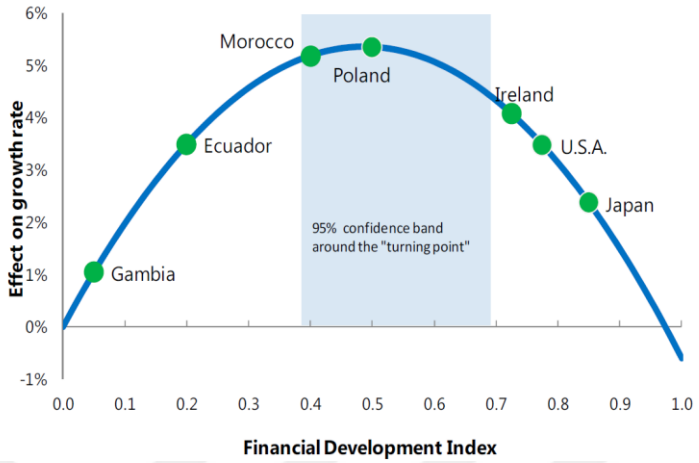


Figure 2. Financial Development Effect on Economic Growth (Source: Sahay, 2015, p.16)

2.4. Main Functions of Financial Service Providers

By reducing market imperfections, the financial intermediaries' most important function is to facilitate the allocation and development of economic resources, both across borders and across time, in an uncertain environment (Merton, 1995; Merton and Body, 1995). To organize finance literature on financial development, Levine (1997, 2005) breaks this main function, allocation of economic sources, into five categories and WEF's Financial Development Report 2012 rearticulates them by arguing that financially developed markets are expected to have improvements in the quality of following financial functions:

1. Producing and processing information about possible investments and allocating capital based on these assessments;

2. Monitoring individuals and firms and exerting corporate governance after allocating capital;

3. Facilitating the trading, diversification, and management of risk;

4. Mobilizing and pooling savings; and

5. Easing the exchange of goods, services, and financial instruments (p.18).

In addition to these functions, IMF (2005) adds "making payment" as an important function of the financial intermediaries. According to the IMF, ideal

financial intermediaries are supposed to offer reliable and affordable fund transfer within country, reaching areas and even poor people. On the other side, some researchers or documents, such as European Central Bank (2012) January Monthly Bulletin, relates making payment with payment services function arguing that the financial intermediaries' payment services facilitate trade and payment of goods and services between the agents. Summary of main functions of financial service providers are presented below;

2.4.1. Producing Information and Allocation of Capital

Evaluating firms, managers and market conditions before making investment is costly. All individuals in the market may not be able to have ability to gather, process and produce information about possible investment. Thus the households will not invest because of their little reliable information and higher cost and the capital will not be allocated to its highest value use (Levine 1997, 2005).

However, Boyd and Prescott (1986) argue that the financial intermediaries are able to reduce the cost of processing and producing information and thereby improving allocation of capital. Boyd and Prescott (1986) stress that the intermediaries are required for efficiency of capital allocation. Because the intermediaries are coalition of the agent, they borrow from households and lend to large groups of the agents. They produce information about investment projects and they issue claims that have different state of contingent payoffs than claims issued by ultimate borrowers. In absence of the financial intermediaries, each investor will pay large amount of money to assess possible investments and macroeconomic conditions and similar effects and therefore efficiently allocation capital will not be possible.

2.4.2. Monitoring Firms and Exerting Corporate Governance

If capital providers monitor the individuals and the firms after allocating capital, they can influence them to use capital as proposed way and thereby they could exert corporate governance. Notwithstanding, Levine (2005) argue that market frictions may prevent the shareholders from effectively exerting corporate governance, which results in that the managers can be induced to pursue projects that benefit themselves rather than the shareholders. Especially there are significant information asymmetries between small shareholders and the managers. Thereby the managers have large discretion over the flow of

information. In addition, small shareholders generally do not have expertise and incentives to monitor the managers due to enormous cost and difficulty of overseeing the managers and exercising corporate control. Hence, Levine (2005) emphasizes that due to asymmetric information and costs the shareholders may not exert effective corporate governance and it adversely affects capital allocation and economic growth.

Diamond (1984) proposes a model where the financial intermediaries help corporate governance. He postulates a theory in which the lenders delegate the costly monitoring of the borrowers to an agent which is called as financial intermediary. Diamond (1984) argues that as the financial intermediaries deal with significant number of the lenders and the borrowers and thereby cost of contracting decreases monotonically. Thus, the financial intermediaries are able to contract with as many borrowers and lenders as possible. Moreover, as mentioned by Boot (2000) the financial intermediaries and the borrowers can develop long term relationship which can further decreases cost of information.

Similarly, Jensen and Meckling (1976) accentuate importance of well-functioning stock markets in exerting corporate governance. Their agency theory illustrates how smaller managerial stakes cause to increase in non-pecuniary expenditures by the agents (managers) as they do not fully bear the cost. A key argument in the model is that outside shareholders are not able to observe freely the managers' actions. Jensen and Meckling (1976) argue that large shareholders monitor the management better than small shareholders because they internalize significant amount of the monitoring costs and have enough voting rights to affect corporate decisions.

2.4.3. Facilitating the Trading, Diversification, and Management of Risk

Levine (2005) argues that the intermediaries with information and transactions costs, financial contracts ameliorates the trading, hedging, and pooling of risk with implications for resource allocation and economic growth. He divides the discussion of risk amelioration into three categories: cross-sectional risk diversification, intertemporal risk sharing, and liquidity risk. Financial systems may mitigate cross-sectional risks associated with firms, countries, regions, industries or individual projects. Because the financial institutions and markets offer products for trading, pooling and diversifying risks. Some kind of risks such as macroeconomic shocks cannot be eliminated at a particular time period; however they can be

diversified across generations. To be specific some kind of intermediaries can facilitate intergenerational risk sharing by investing with a long term perspective and offering low returns in boom times and relatively high returns in slack times. Lastly Levine (2005) articulates that the financial intermediaries provide liquidity for participant and markets. Liquidity risk emerges because of the uncertainties related with transforming assets into a medium of exchange. Asymmetric information and transaction costs may distort liquidity and increase liquidity risk. These imperfections lead incentives for the existence of the financial intermediations which augment liquidity. For instance, the investors can purchase liquid assets such as stocks, bonds or demand deposits and they can sell them in case of they need money.

2.4.4. Mobilizing and Pooling Savings

Mobilizing and pooling of capital from disparate savers for investment is costly process. Mobilizing savings entails (1) reducing transaction costs associated with collecting savings from different individuals, namely eliminating the need for multitude of bilateral contracts between lenders and borrowers and (2) mitigating the informational asymmetries associated with making savers feel comfortable in relinquishing control of their savings (Avgouleas, 2012). Indeed, if the financial intermediaries do not exist, mobilization of capital for investment might be impossible. Thanks to the financial intermediaries' capability to mobilize and pool capital, savings for investment can increase and investment indivisibilities are can be overcome and the economies can grow. Moreover, better savings mobilization can increase resource allocation and leads technological innovation, because it spurs production process to reach economically efficient scales of production (Sirri and Tufano, 1995).

2.4.5. Easing the Exchange

Levine (1997) and Greenwood and Smith (1997) state that besides channeling investment capital to its highest return uses and providing liquidity and permit efficient pooling of risk, financial intermediaries that lower transaction cost can promote specialization, technological innovation and growth. Greenwood and Smith (1997) illuminates the ties between exchange, specialization and innovation. They argue that more specialization requires more transactions. As each transaction is costly, financial arrangements that reduce transaction costs will

provide better specialization. Therefore, markets that promote exchange spurs increased productivity.

2.5. Measurement of Financial Development

Even though finance literature stresses importance of these institutions and markets' efficiency for economic growth and higher living standards of the nation, there is some concern about how to measure indicators of financial development. Measuring financial development is so difficult; it is a vast concept and has several dimensions. A comprehensive research which aims to measure financial development is supposed to cover how the financial intermediaries a) produce and process information about possible information, b) monitor individuals and firms, c) facilitate the trading, diversify and manage risk, d) mobilize and pool savings and e) ease the exchange of goods, services and financial instruments. However, finding cross-country time series data including all of these dimensions for every type of intermediaries is not easy.

Empirical researches measuring financial development are usually based on standard quantitative indicators such as ratio of financial institutions' assets to GDP, ratio of liquid liabilities to GDP, and ratio of deposits to GDP. These indicators are generally rough estimation of the size of the banking industry; however, the financial sector of a country typically includes a variety of financial institutions and markets such as stock markets, bond markets, insurance companies, venture capital market, derivatives market and etc. Thereby just measuring size of the banking industry is not enough to show quality, efficiency and stability of the financial institutions and markets. For that reason, they are not the best indicators to be used as proxy for financial development (IMF webpage[1], n.d.). Hence to measure a region or country's financial development, significant characteristics of finance intermediaries are supposed to be taken into account.

To illustrate, Soytas and Kucukkaya (2011) point out that the researchers typically employ six proxies for financial development in the literature. They list them as (1) ratio of broad money to nominal GDP, (2) ratio of total domestic credit to nominal GDP, (3) ratio of total domestic credit to private bank and central bank assets, (4) ratio of deposit money banks' claims on private credit to total domestic credit, (5) ratio of stock market capitalization to nominal GDP and (6) ratio of

[1] http://www.worldbank.org/en/publication/gfdr/background/financial-development

average trading volume in the bonds and bill markets to nominal GDP. Soytas and Kucukkaya (2011) emphasize that these indicators contain common information and may lead to multicollinearity and pararmeterization problems. Thereupon, as offered by Ang and McKibbin (2007), Soytas and Kucukkaya (2011) use principle component analysis to reduce the dimensionality of correlated measurements in their study.

Cihak et al. (2012) determine the most important four characteristics of financial institutions and markets to measure and benchmark financial systems. These financial system characteristics are selected to be proxies for the services provided by the financial intermediaries. Cihak et al. (2012) use these characteristics to describe, compare and analyze the financial systems around the globe and to evaluate them over recent decades. The first characteristic is “financial depth” used to show size of financial institutions and markets, the second characteristics is “access”, it depicts the degree to which individuals can and do use the financial institutions and markets, the third characteristics “efficiency” used to show the efficiency of the financial institutions and markets in providing financial services and the last one is “stability” which depicts the stability of the financial institutions and markets. The researchers use these four characteristics not only for the financial institutions, but also for the financial markets such as equity and bond markets. Each of these characteristics provides significant information about key features of financial systems. For instance a dept market would not be an efficient market or an efficient market would not be necessarily stable than less efficient market. Hence, according to Cihak et al. (2012) to define a market as developed, it should be depth, accessible, efficient and lastly stable.

Cihak et al. (2012) also present measures for financial intermediaries’ four characteristics by reviewing the related empirical literature on financial system. Table-1 presents a summary of Cihak et al.’s the 4x2 Matrix of Financial System Characteristics. WEF (2013) report argues that the variables that are highlighted in bold are the ones suggested for the benchmarking exercise in Table-1.

Table 1. 4x2 Matrix of Financial System Characteristics (Source: Cihak et al., 2012)

	Financial Institutions	Financial Markets
Depth	**Private Sector Credit to GDP** Financial Institutions' asset to GDP M2 to GDP Deposits to GDP Gross value added of the financial sector to GDP	**Stock market capitalization and outstanding domestic private debt securities to GDP** Private Debt securities to GDP Public Debt Securities to GDP International Debt Securities to GDP Stock Market Capitalization to GDP Stocks traded to GDP
Access	**Accounts per thousand adults(commercial banks)** Branches per 100,000 adults (commercial banks) % of people with a bank account (from user survey) % of firms with line of credit (all firms) % of firms with line of credit (small firms)	**Percent of market capitalization outside of top 10 largest companies** Percent of value traded outside of top 10 traded companies Government bond yields (3 month and 10 years) Ratio of domestic to total debt securities Ratio of private to total debt securities (domestic) Ratio of new corporate bond issues to GDP
Efficiency	**Net interest margin** Lending-deposits spread Non-interest income to total income Overhead costs (% of total assets) Profitability (return on assets, return on equity) Boone indicator (or Herfindahl or H-statistics)	**Turnover ratio for stock market** Price synchronicity (co-movement) Private information trading Price impact Liquidity/transaction costs Quoted bid-ask spread for government bonds Turnover of bonds (private, public) on securities exchange Settlement efficiency
Stability	**Z-score** Capital adequacy ratios Asset quality ratios Liquidity ratios Others (net foreign exchange position to capital etc)	**Volatility (standard deviation / average) of stock price index, sovereign bond index** Skewness of the index (stock price, sovereign bond) Vulnerability to earnings manipulation Price/earnings ratio Duration Ratio of short-term to total bonds (domestic, Int'l) Correlation with major bond returns (German, US)

2.5.1. Measurement of Financial Depth

In finance literature, financial depth of the financial institutions is generally measured by the variable of *"private credit to the private sector as percentage of GDP."* Another commonly used variable to measure financial depth of the financial institutions is *"total financial institutions' assets to GDP."* This variable is more comprehensive than credit to the private sector as percentage of GDP due to covering both credit to government and private sector. Both of these variables are normalized by dividing them to GDP which provide a benchmark for financial development and allow comparison across countries or regions. However, Cihak et al. (2012) stress that the latter variable is available for only a smaller number of countries and therefore it has not been commonly used in the literature on financial development. Also it should be noted that Cihak et al. (2012) argue that these two variables are closely correlated with a correlation coefficient of about 0.9. Therefore using credit to private sector as a percentage of GDP variable is appropriate in analysis which excludes credit to government.

On the other side, IMF (2005) offers "*broad money to GDP (M2 to GDP)"* as an indicator of financial depth. IMF (2016) defines broad money as;

> *The sum of all liquid financial instruments held by money-holding sectors that are widely accepted in an economy as a medium of exchange, plus those that can be converted into a medium of exchange at short notice at, or close to, their full nominal value.*

Broad money is represented by a sequence as follows: M1, M2, M3 and etc. with larger M encompasses the previous one. Even though the economies generally adjust their components of the money aggregates, M1 is universally the narrowest money aggregate includes currency in circulation and transferable deposits which are held in market. Thus, component of M2 and higher level money aggregates depend on the available financial instruments and their characteristics in an economy. IMF (2016) stresses that the definition of money aggregates may differ across the economies, for instance, one country may define M2 as M1 plus time deposits with maturities of one year or less, on the other side another country may define M2 as M1 plus time deposits with maturities of two years or less. Nevertheless, IMF (2016) offers M2 to GDP as an indicator of financial depth.

Depth of the financial markets is generally measured by the variables of *"stock market capitalization as a percentage of GDP"* or *"outstanding public and debt value to GDP."* Moreover some researchers prefer to measure financial

market depth as *"stock market capitalization plus outstanding debt total to GDP."* As underlined by Cihak et al. (2012) measuring stock with market capitalization to GDP present just size of the market not activity of it. Thus they argue that using *"stock value traded to GDP"* shows both stock market capitalization and stock market activity.

As well, depth financial intermediation system should cover up not only basic institutions such as banks and stock markets but also they should include venture capitalist and derivative markets. For instance, Metric and Yasuda (2014) mention that depth markets such as United States, United Kingdom have higher venture capital investment to GDP ratio, however, emerging Asian, Latin America and Africa countries continue to lag behind the rest of the world in venture capital activity.

Lastly, function of the insurance sector is an important indicator of financial depth of markets. Hence, the World Bank provides data of "life insurance premium volume to GDP (%)" and "non-life insurance premium volume to GDP (%)" variables as indicator of markets' financial depth. Similarly, Sahay et al. (2015) advice to use pension fund assets, mutual fund asset and insurance premiums as percentage of GDP. This variables show development of more sophisticated financial intermediaries. However, availability of long-period cross-country data is problematic.

2.5.2. Measurement of Financial Access

In financially developed markets, the resources saved by the households are allocated to the projects with for their most productive usage by expectation of highest expected return. It means that in financially developed countries, financial services are provided to the investors with good projects rather than politically powerful or rich individuals or a few conglomerates. Thus, well-functioning financial systems provide a wide range of financial services and products to public from a diversified set of the financial institutions and markets (IMF, 2005). Therefore, to measure financial development of a market, citizens' access to financial services offered by from both financial institutions and financial markets is supposed to be measured. To measure access to financial services, the first step is to regularly collecting a set of standardized indicators in a country. The number of deposit and/or loans accounts, the number of deposit clients and/or borrowers and the number of financial access points, such as automated teller machines (ATMs),

bank branches, agents per a number of people such as 1,000 or 10,000 adults are the basic indicators of financial access used by researchers. For instance, Ardic et al. (2011) highlight that access to basic financial services can make an important difference in improving poor people's lives. Samans et al. (2015) point out that an account at a financial institution mostly reduces the cost of engaging in financial transactions and it provides a ready vehicle for savings and access to funds, and moreover it serves as a reference for households wishing to receive credit for business. Similarly they also argue that in high level financially accessible countries, households can smooth out their consumption and therefore they can increase investment, including in education and health.

CGAP (Consultative Group To Assist The Poor) (2009) offers to use bank branches per square kilometer in a country as indicator of financial access. It stress that the availability of financial services in a country is influenced by a significant number of factors including economic growth, income level of people, trust in the financial system, distance, and competition. As shown at Figure-3, CGAP (2009) argue that number of bank deposits accounts is positively associated with income per capita in cross country data. Namely, it also refers that financial system is mostly more developed in richer countries.

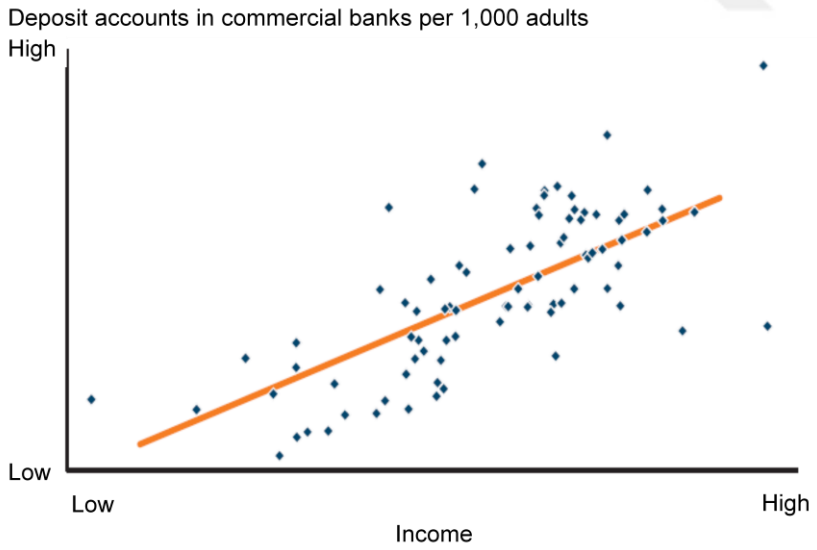


Figure 3. Income correlates with deposit accounts in commercial banks (Source: CGPA, 2009).

CGAP (2009) also depicts that ratio of usage of ATMs, POS machines and number of bank branches in financially developed countries outperforms these services in the developing countries as seen Figure-4. Thus it asserts that poor infrastructure, lack of technological services and heavy banking regulation restrict the geographical expansion of bank branch networks, and prevents increase in technological financial machines.

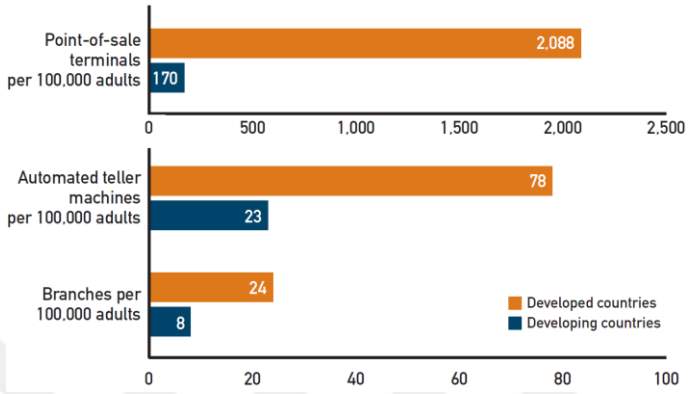


Figure 4. In developed countries accessing financial services is more easier (Source:CGPA, 2009).

However, Ardic et al. (2011) note that these commonly used variables such as number of ATMs and POSs per a specific number of adults have some drawbacks due to technological development. As the number of ATM numbers have declined in high income countries due to a significant usage of electronic transactions via internet and cell phones. Similarly the number of POS machines per specified adults has increased reflecting people's reliance on noncash payment. However, citizens' in these countries accessibility to financial services do not decline due to these changes.

At this point it is important to mention that the WEF provides precious information regarding accessibility to financial markets. It publishes Global Competitiveness Index (CGI) over 35 years. They have retrieved associated data from the Executive Opinion Survey to capture financial market development. In their survey examine *"availability of financial services, affordability of financial services, financing through local equity market, ease of access to loans, venture capital availability and etc."* In their survey, they ask the respondents the questions about one particular aspect of financial market development to evaluate on a scale of 1 to 7 in which 1 represents the worst possible situation and 7 represents the best. In 2012, around 15,000 business executives respond the surveys in 150

economies. This financial access data is particularly important to observe availability and affordability of the financial services and products in the markets as they reflect the citizens' sentiment.

In addition, Demirgüç-Kunt and Klapper (2012) have constructed Global Findex public database to show the indicators to attest usage of individuals to financial products across countries and over time. It is a useful database to understand how individuals around the world save, borrow and make payment.

Even though there are several useful databases providing data of accessibility to financial institutions, sources to reach the indicators of accessibility to financial markets are more scant. Cihak et al. (2012) argue that market concentration can also be used as indicator of financial access. Namely higher degree of concentration results in greater difficulties to access newer and smaller issuers. The indicators of accessibility include percentage of market capitalization outside of top 10 largest companies, the percentage of value traded outside top 10 traded companies etc. Also some researchers use number of regulation of securities exchange. If the number of regulation of securities exchange is high, it indicates restriction of access to securities exchange.

2.5.3. Measurement of Financial Efficiency

Another characteristic of financial system around the world for a broad cross-section of countries is financial efficiency (Cihak et al., 2012). Financial efficiency for the financial intermediaries refers to the ability of the financial intermediaries to provide high-quality services and products at the lowest cost (IMF, 2005). That is, efficient financial intermediaries are profitable than the inefficient one. Cihak et al. (2012) stress that *"return on assets, return on equity, overhead cost to assets, non interest-income to total income, net interest margin, cost to income ratio and lending-deposits spread"* are some of the primary indicators of financial efficiency of institutions. Net interest margin refers accounting value of a bank's net interest revenue as share of its total earning assets. Higher levels of net interest margin refers lower levels of bank's efficiency, because its shows a higher wedge between lending and deposit interest rates. Similarly, Beck et al. (2009) offers *"bank credit to bank deposits"* as an indicator of financial intermediation. They argue that this variable increases with financial intermediation and economic growth.

"Stock market turnover ratio" which typically refers the ratio of trading volume to capitalization in the stock market shows liquidity of the market. Higher stock

market liquidity reflects the more efficient stock market (Beck et al., 2009). On the other side, *"the bid-ask spread"* is also an indicator of efficiency in bond market. The tighter bid-ask spread refers the more efficient bond market (Sahay et al., 2015).

IMF (2005) argues that competition is desirable for the financial intermediaries as it leads to increase their efficiency by lowering cost for the customers, motivating for better products and services. Concentration, which refers how the financial sector is controlled by the biggest institutions in the market, is an indicator of competition. Because, concentration is negatively related to measures of competition and thereby with efficiency. Therefore, IMF (2005) states that Herfindahl Index, which is the sum of squares of the market shares of all firms in a sector, is a sophisticated indicator of concentration. Higher values of the index signify greater market concentration which refers lower financial efficiency.

2.5.4. Measurement of Financial Stability

According to Cihak et al (2012) financial stability is one of the characteristics of financial sector. However, Sahay et al. (2015) develops a comprehensive financial development index using indicators of financial depth, access, and efficiency for financial institutions and markets. Recent studies exclude stability from their indices. There are a couple reasons for excluding stability from the indices. For instance, (Ardic et al., 2013) argue that even though the theoretical studies postulates a strong linkage between financial depth, access, efficiency, and stability; the empirical studies does not yet conform a strong relationship between financial stability and financial development. That is, a deep, accessible and efficient financial market might be instable. Moreover, financial stability data is rarely distributed by the countries. Although the World Bank's database provides various financial depth, accessibility and efficiency indicators, there are limited variables showing financial stability.

Cihak et al. (2012) offer *"z-score"* as an indicator of stability measure for financial institutions. Z-score is defined as z=k+r/s, k refers equity capital as percent of assets, r refers return as percent of asset and s refers standard deviation of return on assets as proxy for return volatility. Accounting data is used to calculate z-score. If the country or companies has well-reported high quality accounting standard, z-score provide good assessment of financial stability. For financial markets, market volatility is a commonly used proxy for financial stability.

For instance, negative skewness reflects large negative returns and therefore shows less stability in the market.

2.6. Importance of Logistics

Roots of logistics originates from the ancient Greek, it refers “ratio or calculation”. At ancient times word of logistics used by military organizations to refer movement and support of warriors into the battlefield. However, the application of logistics has moved into business field, it has continued to change and evolve to fit the needs of business profession and nowadays it has become inextricable part of daily business. Hence, for a long time logistics not only plays a significant role in military context such as troop transportation, supply of troops with food and etc., but also it has a pivotal role in business organizations such as continental transportation, production and distribution, and lastly in public organizations such as garbage collection and mail delivery and etc.

Logistics in this century touches every aspect of daily life of everyone and it has grown into a business specialty of its own. Haksever and Render (2000) indicate that logistics touches daily aspect of everyone in three major ways. First, logistics makes good and services available to all parts of public such as consumers, business, government and non-profit organizations. Second, it has a significant impact on price of goods and services. Because a well-designed and well-functioning logistics system is indispensible for low cost goods and services. Lastly, logistics has crucial importance to respond to the needs of its citizens to increase the standard of living by providing food, medical care, shelter and etc.

Fawcett et al. (2011) support Haksever and Render (2000) by arguing that product’s availability and cost affects its market competitiveness. That is, the more efficient the logistics system, the more expanding markets, and therefore the greater the ability to take advantage of the division of labor. According to Fawcett et al. (2011) logistics is not only a necessary function in any developed economies but it is a limiting factor in overall economic development.

2.6.1. Definition of Logistics

Definition of logistics has evolved in military organizations as “planning and executing *the movement and support of forces*” (U.S. Armed Forces, 2013). In this definition, supporting forces refers deployment, distribution, supply, maintenance,

facilities management, operational contract support, engineering and health services in military.

There are various definitions of logistics as every group or organization define logistics depend on their point of view. Council of Supply Chain Management Professionals' (CSCMP) Supply Chain Terms and Glossary provides a comprehensive definition as;

> *Logistics management is a part of supply chain management that plans, implements, and controls the efficient, effective forward and reverse flow and storage of goods, services, and related information between the point of origin and the point of consumption in order to meet customers' requirements... (CSCMP, n.d., p.117).*

Coyle et al. (2013) have widened the definition of logistics as;

> *The process of anticipating customer needs and wants; acquiring the capital, materials, people, technologies, and information necessary to meet those needs and wants; optimizing the goods- or service-producing network to fulfill customer requests; and utilizing the network to fulfill customer requests in a timely manner (p.38-39).*

According to Coyle et al.'s (2013) definition logisticians not only execute flow and storage of goods, services and information, but also it is supposed to anticipate customer needs and wants, acquire the capital or required material, services and information, optimize and utilize them to fulfill customers request at time.

Ballou (2004) offers a broad definition of logistics for military, business and government organizations by rewording mission of it with 6-Rights. Thus according to Ballou (2004) logistics gets;

- The right goods/services,
- In the right quantity/quality,
- In the right place,
- At the right time,
- At the right cost and
- For the right customer.

Thus, this definition is so comprehensive and it is usable for all military, business and public organizations.

2.6.2. Scope of Logistics

What kind of products or services logistics provides is another contentious topic. However to execute the missions of logistics management activities typically include;

- Warehousing,
- Inventory management,
- Supply,
- Demand planning,
- Order processing,
- Transportation management,
- Fleet management,
- Materials handling,
- Network design,
- Border clearance, and
- Management of third party logistics services providers.

Moreover, in a more comprehensive definition, the logistics function also encompasses sourcing and procurement, production planning and scheduling, packaging and assembly, and customer service. CSCMP's webpage also argues that logistics management has an integrating function, which coordinates and optimizes all logistics activities, as well as integrates logistics activities with other functions including finance, sales manufacturing, information technology and marketing.[2]

Harrison & van Hoek (2008) define logistics as a task of managing two key flows:

Material flow of the physical goods from point of origin through the distribution centers to market;

Information flow of demand data from the customers back to purchasing and to suppliers, and supply data from suppliers to the retailer, so that goods flow can be accurately planned and controlled.

All definitions and scope of logistics point out that logistics services are executed between anywhere point of origin and point of consumption/disposal. Thus, the producers or the consumers use at least one of the logistics services across supply chain. Australian Bureau of Infrastructure, Transport and Regional

[2] http://cscmp.org/about-us/supply-chain-management-definitions

Economics – BITRE, (2001) gives a clear picture of points of logistics services in the supply chain system. It states that logistics can be divided into logistics services, information systems and logistics infrastructure/resources. As seen at Figure-5, in the supply chain system, logistics services enable the movement of goods, services or information between inputs through production to point of consumption as well as associated disposal and reverse flows. Logistics services include physical activities such as transportation and storage, as well as non-physical activities such as network design and border clearance. Likewise logistics information system and logistics infrastructure/resources facilitate flow of goods, services and information and also make it effective and efficient.

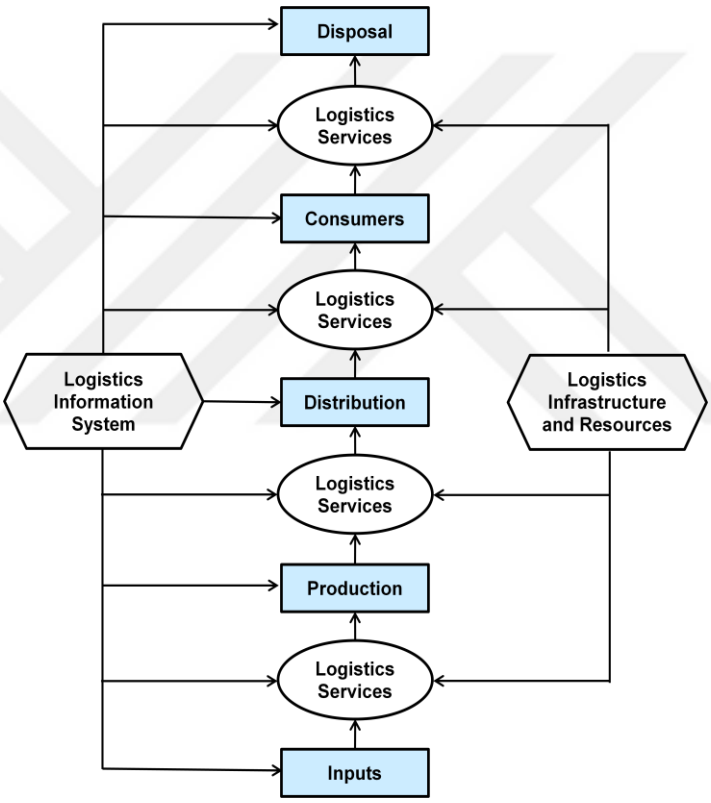


Figure 5. Logistics Service Point in Supply Chain System (Source: BITRE, 2001)

Figure-6 summarizes what kind of main logistics services can be provided in supply chain system. Logistics industry deals with comprehensive functions in supply chain system from procurement of inputs to reverse flows and disposal, transportation and product support. Obviously, Figure-5 and Figure-6 reflect that logistics has significant impact on economy of a country or region as its services has crucial importance for supply chain system in which between points of

production to point of consumption as well disposal. Without efficient logistics services, an economy cannot flow or store its product, services and information between point of origin and consumption.

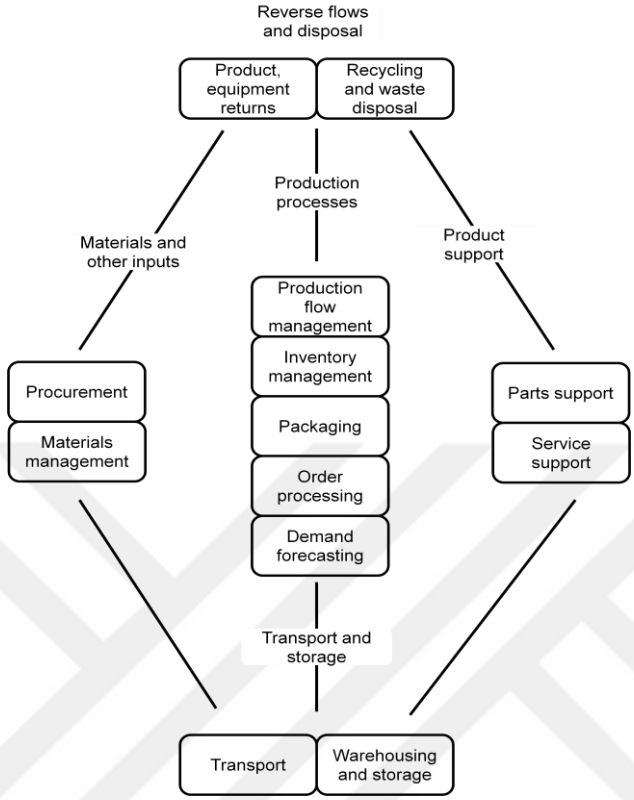


Figure 6. Main Logistics Services in Supply Chain System (Source: BITRE, 2001)

2.6.3. Relationship between Logistics and Supply Chain Management

Sometimes term of logistics can be mistakenly used instead of the term of supply chain management (SCM). Relationship between SCM and logistics is widely researched in numerous studies during the last few decades. Skjott-Larsen (1999) and Mentzer et al. (2001) argue that despite the popularity of the term SCM, both in academia and practice, the SCM concept is not well defined and there remains considerable confusion as to its meaning. Thus, concept of SCM and logistics are entwined. Larson et al. (2007) postulate four conceptual perspectives on relationship of SCM versus logistics. First is logistics encompasses SCM, second is SCM encompasses logistics, third is SCM replaces logistics and the last is SCM and logistics intersect each other. In Larson et al.'s (2007) study, they test how supply chain professionals see SCM and logistics relation. They find that 47% of their sample size thinks that logistics is a subset of SCM. That is, SCM includes

logistics management activities as well as including manufacturing, supply and demand managements. Thus, in this study we abide the supply chain professional's view and logistics is considered as subset of SCM.

2.6.4. Measurement of Logistics Performance

A substantial amount of academic studies has been executed on how to define and measure logistics performance (Töyli et al., 2011). Logistics and supply chain management literature typically conceptualizes logistics performance through logistics dimensions. For instance, Fugate et al. (2010) argue that logistics could create value through efficiency, effectiveness and differentiation. That is, logistics efficiency, effectiveness and differentiation are the dimensions of logistics performance as seen at Figure-7.

Fugate et al. (2010) define logistics efficiency as the measure of how well the resources expended are utilized. They measure logistics efficiency by evaluating percent of orders shipped on time, percent of shipments requiring expediting, inventory turns per year, average order cycle time, line item fill rate. They define effectiveness of logistics as the extent to which the logistics function's goals are accomplished. They measure logistics effectiveness by comparing actual performance with planned performance of transportation cost, warehousing cost, inventory cost and logistics cost. Fugate et al. (2010) claim that logistics differentiation refers a logistics firm's excellence in logistics performance compared to its competitors. They measure logistics differentiation with comparing the firm with its major competitors by measuring percentage of damaged deliveries, finished goods inventory, forecasting accuracy, time on backorder, on-time delivery, total inventory turns etc.

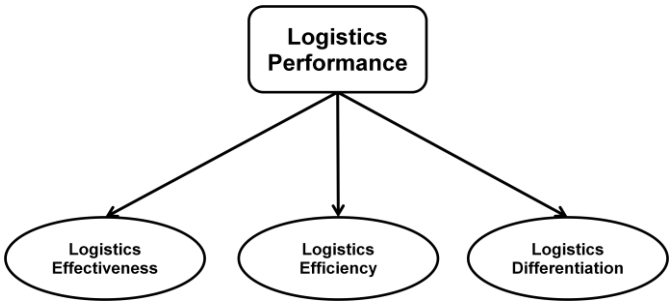


Figure 7. Logistics Performance Indicators (Adapted from Fugate et al. (2010)

Also the World Bank provides Logistics Performance Index (LPI) by publishing biennially Logistics Performance Index since 2007. Contrary to Fugate et al.'s (2010) study, it provides indicators of logistics performance rather than defining characteristics or dimensions of logistics performance. LPI is originated form analyzing countries six logistics performance indicators as:

* Customs; refers the efficiency of the clearance process (speed, simplicity, and predictability of formalities),
* Infrastructure; refers the quality of trade and transportation infrastructure (ports, railroads, roads, information technology),
* The ease of arranging shipments; refers the ease of arranging competitively priced shipments,
* Service quality refers the competence and quality of logistics services (trucking, forwarding, and customs brokerage),
* Tracking and tracing; refers the ability to track and trace consignments,
* Timeliness; refers the frequency with which shipments reach the consignee within the scheduled delivery time.

The World Bank divides these indicators into two subgroups based on theoretical and empirical research and moreover on the experience of logistics professionals who involve in international freight forwarding. Two main categories as seen at Figure-8.

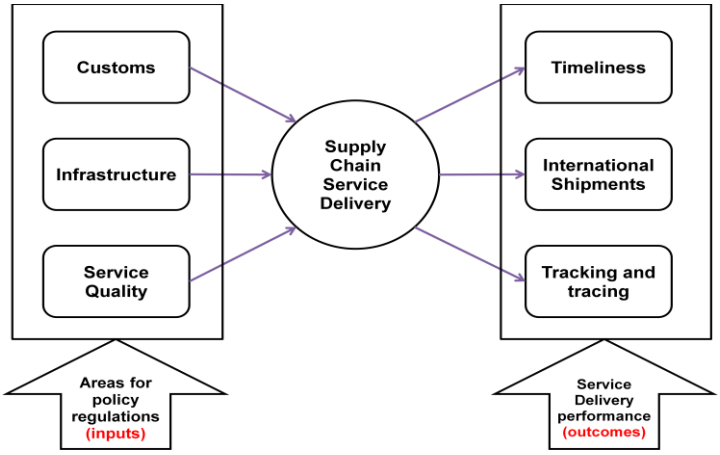


Figure 8. The World Bank's Logistics Performance Indicators

Customs, infrastructure and services quality indicators are added into the areas for policy regulation, indicating main inputs to the supply chain. On the other

side timeliness, international shipments and tracking and tracing are added into the areas of supply chain performance outcomes which corresponds to LPI indicators of time and reliability. That refers well-functioning customs systems, infrastructure and high quality service results in punctual and traceable shipments.

For LPI, the World Bank relies on an online survey of logistics professionals from the companies responsible for transferring goods, services and information around the world such as the main express carriers and multinational freight forwarders. Because these logisticians, the express carriers ad freight forwarders, are the best positioned to evaluate how countries perform their logistics work. Moreover, these logisticians directly affect the choice of shipping routes and gateways. They also influence the decisions of firms on production location, choice of suppliers, and selection of target markets (Arvis et al., 2016).

CHAPTER 3

RELATIONSHIP AMONG THE VARIABLES

3.1. Relationship between Governance Quality and Financial Development

Financial development can be promoted by putting in place a strong and sound government, regulatory, business environment (Sahay et al., 2015). State governance factors help to set up this environment which sustains a higher level of financial development while mitigating financial stability and macroeconomic risks. According to the World Bank, political stability, control of corruption, higher regulatory quality and rule of law, governments' or responsible organizations' accountability are the indicators of state government quality which are positively associated with greater financial development.

According to Kaufman et al. (2010) state governance refers;

> *The traditions and institutions by which authority in a country is exercised. This includes (a) the process by which governments are selected, monitored and replaced; (b) the capacity of the government to effectively formulate and implement sound policies; and (c) the respect of citizens and the state for the institutions that govern economic and social interactions among them. (p.4)*

Therefore, quality of state government or autonomous or semiautonomous organizations such as Central Bank and Competition Authority has a major role in the financial sector (WEF, 2014).

The Worldwide Governance Databank (World Bank, 2015) provides indicators of state governance quality indicators as government efficiency, political stability, voice and accountability, control of corruption, regulatory quality and rule of law. The factors of state governance quality are driving force for both financial development and economic growth. Higher state governance quality erodes financial obstacles for entrepreneurs in financially and economically developed markets (Beck et al., 2006). So, literature emphasizes that these factors are basis of a sound business life, financial development and competitiveness of a country.

Especially, government has a cardinal responsibility in providing supervision, implementing sound policies, contributing on political stability and accountability, ensuring sound competition, strengthening financial infrastructure and limiting the adverse repercussions of these market failures (Cihak and Demirguc-Kunt, 2013). That is, government policies and structure severely affect the functions of the financial system. In addition to government quality, the degree of political stability, operations of legal and regulatory system influence the financial system. So, well-governed states with political stability and high level legal and regulatory quality can ensure stability in the financial markets, promote transparency and reduce information asymmetry; in turn, they boost financial development.

Haan et al. (2009) state that a well functioning financial system requires particular government actions. First of all, sound regulations are required to protect property rights and enforce financial contracts. They argue that if the governments are not able to secure property rights and enforcement of contracts, financial transactions and investment will be restricted and thereby financial development will be hampered. Haan et al. (2009) also stress that if a financial system allocates capital across space and time; contracts are required to related lender and the borrower. Because if one party does not commit his/her responsibility required by the contract, an agency such as a court is needed to enforce the contract, otherwise the contract would be useless. Secondly, the governments are supposed to provide sound regulations to encourage proper and prompt information transparency therefore the lenders can make right decisions on to allocate their money. If government provides regulations, adverse selection and moral hazard problems in the finance system can be mitigated. Lastly, the government should regulate and supervise the financial intermediaries in order to ensure their soundness. For instance, the government can prevent the financial intermediaries having extensive risk which can harm the lenders. Likewise, the government can protect the depositors by introducing deposit insurance system.

Several studies examine separately relationship between financial development and some factors of state governance quality. For example, Detragiache et al. (2005) investigate relationship between financial development and the country characteristics in low income countries. They find that instable and politically corrupt countries with high inflation have relatively shallower and less efficient financial system.

Similarly, Haber (1991, 1996) examines the relationship between capital market development and industrial structure during the early stages of

industrialization, comparing the experiences of Brazil, Mexico, and the United States. He shows that political changes and efficiency of national institutions severely affect financial development. Haber (1991, 1996) argues that government regulatory policies also have profound effects on the size and structure of financial markets. He underlines that Mexico's closed political economy during the Porfirio Diaz dictatorship prevented the kind of financial market development that occurred in Brazil during monarchy period. Again, Outreville (1999) examines relationship between the level of financial development and both human capital and political instability as a measure of socio-economic factor. His empirical findings indicate that there is negative relation between financial development and political instability and there is positive correlation between financial development and human capital.

Empirical studies attest that developed legal infrastructure also boosts the financial system to function well. For example, Djankow et al. (2007) investigate cross-country determinants of the private credit, using legal creditor rights and private and public credit registries. They confirm that better credit protection infrastructure leads to increase in ratio of private credit to GDP. Leaven and Majoni (2005) examine the effect of judicial efficiency on banks' lending spreads for cross-section of countries. They point out that judicial efficiency importantly influence interest rate spreads across countries. Thus Leaven and Majoni (2005) state that developments in judicial efficiency and judicial enforcement of financial contracts are important to reduce the cost of the financial intermediation.

Levine (1997) argues that the factors such as a country's legal system and political institutions certainly drive both financial development and economic growth. La Porta et al. (1998) examine efficiency of legal rules including protection of corporate shareholders and creditors, the origin of these rules and quality of their enforcement. They find that differences in legal and political systems significantly affect financial development and economic growth rates. Beck and Levine (2003) and Beck et al. (2003) study cross-country differences in legal origin account for variance in financial intermediary development, equity market development, and private rights protection. They argue that the legal systems differ in their ability to adapt efficiently to evolving economic conditions. As a result, they find that British common law and German civil law countries have highly developed financial markets and they have sound intermediaries and better property right protection than French civil law countries.

Lastly, Cumming et al. (2010) argue that better laws, which cover measures of the efficiency of the judicial system, the rule of law, corruption, risk of

expropriation, risk of contract repudiation and shareholder rights, is associated with more rapid deal of screening and origination which is one of the indicator of financial development. Thus, with these factors of state governance quality, well functioning financial markets decrease fraud and waste, in turn, boost the efficient use of resources.

Literature points out that Granger causality runs from the state governance quality to financial development and from financial development to factors of countries' global competitiveness. WEF (2014) argues that the economic and financial crises have exhibited importance of well functioning financial intermediaries and markets for factors of global competition. During financial and economic crises competitiveness power of the nations referring living standards of people who live in countries with delicate financial system have decreased severely.

3.2. Relationship between Governance Quality and Logistics Performance

Studies refer that not only better financial development is strictly associated with higher quality of state governance, but also superior logistics performance requires higher quality of state governance quality. Political stability, control of corruption, honest and accountable overall business environment and high level regulatory quality are **sine qua non** for efficiency of logistics system. As well, building trade and transportation infrastructure, decreasing bureaucracy in all phases of logistics activities, implementing sound custom procedures, regulating compensation contracts for unshipped or lost cargo, are issues where the governments have critical role and responsibility. Some researchers and organizations examine relationship between logistics performance and the factors of the state governance quality.

For instance, WEF (2012) mentions that the efficiency of logistics importantly depends on government services, investments, and policies. Government has significant role and responsibility building infrastructure, developing a regulatory regime for transport services, and designing and implementing efficient customs clearance procedures. Thus, governments can facilitate trade, at least, by investing in infrastructure and regulating factors affecting logistics system.

On the other side, Hausman et al. (2005) report that efficient logistics services play an essential role in the worldwide flow of goods and services, and in the ability of countries to attract and sustain investment. They argue that

procedural red tape, inadequate enforcement of contracts, poor enforcement of rules of engagement, inefficient custom system, delays at ports and border crossings, pilferage or loss in transit, and highly restrictive protocols on movement of cargo severely impact of nations' trade competitiveness. Due to these inefficiencies, the countries' production level, productivity and competitiveness are constrained. For example, when delivery times and reliability are late and uncompetitive, the transportation and inventory holding cost increase, value of the product declines with time while in transit. Thus it affects the county's position in the competitive international markets demanding just-in-time delivery.

Dollar et al. (2004) investigate how institutional, infrastructure, financial and policy weaknesses actually affect countries' day-to-day business and their international integration. If the government is highly corrupt and bureaucratic, regulations quality is inadequate, infrastructure is insufficient and financial services are inefficient, then returns of the potential projects will be unclear and low. Thus, they do not attract not only foreign investors, but also domestic entrepreneurs to invest. On the other side, the countries with a superior investment climate as reflected in reliable infrastructure, low customs clearance times, better financial services, and sound regulatory environment attract foreign direct investment. Moreover, these foreign firms generally bring superior technologies and management and spur productivity. In turn, these countries' export volume increase, the domestics firms become more competitive by expanding their scale and scope. In short, they note that the government's role in providing a good regulatory framework for infrastructure, access to the international market, and financial services are very important. Thus if a country has high level state governance, one can expect high level logistics performance.

3.3. Relationship between Financial Development and Logistics Performance

In financially developed countries, the financial intermediaries and markets are expected to provide high quality financial services as they alleviate market imperfections and lessen information asymmetry and cost when channeling the resources saved by the households to their most productive logistics enterprises. Also as stated by Diamond (1984), thanks to delegated monitoring, the financial intermediaries monitor logistics enterprises to deter from taking a self-interest action. In result, the financial intermediaries and markets lead logistics enterprises

to reach deep and broad access to capital and financial services which affect logistics performance of the firms and the countries.

To understand the effect of the financial intermediaries and financial flow along logistics management has long been of interest to logistics and supply chain literature. Thus, scholars have revealed importance of efficient financial intermediation for superior logistics and supply chain management performance which is essential for better firm performance (Ellram, 1991; Bowersox & Closs, 1996; Mentzer et al., 2004; Fugate et al., 2010 and Gupta & Dutta, 2011). Moreover, not only academicians accentuate the importance of the relationship between finance and logistics, but also commercial and government finance and logistics organizations emphasize importance of the relationship between these systems.

An increasing amount of studies conceptualize the relationship between financial development and logistics. The literature reveals that sophisticated financial intermediaries and markets are vital for logistics sector for effective forward and reverses flow and storage of goods, services and related information between the point of origin and the market in order to meet customers' requirements. As mentioned above, logistics activities include transportation management, fleet management, warehousing, materials handling, order fulfillment, logistics network design, inventory management, supply/demand planning, and management of third party logistics services providers. In some varying degrees, the logistics function also includes sourcing and procurement, production planning and scheduling, packaging and assembly, and customer service (CSCMP, n.d.). In this sense, recent studies show that finance and logistics are intertwined systems where finance has significant impact on logistics activities and financial intermediaries and markets boosts firms' and countries' logistics performance by providing numerous significant services.

The financial intermediaries and markets provide logistics enterprises with direct services such as financing ongoing working capital, transportation, infrastructure and fixed assets needs, insuring against some type of risks and helping to hedge financial risks such as interest, credit (Hofmann and Kotzab, 2010) or exchange rate risk. In addition to direct services, efficient financial intermediaries and markets provide indirect services for logistics enterprises such as facilitating trade and promoting production and productivity.

One of the direct services provided by the financial intermediaries to the logistics industry is insurance contracts. Logistics and supply chain literature stress

importance of insurance products and services for supply chain and logistics industry (Cavinato, 2004; Choi et al., 2016; Zhen et al., 2016). As it is vulnerable (Xanthopoulos et al., 2012) to various risks, threats and uncertainties (Manuj and Mentzer, 2008; Rangel et al., 2015; Govindan and Chaudhuri, 2015), however, the financial intermediaries' wide range of insurance solutions protect the industry against transportation, handling, warehousing, financial flow risks and catastrophic risks such as natural disasters and terrorism and etc. Concerning the physical goods in transit, the financial institutions provide transportation insurance coverage against damage, loss or undelivered goods (Schramm, 2012). In addition, insurance coverage not only protect against the catastrophic risks such as storm, fire, earthquake, flood, and collision, but also it saves logistics firms against accidental, fortuitous or out of control risks such as dropping, mishandling, breaking, contamination, pilferage, theft, wrong delivery, non-delivery, pricy, malicious damage, terrorism, strikes and civil unrest. Moreover, using these insurances can encourage other financial institutions to provide the logisticians with better access to credit financing solutions, as its investment is protected. Lastly, financial institutions' open account, letters of credit, documentary collection applications or export credit insurance and accounts receivable insurance facilitate financial flows for logistics industry.

Another direct service provided by the financial intermediaries and markets to the logistics field is the financing capital assets. Logistics is a sort of capital heavy industry which typically requires trucks, railroads, bigger ships, aircrafts, and warehouses. All these bigger logistics vehicles demand enormous sophisticated infrastructure. Logistics also requires complex and sophisticated machinery like automated container handling machines, cranes, software and information technology for security, custom clearance and container tracking (Bidgoli, 2010). Hence, in financially developed markets, the enterprises can find more competitive and cost effective financial sources to finance their capital assets. For instance, Drobetz et al. (2013) state that commercial ships involving in the carriage of roughly 90% of global logistics and significant part of shipping industry are financed by debt capital markets. On the other side, due to limited access the capital debt markets, small firms are generally financed by banks loans and private equity for acquisition of small ships. PriceWaterhouseCoopers (2013) claims that aviation financing sector shifts from traditional aviation financing institutions as banks to governments back funds and institutional investors such as sovereign wealth funds, insurance companies, pension funds and certain private equity funds.

Similarly, the financial intermediaries have significant contribution by providing funds for establishment of logistics infrastructure. For instance, ING Bank advertises on its webpage that it has many years experience providing funds for big railroads and local short-lines with the required financing for rail equipment such as freight cars and locomotives in US market. (Transportation Financing, n.d.)

To forward and reverse flow and storage of goods, services and related information as desired time, place and quality by the customer, the logistics enterprises have to manage their working capital requirements and inventory at optimal level. Thus, the financial intermediaries provide the logistics enterprises with important assistance to spur their logistics performance by providing liquidity management for working capital needs, inventory management and other short term cash requirements. As evidence, Hofmann and Kotzab (2010) provide a conceptual approach to show collaborative working capital management and especially cash management in logistics and supply chains. Protopappa-Sieke and Seifert (2010) examine the relationship of financial and logistics decisions and indicate that improved cash flows may reduce suppliers' financial constraints and thereby improving their logistics performance. Buzacott and Zhang (2004) highlight importance of sound cooperation between finance and logistics fields for optimized inventory management and asset-based financing.

Hofmann (2009) underscore that inventory financing is the area for logistics service providers to get profitability from financing activities. Hofmann (2009) reflects relationship between the finance service providers such as banks and the logistics service providers in supply chain management concept. Figure-9, which is retrieved from Hofmann's (2009) study but belonging to Stefansson's (2006) study, shows traditional relationship between the banks/other financial service providers, suppliers/shippers and logistics service providers. In this traditional model banks provide capital for inventory financing to suppliers/shippers and capital for asset financing to logistics service providers, they provide securities as collateral. However, Hofmann (2009) points out two conflict of interest, first is between the supplier/shipper and the consumer as supplier keeps inventory of finished goods as low as possible for its cost but the consumer prefer high level inventory for readiness to delivery. Secondly, there might be conflict of interest between the financial service provider and the supplier/shipper due to assessment of creditworthiness of the producer by the financial service provider. As a remedy to these conflict of interest Hofmann (2009) offers a model in which with cooperation of financial service providers, logistics service providers can take over the inventory

financing. Because logistics service providers are not only responsible for transport, handling and warehousing, but also they are an intermediary between the supplier and the consumers and they are legal owner of the goods in transit according to contract. As an intermediary the logistics service providers have more information about turnover of goods, shipping lead-times and stock levels. Therefore they have more detailed precise information about effective risks than the other external players. With these capabilities financial service providers can more efficiently assess creditworthiness of the logistics service players than the suppliers.

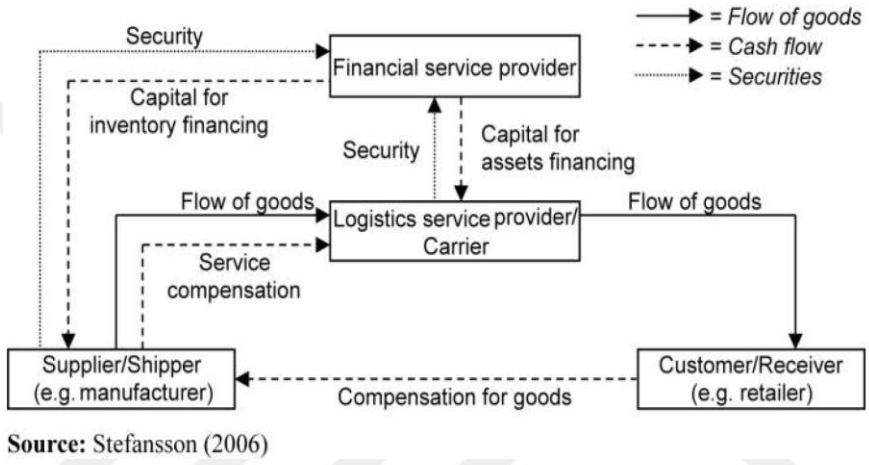


Figure 9. Interrelationship between Finance and Logistics fields (Source: Stefansson, 2006 and retrieved from Hoffman, 2009)

Logistics firms also benefit from sophisticated financial institutions such as financial derivatives markets to hedge various kinds of risks. Kleindorfer and Visvikis (2007) state that risk management products based on derivatives such as futures, forwards, options and swaps are the instruments providing the backbone for risk management and contracting for logistics industry. Because the derivatives are important financial instruments for managing risk as they allow risks to be separated and more importantly controlled. According to Kleindorfer and Visvikis (2007) the derivatives are important tools to shift the risks and therefore they can act as a form of insurance. In derivative markets, one party who exposes to the unwanted risk can transfer the risk to another part willing to assume it. In this sense, the derivatives markets are obviously important for logistics industry to achieve hedging price risk, lower international funding costs, diversify domestics

funding and managing risk and providing international diversification (Kleindorfer and Visvikis, 2007)

Similarly, Kavussanos and Visvikis (2006) argue that the high volatility of demand due to economic cycles and high capital intensity leading to capacity utilization risk are the well-known typical risks of the maritime logistics. Moreover, terrorist attacks, national disasters, exchange rate risk, price risks, congestion risks and availability risks are the other risks severely affecting maritime logistics. However existence of derivatives products in shipping has made risk management available and more flexible. Thanks to the maritime derivative products, shipping industry can secure their future income or costs and reduce their uncertainty and volatility which results from the risks mentioned above. In a similar way, Hertwig and Rau (2010) mention that the risks threaten maritime logisticians are also applicable to the air cargo industry, where especially high capital intensity, price risk and the dependence on economic cycles are apparent. Thus, they state that financial institutions such as derivative markets are able to increase efficiency in the air cargo industry and help to counter declining yields as already do in the shipping industry. Hertwig and Rau (2010) strongly emphases that financial intermediation will gain more importance in the air cargo industry.

Alizadeh et al. (2015) argue that international shipping covers significant operational and commercial risk which occur form high volatility in freight rates and vessel prices as well as in operating and capital cost. This volatility in rates and cost significantly affect the profit level and cash flows of the industry members. Thus, since beginning of 1990s, to hedge against this logistics risk of freight volatility and to diversify their asset base, financial derivative market instruments such as Forward Freight Agreements (FFAs), freight futures and freight options have been developed and evolved over time. That is, thanks to these financial derivative market instruments, logisticians in international shipping can manage risks that arise from fluctuations in freight rates and vessel prices.

Gomm (2010) conceptualizes logistics and finance relationship; moreover presents examples to show importance of sophisticated financial intermediaries to logistics development. For instance he states that if a customer finances goods in transit he bears all the risks. On the other side if the supplier finances it, the cost of capital can be higher if it is located in low-cost countries such as India or China. However, financial intermediaries can provide financial services for both sides, such as providing cash flow for supplier and risk buffer for customers. But this is possible for international companies with expertise in financing and organizing

flows across borders and global footprint. That is, only the financially developed markets can lead logistics performance. Gomm's (2010) model postulates that SCM consist of logistics management (LM) and supply chain finance (SCF) as seen on Figure-10. LM and SCF are intertwined where the former manages the customer-oriented demands concerning time, cost and the latter manages future-oriented, risk-oriented and market-oriented demands of the providers of capital. He defines SCF's main fields as order cycle management, working capital management, and fixed asset financing. Order cycle management refers to all activities connected to the order, billing, and payment processes in logistics activities. Working capital management focus on reducing fixed capital such as inventory stocks or goods in transit and moreover optimizing the transfer time, the advanced payments, and deadlines for payments during logistics operations. SCF strives to optimize cost of capital of fixed assets such as logistics real estate, machines and etc.

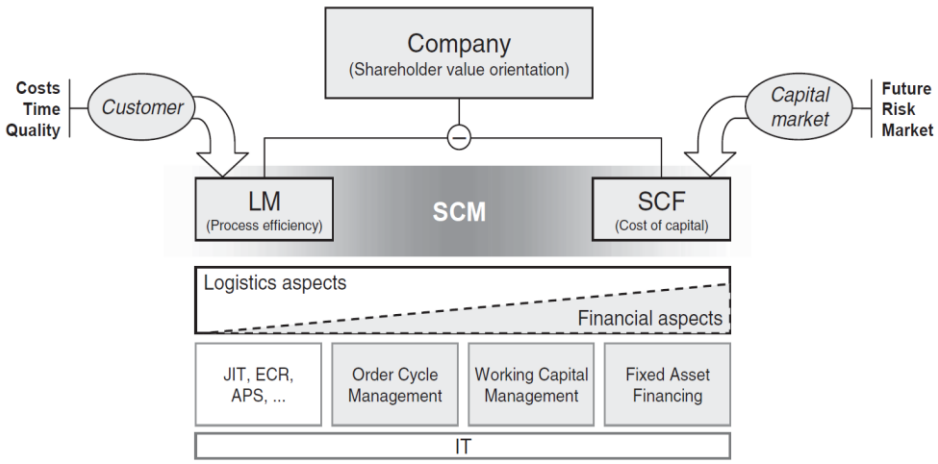


Figure 10. The integration of finance and logistics in SCM literature (Source: Gomm, 2010)

EDC (Export Development Canada)[3] mentions that the world has becoming flat everyday and importance of export and the logistic services increases. EDC advices quickly adaptation to new world in order to remain competitive and to sustain growth. It stresses that Canada's logistics infrastructure like ports, bridges

[3] EDC is a wholly owned by Government of Canada and provides credit and insurance services and advices for Canadian companies and for their foreign customers. EDC is a financially self-sufficient and operates like a commercial institution. It collects interest on the loans and premiums on insurance products and sells bonds and raises money in global capital markets.

and border facilities must be prepared for trade continue to grow much more quickly that the economy. Moreover it shows that trade is full with logistics risks. For instance, exported goods can be damaged during transportation, though the goods is shipped by the supplier, the customer might choose to not pay, or might encounter difficulties in paying, the supplier can have working capital deficiency to manage its inventory or during warehousing or transportation suppliers or customers can be expose to exchange rate risk. As a result, EDC strongly emphasizes that to manage these risks and to be competitive in trade, and particularly in logistics, require increasingly flexible and sophisticated financial intermediation from commercial and official sources alike. It points out that Canada needs more sophisticated financial intermediaries because a foreign firm with the same technology and within same industry but with a better and more flexible bank and insurance company can be more competitive than a Canadian firm with less flexible financial institutions, even if all other things remain equal (Poloz, 2012).

In a similar way DHL (n.d.), one of the globally leading logistics company, mentions importance of new financial services for global logistics in its webpage. DHL especially highlights the importance of payment system and currency risk in international business for global logistics. It suggests that on the basis of supplier and payment conditions, financial institutions have developed new services under the umbrella term financial engineering. It argues that these financial services are a result of the increased risks and the longer application-processing times associated within international logistics.

Literature also argues that due to the complexity of logistics process, particularly global logistics, financial innovation has spurred new financial areas such as logistics finance and supply chain finance (Zhou et al., 2012). Research in the area of logistics financing and supply chain financing is relatively young. Harrison and van Hoek (2008) argue that integration of finance and logistics is significantly important aspect of logistics in this century. They give an example of the acquisition of a third party logistics company, Vaster, by a financial institution, JP Morgan Chase Bank with aim of *"driving cost savings and global supply chain efficiencies while providing best-in-class compliance with government regulations".*

Hofmann (2005) states that finance and logistics activities of an organization is closely connected and interdependent. He mentions that logistics not only considers the flow of goods and related information, but also it has high interest on the flow of financial resources. Recently financial and logistics service providers are trying to adapt to the changing conditions and requirements. New inter-

organizational and inter-functional tasks at the intersection of logistics and finance open new business areas for financial and logistics service providers which is cited as logistics finance or supply chain finance. Hofmann (2005) states that recently emerged this phenomenon deals with managing the financial functions induced by the logistics processes.

Shi et al. (2014) argue that logistics finance is the product of the combination of logistics and financial development. It refers financing, settlement, insurance, and other various financial businesses in the supply chain by financial institutions and third party logistics enterprises. Shi el al. (2014), Yongping (2009), Ruiyu and Yuxi (2014) and Zhou et al. (2012) mention that the logistics enterprises use their raw material or products as collateral; thanks to do this process the enterprises can get credit from financial institutions. Financial institutions invest and regulate the cash flow, and then the cash flow from the trade in good under the regulatory system repays the bank. Zhou et al. (2012) emphases that third part logistics enterprises set up bridges between financial institutions and the enterprises to provide services such as logistics supervision, stock valuation and billing settlement and etc. Thus the collaboration among financial institutions, the enterprises and the third party logistics enterprises create high level value-added logistics service. Yang and Xu (2010) state that logistics finance especially provides fund for small and medium-sized enterprises and they can better develop their business to gain greater market share and increase market competitiveness. More importantly, Yongping (2009) argues that logistics finance not only provides customers with direct or indirect financial services, but also provides customers with high-quality and high value-added logistics and processing services.

Bidgoli (2010) argues that global trade, regardless of the country, is now accompanied by three related developments: technology, global logistics and finance. He points out that these three elements reinforce each other, because they reduce cost per unit of output and shorten the time to manage coordination.

Wuttke et al. (2013) explore the fast evolving field of coordination of interrelated finance and logistics decisions. They suggest that financial managers play an important role for logisticians and logistics managers have to work closely with their financial counterparts.

Trade facilitation and promoting production and productivity are two of indirect benefits provided by the financial intermediaries and markets to the logistics enterprises. It is clear that if a financially developed market stimulates

higher production and productivity with eased trade procedures, it will need efficient logistics system for growth and competitiveness.

As mentioned by Schumpeter (1934), well-functioning financial intermediaries and markets can efficiently allocate funds to the industries, in turn, they can produce more innovative products and improve their productivity and production processes. Beck et.al. (2000) also examine the empirical relation between the level of financial intermediary development and (i) economic growth, (ii) total factor productivity growth, (iii) physical capital accumulation, and (iv) private savings rates. They find that the financial intermediaries have a large and positive causal impact on total factor productivity growth, which feeds through to overall GDP growth. That is, higher level of financial development produce faster rates of economic growth and productivity growth. Fisman and Love (2004) also investigate how financial development affects productivity growth in industrial base. They identify industries relying on external finance to test how financial development affects productivity growth. They find that access to credit spurs greater productivity growth in the long term.

Guillaumonut J. et al. (2006) argue that financial development lead significant productivity growth in China from 1993 to 2001. Gatti and Love (2008) investigates whether access to credit has a significant impact on Bulgarian firm's productivity. They find that accessing credit significantly and positively spurs firm productivity. Arizala et al. (2009) examine whether financial development stimulates productivity by allowing resources to flow towards their more productive uses. The authors use a cross-sector, cross-country dataset spanning the years from 1963 to 2003. They find that the countries with developed financial markets, sectors that rely more on external finance have higher productivity growth than those in countries with shallower markets. Levine and Warusawitharana (2014) empirically investigate the relationship between finance and future productivity growth by using data on a set of European firms. They find that financial development leads productivity growth within firms, and helps explain why economic activity remains persistently depressed following financial crisis.

OECD (2014) argues that **"…*The development of industrial policy and promotion of productivity require improvements to logistics…* (p.10)".** More specifically, it argues that the development of industrial policy and increase of productivity require improvements to logistics system. In financially developed countries the entrepreneurs can reach credit easily to realize their projects and it stimulates higher production and productivity. Thus, higher production, productivity

level in these countries require an efficient logistics system to flow and storage of raw materials, parts, finished goods, services and related information between the producers to market. Because cost and quality of logistics have fundamental implications for competitiveness of the countries particularly on sustainable economic growth.

In addition, Levine (1997) and WEF's (2012a) Financial Development Report postulate that financially developed markets are expected to facilitate exchange of goods and services. Thanks to the facilitated trade, the entrepreneurs are able to reach new markets, including overseas. Thus, Arvis et al. (2014) argues that **"…** ***Trade facilitation fosters logistics performance, and better logistics spurs growth, competitiveness, and investment.*** (p.9)***"*** Finally, financial development leads to ease exchange of goods and services which requires sound logistics system to flow and storage of goods, services and information between producers and consumers. Then, higher level production, productivity, facilitated exchange of goods/services/information require superior logistic performance.

When both, direct and indirect benefit of financial development, are combined, it is clear that financial development enables the logistics industry to access deep and broad capital markets and the financial services such as fund for capital asset, working capital, inventory management, insures or helps to hedge some sort of risk, promotes production and productivity, also facilitates the trade and eases exchange of goods/services/information. Ultimately, financial development spurs superior logistics performance and it fosters factors of competitiveness of the countries.

3.4. Relationship between Governance Quality and Global Competitiveness

Importance of state governance quality is pointed out by various studies. For instance, Acemoğlu and Robinson (2012) stress that political power, democratic principles and economic incentive have significant impact on development paths of the countries. They provide evidence by exemplifying different development levels of the United States of America and Mexico which results from the limitations of Mexico's political power and democratic principles. Likewise they compare South Korea and North Korea which were almost same at beginning of 1950s, however till 1990s South Korea has growth tenfold of North Korea has done. Acemoğlu and Robinson (2012) argue that this gap between North Korea and South Korea is due to North Korean's stifling and repressive regime. As inclusive political and

economic institutions encourage pluralistic voting rights, freedom of thought, secure property rights and economic opportunities. Therefore these nations' political and economical institutions foster economic activity, productivity growth, economic prosperity, better education, technological development and innovation, as did in South Korea. However, the countries such as North Korea which as extractive regimes contrast of inclusive regimes suffer from starvation, poor education and health conditions. Thereby they stress importance of political and economical institutions' importance for growth and competitiveness of the nations.

Likewise, Brunet (2012) argues that the nations who have a sound democratic management, efficient governance and free economic circulation can compete and improve their competitiveness. That refers the countries belonging to politically stable environment, efficient governance, high level regulatory quality, rule of law and control of corruption have significant advantage for economic growth, better education and health system, sophisticated and innovative business system.

3.5. Relationship between Financial Development and Global Competitiveness

Several studies examine relationship between financial development and factors of countries' competitiveness. Empirical studies provide evidence that there is a positive link between financial development and the factors of global competitiveness such as institutions, education, health, labor market efficiency, macroeconomic growth, human capital, technology readiness, business sophistication and innovation.

For instance, since 1960s the researchers investigate causal relationship between financial development and economic growth and they set up a well-established empirical link between them. Theoretical and empirical studies reveal that the financial intermediaries have significant impact on economic development. Goldsmith (1969), King and Levine (1993), Levine (1997, 2005) and Beck et al. (2000) postulate a sound positive link between financial development and economic development. Rajan and Zingales (1998) reveal that causality runs form financial development to economic growth. Levine and Zervos (1998) exhibit that banking development and equity market liquidity are both robust predictors of current and future rates of economic growth, productivity growth and capital accumulation. Furthermore, they stress that the main channel linking financial

sector development with economic growth runs through productivity to growth. Rousseau and Wachtel (2000) argue that both stock market and banking sector development explain future growth. Likewise Beck and Levine (2004) investigates impact of stock market and bank development on growth with a panel data. They argue that financial development has a significant positive role in the process of economic growth.

Beck (2008) summarizes the econometrics of financial development and economic growth in the following simple regression model:

$$g(i,t) = y(i,t) - y(i,t-1) = \alpha + \beta_i f(i,t) + C(i,t)\gamma_i + \mu(i) + \varepsilon(i,t) \quad (1)$$

In equation (1), y is the log of real GDP per capita and it is measure of welfare, g is the growth rate of y, f is an indicator of financial development, C is a set of conditioning information, μ and ε are error terms, i is the observational unit such as a firm, a country or an industry and t is the time period.

Outreville (1999) also empirically indicates that a significant relationship exists between the level of financial development and higher education. Claessens and Feijen (2007) investigate the relationship between financial sector development and poverty, education, health, and gender equality. They find that financial development is an important driver for economic growth in which it reduces the poverty and undernourishment. Notably, they provide evidence of a positive association between financial development and health, education, and gender equality.

Fanelli and Medhora (2002) state that the financial intermediaries can spur technological innovation by identifying and funding those projects with the best chance of successfully developing innovative products. Levine (2005) also highlights that financial intermediaries may also boost the technological innovation by identifying the entrepreneurs with best chance of successfully initiating new goods and production process. In a similar way, Hsu et al. (2014) examine how better financial market development affects technological innovation in the firm level. They use a large data set that includes 32 developed and emerging countries. They find that industries that are more dependent on external finance and that are more high-tech intensive show a disproportionally superior innovation level in countries with better developed stock markets.

Acemoglu (2001) argues that financial constraints hinder employment level of the counties as they prevent the emergence of innovative firms, which create more

jobs. Gatti and Vaubourg (2009) also stress that financial development promotes job creation as it allows the firms to finance labor adjustment costs by security issuance. Because the firms' policy becomes less dependent on their internal resources, they can adjust their employment level more responsively.

3.6. Relationship between Logistics Performance and Global Competitiveness

Relationship between logistics performance and its effect on competitiveness of countries is examined in several studies. For instance, Arvis et al. (2014) and OECD (2014) highlight that improving logistics performance is at the core of the growth of economies and competitiveness agenda. Recently published LPI 2016 report, the World Bank supported, begins with this sentence;

> *Logistics performance both in international trade and domestically is central to the economic growth and competitiveness of countries, and the logistics sector is now recognized as one of the core pillars of economic development. Policy makers not only in the best performing countries, but also in emerging economies, increasingly see the need to implement coherent and consistent policies to foster seamless and sustainable supply chain operations as an engine of growth. (p.1)* (Arvis et al., 2016)

As mentioned by the Arvis et al. (2016), efficient logistics connects the firms to domestics and international markets through reliable supply chain networks. Then higher logistics performance results in globally competitive countries.

Fawcett (2011) strongly emphasize that global business and economic development is only possible with modern logistics system. Moreover, failure to invest in logistics capabilities threatens to hinder economic growth and dissipate wealth (Fawcett, 2013). Thus, Fawcett (2011) recommends the corporate and academic world to recognize the centrality of logistics and SCM to sustained competitive performance.

Chen and Novy (2011) show that high logistics cost such as high transportation cost hamper trade integration and the countries' competitiveness. Chu (2011) examines the long run relationship between logistics and economic growth for China. The scholar finds a significant and positive impact of logistics investment on economic growth in China. Likewise, Coto-Milan et al. (2013) examine the impact of logistics activity on economic growth for countries for period of 2007-2012. They find that logistics activity has significant and positive impact on the generation fo economic growth.

Subramanian (2012) mentions that improving policy, regulatory, infrastructural and procedural environment for logistics boosts the competitiveness of the countries. Thus, policymakers globally recognize the logistic sector as one of the key pillars for development and growth. On the other side, as shown by Hausman (2005), low logistics performance hampers countries' competitiveness by reducing operational performance. Besides, a country's global competitiveness based on low labor costs or abundant natural resources can be easily lost through inefficient logistics (Arvis et al., 2014). Thus efficient logistics system is a prerequisite for sound global competitiveness.

Solakivi et al. (2012) state that logistics is a recognized factor of global competitiveness. They argue that in Finland logistics is based on efficiency, good transport markets and the development of transport connections. To be globally competitive the firms and the authorities have to take into account the needs of sustainable and competitive logistics as strong logistics boosts global competitiveness, economic growth, employment and welfare in a country. Solakivi et al. (2012) also argue that superior logistics performance is not just required for countries for global competitiveness, but also it is essential for companies to be competitive in the market. They state that Finland's trading companies' 43 % of competitiveness power results from logistics success.

If logistics sector is dysfunctional, it is highly difficult for a firm to export its goods at a reasonable price or import at a competitive cost. If a firm confronts high prices, poor logistics service and uncertainty in transportation, it cannot be able to compete with a firm that benefits from plausible transportation and logistics cost, punctual and high quality services (Hoekman, 2012). In tandem, OECD and WTO (2013) underscore that transportation and logistics have direct and indirect significant and substantial effect on development as they facilitate international trade transactions, which, under appropriate circumstances, increase national income, lower poverty, and thus contribute to economic and social development.

Hollweg and Wong (2009) construct an index quantifying regulatory restrictions faced by logistics service providers of the Association of South Asian Nations. Then they compare this index with the World Bank's Logistics Performance Index (LPI). They find that countries with fewer restrictions on logistics system get higher LPI results. This finding supports the notion that burdensome restrictions on logistics decrease competitiveness of countries by causing higher cost and time.

CHAPTER 4

HYPOTHESES, DATA AND METHODOLOGY

4.1. Hypothesis Development

State governance quality is a prerequisite for financial development. Effectiveness of the government bureaucracy, political stability, voice and accountability in political system, regulations quality and consistency, rule of law and the lack of official corruption are significant drivers for financial development (Beck et al., 2006). Because political stability in a country, high accounting and reporting standards, low level of corruption, fraud, cronyism, mismanagement and transparency are drivers of financial development. Otherwise, the financial institutions and markets cannot efficiently provide the financial services to the real sector. Similarly, financial institutions and markets cannot have full capability to choose the possible best projects to allocate capital. That is, quality of state governance has an important effect on financial development of countries; moreover, it is a prerequisite for financial development. Thus we offer the hypothesis;

H1: Countries' quality of state governance is positively associated with their financial development.

Political stability, control of corruption, honest and accountable overall business environment and high level regulatory quality are not only sine qua non for financial development, but also they are indispensible for efficiency of logistics system. Because the governments have significant responsibilities to set up well-functioning logistics system such as building trade and transportation infrastructure, decreasing bureaucracy in all phases of logistics, implementing sound custom procedures, regulating compensation contracts for unshipped or lost cargo. For instance, Hausman et al. (2005) argue that procedural red tape, inadequate enforcement of contracts, poor enforcement of rules of engagement, inefficient custom system, delays at ports and border crossings, pilferage or loss in transit

and highly restrictive protocols on movement of cargo severely impact of nations' logistics system and trade competitiveness. Thus we submit the hypothesis:

H2: Countries' quality of state governance is positively associated with their logistics performance.

Logistics and supply chain literature reveals that sophisticated financial intermediaries and markets are critical for logistics industry for effective forward and reverses flow and storage of goods, services and related information between the point of origin and the market in order to meet customers' requirements (Ellram, 1991; Bowersox & Closs, 1996; Mentzer et al., 2004; Fugate et al., 2010 and Gupta & Dutta 2011).

The financial intermediaries and markets provide logistics enterprises with direct services such as financing ongoing working capital, transportation, infrastructure and fixed assets needs, insuring against various type of risks and helping to hedge financial risks such as interest, credit or exchange rate risk. As logistics is a capital heavy industry which requires trucks, railroads, bigger ships, aircrafts and warehouses (Bidgoli, 2010), all these vehicles or infrastructures require deep, accessible and efficient financial intermediates to finance of acquisition, sustainment, renovation or maintenance of them. Likewise, substantial part of shipping industries' capital requirement for asset financing is met from the debt capital markets (Drobetz et al., (2013). Similarly aviation sector not only benefits from basic financial intermediaries such as banks for financial product and services, but also uses more sophisticated financial intermediaries such as government backed funds, sovereign wealth funds, insurance companies, pension funds and private equity funds for vital capital asset financing (PriceWaterhouseCoopers, 2013).

Concerning the physical goods in transit, the financial institutions provide transportation insurance coverage against damage, loss or undelivered good (Cavinato, 2004; Choi et al., 2016; Zhen et al., 2016, Schramm, 2012). Logistics sector is also vulnerable to various kind of financial risk, thus sophisticated financial derivatives markets provide solutions to this sector. Kleindorfer and Visvikis (2007) and Alizadeh et al. (2015) state that risk management products based on derivatives such as futures, forwards, options and swaps are the instruments can provide the backbone for risk management and contracting in logistics industry. Lastly, also as mentioned by Diamond (1984), the financial intermediaries monitor the logistics enterprises to deter from taking self-interest actions. As a result we present the following hypothesis:

H3: Countries' financial development is positively associated with their logistics performance.

Sahay et al. (2015) develop an index to measure financial development level. It encompasses financial institutions and markets across three characteristics: depth, access and efficiency. They state that a financially depth market might be inefficient or vice verse. Likewise, in a financially depth market, investors might have difficulties to reach affordable financial products and services. Hence to assess financial development level of a country or market, we should take into consideration all characteristics of financial development as depth, access and efficiency as there might be significant differentiation along the key characteristics of financial intermediaries. For instance, the scatter plots in Figure-11 presents that even though Netherlands and Jordan have similar level of banking access –bank branches per 100,000 adults-, Jordan's[4] banking depth is one third of Netherlands banking depth. That is although Netherlands and Jordan have same banking access, Netherland's banking depth is significantly better than that of Jordan.

Similarly, Figure-12 highlights Jordan's and Korea's stock market depth and efficiency. Jordan and Korea have almost same stock market depth –stock market capitalization to GDP. However, they have significantly different stock market efficiency -stock market turnover ratio. Korean Stock Market's is fourteen times efficient than Jordan's Stock Market. Lastly, Figure-13 depicts Jordan and Argentina's banking access and efficiency. They have close financial access –bank branches per 100,000 adults-, however, Argentinean banks' overhead cost to total assets is larger than that of Jordanian's.

The bottom line is that as seen at the scatter plots, there can be significant discrepancy among the countries' financial development characteristic. Moreover, different financial development characteristics can be different affect on logistics performance. Therefore, to test which financial characteristics have larger affect on logistics performance, we propose three more hypotheses;

H3A: Countries' financial depth is positively associated with their logistics performance.

H3B: Countries' financial access is positively associated with their logistics performance.

[4] Jordan is randomly selected to show the discrepancy between the countries' financial intermediaries' development dimensions.

H3C: Countries' financial efficiency is positively associated with their logistics performance.

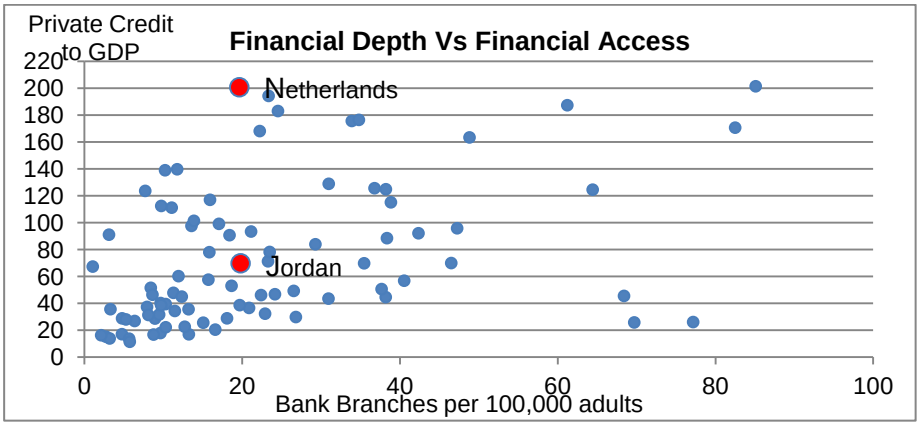


Figure 11. Financial Depth versus financial access.

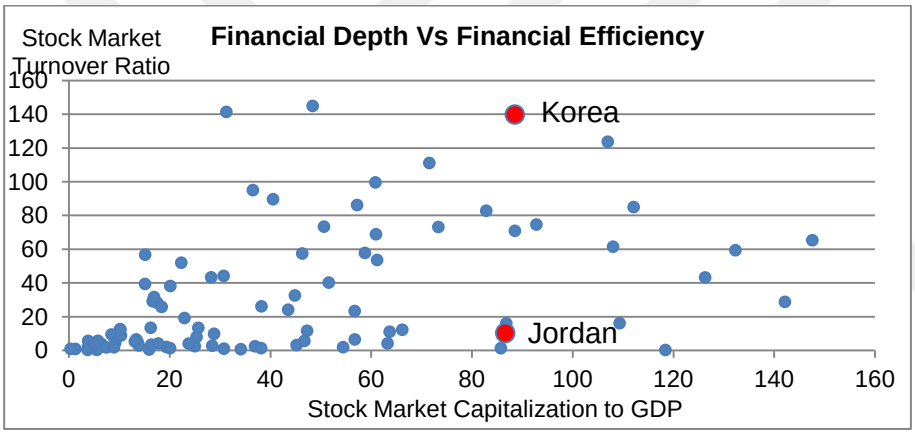


Figure 12. Financial Depth versus Financial efficiency.

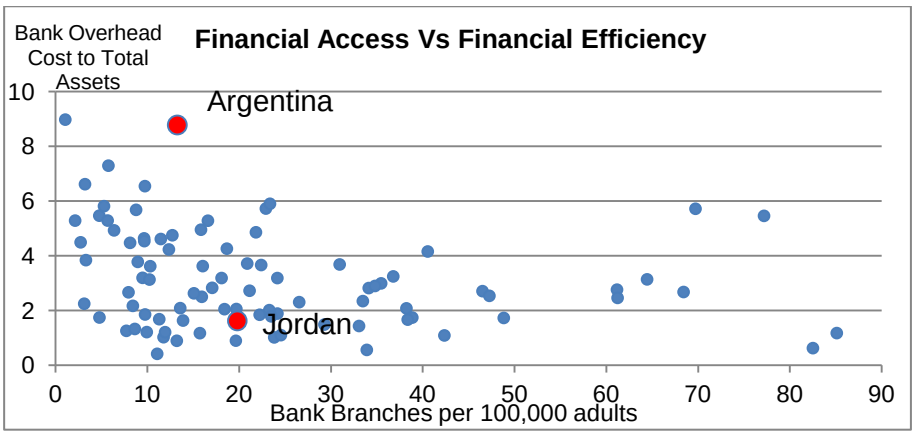


Figure 13. Financial Access versus Financial Efficiency.

Brunet (2012) argues that the nations who have a sound democratic management, efficient governance and free economic circulation can compete and improve their competitiveness. Thus the countries belonging to politically stable environment, efficient governance, high level regulatory quality, rule of law and control of corruption have significant advantage for economic growth, better education and health system, sophisticated and innovative business system. Hence we offer the following hypothesis:

H4: Countries' quality of state governance is positively associated with their global competitiveness.

Financial development has significant and positive impact on a country or region's global competitiveness. Theoretical and empirical studies demonstrate that financial development positively affect component of global competitiveness such as institutions, macroeconomic environment, educational quality and equality, labor and goods market efficiency, technological development, business innovation and sophistication. Goldsmith (1969), King and Levine (1993), Levine (1997, 2005), Beck et al. (2000) postulate a sound positive link between financial development and economic growth. Outreville (1999) shows that there is a significant relationship between the level of financial development and higher education. Also, Claessens and Feijen (2007) points out that there is a positive association between financial development and health, education, and gender equality. Fanelli and Medhora (2002), Levine (2005), Hsu et al. (2014) argue that financial development spurs technological innovation. Acemoglu (2001) and Gatti and Vaubourg (2009) mention that financial development promotes job creation. Thus we submit the hypothesis;

H5: Countries' financial development is positively associated with their competitiveness.

A country's logistic performance has impact on its global competitiveness factors. High level logistics performance refers facilitated mobility of products and services, their safe, traceable and on-time delivery while providing cost efficiency when trading. That is, logistics has the ability to efficiently solve transportation, storage and packaging issues, thereby it can lead the competitiveness of day-to-day businesses and by extension the country in general (Martia et al., 2014). Awareness towards the impact of logistics performance on the countries' competitiveness, in general, and economic growth, in particular, has increased in recent years, partly as a result of numerous reports such as the World Bank's

logistics performance index reports (Arvis et al., 2007, 2010, 2012, 2014 and 2016) and OECD (2014) report. Lastly we offer the following hypothesis;

H6: Countries' logistics performance is positively associated with their competitiveness.

We present a list of testable hypotheses in Table-2 below.

Table 2. List of Testable Hypotheses

H1: Countries' quality of state governance is positively associated with their financial development.
H2: Countries' quality of state governance is positively associated with their logistics performance.
H3: Countries' financial development is positively associated with their logistics performance.
H3A: Countries' financial depth is positively associated with their logistics performance.
H3B: Countries' financial access is positively associated with their logistics performance.
H3C: Countries' financial efficiency is positively associated with their logistics performance.
H4: Countries' quality of state governance is positively associated with their global competitiveness.
H5: Countries' financial development is positively associated with their global competitiveness.
H6: Countries' logistics performance is positively associated with their global competitiveness.

Furthermore to reveal the linkage between financial development and logistics performance, we take into consideration the states' governance quality such as voice and accountability, political stability, government efficiency, regulatory quality control of corruption and their impact on countries' competitiveness factors such as institutions, health and primary education, higher education, goods and labor market efficiency, technological readiness, innovation and business sophistication. Therefore Figure-14 demonstrates proposed testable hypotheses and model which is consistent with the theory.

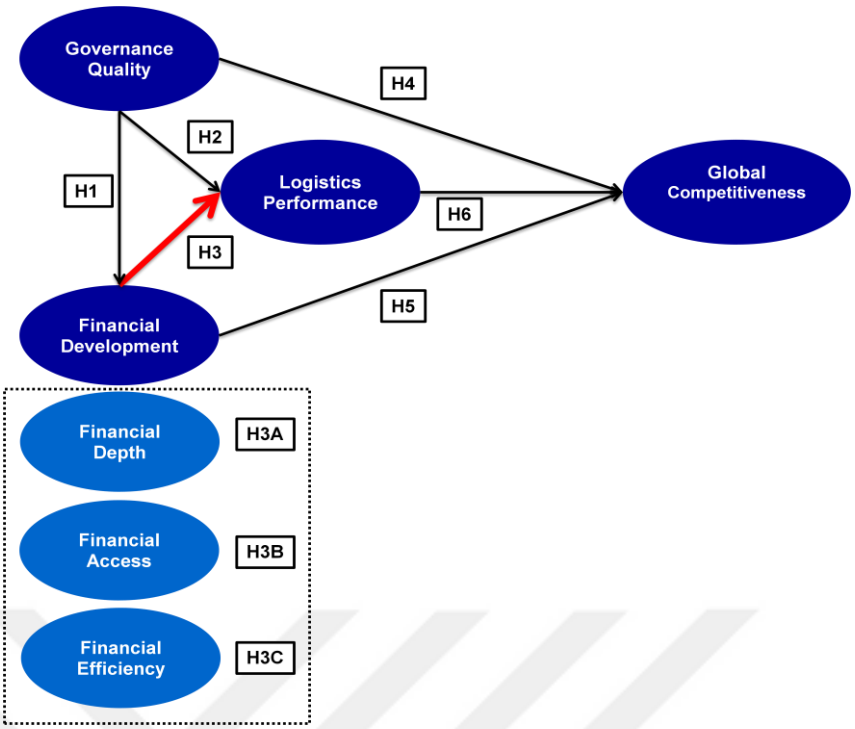


Figure 14. Proposed hypotheses and inner structural model

4.2. Data

4.2.1. General

The sample size consists of 101 countries for year 2012. Year 2012 is selected due to data availability of all indicators in that year. Financial development sample size is restricted to 107 coumtries due to stock market variables such as stock market capitalization to GDP, stock market total value traded to GDP and stock market turnover ratio. However, even though Bangladesh, Barbados, Bermuda, Israel, Trinidad and Tobago, Uganda and Zambia have stock market data and other financial information they do not have logistics performance data. Similarly, Fiji, Papua New Guinea and Tunisia have stock market data but they do not have global competitiveness data. Hence these countries are excluded from the sample. On the other side Azerbaijan, Dominican Republic, Haiti and Moldova have no stock market data but they have data for rest of the variables. Thus they are included to sample. List of the countries included to sample are presented at Appendix-A.

State governance quality, logistics performance and global competitiveness indicators have no missing data. However, financial development indicators have missing data. How we deal with missing data is explained in the following part.

4.2.2. State Governance Quality Indicators

Data about state governance quality comes from the World Bank's databank[5]. The WB publishes The Worldwide Governance Indicators since 1996 for nearly 200 countries. It is a research dataset provides the views on the quality of governance provided by a large number of households, firms, and enterprise and expert survey respondents in business.

Between 1996 and 2002, the report was published every two years. After 2002, it has been published every year. Worldwide Governance Indicators are a detailed and long-standing research designed to develop cross-country indictors of governance (Kaufman et al., 2010). The Worldwide Governance Indicators consist of six dimensions of governance which are; Voice and Accountability, Political Stability, Government Effectiveness, Regulatory Quality, Rule of Law and Control of Corruption.

Kaufman et al. (2010) argue that Voice and Accountability and Political Stability/Absence of Violence/Terrorism indicators provide information about the process by which governments are selected, monitored and replaced. On the other side, Government Effectiveness and Regulatory Quality indicators reflect how the government effectively formulate and implement sound polices. Lastly, Rule of Law and Control of Corruption indicators show respect of citizens and the state for the institutions that govern economic and social interactions among them. Descriptions of state governance quality are presented at Table-3.

The WB's indicators rely on perceptions of households, firms, commercial businessmen and public sector bodies. The WB gathers information from a variety sources such as from surveys of individuals or domestics firms or from other comprehensive reports such as the GCR, the Institute for Management Development's World Competitiveness Yearbook, Gallup World Poll and from government or other non-government agencies' reports.

After gathering information from different sources, the WB rescales source data from 0 to 1. Then it uses Unobserved Components Model to construct a weighted average of the individual scores for each of six variables. It develops a

[5] Available at: http://info.worldbank.org/governance/wgi/

composite measure of governance of countries in units of a standard normal distribution with mean zero, standard deviation of one and running from -2.5 to 2.5 by which higher value refers better governance.

Table 3. Description of State Governance Quality Variables (Source: Kaufman et al., 2010)

Variables Symbol	Variable Name	Variable Description
GQ1	Voice and Accountability	It refers perceptions of the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association and a free media.
GQ2	Political Stability and Absence of Violence/ Terrorism	It refers of the likelihood that the government will be destabilized or overthrown by unconstitutional or violent means, including politically-motivated violence and including terrorism.
GQ3	Government Effectiveness	It refers perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressure, the quality of policy formulation and implementation and the credibility of the government's commitment to such policies.
GQ4	Regulatory Quality	It refers perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development.
GQ5	Rule of Law	It refers perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police and the courts as well as the likelihood of crime and violence.
GQ6	Control of Corruption	It refers perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests.

It is worth noting that these variables are highly interrelated. For instance accountability leads to less corruption or effective government provides a better regulatory environment or respect for rule of law spurs fairer process of election or replacement of governments. Hence these variables strongly and positively correlated across within countries (Kaufman et al., (2010). These variables manifest some aspects of state governance quality. Hence in PLS-SEM governance quality variables is used in a reflective measurement model rather than formative measurement model.

4.2.3. Logistics Performance Indicators

Logistics performance indicators are derived from Arvis et al.'s (2012) Connecting to Compete: Trade Logistics in the Global Economy 2012 report which is supported by the World Bank. The report which develops Logistics Performance Index (LPI) has been published for years of 2007, 2010, 2012, 2014 and 2016. It is designed to measure on-the-ground efficiency of trade supply chains and logistics performance.

The report covers 150-160 countries. To develop LPI, a worldwide survey is carried out on logistics professionals. A standardized questionnaire is filled by more than 6,000 logistics professionals around the world. The respondents are asked to provide six areas of logistics performance such as availability and quality of infrastructure, ease of shipments, logistics service quality and the ability to track cargo- in eight of their main overseas markets. They rate the markets on a scale of 1 (worst) to 5 (best). Thus, LPI enables to compare countries' logistical performance in terms of cost, quality, lead times, infrastructures and administrative efforts (Arvis and Shepherd, 2011). The indicators of LPI are presented at Table-4.

After data collection and normalization, Arvis et al. (2012) sum these indicators to construct composite index by using principal component analysis weights. Arvis et al. (2012) demonstrate that principal component analysis weights are close to each other (P1 to LP6, 0.41, 0.41, 0.40, 0.42, 0.41, 0.40, respectively). LPI is so close to simple average of the variables.

Table 4. Description of Logistics Performance Variables.

Variable Symbol	Variable Name	Variable Description
LP1	Customs	It refers the efficiency of the clearance process (speed, simplicity, and predictability of formalities) by border control agencies, including customs.
LP2	Infrastructure	It refers the quality of trade and transportation infrastructure (ports, railroads, roads, information technology).
LP3	Shipments	It refers the ease of arranging competitively priced shipments.
LP4	Service Quality	It refers the competence and quality of logistics services (trucking, forwarding, and customs brokerage).
LP5	Tracking and Tracing	It refers the ability to track and trace consignments.
LP6	Timeliness	It refers the frequency with which shipments reach the consignee within the scheduled or expected delivery time.

3.2.4. Global Competitiveness Indicators

The WEF (2012a) argue that many factors can drive competitiveness and productivity of a country. Institutions, education and training are well-known traditional competitiveness factors; however, more recently technological readiness, innovation, business sophistication and similar factors have become important factors affecting a country's global competitiveness. Thus, WEF determines 12 pillars representing global competitiveness of countries. WEF issues the results of all pillars of competitiveness separately every year since 2004 by publishing the GCR. Moreover, WEF (2012a) strongly emphasizes that these variables are not independent; they tend to reinforce each other and a weakness in one variable has generally a negative impact on some of the other variables. For instance, a strong business sophistication or innovation cannot be achieved without a healthy and well-educated workforce and without adapting cutting edge technology.

WEF (2012a) mentions that the competitiveness factors have different effect on the countries depending on the stage of development. It argues that the best ways for Cambodia to improve its competitiveness is not the same as the best way for France to do so. Thus Cambodia and France have to concentrate on different factors to improve their competitiveness. As a result, The GCR divides the factors into three sub-groups as key factors for factor-driven economies, key factors for efficiency-driven economies and key factors for innovation-driven economies in line with the economic theory of stages of development.

The countries which are in the first stage of development –primarily have low-skilled labor and natural resource- compete on the basis of price and sell basic products and commodities. They need to concentrate on the variables of institutions, infrastructure, macroeconomic environment and health and primary education improve their competitiveness. If they improve their institutions, infrastructure, macroeconomic environment and health and primary education, they become more competitive in regional or global markets. Then these countries move into the second -efficiency-driven- stage of development. In this stage they need to improve their production process and product quality as wages have risen and they cannot increases prices. Hence these countries have to improve efficiency driving factors as higher education and training, efficient goods market, well-functioning labor markets, technological readiness and their domestic and foreign market share. Lastly, after accomplishing requirements of the second stage, the countries move into the innovation-driven stage, this stage covers developed countries. WEF (2012a) argues that in this stage, the wages will have risen by so much that they are able to retain the higher wages and the associated higher living standards only if their businesses are able to compete with new or unique commodities, services and processes. Therefore in this stage, the entrepreneurs have to compete by developing new, unique and different commodities by developing business sophistication and innovation. At the bottom line, even though these 12 factors are matter for all countries, their relative importance of each one depends on the country's particular level of development.

On the other side, WEF (2012a) aggregates the scores of the indicators using an arithmetic mean when constructing the GCI. Appendix-B shows details of the GCI composite and weights.

In this thesis, we combine the competitiveness indicators into sub-groups as offered by WEF (2012a). They are "basic requirements, efficiency enhancers and

business sophistication and innovation factors." Indicators of these three variables are aggregated by average as offered by WEF (2012a).

However, we exclude two indicators in our model. They are "infrastructure and financial market development." Infrastructure indicator covers quality of roads, railways, ports and airports and similarly financial market development indicators reflects efficiency of the markets. Infrastructure indicator is included into logistics performance variables and efficiency of financial markets indicator is already added into model as financial development latent variable. Thus, to refrain from multicollinearity problem, infrastructure and financial market development variables are not included into basic requirements and efficiency enhancers indices, respectively. Details of three indices are presented below;

Table 5. Description of Global Competitiveness Variables.

Variables Symbol	**Variable Name**	**Variable Description**
BASICREQ	Basic Requirements	GC1 Institutions GC2 Macroeconomic Environment GC3 Health and Primary Education
EFFICIENCY ENHANCER	Efficiency Enhancers	GC4 Higher Education and Training GC5 Goods Market Efficiency GC6 Labor Market Efficiency GC7 Technological Readiness GC8 Market Size
BS&INNOV	Business Sophistication and Innovation Factors	GC9 Business Sophistication GC10 Innovation

4.2.5. Financial Development Data and Construction of Indices

In finance literature, the researchers generally assign stock market capitalization, private credit to GDP, M2 to GDP to measure financial development of the countries or the regions. However, recent studies, Cihak et al. (2012) and Sahay et al. (2015) strongly emphasize that even though recent financial development indices mostly set up on banks' depth, realistic and more comprehensive financial development indices must cover not only depth of banks,

but also they have to cover financial depth, access and efficiency of both banks and other nonbank financial intermediaries (such as insurance companies, mutual funds etc.) and financial markets (such as stock markets and bond markets).

Thereby, in this thesis, we construct three indices as financial depth, access and efficiency for both financial institutions and markets to represent financial development indicators. These indicators represent the characteristics of financial development. Thus in PLS-SEM, they are added into PLS-SEM as formative measurement model as seen on Figure-15.

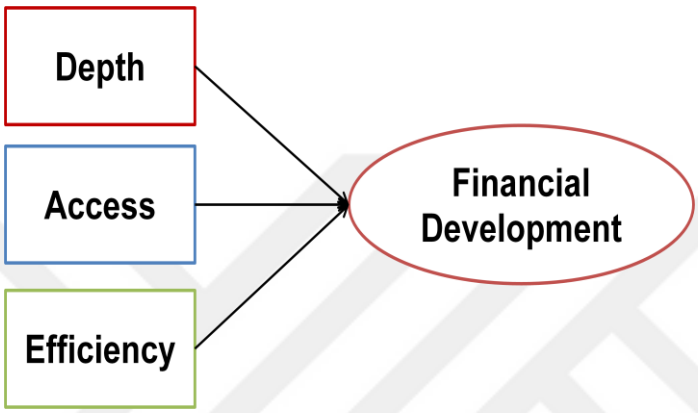


Figure 15. Dimensions of Financial Development

We have gathered financial development data mainly from the WB's Global Financial Development Database and the WEF's GCR. Sample size mostly limited by the number of stock market data.

Financial depth of year 2012 dataset contains seven indicators for 101 economies. Excluding Venture Capital Availability, all data derived from the WB Financial Development Database and they are measurable variables. On the other side, Venture Capital Availability data is obtained from the WEF Database and is retrieved from perception of survey respondents. Details of financial depth data is presented in Table-6.

Table 6. Variables of Financial Depth

Variable Symbol	Variable Name	Data Source	Variable Description
DPH1	Stock market capitalization to GDP (%)	The WB Databank	Total value of all listed shares in a stock market as a percentage of GDP.
DPH2	Private credit by deposit money banks and other financial institutions to GDP (%)	The WB Databank	Private credit by deposit money banks and other financial institutions to GDP.
DPH3	Venture capital availability	The WEF	Executive Opinion Survey: In your country, how easy is it for entrepreneurs with innovative but risky projects to find venture capital? [1 = very difficult; 7 = very easy] |
DPH4	Life and Nonlife insurance premium volume to GDP (%)	The WB Databank	Ratio of life and nonlife insurance premium volume to GDP. Premium volume is the insurer's direct premiums earned (if property /Casualty) or received (if Life/ Health) during the previous calendar year.
DPH5	Financial system deposits to GDP (%)	The WB Databank	Demand, time and saving deposits in deposit money banks and other financial institutions as a share of GDP.
DPH6	Deposit money banks' assets to GDP (%)	The WB Databank	Total assets held by deposit money banks as a share of GDP. Assets include claims on domestic real nonfinancial sector which includes central, state and local governments, nonfinancial public enterprises and private sector. Deposit money banks comprise commercial banks and other financial institutions that accept transferable deposits, such as demand deposits.
DPH7	Stock market total value traded to GDP (%)	The WB Databank	Total value of all traded shares in a stock market exchange as a percentage of GDP.

As seen at Table-6, in addition to deposit money banks' asset to GDP variable, nonbank financial institutions' depth indicators -venture capital availability, total of life and nonlife insurance premium volume to GDP- are selected to measure financial depth of financial institutions. Likely, private credit by deposit

money banks and other financial institutions to GDP and financial system deposit to GDP variables are included into financial depth to measure all financial institutions effect on financial depth. On the other side stock market capitalization to GDP and stock market total value traded to GDP are added into model to measure depth of financial markets. We excluded bond market data due to more than 50% missing data.

Financial access year of 2012 dataset contains six indicators for 101 economies. Indicators -bank branches per 100,000 adults and ATMs per 100,000 adults- are derived from the WB Financial Development Database and they are measurable variables. Rests of four variables are received from The WEF Database and they are retrieved form perception of survey respondents. Details of financial access data is presented in Table-7.

Table 7. Variables of Financial Access

Variable Symbol	Variable Name	Data Source	Variable Description
ACC1	Financing through local equity market	The WEF	Executive Opinion Survey: How easy is it to raise money by issuing shares on the stock market in your country? [1 = very difficult; 7 = very easy]
ACC2	Bank branches per 100,000 adults	The WB Databank	Number of commercial bank branches per 100,000 adults.
ACC3	ATMs per 100,000 adults	The WB Databank	Number of ATMs per 100,000 adults.
ACC4	Availability of financial services	The WEF	Executive Opinion Survey: Does the financial sector in your country provide a wide variety of financial products and services to businesses? [1 = not at all; 7 = provides a wide variety]
ACC5	Affordability of financial services	The WEF	Executive Opinion Survey: To what extent does competition among providers of financial services in your country ensure the provision of financial services at affordable prices? [1= not at all; 7 =extremely well]
ACC6	Ease of access to loans	The WEF	Executive Opinion Survey: How easy is it to obtain a bank loan in your country with only a good business plan and no collateral? [1 = very difficult; 7 = very easy]

To measure number of banks branches or ATM number are not alone enough to measure access dimension of financial development due to recently increased usage of internet banking. Even though number of bank branches and number of ATM's per people decreases, access of financial products or services increase or least does not decrease with internet banking usage. Thus using survey-based indicators reflecting the perception of customers about financial accessibility are better to measure financial access to institutions and markets. Obviously, two indicators –availability and affordability of financial services reflects whether both financial institutions and markets provide a wide variety of financial products and services with plausible prices and easily.

Table 8. Variables of Financial Efficiency

Variable Symbol	Variable Name	Data Source	Variable Description
EFF1	Stock market turnover ratio (%)	The WB Databank	Total value of shares traded during the period divided by the average market capitalization for the period.
EFF2	Bank return on assets (%, after tax)	The WB Databank	Commercial banks' after-tax net income to yearly averaged total assets.
EFF3	Bank return on equity (%, after tax)	The WB Databank	Commercial banks' after-tax net income to yearly averaged equity.
EFF4	Bank overhead costs to total assets (%)	The WB Databank	Operating expenses of a bank as a share of the value of all assets held. Total assets include total earning assets, cash and due from banks, foreclosed real estate, fixed assets, goodwill, other intangibles, current tax assets, deferred tax assets, discontinued operations and other assets.
EFF5	Bank net interest margin (%)	The WB Databank	Accounting value of bank's net interest revenue as a share of its average interest-bearing (total earning) assets.

Financial efficiency for year of 2012 dataset contains five indicators for the economies in the sample. All data is derived from the WB Financial Development Database and they are measurable variables. Details of financial efficiency data is presented in Table-8. Variable of stock market turnover ratio measures efficiency of stock market; the others measure efficiency of banks.

4.2.5.1. Dealing with Missing Data

Missing data often prevent the construction of robust indices. For that reason dealing with missing data is important for robust results. There are typically three ways to deal with missing data (Ringle et al., 2015).

First way is case deletion; in this approach we exclude the row –sometimes called as case, response or observation- that contains a missing value. In case deletion approach just the rows with full data are remained. Hence it significantly reduces sample size.

Second way is called as pairwise or listwise approach. It allows remaining as much information as possible. For each analysis, it deletes those cases which exhibit missing values in each pair of variables. If the variables having missing data do not be used in the analysis, it will be used for just estimation purposes as means, variance, covariance (Allison, 2001, Barladi and Enders, 2010).

Last way is called as mean replacement. In this way we replace all missing data points with the mean value of all remaining data per variables. In time series data, mostly weighted average replacement is used (Sahay et al., 2015). Benefit of this method is that it does not change the sample size.

Exclusion of indicators based on missing financial data could significantly lower sample sizes and the statistical power of study results. On the other side, Hair et al. (2016) argue that as a rule of thumb, the researcher can use mean value replacement if there are less than 5% values missing per indicator. Hence as seen Appendix-C missing values for financial development data are less than 5%. Thereby, we chose to impute the mean value of that variable.

4.2.5.2. Winsorizing and Normalizing Financial Development Data

Before normalization of data, to avoid pitfalls arising from extreme good and worse observations, we winsorize extreme best and worst scores with 5^{th} and 95^{th} observations. Then we normalize all indicators between 0 and 1 using min-max

procedure. After normalization the best value of associated variable will be one and the worst of it will be zero. Formally;

$$l_v = \frac{v - v_{min}}{v_{max} - v_{min}} \quad (2)$$

$$l_v = 1 - \frac{v - v_{min}}{v_{max} - v_{min}} \quad (3)$$

In equation (2) and (3), v is observed indicator value after winsorizing at the 5th and 95th variable, l is new, rescaled value ranging from 0 to 1. For some variables – bank net interest margin and banks' overhead cost to total assets- smaller value represent better performance on efficiency, vice versa. For these two variables, we rescale data according to equation (3) as shown above. After rescaling for all variables higher value refers better financial depth, access or efficiency.

4.2.5.3. Data Distribution

PLS-SEM does not require the data to be normally distributed as it is a nonparametric statistical technique. However, Hair et al. (2016) stress that even though PLS-SEM is a nonparametric technique, data which is too far from normal distribution causes problem in assessment of the parameter's significances. Hair et al. (2011) emphasize that extremely non-normal data inflates standard errors obtained from bootstrapping and hence decreases likelihood that some relationships is assessed as significant.

Skewness and kurtosis are the important measures to examine normality of the data. According to SPSS statistics program, for normal distribution, the value of skewness and kurtosis statistics are supposed to be zero. As a rule of thumb, skewness and kurtosis data of lesser than -1 or greater than +1 exhibit non-normal distribution.

Data distribution of variables is presented at Appendix-D in which the variables of DPH7, ACC2, EFF1 and GC3 (stock market total value traded to GDP, bank branches per 100,000 adults, stock market turnover ratio, health and primary education, respectively) have absolute value of skewness slightly larger than absolute value of 1. Likely, GQ1, GC3 and GC7 (rule of law, health and primary

education and technological readiness, respectively) have absolute value of kurtosis higher than absolute value of 1. Therefore, even though some variables are non-normally distributed, it is in acceptable range. Thus we can perform PLS-SEM with this dataset.

4.2.5.4. Weights of the Indicators

After normalization, we aggregate indicators into three sub-indices as financial depth, financial access and financial efficiency. When constructing an index, we have to decide how to obtain weights to assign each indicator. Nardo et al. (2005) and OECD (2008) recommend principal component analysis (PCA) as a method for determining weights for index construction. For instance, Sahay et al. (2015) use PCA to obtain weights to construct financial development indices.

PCA is a multivariate method which transforms a number of correlated variables into a set of uncorrelated variables which are called principal components. Principal component represents unobserved characteristics of the sample. They are linear combinations of the indicators and each principal component represents the group of indicators which have the highest possible association with it. The variance (λ) for each principal component is reflected by the eigenvalue of the corresponding eigenvector (Vyas and Kumaranayake, 2006). Thus, the principal component which account for the largest amount of the variance –highest eigenvalue- retained in the analysis. Procedures to determine number of principal components are 1) associated eingenvalue is greater than one, 2) the principal component individually explains at least 10% of overall variance 3) the principal components collectively explains more than 60% of variance.

We use SPSS Statistics 20 software to derive PCA weights for financial depth, financial access and financial efficiency indices. First step in the PCA is to determine whether data are likely to produce component well based on correlation and partial correlation. At the beginning, we test sampling adequacy using the Kaiser-Meyer-Olkin (KMO) statistics. The KMO shows the proportion of variance in the variables that caused by underlying components. KMO-values above 0.50 indicate an acceptable level, and greater is better. Then we assign Bartlett's Test of Sphericity to examine the null hypothesis that the individual indicators in a correlation matrix are uncorrelated. The value below 0.05 of the Bartlett's test of sphericity rejects that the variables are unrelated and therefore unsuitable for structure detection. (OECD, 2008) As seen on the Table-9 overall KMO test result

is greater than 0.50 and Barlett's test of sphericity results are significant which indicates that there are significant correlations among the indicators to proceed. Therefore we can apply PCA.

Table 9. KMO and Bartlett's Test of Sphericity

Statistic Name	Financial Depth	Financial Access	Financial Efficiency
Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy	.808	.772	.684
Bartlett's Test of Sphericity Significancy	.000	.000	.000

The variance of financial depth indicators for each principal component is explained by the eigenvalues which are demonstrated at Appendix-E. For interpretation, we chose the eigenvalues which are greater than one. For financial depth indicators, we determine two princial components. The first principal component explains 64% of variation in the financial depth data, The second principal component explains 14.74% of the variation. These two principal components collectively account for 78.77% of variance in the financial depth data.

After determining number of principal component, we apply rotation procedures to make easy interpretation of the results. The rotation is highly useful stragegy to minimise the number of individual indicators that have a high loading on the same principal component. After rotation the sum of eigenvalues which is equal to number of indicators is not affected; but eigenvalues associated to particular principal components change. Literature offers various rotation strategies and OECD (2008) advices to use "varimax rotation." In this study, we use varimax rotation strategy. After rotation, we see from Table-10 that the first principal component has high positive coefficients (loadings) with DPH2, DPH4, DPH5 and DPH6. Likewise, the second principal component is formed by DPH1, DPH3 and DPH7.

The next step is to construct weights for the financial depth indicators. As offered by Nardo et al. (2005) and OECD (2008), we obtain weights by getting

square of component loadings represents the proportion of the total unit variance of the indicator which is explained by the associated principal component. They are normalized squared factor loadings, *e.g.* 0.3097=(0.8419^2)/2.2892 which is the portion of the variance of the first principal component explained by the variable DPH1 (Stock market capitalization to GDP, %). Thus, the following Table-10's right side gives weights which will be used during construction of financial depth index.

Table 10. PCA Weights for Financial Depth

	Component		**Squared Component (Scaled to Unity Sum)**	
	1	2	1	2
DPH1	0.3406	**0.8419**		**0.3097**
DPH2	**0.8942**	0.3209	**0.2480**	
DPH3	0.1200	**0.8248**		**0.2972**
DPH4	**0.7289**	0.4014	**0.1648**	
DPH5	**0.8354**	0.2429	**0.2164**	
DPH6	**0.9390**	0.1881	**0.2734**	
DPH7	0.4287	**0.7360**		**0.2366**
Eigenvalue after rotation	**3.2247**	**2.2892**		

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

PCA results for financial access are presented at Table-11. After varimax rotation, it is obvious that the first principal component has high positive coefficients (loadings) with ACC1, ACC4, ACC5 and ACC6. On the other hand, not suprisingly the indicators ACC2 (Bank branches per 100,000 adults) and ACC3 (ATMs per 100,000 adults) have formed second principal component. These two indicators reflect the same dimension of financial access. Right side of Table-11 gives weights for financial access index. As seen at table weights of ACC2 and ACC3 indicators are larger than others.

Table 11. PCA Weights for Financial Access

	Component		Squared Component (Scaled to Unity Sum)	
	1	2	1	2
ACC1	**0.8847**	-0.0945	**0.2357**	
ACC2	-0.0607	**0.8601**		**0.4720**
ACC3	0.1616	**0.8565**		**0.4680**
ACC4	**0.9049**	0.2687	**0.2466**	
ACC5	**0.9475**	0.1118	**0.2703**	
ACC6	**0.8899**	-0.0202	**0.2384**	
Eigenvalue after rotation	**3.321**	**1.567**		

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

Lastly, Table-12 shows that financial efficiency indicators have just one eigenvalues. Thus total of weight equal to one. Weights of financial efficiency indicators are presented at right side of the table. Obviously EFF1 (stock market turnover ratio) has the lowest weight. On the other side, EFF5 (bank net interest margin) has the largest weight.

Table 12. PCA Weights for Financial Efficiency

	Component	Squared Component (Scaled to Unity Sum)
	1	1
EFF1	**0.5733**	**0.1140**
EFF2	**-0.7920**	**0.2177**
EFF3	**-0.7573**	**0.1990**
EFF4	**0.7396**	**0.1898**
EFF5	**0.8975**	**0.2795**
Eigenvalue	**2.8821**	

Extraction Method: Principal Component Analysis.

As a result, for each financial dimension data we construct indices according to weights obtained from PCA.

4.3. Methodology

To examine the relationship between state governance quality, financial development, logistics performance and global competitiveness of the countries, Partial Least Squares Structural Equation Modeling (PLS-SEM) will be used as an econometric analysis method in this thesis. PLS-SEM, also known as PLS path modeling or variance-based SEM, is a statistical method for modeling complex multivariate relationship among latent variables and their observed indicators (also called as manifest indicator).

4.3.1. Structural Equation Modeling Overview

Statistical methods which simultaneously analyze multivariate variables are called multivariate analysis. Hair et al. (2016) divides multivariate techniques into two generations. As demonstrated in Table-13, first generation techniques involve cluster analysis, exploratory and confirmatory analysis, multidimensional scaling, analysis of variance, logistic regression and multiple regression. Cluster analysis, exploratory factor analysis and multidimensional scaling are used to explore or identify data patterns and relationship among variables. The others are used to confirm a priori established theories.

To overcome weakness of first generation techniques, researchers have turned to use second generation techniques. These techniques, referred as structural equation modeling (SEM), offer a range of unique benefits as compared to first generation statistical procedures (Astrachan et al., 2014). SEM enables scholars to simultaneously test and estimate complex causal relationships among variables, even when the relationships are hypothetical or not directly observed (Astrachan et al., 2014; Hair et al., 2016). It allows the scholars to statistically test the relationship between theory-based latent variables and their observable indicator variables (Hair et al, 2014). It permits simultaneously examine multi-level relationships such as a dependent variable can become an independent variable in subsequent relationship in the same model and moreover it allows to include more than one dependent variables to the model (Astrachan et al., 2014). However, first generation techniques such as regression do not directly permit simultaneous assessment of more than one dependent variables in a model, thus latent constructs must be first converted to some composite or average of individual measures, such as factor scores or summated scores (Astrachan et al., 2014).

Table 13. Organization of Multivariate Methods (Adapted from Hair et al., 2016)

Generation	Primarily Exploratory	Primarily Confirmatory
First Generation Techniques	* Cluster analysis * Exploratory factor analysis * Multidimensional scaling	* Analysis of variance * Logistic regression * Multiple regression * Confirmatory factor analysis
Second Generation Techniques	* Partial least squares structural equation modeling (PLS-SEM)	* Covariance-based structural equation modeling (CB-SEM)

SEM has two types, they are covariance based SEM (CB-SEM) and partial least squares SEM (PLS-SEM). Each is used for different research context. CB-SEM is used to confirm or reject a theory by determining how well a proposed theoretical model can estimate the covariance matrix for the dataset. On the other side, even though Ringle and Sarstedt (2016) note that PLS-SEM is suitable to develop theories in exploratory research, Henseler et al. (2016) highlight that PLS-SEM can be used both for exploratory and predictive research. Especially, Hair et al. (2012a), (2016) and Garson (2016) mention that PLS-SEM is used particularly at early stages of theory development and testing in exploratory researches by explaining variance of the dependent latent constructs.

Partial least squares approach has been developed by Hermann Wold in 1960s and extended by Lohmöller (1989). Wold's purpose was to develop a method which was suitable for prediction or the exploration of causality (Westland, 2007, Reinartz et al., 2009). PLS-SEM method has evolved during time and it has become a powerful statistical method which enables researchers to explore relationships among a set of independent and dependent variables and determine the main pathways that exist among the variables (Ketchen, 2013). In the response side, PLS-SEM can relate the set of independent variable to multiple dependent (response) variables, whereas on the predictor side it can handle many independent variables although when predictors display multicollinearity (Henseler et al., 2009; Garson, 2016). For that reason, PLS-SEM has gain popularity as an indispensible analysis method in various research disciplines such as operations

management (Peng & Lai, 2012), family firm research (Astrachan et al., 2014), international marketing (Henseler et al., 2009), international business (Richter et al., 2016), logistics performance (Fugate et al., 2010), family business research (Sarstedt et al., 2014), management information systems (Ringle et al., 2012) and marketing (Hair et al., 2012b).

4.3.2. Comparison of PLS-SEM and CB-SEM

PLS-SEM and CB-SEM are the multivariate methods used to determine *"cause-effect relations between latent constructs"* (Hair et al., 2011, p.139). Even though they differ in their basic assumptions, outcomes and estimation procedures, PLS-SEM and CB-SEM are two close approaches to the same problem (Astrachan et al., 2014; Hair et al., 2014). It is worth mentioning that PLS-SEM and CB-SEM are complementary rather than competitive statistical methods (Hair et al., 2011).

The philosophical distinction between these two methods is straight forward. PLS-SEM is a prediction-oriented variance-based method which is especially suitable for early stage of theory development and testing (Hair et al. 2012a, 2016; Garson, 2016). It focuses on dependent latent constructs in the model and it aims to maximize their explained variance through a series of regression-based ordinary least squares (Reinarz et al., 2009; Hair et al., 2012a; Ringle et al., 2012). In contrast, CB-SEM is a suitable method if purpose is theory testing and confirmation. It practically follows maximum likelihood estimation procedures. CB-SEM focuses on the model's theoretically established relationships and thereby its aim is to minimize the difference between the model implied covariance matrix and the sample covariance matrix without focusing on explained variance (Hair et al., 2011; Astrachan et al., 2014).

Thereby CB-SEM can be assessed by a goodness-of-fit measure such as the Chi-square (χ^2) statistics or the other fit indices which examines the difference between the two covariance matrices in CB-SEM. However, PLS-SEM estimates the parameters which explain the variance of the endogenous latent variables which are maximized, therefore the goodness-of-fit measure such as the Chi-square (χ^2) statistics or the other fit indices which examines the difference between the two covariance matrices are not transferrable to the PLS-SEM. Hence, for analysis of structural model of PLS-SEM, coefficient of determination (R^2), effect size statistics (f^2 and q^2) and predictive relevance statistics (Q^2) are used (Sarstedt et al., 2014; Hair et al., 2016).

CB-SEM requires larger samples than PLS-SEM because relationship between all variables must be assessed in a full information approach (Astrachan et al., 2014). CB-SEM follows maximum likelihood approach, thus it requires multivariate normal distribution of data. Hair et al. (2009) point out that CB-SEM models containing five or fewer constructs, each with more than three observed variables can be estimated with at least 100-150 sample size. Likewise, Henseler et al. (2009) stress that if sample size is less than 200, there are noncovergence problems and improper solutions in the usage of CB-SEM.

However, PLS-SEM provides valid and reliable results even though sample size is relatively small and moreover, it makes no assumptions about the underlying data distributions (Hair et al., 2009; Hair et al., 2011; Hair et al., 2012a; Kwong and Wong, 2013 and Reinartz et al., 2009). In PLS-SEM, to assess the relationship the model is separated into components, therefore relatively smaller sample might be enough for analysis. Hair et al. (2016) highlight that as a rule of thumb the minimum sample size should be 10 times the maximum number of arrowheads pointing at a latent variable in the PLS-SEM model. Thus in this thesis maximum numbers of arrowheads pointing quality of state governance and logistics performance latent variables have six observed variables and financial development and global competitiveness latent variables have three observed variables. According to Hair et al. (2016) required minimum sample size for this thesis is 60; however we have larger sample size, data of 101 countries. Thus we can apply PLS-SEM to analyze the relationship among the latent variables in this thesis.

Overall, not only PLS-SEM has ability to provide valid and reliable results with smaller size sample data, but also it works with less restrictive assumptions about sample data distribution and it enable to deal with increased level model complexity. Therefore, PLS-SEM can handle a broader range of problems than CB-SEM (Hair et al., 2011).

4.3.3. The PLS-SEM Algorithm

PLS-SEM has two components which are referred as structural model and measurement model. First, the structural model is also referred as inner model. As seen at Figure-16, the inner model depicts the relationships (paths) between unobserved or latent variables which are represented in the model as circles or ovals.

PLS-SEM merely permits recursive relationships in the structural model. Therefore, the arrows which show structural causal direction in the inner model can be head in a single direction (Hair et al., 2011). In addition, the latent constructs that have no path relationship pointing at them is defined as exogenous (independent) construct, whereas the construct which is explained by other constructs via structural model relationship is defined as endogenous (dependent) construct. (Hair et al., 2016) Figure-16 depicts that the PLS-SEM model is set up to analyze the relationship among state governance quality, financial development, logistics performance and global competitiveness variables. The model has one exogenous (independent) latent constructs (state governance quality) and has three endogenous constructs (financial development, logistics performance and global competitiveness). The constructs are presented as ovals.

Secondly, measurement component is also referred as the outer model which specifies the relationship between latent variables and its observed variables (also often called indicators, items or manifest variables; Sarstedt et al. 2014) which are represented in the model as rectangular.

PLS-SEM can include two different kinds of outer models. They are formative measurement models and reflective measurement models as seen at Figure-16. The formative model has causal relationships from observed variables to the latent variable. The formative construct is defined as linear combination of its indicators; hence changes in the indicators determine changes in the value of the latent construct (Hair et al., 2011). That is, indicators are seen as the characteristics of the construct (Fugate et al., 2010). The indicators are not required to covary with each other; they need not be interchangeable and moreover dropping an indicator may significantly alter conceptual domain of the construct (Jarvis et al., 2003). The coefficients remarking the relationship between the observed indicators and the latent variables in the formative construct are called *outer weights* (in sample model below represented with “W” at the model) which are estimated by a partial multiple regression where the latent variable represents a dependent variable and its related observed variables represent the independent variables.

In the Figure-16, financial development is measured with three formative indicators in which each is indicated by rectangular boxes, financial depth, financial access and financial efficiency. Cihak et al. (2012) and Sahay et al. (2015) emphasize that financial depth, financial access and financial efficiency are characteristics of financial development. Combination of them consists of financial development. In this setting, in formative models, observed indicators cannot be

used interchangeable and dropping an observed indicator alter conceptual domain the construct (Fugate et al., 2010). In the light of this explanation, financial depth, access and efficiency cannot be used interchangeable and dropping one of these indicators hinder construction of financial development variable. Thus these observed indicators are added into to the PLS-SEM as formative measurement model.

On the other side, the reflective model has causal relationships from the latent variable to the observed indicators, thereby observed indicators are assumed to reflect variation in the latent variable. That is, changes in the construct are expected to be manifested in changes in all of its indicators. Moreover, observed indicators should be interchangeable and they should have the same or similar content, thus they share a common theme (Hair et al. 2009, 2015; Javis et al., 2003 and Fugate et al., 2010). Therefore they are expected to covary with each other (Javis et al., 2003). Dropping an observed indicator from the construct should not change the conceptual domain. The associated coefficients are called *outer loadings;* these numbers are estimated through single regressions with each indicator individually being the dependent variable and the latent variable is independent variable. In Figure-16, state governance quality and logistics performance are measured with six reflective indicators and global competitiveness is measured with three reflective indicators in which arrows pointing away from the construct.

Thereby observed indicators of state governance quality, logistics performance and global competitiveness can be used interchangeably, dropping one indicator should not change the domain of the construct and observed indicators are covary with each other. As they are manifestations of the latent variable, they do not represent a dimension of the latent variables. For that reason, governance quality, logistics performance and global competitiveness variables are added into the PLS-SEM as reflective measurement model.

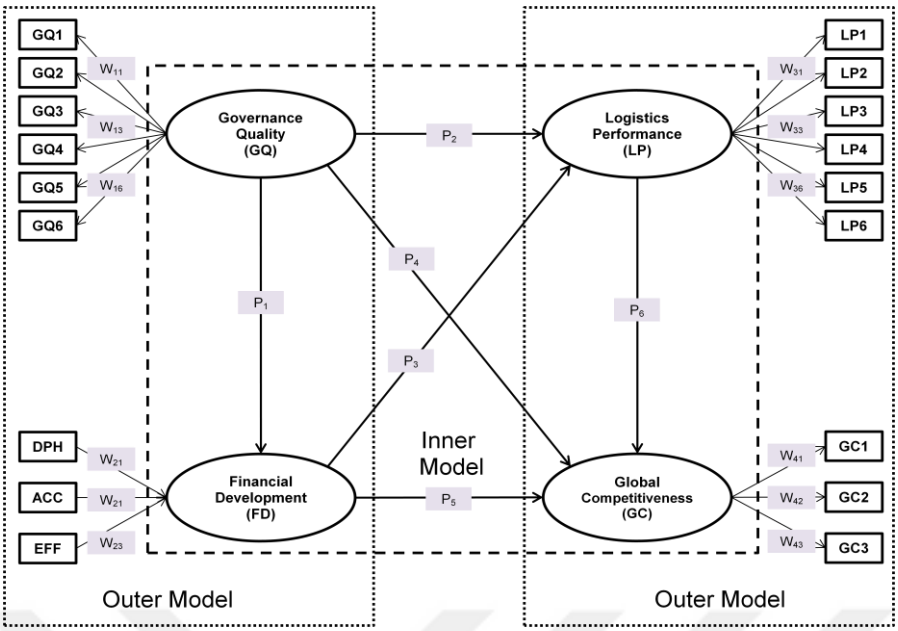


Figure 16. Example of PLS-SEM. (Adapted from Henseler, et al., 2009)

Hair et al. (2011) and Henseler et al. (2009) argue that the basic PLS-SEM algorithm follows two stage estimation processes. The latent constructs' scores are estimated in the first stage with four-step process as seen in Table-14. We draw on Hair et al. (2011) and Henseler et al.'s (2009) description of the stages and steps of the PLS-SEM algorithm.

In Step-One of Stage-One, outer proxies (GQ, FD, LP and GC) of scores of the latent construct are determined as linear combinations of their respective indicators. For instance GQ is computed as a linear combination of GQ1 to GQ6. In the following iterations, outer loadings or weights (W11 to W43) of previous iteration are used to compute outer proxies (GQ to GC). However, when first time the algorithm is calculated and no weights are available any arbitrary linear combination of indicators used as a proxy of outer proxy of latent variable.

In Step-Two of Stage-One, proxies for structural relationships (P1 to P6) are computed to show how strongly the latent variables are related to each other. Even though there are several different weighting schemes to estimate these proxies, Hair et al. (2011) offer to use path weighting scheme which uses combinations of regression analyses and bivariate correlations based on latent construct scores as proxies for structural model relationships.

In Step-Three, inner proxies of the latent construct scores (GQ to GC) are computed as linear combination of their respective associated latent construct

outer proxies from Step-One using the previous determined inner weight from Step-Two.

Lastly in Step-Four, the outer weights (W21, W22 and W23) are calculated as the regression weights resulting from the ordinary least squares regression of the inner proxy of financial development on its indicators. On the other side the other loadings of reflective models (W11 to W16, W31 to W36 and W41 to W43) are computed as the covariance between the inner proxy of each other latent variables and its indicators.

Table 14. Stages and Steps of PLS-Algorithm Calculation (Adapted from Hair et al., 2011)

Stage 1: Iterative estimation of latent construct scores in four step; **Step-1:** Outer approximation of latent construct scores (The scores of GQ, FD, LP and GC are computed based on the indicator variables' scores and the outer coefficients from Step 4) **Step-2 :** Estimation of proxies for structural model relationships between latent constructs (P1, P2, P3, P4, P5 and P6) **Step-3 :** Inner approximation of latent constructs scores (based on scores for GQ, FD, LP and GC from Step-1 and proxies for structural model relationships, P1, P2, P3, P4, P5 and P6 from Step-2) **Step-4 :** Estimation of proxies for coefficients in the measurement models (the relationships between indicator variables and latent constructs with scores from Step-3; W11 to W43) **Stage 2 :** Final estimates of coefficients (outer weights and loadings, structural model relationships) are determined using ordinary least squares method for each partial regression in the PLS-SEM.

These four steps are repeated until the change in the outer loadings/weights between consecutive iterations becomes sufficiently small. Then, in the following stage the outer loadings/weights are used to calculate loadings and structural path coefficients by running the ordinary least squares regression for each construct. Hair et al. (2011) mention that the models name is “partial” as the iterative PLS-SEM algorithm estimates the coefficients for the partial ordinary least squares regression models in the structural and measurement model.

4.3.4. Evaluation of PLS-SEM Measurement and Structural Models

After running PLS-SEM, the results are assessed in a two-step process, the first step is to evaluation of measurement model (also called as outer model) and the second step is the assessment of structural model (also called as inner model). Hair et al. (2011) underscore that;

> *"The first step is based on the logic that if you are not confident that the measures represent the constructs of interest, there is little reason to use them to examine structural relationships. If the measures are shown to be adequate, however, the second step involves an assessment of the structural model estimates (p.144)."*

Therefore, in the first step we assess the constructs based on reliability and validity according to associated criteria whether construct is formative or reflective. Once we have determined that the construct measures are reliable and valid then we can continue to analyze the structural model. We provide an overview of process assessing measurement models at Figure-17.

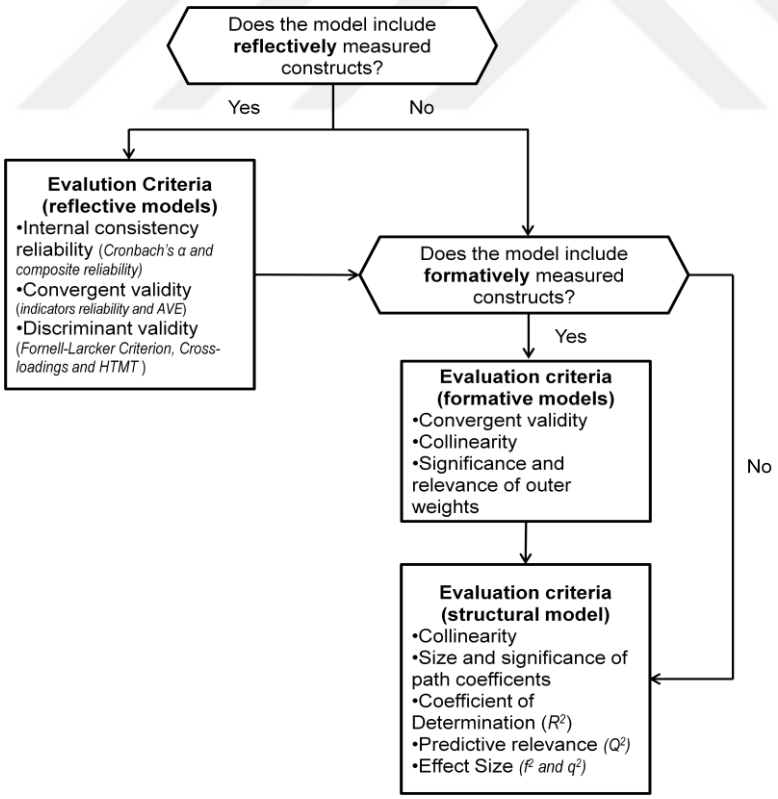


Figure 17. Evaluation of PLS-SEM Measurement and Structural Models (Adapted from Sarstedt et al., 2014 and Hair et al., 2016)

4.3.4.1 Evaluation of Reflective Measurement Models

Reflective measurement models are assessed with regard to reliability and validity. We draw on the procedures advised by Hair et al. (2016) to assess measurement and structural models. Reflective models assessment begins with internal consistency reliability, *Cronbach's* α and *composite reliability* tests. Then to examine convergent validity *indicators reliability* and *average variance extracted (AVE)* are utilized. Lastly, to examine discriminant validity *Fornell-Larcker Criterion, Cross-loadings and Heterotrait—monotrait (HTMT) test* are used.

The researchers routinely rely on two measures of internal consistency reliability. The first measure is Cronbach's α (Cronbach, 1951). It examines reliability based on the indicators intercorrelations. The formula of Cronbach's α is presented below;

$$Cronbach's\ \alpha = \left(\frac{K}{K-1}\right) x\left(1 - \frac{\sum_{i=1}^{K} \sigma_i^2}{\sigma_t^2}\right) \quad (4)$$

In equation (4), K is the number of indicators, σ_i^2 stands for the variance of the indicator i and σ_t^2 represents total variance of K indicators. It implies that all indicators are equally reliable. Thus, Henseler et al. (2009) and Hair et al. (2016) emphasize that Cronbach's α tends to underestimates the internal consistency reliability. For that reason, they advice to use composite reliability statistics which measure the reliability by taking into account different outer loadings. The formula of composite reliability is presented below;

$$\rho_c = \frac{(\sum_{i=1}^{K} l_i)^2}{(\sum_{i=1}^{K} l_i)^2 + \sum_{i=1}^{K} var(e_i)} \quad (5)$$

In equation (5), l_i respresents the standardized outer loadings of indicator variable i of a construct with K indicators. e_i symbolizes the measurement error of indicator variable I and $var(e_i)$ represents the variance of measurement error.

Values of Cronbach's α and composite reliability vary between 0 and 1. Higher values refer greater levels of reliability. Values of them below 0.60 signal a lack of internal consistency reliability. Values between 0.60 and 0.70 are

acceptable in exploratory research. However, generally values of Cronbach's α and composite reliability above 0.70 can be regarded as satisfactory (Hair et al., 2016).

After evaluating internal consistency reliability, we assess convergent validity and discriminate validity. Convergent validity examine whether a set of the indicators represent one and the same underlying construct (Henseler, 2009). Two measures of convergent validity have been put forward, they are *indicators reliability and AVE.* First we examine the indicators reliability to assess whether indicators of a reflective construct converge or share a greater portion of the variance. The outer loadings of the indicators should be above 0.70 as the latent variable supposed to explain each indicators variance (at least 50%). That is, squared number of outer loadings 0.7^2 is equal to ≈.50 refers that latent variables explain substantial part of each indicators variance. However, Henseler et al. (2009) argue that researchers should be careful when eliminating the indicator which has outer loadings between 0.40 to 0.70. If deleting the lower outer loading increase composite relibility, it makes sense to eliminate the indicator with low outer loadings. Outer loadings below 0.40 should be deleted.

The second criteria to assess convergent validity is AVE which is adviced by Fornell and Larcker (1981). AVE is actually average of sum of the squared loadings. Equation (6) presents the formula of AVE;

$$AVE = \frac{\sum_{i=1}^{K} l^2}{K} \quad (6)$$

An AVE value of greater than 0.50 signifies that the construct explains more than 50% of the variance of the indicators as reflecting the same underlying construct.

Discriminant validity measures the extent to which a construct is distinct from other constructs by empirical standards (Hair et al., 2009). Discriminant validity results which meet the criteria refer that the construct in the model is unique and it represents phenomena not indicated by other contructs. The measures of *cross-loadings and Fornell-Larcker Criterion and heterotrait-monotrait ratio HTMT measure discriminant validity*. According to cross-loading measure, the outer loadings of each indicator in the construct should be higher than all of its cross-loadings in the other constructs (Gotz et al., 2009).

The second measure for discriminant validity is Fornell-Larcker Criterion. Fornell and Larcker (1981) underline that discriminant validity is established if a latent variable explain more variance in its associated indicators than it shares with other constructs in the same model. Thus to meet this requirement, the square root of each construct's AVE is expected to be higher than its highest correlation with any other construct in the model.

However, Henseler et al. (2015) argue that cross-loadings and Fornell-Larcker Criterion do not reliably evaluate the lack of discriminat validity. Thus they propose HTMT as an alternative approach to assess discriminat validity. HTMT is the ratio of the between-trait correlations to the within-trait correlations. In other words, HTMT is the mean of the heterotrait-heteromethod correlations (i.e., the correlations of indicators across constructs measuring different phenomena), relative to the geometric mean of the monotrait-heteromethod correlations (i.e., the correlations of indicators within the same construct), for details see Henseler et al., 2015.

4.3.4.2 Evaluation of Formative Measurement Models

To analyze internal consistency of formative measurement models we cannot use the procedures applied to reflective measurement models. As the correlation between formative indicators can be negative, zero or positive, testing internal consistence reliability will produce meaningless results for formative measurement models (Bagozzi, 1994).

Hair et al. (2016) offer the following procedure to assess formative measurement model. According to this procedure, the researchers assess;

a) Convergent validity of formative measurement models by correlating the formatively measured construct with a reflective measurement model of the same construct,

b) Collinearity issues for formative measurement models,

c) The significance and relevance of the formative indicators.

To evaluate convergent validity of a formative measurement model, Henseler et al. (2009) and Hair et al. (2016) point out that we suppose to test whether the formatively measured construct is highly correlated with a reflective measure of the same construst. They offer to set up an PLS-SEM where the exogenous formative construct predicting an endogenous reflective construct in which both constructs

measure same underlying latent variable wiht different indicators. The path value at minimum 0.70 or ideally over 0.80 refers convergent validity.

High correlations betwen formative indicators, which is called as colinearity, refers methodological problem. Hair et al. (2016) emphasize that collinearity might affect the results of the analysis in two respects; firstly, collinearity spurs the standard errors and thereby reduces the the ability to indicate that the estimated weights are significanlty different from zero. Secondly, it might result in the weights being incorrectly estimated. To mesure collinearity, variance inflation factor (VIF) is moslty used approach. Henseler et al. (2009) argue that a value of VIF larger than 10 reflects substantial multicolinearity. However Hair et al. (2016) stress that a VIF value of 5 or greater indicates collinearity among the formative indicators. Thus, one should consider to removing or replacing one of the indicator, if value of VIF is greater than 5.

Lastly, we examine significance of outer weights by using bootstrapping procedures. Outer weights reflect relative contribution of the indicators to the construct. When an indicator is not significant, we check outer loadings whether it is larger than 0.50. If it is larger than 0.50, we can consider to hold it in the construct, otherwise we should remove the indicator.

Jarvis et al. (2003) emphasize that formative indicators should not be eliminated according to on the basis of statistical results because such actions may substantialy change the content of the formative constructs. They offer to define a clear conceptual definition of the construct and rely on the literature when the researchers hesitate whether design the construct as a formative or reflective measurement model.

4.3.4.3 Evaluation of the Structural Models

If we determine that the measurement model results are reliable and valid we can move to second step to evaluate the structural model. In this step we assess the relationship among the latent variables and the model's predictive power. We assess the structural model for collinearity, significance and relevance of the structural model relationships, R^2, f^2, Q^2 and q^2, respectively.

Firstly we examine collinearity among the constructs. As each endogenous latent variable's path coefficient are estimated by ordinary least squares (OLS) regression, high level collinearity among predictor variables can significantly bias

the path coefficients. Thus, if VIF value is greater than 5, we should consider merging the associated constructs or eliminating one of them.

The path coefficients of the PLS-SEM structural model are the standardized beta coefficients of the OLS regressions. They are standardized between -1 and +1 in which negative absolute larger values refer strong negative relation and positive larger values refer strong positive relation. The values close to zero reveal weak relation and mostly they are not significant.

We use bootstrapping to assess the significance of PLS-SEM values. SmartPLS provides t values and p values for all structural path coefficients. We will use critical t values for two-tailed tests for the 5% level. On the other side, p value smaller than 0.05 shows that the relationship under consideration is significant at the 5% level.

Coefficient of determination (R^2) gives the model's predictive power. It demonstrates the amount of explained variance of the endogenous latent variable by the exogenous latent variables associated with it. It ranges from 0 to 1. Larger values indicate higher level of predictiveness power of the model. Chin (1998) postulates R^2 values of 0.19, 0.33 and 0.67 for endogenous latent variable in path models as weak, moderate and substantial, respectively. If an endogenous latent variable is arrowed by one or two exogenous variable moderate R^2 is acceptable. However, if more than two exogenous variable arrows an endogenous latent variable, R^2 should be at least substantial level (Hair et al., 2016).

Also Cohen's f^2 (Cohen, 1988) value allows evaluating an exogenous latent variables contribution to an endogenous latent variable's R^2 value. f^2 values of 0.02, 0.15 and lastly 0.35 shows that the exogenous latent variables has small, medium and large effect, respectively, on the associated endogenous latent variable.

Hair et al. (2011) offer Stone-Geisser's Q^2 (Geisser, 1974 and Stone, 1974) to assess model's predictive capability. Stone-Geisser's Q^2 is obtained by using blindfolding procedure which is a resampling technique. The logic Q^2 procedure is that if the model has predictive power, it is supposed to accurately predict data not used in the model estimation (Hair et al., 2016). Thereby, blindfolding technique omits every d^{th} data point (supposed to be between 5 to 10) in the endogenous construct's indicators and estimates to predict omitted part with remaining data points (Henseler et al., 2009). The results of Q^2 larger than zero state that the exogenous latent variable has predictive relevance for the associated endogenous latent variable.

Lastly, the measurement of q^2 allows us to assess an exogenous latent variables contribution to an endogenous latent variable's Q^2 value. The formula for q^2 is presented below;

$$q^2 = \frac{Q^2_{included} - Q^2_{exluded}}{1 - Q^2_{included}} \quad (7)$$

In equation (7), $Q^2_{included}$ represents Q^2 of PLS-SEM results when an exogenous latent variable predicts an endogenous variable. Then if we discard the exogenous variable we obtain $Q^2_{exluded}$. q^2 values of 0.02, 0.15 and 0.35, respectively, shows that an exogenous latent variable has a small, medium and large predictive relevance for the associated endogenous latent variable.

4.3.5. PLS-SEM Software

SmartPLS and PLS Graph are the commonly used PSL-SEM software (Peng & Lai, 2012). In this thesis we use SmartPLS 3 as statistical software. SmartPLS provides many latest extensions in highly user-friendly software. It incorporates broad range of algorithms such as bootstrapping, blindfolding, confirmatory tetrad analysis, importance-performance map analysis, and etc. Thus we preferred to use SmartPLS in this thesis.

CHAPTER 5

ANALYSIS AND RESULTS

5.1. Simple Linear Regression

Before moving to assess PLS-SEM results, we present linear regression results in this part. First, we regress financial development, logistics performance and global competitiveness on governance quality, separately. Governance quality variable is obtained from average of the World Bank's Worldwide Governance Indicators for year 2012. Worldwide Governance Indicators range from -2.50 to 2.50. Thus before averaging the variables we added +2.5 to all value of the indicators. Financial development data is obtained by accumulating financial depth, access and efficiency indices' scores. Logistics performance variable is average of logistics performance indicators. Lastly global competitiveness data received from the WEF databank.

Figure-18, Figure-19 and Figure-20 indicate a positive relationship between governance quality and financial development, logistics performance, global competitiveness variables, separately. Governance quality explains 54.54% of variance of financial development. It explains 63.54% of variance of logistics performance and 64.63% of variance of global competitiveness. Linear regression results depict that one point increase in governance quality value is associated with a 0,650 increase in financial development value. Likewise one point increase in governance quality is also associated with 0.487 and 0.573 increase in logistics performance and global competitiveness, respectively. That is, well-governed countries tend to have higher financial development, logistics performance and global competitiveness.

Also almost all of the countries on the figures are close to the trend line. Figure-18 reflects that China, India, Jordan, Russia, Thailand, Saudi Arabia, Bahrain, Morocco and Lebanon have higher financial development values; however these countries have lower governance quality values compared to their financial development values. Most of these countries have authoritarian states

and Bahrain, Jordan, Morocco, Saudi Arabia and Thailand are governed by monarchy. China is managed by Chinese Communist party more than six decades. On the other side, Lebanon suffers from political instability and difficulties electing its president. Even though India is the world's largest democracy, has an active civil society and an independent judiciary, it has serious human rights violations and concerns. Likewise most of these countries are criticized for restricting freedom of expression, free media, political rights, accountability and public voice through censorship and punishments.

Figure-19 shows that China, Turkey, United Arab Emirates (UAE) and South Africa have higher logistics performance compared to its governance quality value. Their logistics performance values are unproportional to their governance quality values. These countries have better logistics infrastructure and they are good at punctual delivery of goods, services and information. Haiti and Nepal have lowest logistics performance values. Even though small deviations, Figuer-19 shows that there is a linear relationship between global competitiveness and logistics performance.

Figure-20 indicates that there is tight relationship between governance quality and global competitiveness. However, Saudi Arabia and China are slightly outliers as they have higher global competitiveness value compared to global average but they have lower governance quality value compared to the global average. These two countries have better macroeconomic environment with greater GDP and better health and primary education. Especially China's larger market size increases productivity as it enables the firms to exploit economies of scale (WEF, 2012b) which results in greater global competitiveness value.

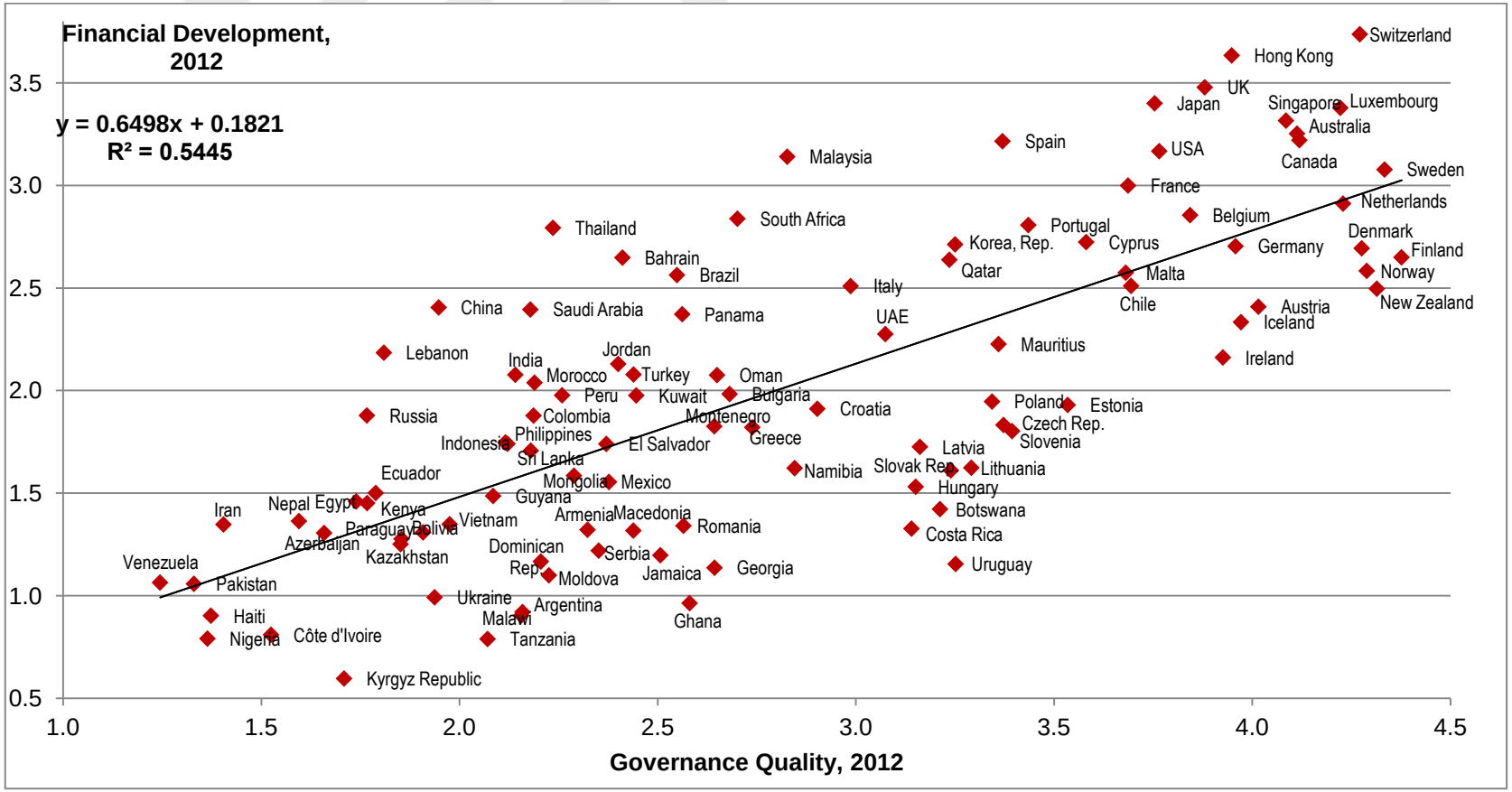


Figure 18. Relation between Governance Quality and Financial Development

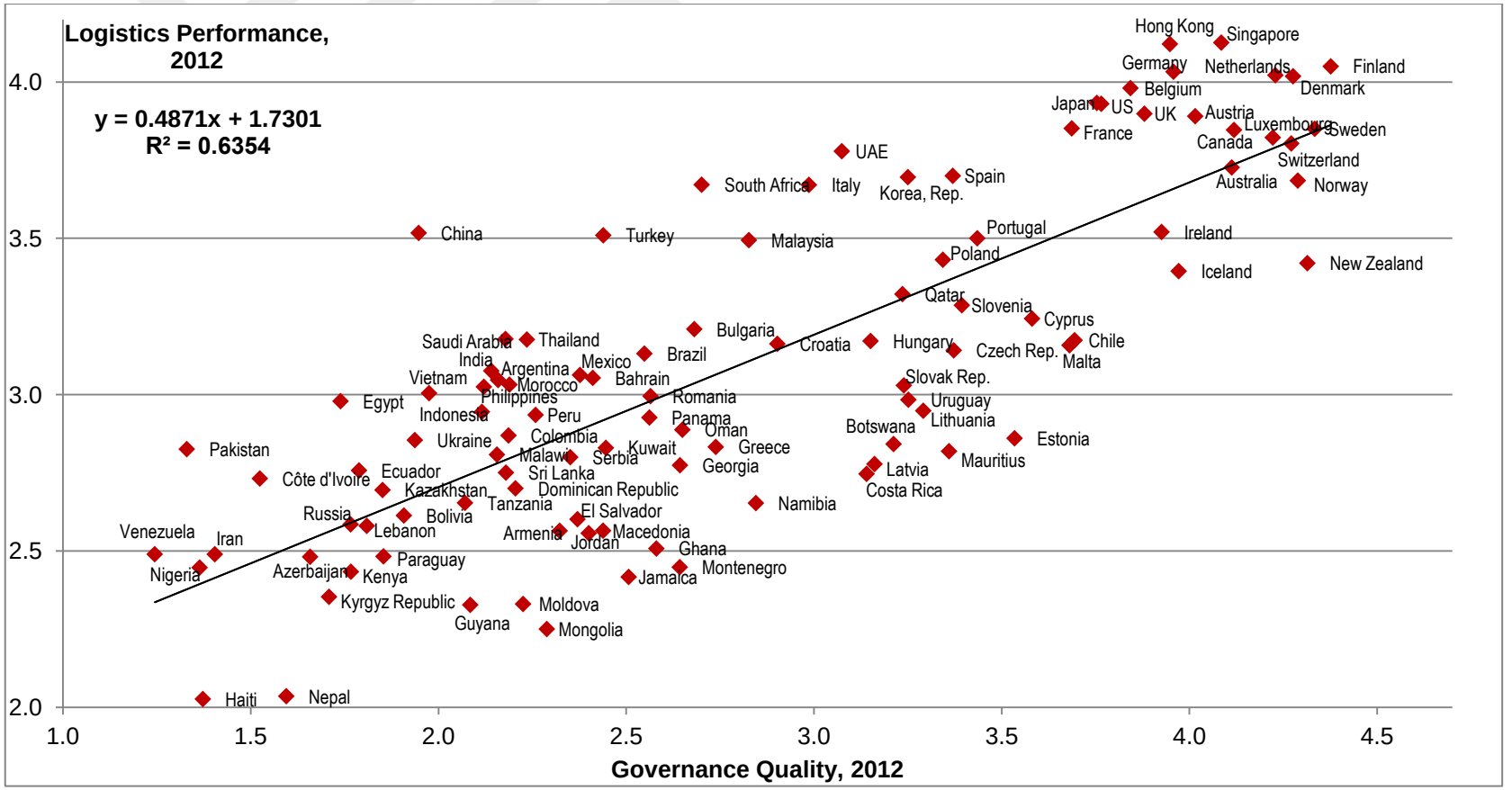


Figure 19. Relation between Governance Quality and Logistics Performance

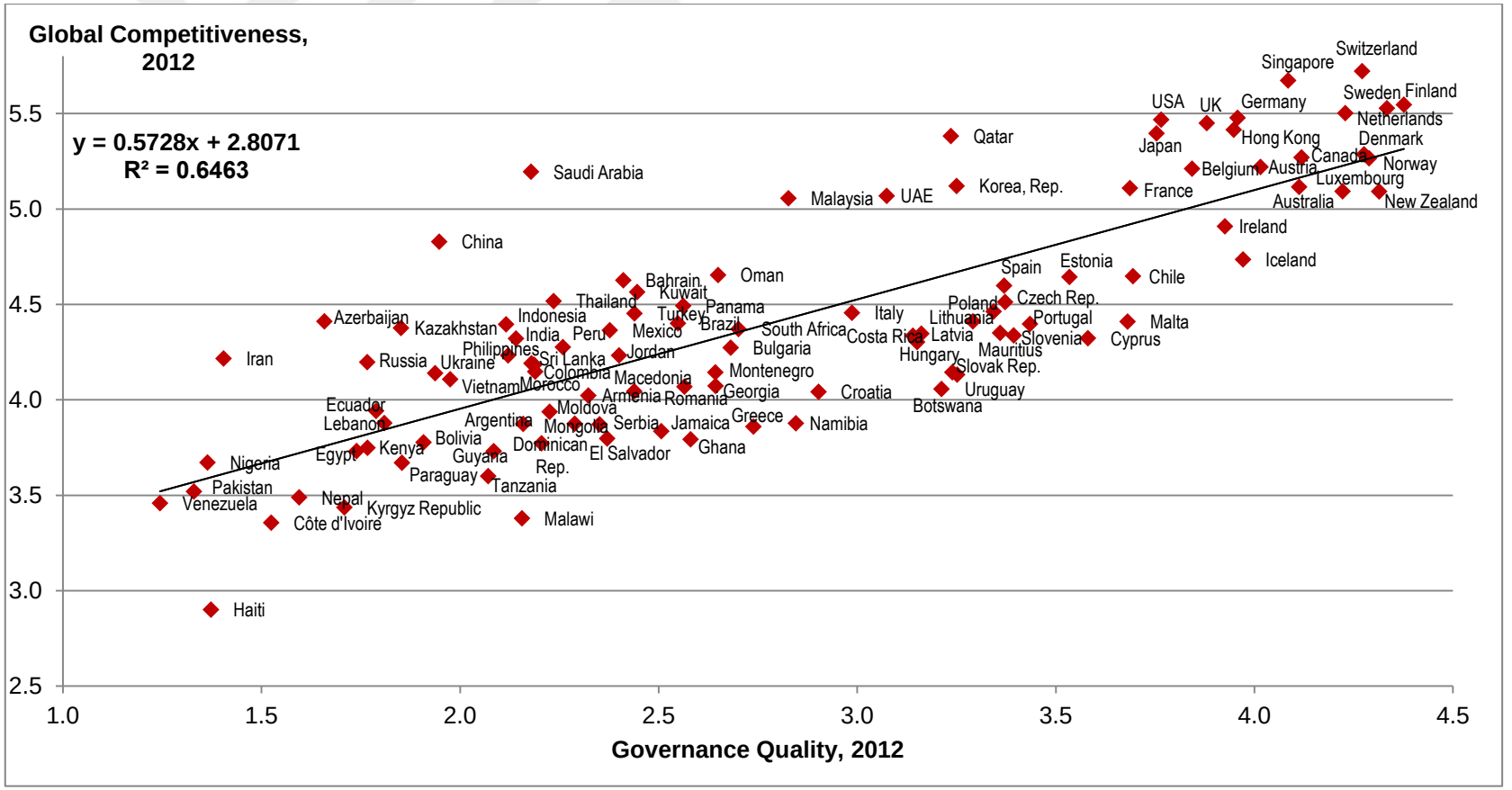


Figure 20. Relation between Governance Quality and Global Competitiveness

Secondly, we regress logistics performance values on financial development. Figure-21 shows positive linear relation between logistics performance and financial development with coefficient of determination, R^2=0.692. Linear regression results show that one point increase in financial development value is associated with a 0,577 increase in logistics performance value. That is, financially developed countries tend to have high logistics performance. Almost all countries are close to the trend line. Just Haiti and Nepal are outliers as these countries have higher financial development scores compared logistics performance scores. On the other side, Singapore, Hong Kong, Finland, Germany and Netherlands have better logistics performance scores compared to financial development scores as these countries are the frontrunner of the logistics performance list.

Figure-22 shows relationship between financial development and global competitiveness variables. Again a strong positive correlation between these two variables is seen. Financial development explains 74.23% of variance of global competitiveness. Linear regression results depict that one point increase in financial development scores is associated with a 0,697 increase in global competitiveness. That is, financially developed countries tend to have higher global competitiveness scores. Likewise, almost all countries are close to the trend line.

Relationship between logistics performance variable and global competitiveness value are demonstrated at Figure-23. Correlation between these two variables are strong and positive with coefficient of determination, R^2=0,763. One point increase in logistics performance is associated with a 1,019 increase in global competitiveness. Almost all countries are close to the trend line.

In simple linear regression analysis we examine the relationship between two variables one by one. However, thanks to PLS-SEM we can simultaneously examine the relationship between all associated variables. Thus, following part presents results of PLS-SEM.

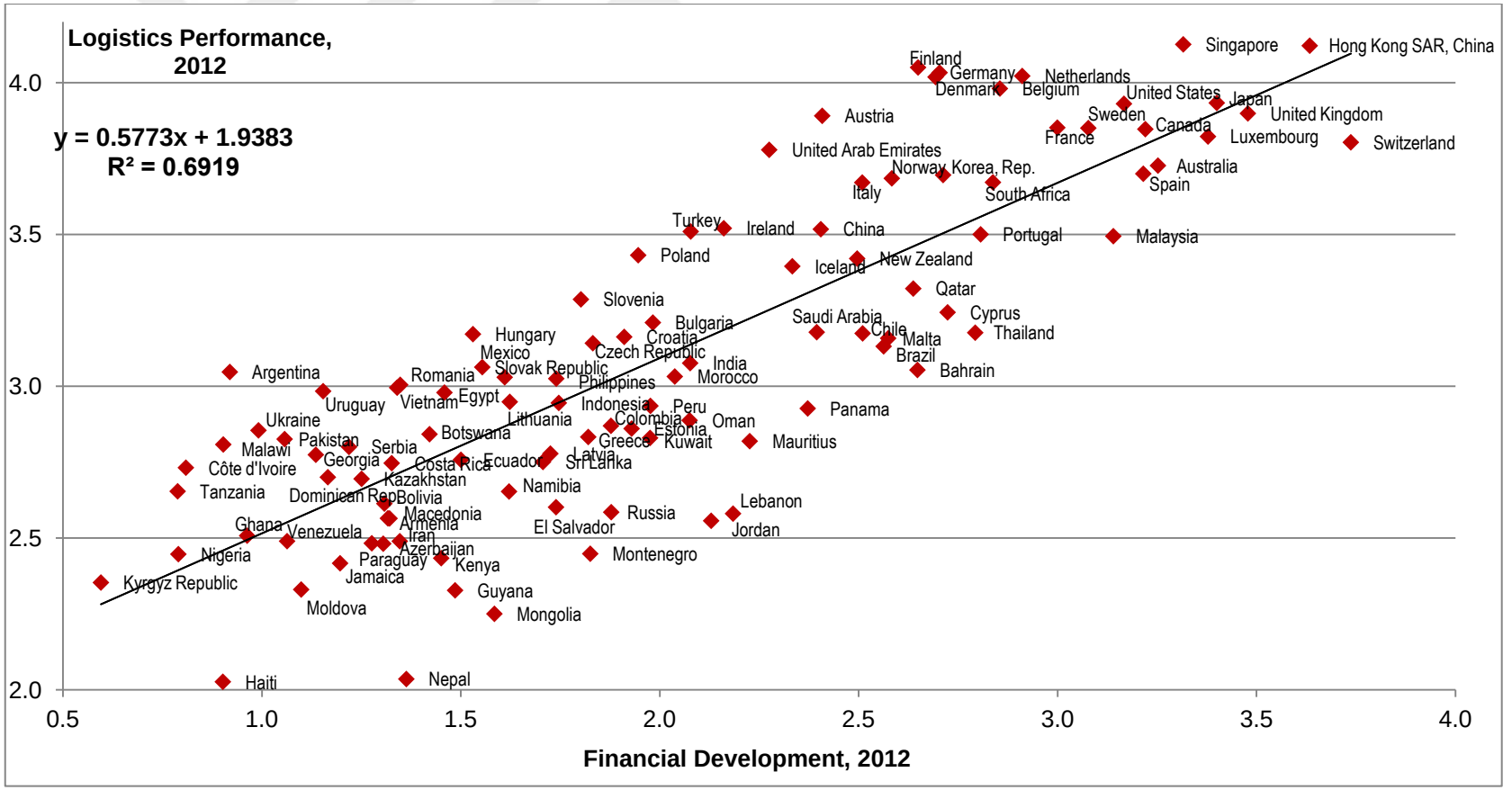


Figure 21. Relation between Financial Development Scores and Logistics Performance Scores for year 2012.

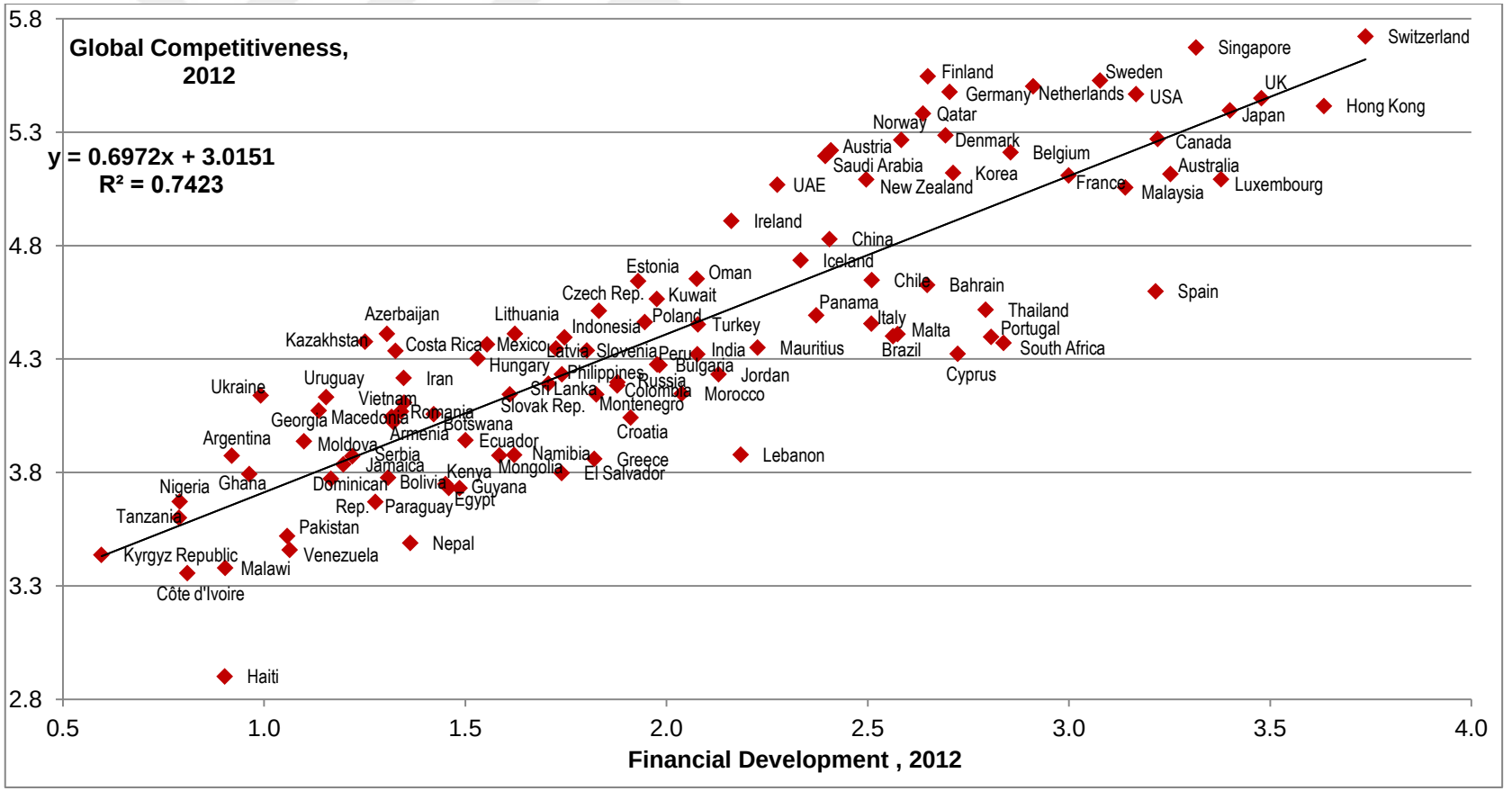


Figure 22. Relation between Financial Development Scores and Global Competitiveness Scores for year 2012.

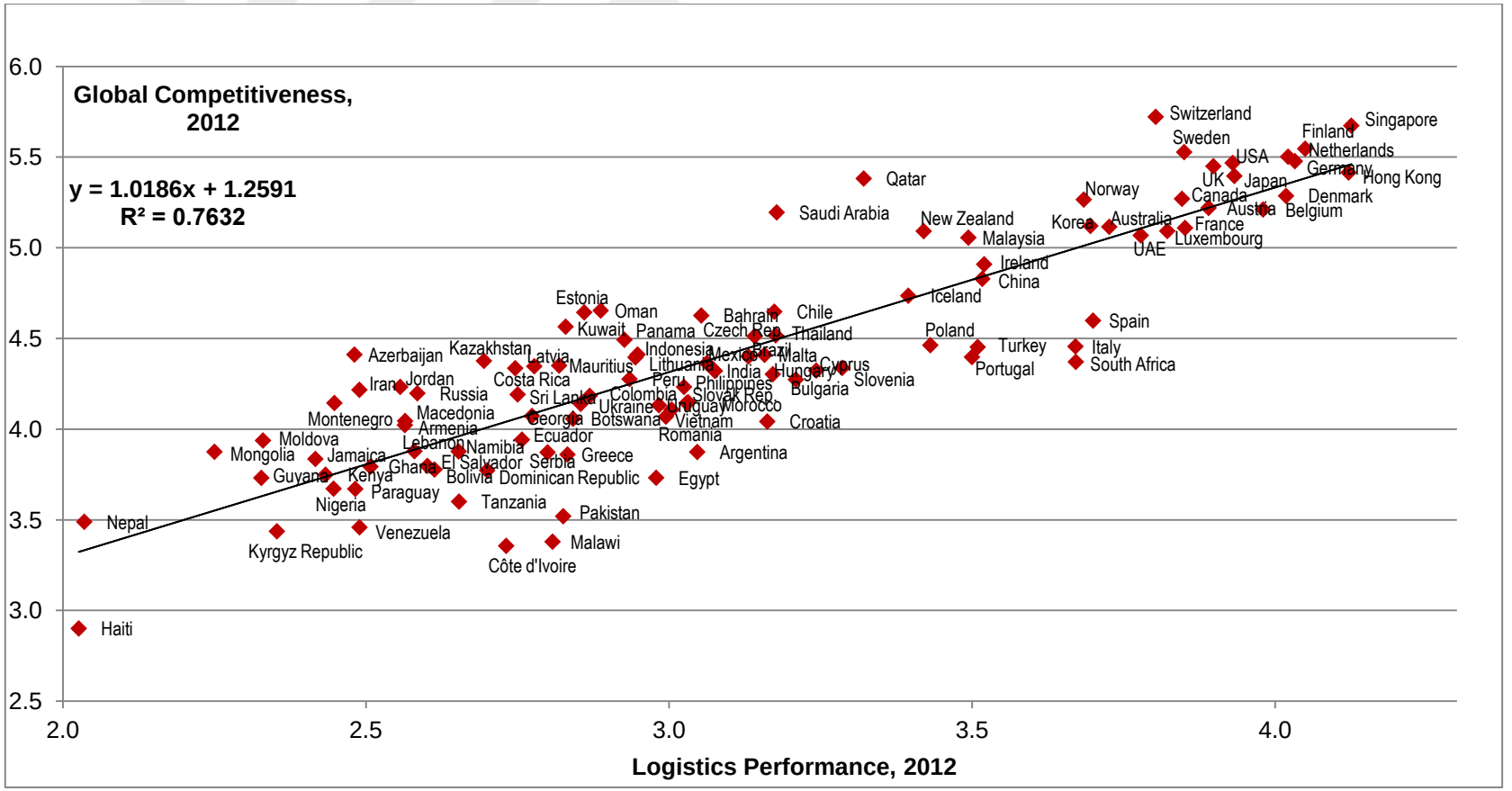


Figure 23. Relation between Logistics Performance Scores and Global Competitiveness Scores for year 2012.

5.2 PLS-SEM Results

Our model has four latent variables with three reflective measurement models (governance quality, logistics performance and global competitiveness) as well as one formative measurement model (financial development). We simultaneously estimate effect of governance quality on financial development, logistics performance and global competitiveness, likewise effect of financial development on logistics performance and global competitiveness and lastly effect of logistics performance on global competitiveness as seen on Figure-24. After concluding this analysis we replace financial development latent variable with its characteristics as financial depth, access and efficiency to determine which financial development characteristics significantly affects logistics performance latent variable.

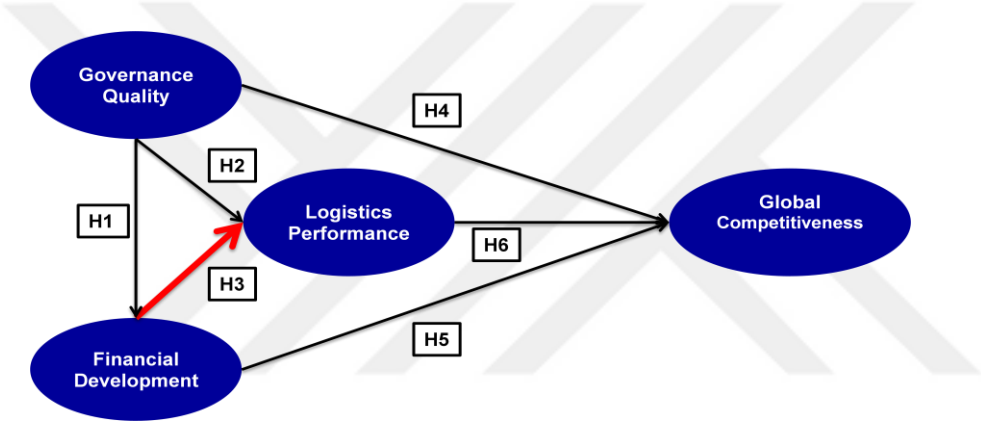


Figure 24. Proposed Hypotheses

5.2.1. Financial Development and Logistics Performance

When we run PLS-SEM, we obtain initial results from the model. Figure-25 presents PLS-SEM estimation path model. The numbers on arrows between latent variable and its indicators reflects outer loadings of governance quality, logistics performance and global competitiveness and outer weights of financial development. Numbers in the circle indicates coefficient of determination (R^2) for endogenous latent variables. Lastly the numbers in inner model on arrows demonstrate path coefficients for latent variables.

We initially analyze reflective measurement models, then formative measurement model and lastly structural model. Before analyzing the results, we checked whether the algorithm converged. We see that the algorithm converged after Iteration 7. Thus we can begin to analyze the results.

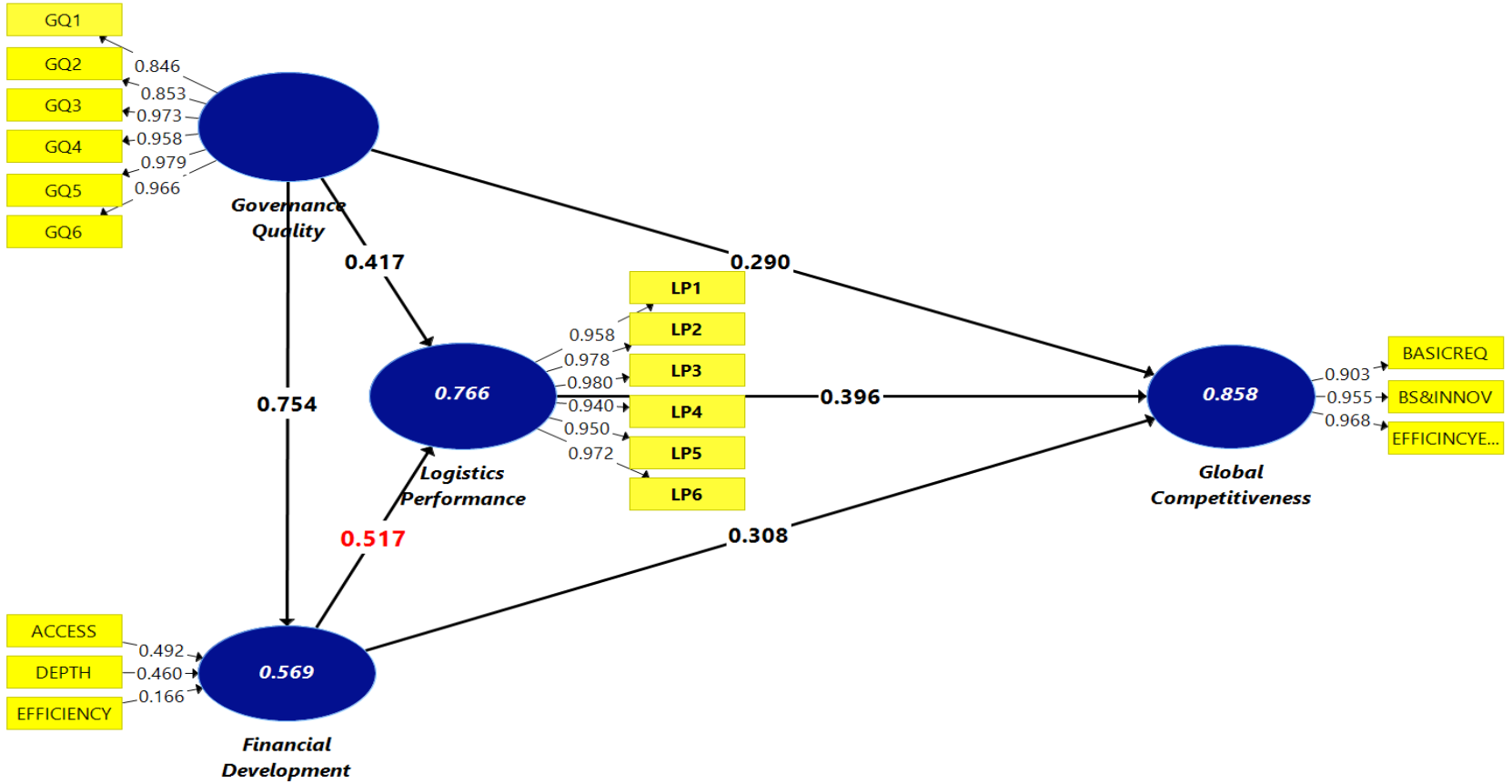


Figure 25. PLS-SEM Estimation for the Model.

5.2.1.1. Assessment of Reflective Measurement Models

We begin to analyze reflective measurement models with sequence of evaluating internal consistency (Cronbach's alpha, composite reliability), convergent validity (indicators validity and AVE) and lastly discriminant validity (Fornell-Larcher Criterion, cross-loadings and HTMT).

To assess internal consistency reliability values of Cronbach's Alpha and Composite Reliability are shown at Figure-26 which is provided by SmartPLS. Red lines at Figure-26 for Cronbach's Alpha and Composite Reliability represents 0.70 thresholds. Values for both criteria are well above the threshold which means reflective measurement models meet internal consistency for all reflective measurement models.

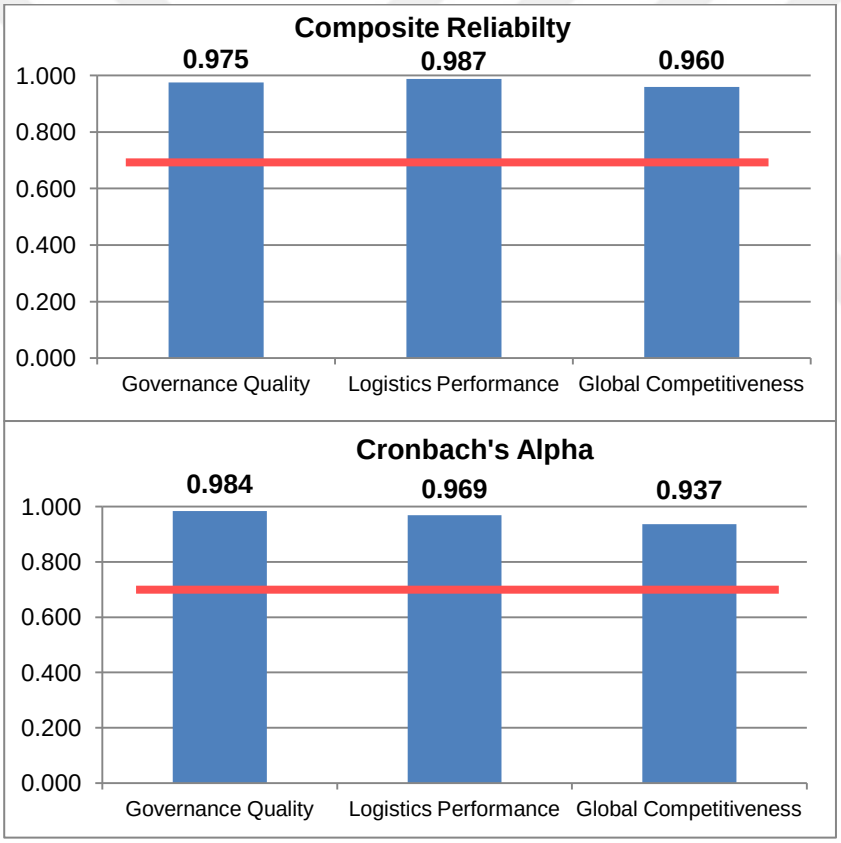


Figure 26. Values of PLS-SEM Internal Consistency Reliability

For reflective measurement models, we estimate the relationship between latent variable and its indicators with outer loadings. As seen on Table-15, all outer loadings of governance quality, logistics performance and global competitiveness are above the threshold value of 0.70 which shows sufficient level of indicators

reliability. Thereby we keep all indicators in the constructs as outer loadings range from 0.846 to 0.980 for all of them. Also Appendix-F provides t-statistics, p-value and bootstrapping[6] confidence interval. They confirm that outer loadings are significant at the 1% level.

The indicator GQ1 has the lowest indicator reliability with a value of 0.846^2=0.715 which means governance quality variable explains 71.5% of variance of GQ1. On the other side the indicator of LP3 has the greatest indicator reliability 0.98^2=0.961. That is logistics performance latent variable explains substantial part of variance of LP3.

Table 15. Results Summary for PLS-SEM Convergent Validity

Latent Variables	Indicators	Outer Loadings	Indicator Reliability (Outer Loadings^2)	AVE
Governance Quality	GQ1	0.846	0.715	**0.866**
	GQ2	0.853	0.727	
	GQ3	0.973	0.946	
	GQ4	0.958	0.917	
	GQ5	0.979	0.959	
	GQ6	0.966	0.934	
Logistics Performance	LP1	0.958	0.917	**0.927**
	LP2	0.978	0.957	
	LP3	0.980	0.961	
	LP4	0.940	0.883	
	LP5	0.950	0.902	
	LP6	0.972	0.944	
Global Competitiveness	BASICREQ	0.903	0.815	**0.888**
	EFFICINCY-ENHANCER	0.968	0.937	
	BS&INNOV	0.955	0.912	

Another variable to measure convergent validity is AVE values. As seen at left side of Table-15, AVE values of governance quality (0.866), logistics performance

[6] We have used 5,000 subsample for each bootstrapping analysis in this thesis.

(0.927) and global competitiveness (0.888) are well above the required minimum level of 0.50. That is, governance quality constructs explains 86.6% of the variance of its indicators, logistics performance and global competitiveness explains 92.7% and 88.8% of them, respectively.

As a consequence, outer loadings and AVE values reflect that three reflective measurement models have high levels of convergent validity.

Lastly, we examine discriminant validity of reflective measurement models by cross-loadings, Fornell-Larcker Criterion and HTMT to measure the extent to which a construct is distinct from other constructs by empirical standards (Hair et al., 2009). These means are alternative to each other. We utilize three of them for robust discriminant validity results.

Table 16. Cross-Loadings for Reflective Measurement Models

	Financial Development	Governance Quality	Logistics Performance	Global Competitiveness
DEPTH	0.937	0.701	0.798	0.787
ACCESS	0.927	0.723	0.754	0.789
EFFICIENCY	0.679	0.458	0.558	0.635
GQ1	0.515	**0.846**	0.598	0.551
GQ2	0.507	**0.853**	0.588	0.632
GQ3	0.808	**0.973**	0.855	0.891
GQ4	0.756	**0.958**	0.772	0.818
GQ5	0.776	**0.979**	0.809	0.863
GQ6	0.761	**0.966**	0.817	0.858
LP1	0.805	0.848	**0.958**	0.874
LP2	0.835	0.803	**0.978**	0.878
LP3	0.786	0.785	**0.980**	0.861
LP4	0.806	0.733	**0.940**	0.827
LP5	0.748	0.706	**0.950**	0.800
LP6	0.818	0.777	**0.972**	0.871
BASICREQ	0.745	0.745	0.712	**0.903**
EFFICINCY-ENHANCER	0.849	0.819	0.901	**0.968**
BS&INNOV	0.819	0.811	0.877	**0.955**

First approach to test discriminant validity is to analyze cross-loadings. According to this approach if an indicator' outer loading value on its associated construct is greater than all of its cross-loadings for every indicator, it signals discriminant validity for associated construct (Hair et al., 2016). Table-16

demonstrates cross-loadings for every indicator. For instance, the indicators of governance quality construct have the largest value for the loading with its corresponding construct. Outer loading of GQ1 is 0.846 for its corresponding construct governance quality, however, its cross-loading for logistics performance is 0.598 and for global competitiveness is 0.551. Thus, cross-loadings results at Table-16 indicate robust discriminant validity for all constructs.

Another alternative mean is Fornell-Larcker Criterion which argues that discriminant validity is established if a latent variable explain more variance in its associated indicators than it shares with other constructs in the same model. Therefore the square root of each construct's AVE is expected to be higher than its highest correlation with any other construct in the model for discriminat validity. Table-17 provides that Fornell-Larcker Criterion for our model. Square root of AVE values for each reflective constructs are seen on the diagonal and the correlations between the constructs are below them. For instance, squre root of AVE value for global competitiveness (0.942) is larger than correlation values (0.842 and 0.886) in the column. Likely squared root of AVE value of governance quality and logistics performance are larger than the correlations of the other constucts. That refers that all reflective latent variables measure a unique concept.

Table 17. Fornell-Larcker Criterion for Reflective Measurement Models

	Financial Development	Global Competitiveness	Governance Quality	Logistics Performance
Financial Development	**Formative**			
Global Competitiveness	0.855	**0.942**		
Governance Quality	0.754	0.842	**0.931**	
Logistics Performance	0.831	0.886	0.807	**0.963**

Last approach to test discriminate validity is HTMT. Table-18 presents HTMT values for all pairs of latent variables in a matrix format. Hair et al. (2016) argue that HTMT values are lower than 0.90 reflects discriminate validity. However, Table-20 demonstrates that HTMT value for logistics performance and global competitiveness (0.917) is larger than threshold of 0.90.

Table 18. Heterotrait-Monotrait Ratio (HTMT) Results

	Governance Quality	Global Competitiveness
Governance Quality	-	**0.867**
Logistics Performance	**0.813**	**0.917**

Hair et al. (2016) points out that if HTMT values are larger than threshold they offer to run the bootstrapping procedure to examine whether the HTMT values are significantly different from 1. That is, a confidence interval including the value of 1 reflects violation of discriminate validity. But if confidence interval does not include 1, it signals that the constructs are empirically distinct. Thus we run bootstrapping procedure to get confidence intervals results for HTMT. We determine bootstrapping subsample as 5,000 and the results are shown at Table-20. The lower (0.5%) and upper (99.5%) bounds of confidence interval are seen at last two columns. As demonstrated at Table-20, none of the confidence intervals includes the value of 1 for lower and upper bounds. Especially, lower and upper bound of the confidence interval of HTMT for the relationship between logistics performance and global competitiveness are 0.853 and 0.961, respectively. With these results we can conclude that bootstrap confidence interval results of HTMT ratio postulates discriminate validity of the reflective constructs in our model.

Table 19. Bootstrapping Results of Confidence Intervals for HTMT

	Original Sample	Sample Mean	Bias	Confidence Interval	
				0.5%	99.5%
Governance Quality -> Global Competitiveness	0.867	0.866	-0.001	**0.774**	**0.928**
Logistics Performance -> Global Competitiveness	0.917	0.916	-0.001	**0.853**	**0.961**
Logistics Performance -> Governance Quality	0.813	0.812	-0.001	**0.714**	**0.883**

As a result, we conclude that governance quality, logistics performance and global competitiveness constructs meet all reliability and validity assessment criteria. Thus, after assessment of formative measurement model, we can evaluate structural model results.

5.2.1.2. Assessment of Formative Measurement Model

Finance literature mostly refers three dimensions of financial development. They are size of financial institutions and markets (financial depth), availability and affordability of financial services (financial access), efficiency of financial intermediaries and markets when allocating or transferring financial resources (financial efficiency) (Cihak et al., 2015; Sahay et al., 2015). In this sense, we set up financial development construct as a formative measurement model with the indicators of financial depth, access and efficiency. Thus, in formative measurement models the indicators do not need to positively and highly correlated. Thereby we cannot evaluate formative measurement models by assessing their internal consistency, convergent validity and discriminate validity (Henseler et. al, 2009; Hair et al. 2011). Instead we should assess convergent validity, collinearity between indicators and significance and relevance of outer weights for financial development construct.

To assess the financial development construct, first of all, we examine whether the formative construct exhibit convergent validity. Convergent validity of the formative measurement model is measured by comparing it with a reflective measure of the same construct with different indicators. This method is also known as redundancy analyses (Chin, 1998). That is, we should test our formative financial development construct whether it is highly correlated with a reflective financial development construct which has different indicators.

The formative financial development construct as an exogenous latent variable operationalized through an endogenous reflective financial development construct. If the path coefficient between these construct is above 0.70 and determination coefficient, R^2, is above 0.50, we can conclude that the formative measurement model has achieved convergent validity.

To carry out redundancy analysis for financial development construct we obtain Financial Market Development data from The WEF the GCR of year 2012. In this report the financial markets are scored according to their efficiency, trustworthiness and confidence. Even though it does not specifically cover all dimensions of financial development and all type of financial intermediaries and markets, it provides useful information about the financial market development. Thus we use it as reflective measurement model.

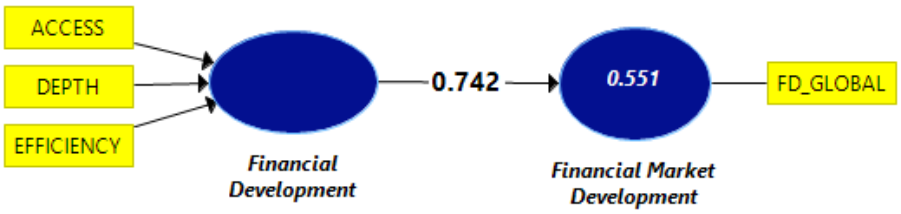


Figure 27. Redundancy Analysis of Formative Financial Development Construct

Figure-27 depicts that the path coefficient between formative Financial Development and reflective Financial Market Development (0.742) is over the threshold of 0.70 and R^2 (0.551) is also above the threshold of 0.50. For that reason we conclude that formative Financial Development exhibit convergent validity.

After assessment of convergent validity, we evaluate collinearity of indicators by examining the formative indicators' VIF values. In reflective models, we expect high correlation among the indicators, on the other side, the indicators of formative models represent a different dimension of the construct and thereby we expect lower VIF values (lower than 5) for them. Table-20 presents VIF values for Financial Development construct. None of VIF values are above the threshold value of 5. Thus, collinearity does not reach critical levels for financial development construct. We can precede the next assessment of formative construct, significance and relevance of the outer weights.

Table 20. VIF Values for Financial Development Indicators

Financial Development Indicators	VIF
Financial Depth	2.866
Financial Access	2.458
Financial Efficiency	1.543

To assess outer weights' significance and relevance we run bootstrapping which presents t-statistics, p-values, confidence intervals bias corrected at Table-21. It shows that all t-statistics values are above the critical value (1.96) and p-values are lower than 0.05. Thus, the t-statistics and p-values of indicators of financial development suggest that all outer weights are significant at the 5% level.

Table 21. Outer Weights Significance Test Results

Indicators of Financial Development	Outer Weights	Standard Deviation	T Statistics	P Values	95% Confidence Interval	
					2.5%	97.5%
DEPTH	0.460	0.104	4.429	0.000	0.235	0.649
ACCESS	0.492	0.097	5.092	0.000	0.309	0.688
EFFICIENCY	0.166	0.066	2.505	0.012	0.037	0.296

Consequently, the results of reflective and formative measurement models confirm that all constructs are reliable and valid. Therefore we can proceed to assessment of structural model results.

5.2.1.3. Assessment of Structural Model

We assess structural model results to determine its predictive capabilities and the relationship between governance quality, financial development, logistics performance and global competitiveness constructs. Assessment of structural PLS-SEM model begins with examining collinearity issues checking VIF values of all associated constructs in the PLS-SEM model. Estimation of path coefficients in the model are obtained from OLS regressions of each endogenous latent variable on its corresponding predecessor constructs (Hair et al., 2016), therefore the path coefficients in multiple regressions can be biased due to high level (above threshold VIF value of 5) collinearity among the predictor constructs.

Figure-28 indicates VIF values of all the linked constructs as GQ-FD (1.000), GQ-LP (2.320), FD-LP (2.320), GQ-GC (3.062), FD-GC (3.459) and LP-GC (4.269). Thus, it is clear that all VIF values are smaller than the threshold of 5. Thereby, we can conclude that collinearity is not a critical problem for our structural model and we can continue evaluating remaining result reports.

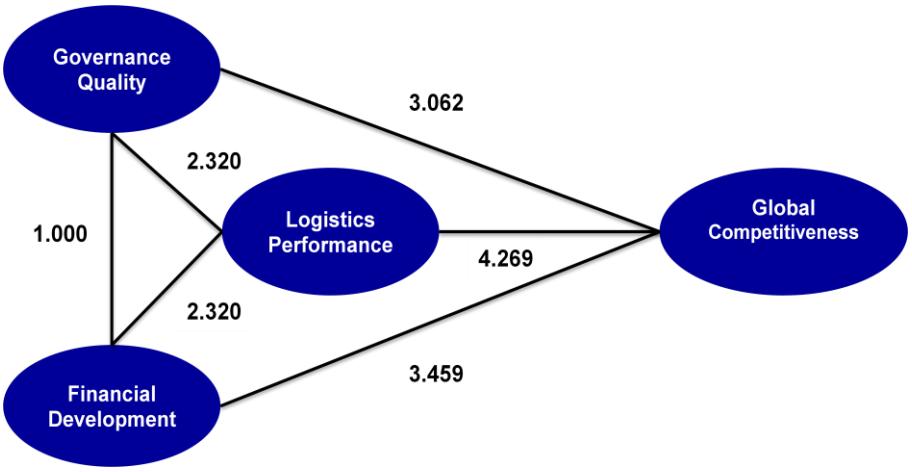


Figure 28. Inner VIF Values for Assessment of Structural Model

Even though there are goodness-of-fit measure such as the Chi-square (χ^2) statistics for CB-SEM, there is no a goodness-of-ft measure which is useable to test the overall goodness of the PLS-SEMs. Rather, PLS-SEM is assessed in terms of how well it predicts the endogenous constructs (Sarstedt et al., 2014; Hair et al., 2016). After assessing collinearity issues in PLS-SEM, we assess structural model of it by the following statistics steps; the significance of the path coefficients, level of coefficient of determination (R^2), f^2 effect size, the predictive relevance Q^2, and the q^2 effect size (Hair et al., 2016).

Figure-29 presents PLS-SEM path coefficients and their t-statistics. PLS-SEM path coefficients points out the relationship among the governance quality, financial development, logistics performance and governance quality. SmartPLS gives standardized values of path coefficients. Their values range from -1 to +1. Estimated path coefficients close to -1 refers negative strong relationship, on the other side close to +1 shows positive strong relationship. Likely the path values closer to 0 refer the weaker relationships. Bootstrapping procedure provides t-statistics and p-value of PLS-SEM parameters.

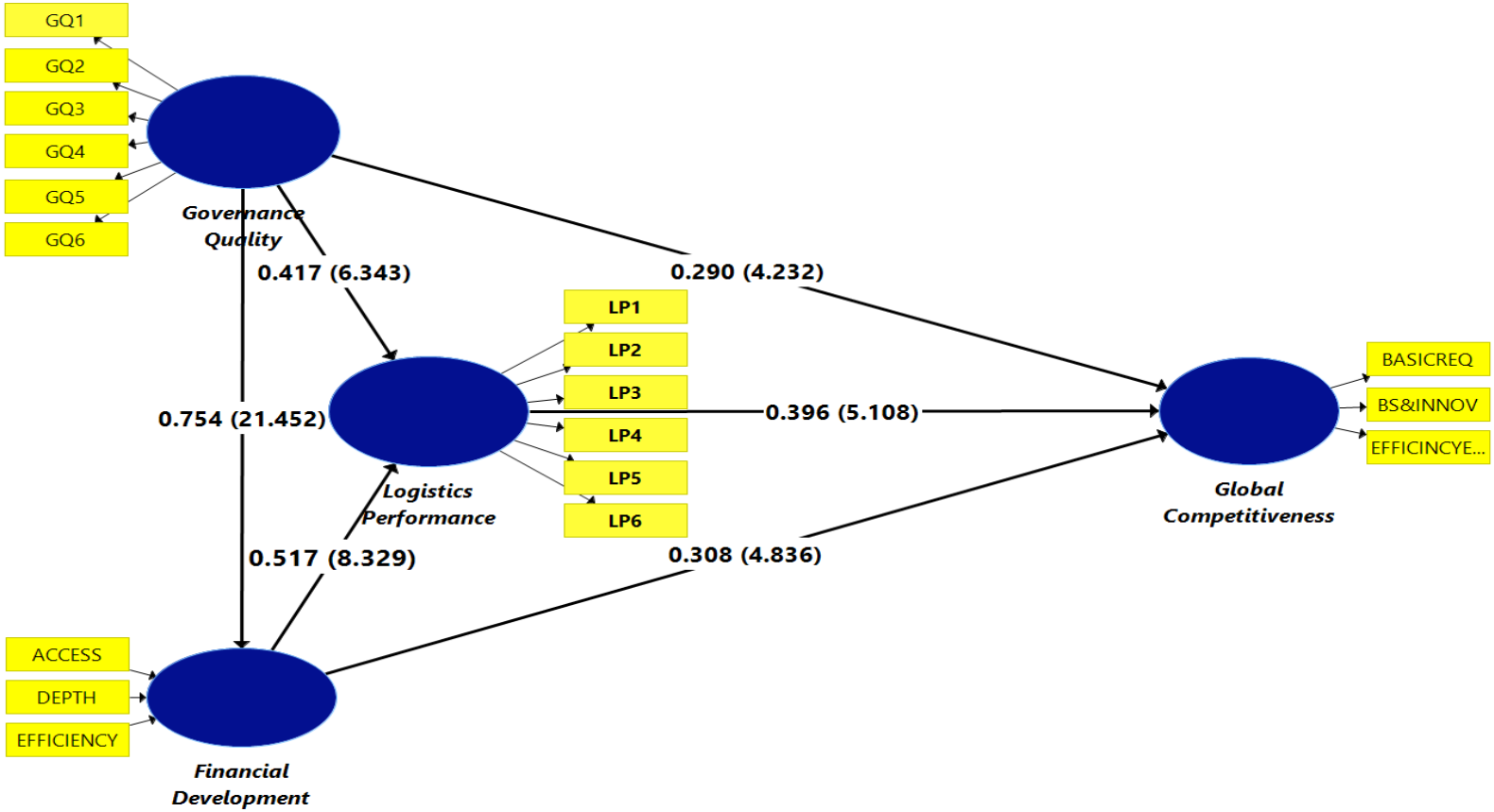


Figure 29. PLS-SEM Path Coefficients and T-Statistics

Figure-29 depicts that all t-statistics for path coefficients are significant at the 1% level as all t-statistics are higher than the critical t-statistics of 2.57. Also, Appendix-G reports p-values and bootstrap confidence intervals for path coefficients. P-values for all path coefficients are 0.000 and bootstrapping confidence intervals of path coefficients does not include zero which means that the hypothesis that the path coefficients equals to zero is rejected. Thus all statistics show that path coefficients are significant at 1% level.

Significant and larger path coefficients support the all hypotheses (H1, H2, H3, H4, H5 and H6). Positive and significant relationship exists between governance quality and financial development with path coefficient of 0.754. It confirms that political stability, government effectiveness, regulatory quality, voice and accountability, rule of law and control of corruptions have significant, positive and substantial impact on financial development (H1). Likely, financial development has significant and positive impact on logistics performance (H3). As the path coefficients are standardized beta coefficient in an OLS regression (Hair et al., 2016), one unit increase in financial development develops logistics performance 0.517 unit when everything else remains constant.

Even though both of governance quality (H2) and financial development (H3) have substantial effect on logistics performance; impact of financial development on logistics performance (0.517) is greater than governance quality's impact on logistics performance (0.417).

Governance quality, logistics performance and financial development have significant and positive impact on global competitiveness of countries (H4, H5 and H6). The inner model suggest that logistics performance has the strongest effect on global competitiveness (0.396), followed by financial development (0.308) and governance quality (0.290). Although financial development's direct effect on global competitiveness is larger than governance quality's direct effect on the global competitiveness; it is worth noting that governance quality has significant indirect impact on global competitiveness via financial development and logistics performance.

Appendix-H provides PLS-SEM indirect effects. For instance, it is obvious that governance quality not only has significant and positive direct effect on logistics performance (0.417), but also it has an indirect effect on logistics performance via financial performance. We calculate governance quality's indirect effect on logistics performance by multiplying path coefficient of governance quality-financial development with path coefficient of financial development-logistics performance

(0.754*0.517=0.390). When we add direct effect to indirect effect we find total effects. PLS-SEM total effects are presented at Appendix-I. As expected governance quality has significant and substantial total effect on global competitiveness (0.842). Thus, even though direct effect of financial development on logistics performance (0.517) is larger than governance quality's direct effect on logistics performance (0.417); total effect of governance quality on logistics performance (0.807) is greater than total effect of financial development on logistics performance (0.517). Also it worth to noting all indirect effects and total effects are statistically significant at the 1% level. Details of t-statistics, p-value and bootstrapping confidence interval are presented at Appendix-J.

The third step assessing PLS-SEM structural model is to evaluate coefficient of determination, R^2, which gives the model's predictive power as it provides the endogenous latent variable's explained variance by all the exogenous latent variables linked to it. R^2 results are indicated in the ovals at Figure-30.

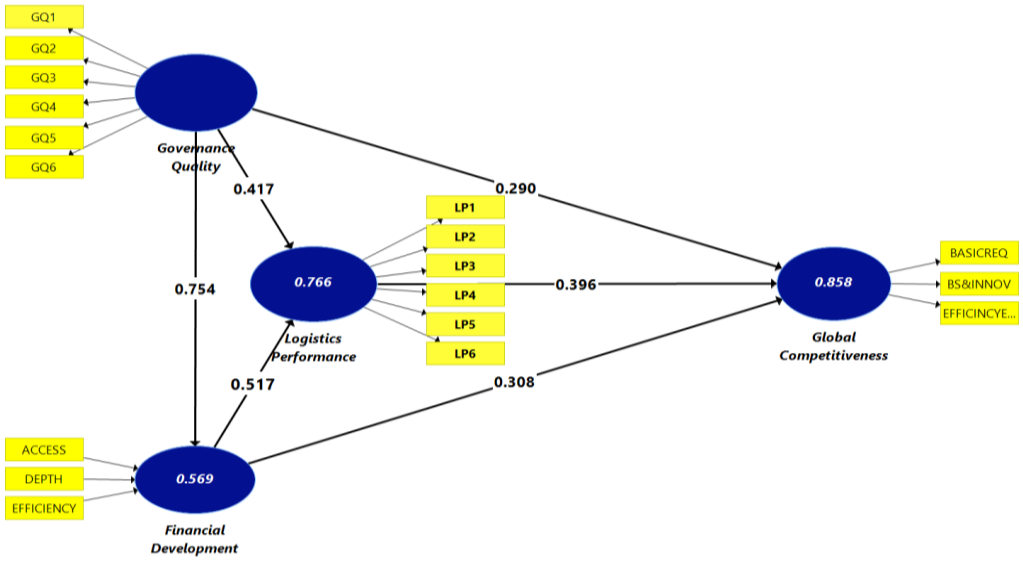


Figure 30. PLS-SEM R^2 Results

Figure-30 shows that R^2 is 0.569 for the financial development latent variable. This means that governance quality moderately explains 56.9% of the variance in financial development. Governance quality and financial development substantially explain 76.6% of the variance in logistics performance. Lastly, governance quality, financial development and logistics performance together substantially explain 85.8% of the variance in global competitiveness. Thereby, our PLS-SEM model

moderately explains in variance of financial development; however it substantially explains the variance in logistics performance and global competitiveness.

The fourth step is to asses Cohen's f^2 (Cohen, 1988) value which reflects an exogenous latent variable's contribution to an endogenous latent variable's R^2 value. f^2 values of 0.02, 0.15 and 0.35 demonstrate that the exogenous latent variables has small, medium and large effect, respectively, on the associated endogenous latent variable. At Table-22, f^2 values are presented. Rows present the exogenous latent variables and the columns show the endogenous latent variables. Thereby, governance quality has medium effect on logistics performance (0.320) and global competitiveness (0.194). Financial development has large effect size of 0.491 on logistics performance's explained variance; however it has medium effect size of 0.193 on global competitiveness's explained variance. Similarly, logistics performance has moderate effect on global competitiveness' coefficient of determination, 0.258. Therefore f^2 results support our argument that financial development has significant effect on logistics performance.

Table 22. PLS-SEM f^2 Results

	Financial Development	**Logistics Performance**	**Global Competitiveness**
Financial Development		0.491	0.193
Governance Quality	1.320	0.320	0.194
Logistics Performance			0.258

The fifth step is to determine predictive relevance of the path model. Hair et al. (2011) advice Stone-Geisser's Q^2 (Stone 1974; Geisser, 1974) to assess model's predictive capability. Thus we run blindfolding procedure to obtain Stone-Geisser's Q^2. We determine omission distance as d=7. Thereby, blindfolding technique omits every 7^{th} data point in the endogenous construct's indicators and estimates to predict omitted part with remaining data points[7]. The results of Q^2 larger than zero reflect that the exogenous latent variable has predictive relevance for the associated

[7] Alternatively, using d=10 does not lead to any change in results.

endogenous latent variable. After running blindfolding procedure, SmartPLS provides Construct Crossvalidated Redundancy estimates which is presented below.

Table 23. PLS-SEM Q^2 Values

	SSO	**SSE**	**Q^2** (=1-SSE/SSO)
Financial Development	303.000	183.164	**0.395**
Global Competitiveness	303.000	74.829	**0.753**
Governance Quality	606.000	606.000	**-**
Logistics Performance	606.000	181.703	**0.700**

Table-23 shows that Q^2 values of all three endogenous constructs are above zero. These values provide support for the model's predictive relevance about the endogenous variables. For example Q^2 value of 0.700 demonstrates that governance quality and financial development have predictive relevance for logistics performance. Likewise Q^2 value of 0.773 reflects that governance quality, financial development and logistics performance have predictive relevance for global competitiveness.

Lastly, the measurement of q^2 allows us to assess an exogenous latent variables contribution to an endogenous latent variable's Q^2 value. Even though Q^2 value provides evidence whether exogenous latent variables have predictive relevance on an endogenous latent variable, it does not provide clue which exogenous latent variable has the stronger predictive relevance on the endogenous latent variable. At this point q^2 value is useful mean to asses each exogenous latent variable's predictive relevance on an endogenous latent variable. As rule of thumb, q^2 values of 0.02, 0.15 and 0.35 show that an exogenous latent variable has a small, medium and large predictive relevance for the associated endogenous latent variable, respectively (Hair et al., 2016).

SmartPLS does not provide values for q^2. Thus we calculate it by using the formula as; $q^2 = \left(Q^2_{included} - Q^2_{exluded)}\right) / \left(1 - Q^2_{included}\right)$. We obtain $Q^2_{included}$ value from previous step (Q^2 above) which is available from Table-23. To obtain $Q^2_{exluded}$ we discard an exogenous latent variable of the endogenous latent variable, then we reestimate the model's blindfolding parameters. For instance, logistics performance endogenous latent variable has a Q^2 value of 0.700 ($Q^2_{included}$). When

we discard financial development from the path model and the model is reestimated, Q^2 of logistics performance drops to 0.593, $Q^2_{excluded}$. Thereby we can compute $q^2_{FD \rightarrow LP}$= (0.700-0.593) / (1-0.700) = 0.357. Similarly, if we keep financial development in the path model and eliminate governance quality, Q^2 of logistics performance drops from 0.700 to 0.628. Thus, we compute $q^2_{GQ \rightarrow LP}$ as 0.240. Hence following the rule of thumb, we conclude that financial development have large predictive relevance for logistics performance ($q^2_{FD \rightarrow LP}$=0.357); however, governance quality has medium predictive relevance for logistics performance ($q^2_{GQ \rightarrow LP}$=0.240). Thereby the q^2 results show that financial development have more predictive relevance for logistics performance compared to governance quality has on the logistics performance. This result indicates that financial development has superior effect on logistics performance than governance quality has on it. Rest of q^2 values are presented at Table-24 below. It shows that governance quality, financial development and logistics performance have medium predictive relevance for global competitiveness.

Table 24. PLS-SEM q^2 Values

	q^2 value of Financial Development	q^2 value of Logistics Performance	q^2 value of Global Competitiveness
Governance Quality		**0.240**	**0.089**
Financial Development		**0.357**	**0.089**
Logistics Performance	-0.002		**0.134**

5.2.1.4. Testing Mediating Effects

A variable which intervenes other two related latent variables is called mediator variable. A change in an exogenous variable affects the mediator variable which in turn affects the endogenous variables. This chain change is referred as mediating effect.

In our model financial development and logistics performance are mediating variables. As governance quality affects financial development and then financial development affects logistics performance, thus financial development is mediating

variable in this relation. Likewise, financial development changes logistics performance which in turn logistics performance changes global competitiveness, thus logistics performance has mediating effect. Lastly, governance quality has effect on global competitiveness with multiple mediators, financial development and logistics performance.

Direct and indirect effects are used to test mediating effects (Hair et al., 2016). Direct effect is the relationship linking two latent variables with a single arrow. Indirect effect refers the relationship between two latent variables via a mediating variable. For instance, direct effect between governance quality and logistics performance is 0.417. Indirect effect between governance quality and logistics performance with intervention of financial development is calculated as multiplying direct effects of governance quality-financial development and financial development-logistics performance (0.754*0.517=0.390). Then, we can find total effect of governance quality on logistics performance with adding indirect effect and direct effect values (0.417+0.390=0.807) as seen at Table-25. For details, PLS-SEM indirect effects are presented at Appendix-H, total effects are presented at Appendix-I.

Table 25. Significance Analysis of the Direct and Indirect Effects

Direction of Mediating	Direct Effect	95% Confidence Interval of Direct Effect	t value	Indirect Effect	95% Confidence Interval of Indirect Effect	t value	Total Effect
GQ→LP	0.417	[0.278 - 0.533]	6.377	0.390	[0.301 - 0.496]	7.839	0.807
GQ→GC	0.290	[0.153 - 0.422]	4.242	0.551	[0.442 - 0.668]	9.604	0.842
FD→GC	0.308	[0.191 - 0.433]	4.922	0.204	[0.126 - 0.298]	4.611	0.512

Hair et al. (2016) mention that if the direct effects and indirect effects both are significant and positive, it is called partial complementary (partial) mediation, however; if all effects are significant but negative, it is called competitive mediation. On the other side, if indirect effect is significant but direct effect is insignificat, it is called as full mediation. All mediation effects in our model are complementary as all

direct and indirect effects are statistically significant and positive. Hair et al. (2016) also offer to use bootstrapping to test mediating effect. Table-25 show that both direct effects and indirect effects are significant since none of the 95% confidence intervals includes zero. To illustrate it with an example, the relationship from governance quality to logistics performance when financial development intervenes is positive and statistically significant, thus financial development serves as complementary (partial mediator). Higher levels of governance quality increase logistics performance directly but also increase financial development, which in turn leads to higher logistics performance. That is, some of governance quality's effect on logistics performance is explained by financial development. Likewise, higher levels of financial development spur global competitiveness directly but also boost logistics performance, which in turn stimulates to higher global competitiveness.

5.2.2. Relationship between Dimensions of Financial Development and Logistics Performance

In the previous part we examined relationship among governance quality, financial development, logistics performance and global competitiveness. We find evidence for our testable hypotheses H1, H2, H3, H4, H5 and H6 at the 1% level. We have three more testable hypotheses which test the relationship between dimensions of financial development and logistics performance. They are;

H3A: Countries' financial depth is positively associated with their logistics performance.

H3B: Countries' financial access is positively associated with their logistics performance.

H3C: Countries' financial efficiency is positively associated with their logistics performance.

Our purpose in this part is to find out which dimension of financial development has superior effect on logistics performance. In the Hypothesis Development part, we have showed that a financially depth market might be financially inefficient or vice versa. Similarly financially depth market participant might have difficulties to reaching affordable financial service and products. To illustrate this issue the scatter plots in Figure-11 reveals that even though Netherlands and Jordan have same banking access, Netherland's banking depth is significantly better than that of Jordan. Likewise, Figure-12 compares Jordan's and Korea's stock market depth and efficiency. Jordan and Korea have almost same

stock market depth – stock market capitalization to GDP. But they have significantly different stock market efficiency -stock market turnover ratio as Korean Stock Market's is substantially efficient compared to Jordan's Stock Market. Lastly, Figure-13 presents Jordan and Argentina's banking access and efficiency. They have close financial access –bank branches per 100,000 adults- however Argentinean banks' overhead cost to total assets is higher than that of Jordanian's.

As a result, there might be substantial discrepancy among the countries' financial development characteristics level. Moreover, different financial development characteristics might have a different effect on logistics performance variable. Therefore, in this part we assess the relationship between logistics performance and each of financial development dimensions, depth, access and efficiency.

We add financial depth, financial access and financial efficiency latent variables into the path model as a reflective measurement model one by one. ecause indicators of these latent variables are manifestations of the corresponding construct rather than characteristics of it. The indicators are expected to covary each other, they are interchangeable and moreover dropping an indicator does not alter conception of the domain.

We have seven indicators for financial depth, six indicators for financial access and five indicators for financial efficiency. These indicators are determined according to literature and data availability.

Moreover, in the previous section we have constructed financial depth index, financial access index and financial efficiency index. We have obtained weights from PCA to construct indices. However, in this part we do not assign any weights to indicators as a United Nations Human Development Report states that *"No index can be better than the data it uses …"* (as cited OECD, 2008, p.34).

5.2.2.1. Financial Depth and Logistics Performance

In this part, we replaced formative measurement model financial development construct with reflective measurement model financial depth construct. It has seven indicators which are presented at Data part. Before moving structural model assessment we assess the reflective measurement models reliability and validity.

Table-26 provides the metrics to assess four reflective measurement models. It shows that all outer loadings values excluding DPH3 (Venture Capital Availability) are greater than the threshold value of 0.70. Outer loading of DPH3 is 0.618. Hair et

al. (2010, 2016) argue that indicators with outer loading between 0.40 and 0.70 should be considered to remove from the model if the elimination leads to an increase in internal consistency reliability and AVE values above the thresholds. However, as seen Table-26, Cronbach's alpha and Composite Reliability which are indicators of internal consistency reliability are already above the threshold value of 0.70. Likewise, minimum AVE value is 0.639 for all constructs, while the threshold is 0.50. Hence we retain DPH3 (Venture Capital Availability) indicator in the model as availability of venture capital is a very important sign of financial depth. Metric and Yasuda (2014) point out financially depth markets such as United States and United Kingdom have higher venture capital investment to GDP compared to emerging markets such as Asia, Latin America and Africa. Therefore we keep DPH3 in the model.

To assess the extent to which a construct is distinct from other constructs we check cross-loadings. Table-26 shows that all cross-loading results excluding DPH-3 are greater than any of its cross-loadings on other constructs. The second approach to assess is the Fornell-Lacker Criterion. It presents that all squared root of AVE values are larger than the interconstruct correlations except that financial depth exhibit a squared root of AVE 0.80 and a shared variance with logistics performance of 0.812. Thus we assign third mean, HTMT, to examine discriminant validity. As shown at Panel-A of Appendix-K, bootstrapping confidence interval does not cover 1. Thus we can conclude that overall discriminate validity is achieved with PLS-SEM analysis.

After the all constructs are been confirmed as reliable and valid, we can begin to assess the structural model results to identify the relationship among the latent variables.

Table 26. Results Summary for Reflective Measurement Model with Financial Depth

Latent Variable	Indicators	Convergent Validity			Internal Consistency Reliablility		Discriminat Validity								
		Outer Loadings	Indicator Reliability	AVE	Cronbach's Alpha	Composite Reliability	Cross-Loadings				Fornell-Larcker Criterion				HTMT**
		>0.70	>0.50	>0.50			GQ	DPH	LP	GC	GQ	DPH	LP	GC	Does HTMT confidence interval include 1?
Governance Quality (GQ)	GQ1	0.846	0.716	0.867	0.984	0.987	**0.846**	0.518	0.598	0.552	**0.931**				**No**
	GQ2	0.852	0.727				**0.852**	0.474	0.588	0.632					
	GQ3	0.973	0.946				**0.973**	0.775	0.855	0.891					
	GQ4	0.958	0.917				**0.958**	0.710	0.772	0.818					
	GQ5	0.979	0.959				**0.979**	0.741	0.809	0.863					
	GQ6	0.966	0.934				**0.966**	0.726	0.817	0.858					
Financial Depth (DPH)	DPH1	0.784	0.614	0.639	0.904	0.925	0.462	**0.784**	0.569	0.597	0.720	**0.800**			**No**
	DPH2	0.899	0.807				0.653	**0.899**	0.693	0.644					
	DPH3	0.618	0.382				0.500	0.618	0.574	0.707					
	DPH4	0.825	0.681				0.699	**0.825**	0.758	0.650					
	DPH5	0.799	0.639				0.560	**0.799**	0.548	0.519					
	DPH6	0.851	0.724				0.636	**0.851**	0.660	0.618					
	DPH7	0.793	0.628				0.473	**0.793**	0.694	0.670					
Logistics Performance (LP)	LP1	0.958	0.918	0.927	0.984	0.987	0.848	0.792	**0.958**	0.874	0.807	0.812	**0.963**		**No**
	LP2	0.978	0.957				0.803	0.820	**0.978**	0.879					
	LP3	0.980	0.961				0.785	0.772	**0.980**	0.862					
	LP4	0.940	0.883				0.733	0.771	**0.940**	0.828					
	LP5	0.950	0.902				0.706	0.733	**0.950**	0.801					
	LP6	0.972	0.944				0.777	0.799	**0.972**	0.872					
Global Competitiveness (GC)	BR*	0.901	0.812	0.888	0.937	0.960	0.745	0.624	0.712	**0.901**	0.841	0.791	0.886	**0.942**	**No**
	EE*	0.969	0.939				0.819	0.802	0.901	**0.969**					
	SI*	0.956	0.914				0.811	0.794	0.877	**0.956**					

* BR=BASICREQ, EE= EFFICIENCYENHANCER and SI=BS&INNOV.
** HTMT Confidence Interval data is available at Panel-A of Appendex-K

Figure-31 and Table-27 indicate the structural model metrics which are crucial for assessment of the model. Table-27 shows that all inner VIF values are lower than threshold of 5. That refers collinearity is not a significant problem for this model thus we can examine the structural model.

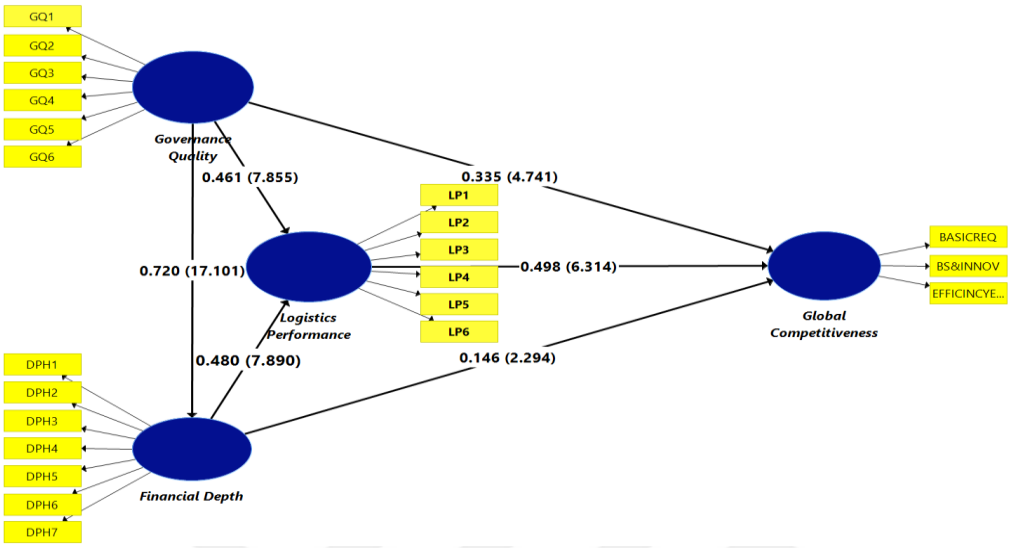


Figure 31. PLS-SEM with Financial Depth Path Coefficients and T-Statistics

Table 27. PSL-SEM with Financial Depth Structural Model Metrics

Latent Variables	Collinearity (Inner VIF)			R^2	f^2			Q^2	q^2		
	DPH	LP	GC		DPH	LP	GC		DPH	LP	GC
GQ	1.000	2.078	2.969		1.078	0.429	0.233			0.308	0.121
DPH		2.078	3.043	0.514		0.464	0.043	0.313		0.351	0.009
LP			4.192	0.757			0.366	0.699	-0.002		0.185
GC				0.833				0.733			

Figure-31 points out that all t-statistics for path coefficients excluding financial depth-global competitiveness are significant at the 1% level as all t-statistics are higher than the critical t-statistics of 2.57 for 1 % significance level. Financial depth-global competitiveness path coefficient is significant at the 5% level as its t-statistics is higher than the critical t-statistics of 1.96 for the 5% level. Therefore we find evidence at 1% significance level for H3A which argues that “Countries’ financial depth is positively associated with their logistics performance.” As one unit increase in financial depth develops logistics performance 0.480 unit when everything else remains constant.

Table-27 presents that the coefficient of determination, R^2, is 0.514 for the financial depth latent variable. This means that governance quality moderately explain 51.4% of the variance in financial depth. Governance quality and financial depth substantially explain 75.7% of the variance in logistics performance. Governance quality, financial depth and logistics performance together explain 83.3% of the variance in global competitiveness. Thereby, our PLS-SEM model moderately explains in variance of financial depth; however it substantially explains the variance in logistics performance and global competitiveness.

f^2 values at the Table-27 present that financial depth latent variable has large effect size of 0.464 on logistics performance's explained variance, however, it has small effect size of 0.043 on global competitiveness's explained variance. Likewise, governance quality has large effect on logistics performance, but it has medium effect on global competitiveness explained variance. Therefore f^2 results provide evidence for H3A by indicating that financial depth has significant effect on logistics performance.

Q^2 values at the Table show that all three endogenous constructs are above zero. These values provide support for the model's predictive relevance about the endogenous variables. Q^2 value of 0.699 points out that the exogenous latent variables governance quality and financial depth has predictive relevance for logistics performance.

Hence following the rule of thumb, we conclude that financial depth has large predictive relevance for logistics performance (q^2=0.351); however, governance quality has medium predictive relevance for logistics performance (q^2=0.308). Thereby the q^2 results reveal that financial depth has more predictive relevance for logistics performance compared to governance quality. This result points out that financial depth has superior effect on logistics performance than governance quality has on it. Rest of q^2 values are presented at Table-27 above. It demonstrates that governance quality and financial development have smaller, but logistics performance has medium predictive relevance effect size for global competitiveness.

5.2.2.2. Financial Access and Logistics Performance

We have added financial access construct as a reflective measurement model into the PLS-SEM as to examine the hypothesis, H3B, stating that "*Countries' financial access is positively associated with their logistics performance."* The

financial access construct initially has six indicators which are presented at Data part.

Initial results indicate that all path coefficients are significant at the 1% level. However, ACC2's (bank branches per 100,000 adults) outer loading is 0.245 and thereby internal consistency for ACC2 is 0.06 which is significantly below threshold of 0.50. Hair et al. (2010, 2016) argue that outer loading lower than 0.40 should be removed from the model and outer loading between 0.40 and 0.70 should be considered to remove if deletion increases internal consistency reliability above the threshold. Thus we remove the indicator, ACC2, from the model. On the other side, outer loading of ACC3 is 0.485 (ATMs per 100,000 adults). Removing this indicator does not affect internal consistency reliability measures Cronbach's alpha and Composite Reliability which are already above the thresholds of 0.70. For that reason we retain ACC3 in the PLS-SEM. Because number of ATMs per 100,000 adults is a commonly used manifestations of financial access variable. Table-28 presents the metrics to assess four reflective measurement model of financial access.

Table-28 indicates that all cross-loading results excluding ACC-3 are greater than any of its cross-loadings on other constructs. Fornell-Lacker Criterion, another approach for discriminate validity, shows that all squared root of AVE values are larger than the interconstruct correlations except financial access. Its squared root of AVE is 0.817, however; a shared variance with global competitiveness of 0.827. But as argued by Henseler et al. (2015) and Hair et al. (2016) we examine the bootstrapping confidence interval of the HTMT statistics whether it includes 1 for all combinations of constructs. Bootstrapping confidence interval for HTMT does not include 1 as seen at Panel-B of Appendix-K. Thus we can conclude that overall discriminate validity is achieved with PLS-SEM analysis.

Obviously, Table-28 shows that all constructs are reliable and valid, we can begin to assess the structural model results to identify the relationship among the latent variables.

Table 28. Results Summary for Reflective Measurement Model with Financial Access

Latent Variable	Indicators	Convergent Validity			Internal Consistency Reliablility		Discriminat Validity								
		Loadings	Indicator Reliability	AVE	Cronbach's Alpha	Composite Reliability	Cross-Loadings				Fornell-Larcker Criterion				HTMT**
		>0.70	>0.50	>0.50			GQ	ACC	LP	GC	GQ	ACC	LP	GC	Does HTMT confidence interval include 1?
Governance Quality (GQ)	GQ1	0.844	0.713	0.866	0.969	0.975	**0.844**	0.410	0.598	0.550	**0.931**				**No**
	GQ2	0.852	0.726				**0.852**	0.449	0.588	0.633					
	GQ3	0.973	0.947				**0.973**	0.742	0.855	0.891					
	GQ4	0.958	0.918				**0.958**	0.713	0.772	0.818					
	GQ5	0.980	0.960				**0.980**	0.709	0.809	0.863					
	GQ6	0.967	0.935				**0.967**	0.706	0.817	0.858					
Financial Access (ACC)	ACC1	0.808	0.653	0.663	0.853	0.903	0.398	**0.808**	0.542	0.589	0.687	**0.814**			**No**
	ACC3	0.443	0.196				0.556	0.443	0.573	0.568					
	ACC4	0.947	0.897				0.701	**0.947**	0.738	0.767					
	ACC5	0.940	0.883				0.589	**0.940**	0.649	0.742					
	ACC6	0.827	0.684				0.452	**0.827**	0.489	0.612					
Logistics Performance (LP)	LP1	0.958	0.918	0.927	0.984	0.987	0.849	0.737	**0.958**	0.873	0.807	0.757	**0.963**		**No**
	LP2	0.978	0.957				0.804	0.756	**0.978**	0.878					
	LP3	0.981	0.961				0.786	0.720	**0.981**	0.860					
	LP4	0.940	0.883				0.733	0.727	**0.940**	0.826					
	LP5	0.950	0.902				0.707	0.687	**0.950**	0.799					
	LP6	0.971	0.944				0.777	0.744	**0.971**	0.870					
Global Competitiveness (GC)	BR*	0.904	0.818	0.888	0.937	0.960	0.746	0.770	0.712	**0.904**	0.842	0.827	0.885	**0.942**	**No**
	EE*	0.967	0.936				0.820	0.783	0.901	**0.967**					
	SI*	0.954	0.910				0.812	0.787	0.877	**0.954**					

* BR=BASICREQ, EE= EFFICIENCYENHANCER and SI=BS&INNOV,
** HTMT Confidence Interval data is available at Panel-B of Appendix-K

Figure-32 and Table-29 present the structural model metrics which are essential for assessment of the model. Table-29 shows that all inner VIF values are lower than threshold of 5, thus collinearity is not a significant problem for this model.

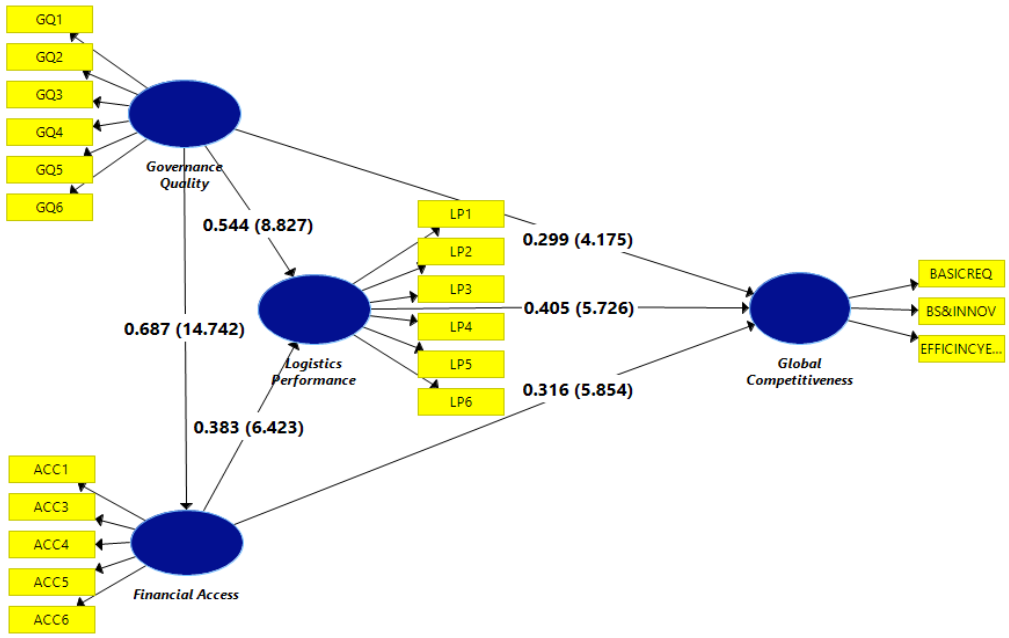


Figure 32. PLS-SEM with Financial Access Path Coefficients and T-Statistics

Table 29. PSL-SEM with Financial Access Structural Model Metrics

Latent Variables	Collinearity (Inner VIF)			R^2	f^2			Q^2	q^2		
	ACC	LP	GC		ACC	LP	GC		ACC	LP	GC
GQ	1.000	1.894	2.987		0.894	0.577	0.231			0.716	0.280
ACC		1.894	2.437	0.472		0.287	0.316	0.274		0.487	0.314
LP			3.694	0.729			0.343	0.668	0.068		0.331
GC				0.871				0.764			

Figure-32 shows that all t-statistics for path coefficients are significant at the 1% level. It provides evidence to support H3B which argues that “Countries’ financial access is positively associated with their logistics performance.” at 1% significance level. As one unit increase in financial access develops logistics performance 0.383

unit when everything else remains constant. In this aspect, it seems like even though financial depth and financial access have positive effect on logistics performance, financial depth's contribution to logistics performance is larger than that of financial access.

Table-29 shows that the coefficient of determination, R^2, is 0.472 for the financial access latent variable. This means that governance quality moderately explain 47.2% of the variance in financial access. Governance quality and financial access substantially explain 72.9% of the variance in logistics performance. All constructs collectively explain 87.1% of the variance in global competitiveness.

f^2 values of financial access latent variable are at middle of Table-29. Thus, financial access has medium effect size of 0.287 on logistics performance's explained variance. Similarly it has medium effect size of 0.316 on global competitiveness's explained variance. Even though financial depth has large effect on logistics performance's explained variance and small effect on global competitiveness' explained variance, financial access has medium effect on both constructs' explained variance.

Table-28 also reveals that Q^2 values of all three endogenous constructs are above zero. These values provide support for that all exogenous variables have predictive power on the endogenous variables. For instance, Q^2 value of 0.668 demonstrates that the exogenous latent variables, governance quality and financial access have predictive relevance for logistics performance.

q^2 values of 0.487 and 0.716 indicate that respectively financial access and governance quality have large predictive relevance effect size for logistics performance. Even though both of them have large predictive relevance effect size for logistics performance, predictive relevance effect size value of governance quality is larger than financial access's predictive relevance effect size. Table-29 also indicates that governance quality, financial development and logistics performance have medium predictive relevance for global competitiveness.

5.2.2.3. Financial Efficiency and Logistics Performance

Finally we added financial efficiency latent variable into the model to assess its effect on logistics performance and global competitiveness. Initially financial efficiency constructs had five indicators. When we run SmartPLS, we observed that all the path coefficients are significant at the 1% level but financial development-global competitiveness path is significant at the 5% level, however there were

problem with internal consistency reliability indicators Cronbach's alpha and Composite Reliability which are highly below the threshold of 0.70. Hair et al. (2016) suggest that the indicators with outer loadings between 0.40 and 0.70 should be considered elimination from the scale only when elimination the indicator leads to an increase in the Composite Reliability above the threshold of 0.70. However, Hair et al. (2016) also underline that the researchers should consider the effect of elimination on the construct's content validity. In this sense we eliminate EFF2 and EFF3 indicators, which have outer loadings below threshold, from the construct. That is, financial efficiency remains in the model with three indicators. Thereby, outer loadings, Cronbach's alpha and Composite Reliability, increase to above the threshold.

Cross-Loadings, Fornell-Lacker Criterion and HTMT results in Table-30 demonstrate that the model achieves discriminate validity. In short, results summary confirm that all constructs are reliable and valid. As a consequence we can proceed to assessment of the structural model to identify the relationship among the latent variables.

Table 30. Results Summary for Reflective Measurement Model with Financial Efficiency

Latent Variable	Indicators	Convergent Validity			Internal Consistency Reliablility		Discriminat Validity								
		Loadings	Indicator Reliability	AVE	Cronbach's Alpha	Composite Reliability	Cross-Loadings				Fornell-Larcker Criterion				HTMT**
		>0.70	>0.50	>0.50			GQ	EFF	LP	GC	GQ	EFF	LP	GC	Does HTMT confidence interval include 1?
Governance Quality (GQ)	GQ1	0.845	0.714	0.866	0.968	0.975	**0.845**	0.419	0.598	0.552	**0.931**				**No**
	GQ2	0.853	0.728				**0.853**	0.440	0.588	0.632					
	GQ3	0.973	0.946				**0.973**	0.684	0.855	0.891					
	GQ4	0.958	0.917				**0.958**	0.632	0.772	0.818					
	GQ5	0.980	0.960				**0.980**	0.704	0.809	0.863					
	GQ6	0.967	0.934				**0.967**	0.636	0.817	0.858					
Financial Efficiency (EFF)	EFF1	0.722	0.521	0.682	0.765	0.864	0.382	**0.722**	0.651	0.593	0.644	**0.826**			**No**
	EFF4	0.825	0.681				0.484	**0.825**	0.472	0.543					
	EFF5	0.918	0.843				0.689	**0.918**	0.687	0.733					
Logistics Performance (LP)	LP1	0.958	0.918	0.927	0.984	0.987	0.848	0.708	**0.958**	0.874	0.807	0.740	**0.963**		**No**
	LP2	0.978	0.957				0.803	0.749	**0.978**	0.879					
	LP3	0.980	0.961				0.785	0.693	**0.980**	0.861					
	LP4	0.940	0.883				0.733	0.727	**0.940**	0.827					
	LP5	0.949	0.901				0.706	0.656	**0.949**	0.801					
	LP6	0.972	0.944				0.777	0.739	**0.972**	0.871					
Global Competitiveness (GC)	BR*	0.902	0.813	0.888	0.935	0.960	0.745	0.644	0.712	**0.902**	0.842	0.765	0.886	**0.942**	**No**
	EE*	0.968	0.938				0.819	0.765	0.901	**0.968**					
	SI*	0.955	0.913				0.812	0.745	0.877	**0.955**					

* BR=BASICREQ, EE= EFFICIENCYENHANCER and SI=BS&INNOV,
** HTMT Confidence Interval data is available at Panel-C of Appendex-K

Figure-33 reveals that all path coefficients are significant at the 1% level when we keep Financial Efficiency construct with three indicators. One unit increase in financial efficiency develops logistics performance by 0.377 units when everything else remains constant. Compared to other dimensions of financial development, financial depth-logistics performance (0.480) has the highest path coefficient, financial access-logistics performance (0.383) and financial efficiency-logistics performance (0.377) have the relatively lower path coefficients.

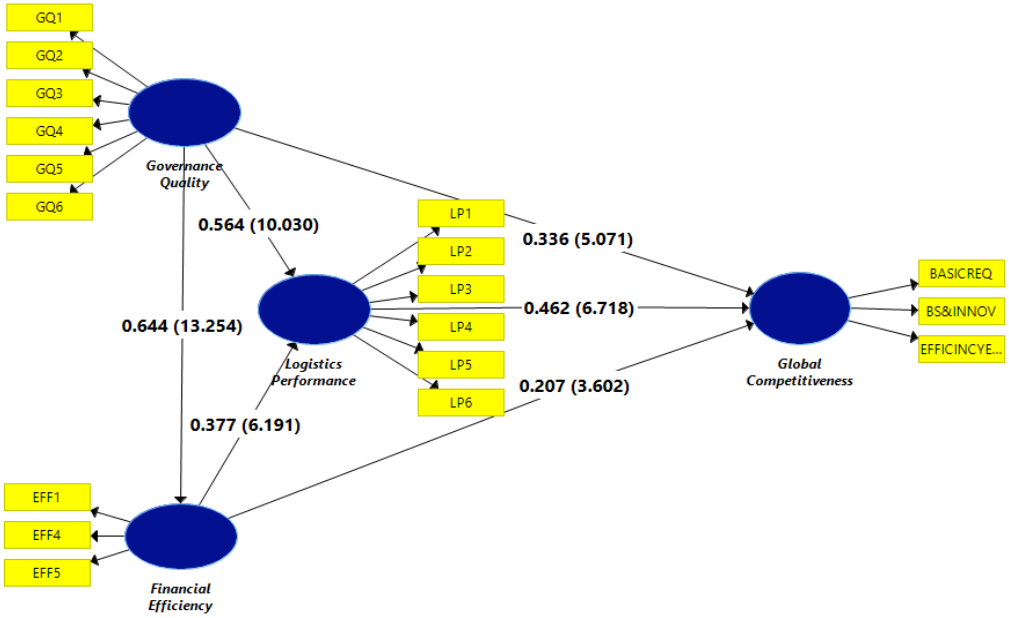


Figure 33. PLS-SEM with Financial Efficiency Path Coefficients and T-Statistics

Table-31 indicates that governance quality explains 41.5% of the variance of financial efficiency. Governance quality and financial efficiency explains 73.4% of the variance of logistics performance. Lastly governance quality, financial efficiency and logistics performance collectively explain 85% of the variance of governance quality.

Governance quality has large effect size on logistics performance's explained variance, but it has medium effect size on global competitiveness' explained variance. Likewise financial efficiency has medium effect size on the logistics performance's and global competitiveness' explained variance.

Q^2 value of 0.260 reflects that governance quality has predictive relevance for financial efficiency. Similarly Q^2 value of 0.624 show that governance quality and financial efficiency have predictive relevance for logistics performance. q^2 values

of 0.486 and 0.755 mention that financial efficiency and governance quality have large predictive relevance effect size for logistics performance, respectively.

Table 31. PSL-SEM with Financial Efficiency Structural Model Metrics

Latent Variables	Collinearity (Inner VIF)			R^2	f^2			Q^2	q^2		
	EFF	LP	GC		EFF	LP	GC		EFF	LP	GC
GQ	1.000	1.708	2.904		0.708	0.700	0.259			0.755	0.396
EFF		1.708	2.243	0.415		0.313	0.127	0.260		0.486	0.313
LP			3.760	0.734			0.379	0.624	0.0741		0.468
GC				0.850				0.703			

Thereby we conclude that financial depth has the largest effect on logistics performance and followed by financial access and financial efficiency, respectively as seen from the numbers in Table-32. This is not surprising as in the financially depth markets, logisticians can reach various products and services which are provided by banks, bond markets, stock markets, financial derivatives markets, insurance companies, venture capitalists and more and more financial institutions and markets. These financial institutions and markets provide crucial product and services to logistics industries by producing and processing information, facilitating diversification and management of risk, providing capital and liquidity and easing exchange of goods and services.

Table 32. Summary of Effects

Variables	Effect Type	Logistics Performance	Global Competitiveness
Financial Depth	Direct Effect	0.480	0.146
	Indirect Effect		0.239
	Total Effect	0.480	0.385
Financial Access	Direct Effect	0.383	0.316
	Indirect Effect		0.155
	Total Effect	0.383	0.471
Financial Efficiency	Direct Effect	0.377	0.207
	Indirect Effect		0.174
	Total Effect	0.377	0.381

As seen at Table-32, financial access has the largest direct and total effects on global competitiveness followed by financial efficiency and financial depth, respectively. This finding support Ardıc et al. (2011), Samans et al. (2015) and World Bank (2008) which argues that better access to financial services decrease poverty and facilitates day-to-day living citizens and increases possibility of obtaining education and health services and similar services. Moreover, easy access to financial products and services is crucial for global competitiveness as it facilitates doing business. That is, countries having difficulties in accessing financial services lag behind the others that have easy access to those services.

CHAPTER 6

CONCLUSION

In this thesis, we examine the linkages among governance quality, financial development, logistics performance and global competitiveness. Even though the purpose of this thesis is to examine the relationship between financial development and logistics performance, including governance quality and global competitiveness completes the picture.

Financial development is only possible with a strong and sound government, regulatory and business environment (Sahay et al., 2015). Establishment of this environment is only possible with effectiveness of the government bureaucracy, political stability, voice and accountability in political system, regulations quality and consistency, rule of law and the government officials' commitment to fight against corruption which are the significant drivers of financial development (Beck et al., 2006). Detragiache et al., (2005) stress that politically corrupt and instable countries are unable to have efficient financial systems. If a country's accounting and reporting standards are not high and it suffers from corruption, fraud and cronyism, the financial system cannot efficiently provide the financial products and services to the real sector and they are unable to have full capability to choose the possible best projects to allocate capital. Likewise, literature postulates that government's regulatory policies have profound effect on size and structure of financial system (Haber, 1991, 1996). The countries legal system and political institutions drive both financial development and economic growth (Levine, 1997) and differences in legal and political systems significantly affect financial development and economic growth (La Porta et al., 1998). That is, state governance quality has significant effect on financial development of the countries; moreover, it is a prerequisite for financial development.

As the backbone of domestic and international trade, logistics encompasses freight transportation, inventory management, warehousing, border clearance, payment systems, and many other functions (Arvis, 2012). Even though logistics activities are performed typically by private service providers for owners of goods,

governments have significant role and responsibility for high level logistics performance such as building financial, trade and transportation infrastructure, decreasing bureaucracy in all phases of logistics activities, implementing sound custom procedures, regulating compensation contracts for unshipped or lost cargo and etc. Thereby, political stability, control of corruption, honest and accountable overall business environment and high level regulatory quality are sine qua non for efficiency of logistics system. Procedural red tape, inadequate enforcement of contracts, poor enforcement of rules of engagement, inefficient custom system, delays at border crossing or ports, pilferage, loss in transit, and restrictive protocols on movement of cargo severely deteriorate the nations' trade (Hausman et al., 2005). On the other side, the countries which has reliable infrastructure, low customs clearance times, better financial services and sound regulatory environment attract foreign direct investment, in turn their export volume increase and the domestics firms become more competitive by expanding their scale and scope (Dollar et al., 2004). Thereby the countries with high level of governance quality, business, financial and trade environment are expected to have better logistics performance.

Logistics is vulnerable to inherent risks and uncertainties such as transportation, exchange, payment and cargo risks, infrastructure inefficiency, capital requirements for investment, warehousing or inventory etc. Moreover, in the second half of previous century, international and domestic trade has steeply increased, causing the risks and uncertainties to icrease for the logistics industry. In response, financial institutions and markets have provided various solutions for these risks and uncertainties. The products and services of financial intermediaries and markets boost firms' and the countries' logistics performance as finance has a substantial effect on logistics activities, where better logistic performance result in high level global competitiveness of the countries (Ellram, 1991; Bowersox & Closs, 1996; Mentzer et al., 2004; Fugate et al., 2010; Gupta and Dutta 2011).

There are several connections which link financial intermediation and markets with logistics industry. Insurance companies provide coverage such as physical transportation insurance, loss, damage or undelivered goods (Shcramm, 2012), catastrophic risks coverage such as fire, flood, collision, terrorism, strikes, and civil unrest and financial risk coverage as accounts receivable insurance, documentary collection applications and export credit insurance and etc. Likewise logistics industry is highly vulnerable to operational and commercial risks which occur due to high volatility in freight rates as well as in operating and capital cost (Alizadeh et al.,

2015; Hertwig and Rau, 2010). Financial derivatives market provides instruments such as Forward Freights Agreements (FFAs), futures, freights options to hedge against these logistics risks and they are backbone for risk management in logistics industry (Kleindorfer and Visvikis, 2007).

Logistics is also a capital heavy industry and requires larger amount of capital to finance warehouses, trucks, cranes, handling machines, larger containers, cold-chain transportation vehicles, bigger ships and aircrafts, roads, ports, railroads and airports. In financially developed countries, the logisticians can reach the more competitive and cost efficient financial resources to finance these capital requirements. Similarly, the logistics enterprises have to manage their working capital and inventory at optimal level to forward and reverse flow of goods and services. Financial intermediaries support logistics industry with providing funds for their working capital and inventory requirements (Buzacott and Zhang, 2004; Hofmann, 2009)

Shortly, in financially developed countries, financial institutions and markets, facilitates trade, mitigates/hedges all kind of risks/uncertainties and provides capital to logistics industry. Then, all these financial operations require organized and coordinated set of activities to flow and storage of goods, services and information between the producers to the market (OECD, 2014). Otherwise the countries cannot benefit from high level productivity and facilitated trade. Thereby, high level financial development promotes superior logistics performance resulting high level global competitiveness.

Even though theoretical studies postulate positive relationship between financial development and logistics performance, the empirical studies examining the relationship is limited. Thereby, the focal point of this thesis is to cover the gap, whether there is any empirical relation between financial development of the countries and their logistics performance.

Therefore we employ a model in which states' governance quality (voice and accountability, political stability, government efficiency, regulatory quality, rule of law and control of corruption) financial development (financial depth, access and efficiency), logistics performance (customs, infrastructure, shipments, service quality, tracking & tracing and timeliness) and global competitiveness (basic requirements [institutions, macroeconomic environment, health and primary education], efficiency enhancers [higher education and training, goods market efficiency, labor market efficiency, technological readiness, market size] and business sophistication and innovation) are linked to each other.

We have obtained data from the World Bank and World Economic Forum. We have constructed financial depth, access and efficiency indices by using principal component analysis. Then, we firstly examine the relations between the variables in pairs using OLS regression which reflects positive linear relationships between them. Then to simultaneously examine relationship among governance quality, financial development, logistics performance and countries' global competitiveness, we have used Partial Least Squares (PLS) method. It is an advantageous method when simultaneously examining multi-level relationships such as a dependent variable can become an independent variable in subsequent relationship in the same model and more over it allow including more than one dependent variable to the model (Astrachan et al., 2014).

PLS-SEM empirical results provide substantial support for each hypotheses in the model at 1% significance level. That is, governance quality is significantly and positively associated with financial development, logistics performance and global competitiveness. In terms of direct effects, one-unit change of governance quality changes financial development, logistics performance and global competitiveness by 0.754, 0.417 and 0.290 units, respectively, when everything else remains constant. Moreover, governance quality has the strongest total effect on global competitiveness (0.842), followed by logistics performance (0.807), and financial development (0.754). Thereby governance quality has significant effect on all other factors. Hence, it is advisable for policy makers to develop government efficiency, political stability, voice and accountability, control of corruption, regulatory quality and rule of law which positively influence financial development, logistics performance and global competitiveness.

Financial development has significant and positive total effect on logistics performance (0.517) and global competitiveness (0.512). Lastly, logistics performance is significantly and positively associated with global competitiveness (0.396). Thereby, the policy makers who want to improve their country's global competitiveness should focus on governance quality, financial development and logistics performance, respectively.

Moreover governance quality moderately explains 56.9% of the variance in financial development. Likewise governance quality and financial development substantially explain 76.6% of the variance in logistics performance. Importantly, f^2 results point out that financial development's contribution to the explained variance of logistics performance is greater than the variance explained by governance quality. Moreover, blindfolding statistics results, Q^2 and q^2, show that financial

development has the largest predictive relevance for logistics performance. Governance quality, financial development and logistics performance altogether explain 85.8% of the variance in global competitiveness.

In the model, financial development and logistics performance constructs serve as mediating variable. All mediation effects in the model are complementary (partial mediation) as all direct and indirect effects are statistically significant and positive. The relationship from governance quality to logistics performance in which financial development intervenes is positive and statistically significant, thus financial development serves as complementary mediator. That is, higher levels of governance quality increase logistics performance directly but also increase financial development, which in turn leads to higher logistics performance. That is, some of governance quality's effect on logistics performance is explained by financial development. Likewise, some of the financial development's effect on global competitiveness is explained by logistics performance.

We also have replaced the financial development variable with its dimensions represented by financial depth, access and efficiency indices to capture which dimension has larger influence on logistics performance. We find that financial depth has the largest effect on logistics performance followed by financial access and financial efficiency, respectively. One-unit increase in financial depth increases logistics performance by 0.480 units, additionally, one unit increase in financial access and financial efficiency improves logistics performance by 0.383 and 0.377 units, respectively. In markets that has financial depth, logisticians can reach various financial products and services which are provided by banks, bond markets, stock markets, financial derivatives markets, insurance companies, venture capitalists and other financial intermediaries. Financial intermediaries provide crucial products and services to the logistics industries by producing and processing information, facilitating diversification, transfer and management of risk, providing capital and liquidity and easing exchange of goods and services. In addition, financial access (0.316) has the greatest effect on global competitiveness followed by financial efficiency (0.207) and financial depth (0.146). This finding is in line with the World Bank (2008) report which argues that better access to financial services decreases poverty and facilitates day-to-day living of the citizens and increases possibility of obtaining education, health services and similar services. It is important for policy makers to improve financial depth for better logistics performance and to improve financial access for achieving global competitiveness.

Logistics is the backbone of trade and it is important for all industries as it touches every cell of the firm or organization. Moreover, it provides crucial support for all industries which produce goods, services and information. Without well-performing logistics system, movement of goods, services and information to the right consumer, at the right time, at the right place, at the right quantity, at the right quality and at an affordable cost might not be possible, and those countries without well performing logistic systems cannot be competitive globally. As postulated by the theory and supported by the findings of this study, well-functioning, accessible and efficient financial institutions and markets have significant and positive contribution to logistics performance of countries.

Thereby, practitioners and policymakers around globe should have a good understanding of the association between financial development and logistics performance in order to increase logistics performance of a country and its global competitiveness.

BIBLIOGRAPHY

Acemoglu, D. (2001). Credit market imperfections and persistent unemployment. *European Economic Review 45,* 665-679.

Acemoglu, D. & Robinson, J.A. (2012). *Why Nations Fail: The Origins of Power, Prosperity, and Poverty.* New York, NY: Crown.

Aizenman, J., Jinjarak, Y., & Park, D. (2015). *Financial Development and Output Growth in Developing Asia and Latin America: A Comparative Sectoral Analysis* (NBER Working Paper, 20917 National Bureau of Economic Research). Cambridge, Massachusetts.

Akerlof, George A. (1970). The Market for Lemons: Quality Uncertainty and the Market Mechanism. *Quarterly Journal of Economics, The MIT Press, 84 (3),* 488–500. doi:10.2307/1879431.

Alizadeh, A.H., Kappou, K., Tsouknidis, D. & Visvikis I. (2015). Liquidity effects and FFA returns in the international shipping derivatives market. *Transportation Research Part E, 76,* 58-75.

Allen, .F. (2001). Do Financial Institutions Matter?. *The Journal of Finance, Vol. 56, No. 4, Papers and Proceedings of the Sixty-FirstAnnual Meeting of the American Finance Association,* 1165-1175.

Allen, F., Chui, M. & Maddaloni, A. (2004). Financial systems in Europe, the USA, and Asia. *Oxford Review of Economic Policy, 20,* 490–508.

Allen, F., & Santomero, A.M. (1998). The Theory of Financial Intermediation. *The Journal of Banking and Finance, Volume 21, Issues 11-12,* 1461-1485.

Allison, P. D. (2001). *Missing Data Series: Quantitative Applications in the Social Sciences.* Sage University Paper: Thousand Oaks.

Ang, J.B. & McKibbin, W.J. (2007). Financial liberalization, financial sector development and growth: evidence from Malaysia. *Journal of Development Economics, 8,* 215–233.

Arcand, J.L., Berkes, E., & Panizza, U. (2012). *Too Much Finance?* (IMF Working Paper 12/161). International Monetary Fund Washington, DC.

Ardic, O.P., Heimann, M. & Mylenko, N. (2011). *Access to Financial Services and the Financial Inclusion Agenda around the World A Cross-Country Analysis with a New Data Set* (Policy Research Working Paper 5537). The World Bank.

Ardic, O., Imboden, K. & Latotue, A. (2013). *Financial Access 2012 Getting to a More Comprehensive Picture.* New York: CGAP and International Finance Cooperation.

Arizala, F., Cavallo, E., & Galindo, A. (2009). *Financial development and TFP growth: Cross-country and industry-level evidence, (Working Paper # 682).* Inter-American Development Bank.

Arvis, J-F., Mustra, M.A., Panzer, J., Ojala, L., & Naula, T. (2007). *Connecting to Compete, Trade Logistics in the Global Economy, The Logistics Performance Index and Its Indicators, 2007.* Washington, DC: The International Bank for Reconstruction and Development / The World Bank.

Arvis, J-F., Mustra, M.A., Ojala, L., Shepherd, B. & Saslavsky, D. (2010). *Connecting to Compete 2010, Trade Logistics in the Global Economy, The Logistics Performance Index and Its Indicators.* Washington, DC: The International Bank for Reconstruction and Development / The World Bank.

Arvis, J.F., & Shepherd, B. (2011). *The air connectivity index: Measuring integration in the global air transport network, (*Policy Research Working Paper No. 5722. World Bank). Retrieved from www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2011/06/30/000158349_ 20110630135825/Rendered/ PDF/WPS5722.pdf.

Arvis, J-F., Mustra, M.A., Ojala, L., Shepherd, B. & Saslavsky, D. (2012). *Connecting to Compete 2012, Trade Logistics in the Global Economy, The Logistics Performance Index and Its Indicators.* Washington, DC: The International Bank for Reconstruction and Development / The World Bank.

Arvis, J-F., Saslavsky, D., Ojala, L., Shepherd, B., Busch, C., & Raj, A., (2014). *Connecting to Compete 2014, Trade Logistics in the Global Economy, The Logistics Performance Index and Its Indicators.* Washington, DC: The International Bank for Reconstruction and Development / The World Bank.

Arvis, J-F., Saslavsky, D., Ojala, L., Shepherd, B., Busch, C., Raj, A., & Naula, T. (2014). *Connecting to Compete 2016, Trade Logistics in the Global Economy, The Logistics Performance Index and Its Indicators.* Washington, DC: The International Bank for Reconstruction and Development / The World Bank. Retrieved from https://wb-lpi-media.s3.amazonaws.com/LPI_Report_2016.pdf.

Astrachan, C.B., Patel V.K., & Wanzernried G. (2014). A comparative study of CB-SEM and PLS-SEM for theory development in family firm research. *Journal of Family Business Strategy. Vol.5,* 116-128.

Atje, R. & Jovanovic, B. (1993) Stock markets and development. *European Economic Review 37,* 632-640.

Avgouleas, E. (2012). *Governance of Global Financial Markets: The Law, the Economics, the Politics.* New York: Cambridge University Press.

Bagehot, W. (1873). *Lombard Street: A Despcription of the Money Market.* London: Henry S.King.

Bagozzi R.P. (1994). *Structural equation models in marketing research: basic principles.* Bagozzi R. P. (edt). Principles of marketing research. Oxford: Blackwell, 317–385.

Ballou, R.H. (2004). *Business Logistics, Supply chain Management.* Pearson Prentive Hall: New Jersey.

Barajas, A., Chami, R., & Yousefi, S.R. (2013). *The Finance and Growth Nexus Re-examined: Do All Countries Benefit Equally?* (IMF Working Paper 13/130). International Monetary Fund: Washington, DC.

Barladi, A. N. and Enders, C. K. (2010). An Introduction to Modern Missing Data Analyses. *Journal of School Psychology, 48(1),* 5-37.

Bhattacharya, S., and Thakor, A.V. (1993), Contemporary Banking Theory, *Journal of Financial Intermediation, 3 (1),* 2-50.

Beck, T., (2008). *The Econometrics of Finance and Growth* (World Bank Working Paper Series). Retrieved from http://www-wds.worldbank.org/servlet/WDSContentServer/WDSP/IB/2008/04/24/000158349_20080424160616/Rendered/PDF/WPS4608.pdf

Beck, T., Levine, R. & Loayza, N. (2000). Finance and the sources of growth. *Journal of Financial Economics 58,* 261-300.

Beck, T., Demirguc-Kunt, A. & Levine, R. (2003). Law and finance: Why does legal origin matter?. *Journal of Comparative Economics, Elsevier, vol. 31(4),* 653-675.

Beck, T., & Levine, R. (2003). Legal institutions and financial development. *New Institutional Economics.* Retrieved from http://www1.worldbank.org/finance/assets/images/wps3136.pdf

Beck, T., & Levine, R. (2004). Stock markets, banks, and growth: Panel evidence. *Journal of Banking & Finance 28,* 423–442.

Beck, T., Demirguc-Kunt, A., Laeven, L., & Maksimovic, V. (2006). The determinants of financing obstacles. *Journal of International Money and Finance, Vol. 25:6,* 932-952. doi:10.1016/j.jimonfin.2006.07.005.

Beck, T., Demirguc-Kunt, A., & Levine, R. (2009). *Financial Institutions and Markets across Countries and over Time* (WPS4943). The World Bank: Policy Research Working Paper.

Benston, G.J., Smith, C., W., (1976). Papers and Proceedings of the Thirty-Fourth Annual Meeting of the American Finance Association Dallas. *Journal of Finance, Vol. 31, No. 2,*, 215-231.

Bidgoli, H. (2010). *The handbook of technology management, supply chain management, marketing, and advertising, and global management. Volume 2.* John Wiley and Sons, Inc: New Jersey, US.

Boot, A.W.A. (2000). Relationship Banking: What Do We Know?. *Journal of Financial Intermediation,* 7-25.

Bowersox, D.J., & Closs, D.J. (1996*). Logistical Management: The Integrated Supply Chain Process.* New York: McGraw- Hill.

Boyd, J.H. & Prescott, E.C. (1986). Financial intermediary-coalitions. *Journal of Economics Theory 38,* 211-232.

BITRE, Bureau of Infrastructure, Transport and Regional Economics. (2001) *Logistics in Australia: A Preliminary Analysis. Bureau of Transport and Regional Economics:* Canberra. Retrieved from https://bitre.gov.au/publications/2001/wp_049.aspx

Brunet, F. (2012). *Regulatory Quality and Competitiveness in Recent European Union Member States.* L'Europe en Formation. 2012/2 No:364.

Buzacott J.A., & Zhang, R.Q. (2004). Inventory management with asset-based financing. *Management Science,Vol.50, No:9.* 1274-1292.

Campbell, T. S., & Kracaw, W. A., (1980). Information Production, Market Signaling, and the Theory of Financial Intermediation. *The Journal of Finance, Vol.35, No.4,* 863-881.

Cavinato, J.L. (2004). Supply chain logistics risks. *International Journal of Physical Distribution & Logistics Management, Vol. 34 Iss 5.* 383-387. Retrieved from: http://dx.doi.org/10.1108/09600030410545427

Chemmanur, T. & Fulghieri, P., (1994a). Reputation, Renegotiation, and the Choice between Bank Loans and Publicly Traded Debt. *The Review of Financial Studies, Vol. 7, No. 3,* 475-506.

Chemmanur, T. J., & Fulghieri, P., (1994b). Investment Bank Reputation, Information Production, and Financial Intermediation. *The Journal of Finance, Vol.49, No.1,* 57-79.

Chen, N. & Novy,D. (2011). Gravity, trade integration, and heterogeneity across industries. Journal of International Economics, 85(2). 206–221.

Chin, W.W. (1998*). The partial least squares approach to structural equation modeling.* In: G. A. Marcoulides (Ed.), Modern Methods for Business Research, 295–358. Mahwah, NJ: Lawrence Erlbaum Associates.

Chin, W.W. (2000). *Partial least squares for researchers: An overview and presentation of recent advances using the PLS approach.* Retrieved from http://disc-nt.cba.uh.edu/chinl/ icis2000pIstaIk.pdf.

Choi, T-M., Chui, C-H & Chan, H-K. (2016). Risk management of logistics systems. *Transportation Research Part E (90),* 1-6.

Chu, Z. (2010), Logistics and economic growth: a panel data approach. *The Annals of Regional Science, 49.* 87-102

Claessens, S. & Feijen, E. (2007). *Financial Sector Development and the Millennium Development Goals.* World Bank Working Papers. Retrieved from http://dx.doi.org/10.1596/978-0-8213-6865-7.

Clause, I., & Glimse, A., (2003). *Asymmertic Information, Financial Intermediation and the Monetary Transmission Mechanism: A Critical Review.* New Zealand Treasury, Working Paper 03/19.

Cihak, M., Demirguc-Kunt, A., Feyen, E., & Levine R. (2012). *Benchmarking Financial Systems around the World, Policy Reserch Working Paper.* The World Bank.

Cihak, M., & Demirguc-Kunt, A. (2013). *Rethinking the State's Role in Finance.* World Bank, Washington, DC: World Bank. Retrieved from https://openknowledge.worldbank.org/handle/10986/13197

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences (2nd ed.).* Hillsdale, NJ: Lawrence Erlbaum Associates.

CGAP, Consultative Group to Assist the Poor. (2009). *Financial Access 2009: Measuring Access to Financial Services around the World.* Washington, D.C.: Consultative Group to Assist the Poor/The World Bank.

Coyle, J.J., Langley, C.J., Novack, R.A., & Gibson, B. (2013). *Supply Chain Management: A Logistics Perspective, 9th edition.* Mason, OH, USA.

Coto-Milan, P., Agueros, M., Casares-Hontanon, P. & Pesquera, M. (2013). Impact of Logistics Performance on World Economic growth (2007–2012). *World Review of Intermodal Transportation Research*, 4(4).

Cronbach, L. (1951). Coefficient alpha and the internal structure of tests. *Psychomerika.16,* 297-334.

CSCMP, Council of Supply Chain Management Professionals. (n.d.) *Council of Supply Chain Management Professionals' Supply Chain Definitions and Glossary.* Retrieved from https://cscmp.org/imis0/CSCMP/Educate/SCM_Definitions_and_Glossary_of_Terms/CSCMP/Educate/SCM_Definitions_and_Glossary_of_Terms.aspx?hkey=60879588-f65f-4ab5-8c4b-6878815ef921.

Cumming, D., Schmidt, D., & Walz, U. (2010). Legality and venture governance around the world*. Journal of Business Venturing. Vol.25 (1),* 54–72.

Degryse, H., & Van Cayseele, P., (2000). Relationship Lending within a Bank-Based System: Evidence from European Small Business Data. *Journal of Financial Intermediation, Vol.9,* 90-109.

Demirgüç-Kunt, A. & Klapper, L. (2012). *Measuring Financial Inclusion: The Global Findex.* Policy Research Working Paper 6025. World Bank, Washington, DC.

Detragiache, E., Gupta, P. & Tressel T. (2005). *Finance in Lower-Income Countries: An Empirical Explaration.* IMF Working Paper: WP/05/167.

DHL. (n.d.) *Financial aspects: The global solution for low-risk business.* Retrieved from https://www.dhl-discoverlogistics.com/cms/en/course/management/management/financial.jsp?pdf=1

Diamond, D.W. (1984). Financial intermediation and delegated monitoring. *The Review of Economic Studies. Volume 51, Issue 3,* 393-414.

Diamond, D.W. (1991). Monitoring and Reputation: The Choice between Bank Loans and Directly Placed Debt. The Journal of Political Economy*, Vol. 99, No. 4,* 689-721

Djankow, S., McLiesh, C., & Shleifer, A. (2007). Private credit in 129 countries. *Journal of Finance Economics, 84,* 299-329.

Dollar, D., Hallward-Driemeier, M., & Mengistae, T. (2003). *Investment climate and international integration* (Policy Research Working Paper. No.3323)*.* World Bank.

Dow J, Gorton G. 1997. Stock market efficiency and economic efficiency: Is there a connection? *Journal of Finance 52(3),* 1087–1129.

Drobetz, W., Gounopoulos, D., Merikas, A. & Schöder, H. (2013). Capital structure decisions of globally-listed shipping. *Transportation Research Part E. 52,* 49-76.

Ellram, L.M. (1991). Supply-Chain Management: The Industrial Organisation Perspective. *International Journal of Physical Distribution and Logistics Management 21(1),* 13–22.

European Central Bank. (2012). The Interplay of Financial Intermediaries And Its Impact On Monetary Analysis. *Monthly Bulletin.* Retrieved from https://www.ecb.europa.eu/pub/pdf/other/art1_mb201201 en_pp59-73en.pdf.

Fanelli, J.M., Medhora, R. (2002). *Finance and competitiveness in developing countries.* José María Fanelli and Rohinton Medhora Routledge (Ed.). International Development Research Center, London ; New York.

Fawcett, S.E., Waller, M.A., & Bowersox, D.J. (2011). Cinderella in the C-Suite: Conducting Influential Research to Advance the Logistics and Supply Chain Disciplines. *Journal of Business Logistics 32(2),*115–121.

Fawcett, S.E. & Waller, M.A. (2013). Considering Supply Chain Management's Professional Identity: The Beautiful Discipline (Or, "We Don't Cure Cancer, But We Do Make a Big Difference"). *Journal of Business Logistics, 343*. 183-188.

Fisman, R., & Love, I. (2004). *Financial development and growth in the short and long run,* (NBER Working Paper 10236). Cambridge, United States: National Bureau of Economic Research.

Fornell, C. & Larcker, D.F. (1981). Structural equation models with unobservable variables and measurement error: Algebra and statistics. *Journal of Marketing Research, 18(3),* 328–388.

Fugate, B.S., Mentzer, J.T., & Stank, T.P.(2010). Logistics Performance: Efficiency, Effectiveness, and Differentiation. *Journal of Business Logistics 31(1),* 43–62.

Garson, G.,D. (2016). *Partial Least Squares: Regression & Structural Equation Models.* Asheboro, NC, USA: Statistical Publishing Associates.

Gatti, R. & Love, I. (2008). Does access to credit improve productivity? Evidence from Bulgaria. *Economics of Transition 16,* 445-465.

Gatti, R. & Vaubourg, A. (2009). *Unemployment and Finance: How Do Financial and Labour Market Factos Interact?* (The Institute of the Study of Labor (IZA) Discussion Paper Series). Bonn, Germany.

Geisser, S. (1975). A predictive approach to the random effect model. *Biometrika. 61(1),*101–107.

Goldsmith, R.W. (1969). *Financial Structure and Development.* New Haven: Yale University Press.

Gomm, M.L. (2010). Supply Chain Finance: Applying Finance Theory to Supply Chain Management to Enhance Finance in Supply Chains. *International Journal of Logistics: Research and Applications 13(2),* 133-142.

Greenbaum, S. I., & Thakor, A. V. (1995). *Contemporary Financial Intermediation.* New York: Dryden Press.

Greenwood, J.& Smith, B. (1997). Financial markets in development, and the development of financial markets. *Journal of Economic Dynamics and Control 21,* 145–181.

Goldby, J.T., & Zinn, W. (2016). Technology innovation and new business models: Can logistics and supply chain accelerate the evolution?. *Journal of Business Logistics. 37(2),* 80-81. doi:10.1111/jbl.12130

Goldsmith, R.W. (1969). *Financial Structure and Development.* New Haven, CT: Yale University Press.

Gotz, O., Liehr-Gobbers, K., & Krafft, M. (2009). *Evaluation of structural equation models using the partial least squares (PLS) approach.* From: V. Esposito Vinzi, W.W. Chin, J. Henseler and H. Wang (Eds). Handbook of partial least squares: Concepts, methods and applications. Berlin: Springer.

Govindan, K. & Chaudhuri, A. (2015). Interrelationships of risks faced by third party logistics service providers: A DEMATEL based approach. *Transportation Research Part E 90,* 177-195.

Gupta, S., & Dutta, K. (2011). Modeling of Financial Supply Chain. *European Journal of Operational Research 211 (1),* 47–56.

Guillaumonut Jeanneney, S., Hua, P., & Liang, Z. (2006). Financial development, economic efficiency, and productivity growth: Evidence from China. *The Developing Economies, XLIV-1.* 27–52. doi:10.1111/j.1746-1049.2006.00002.x

Haan, J., Oosterloo, S. & Schoenmaker, D., (2009). *European Financial Markets and Institutions.* Cambriedge: Cambriedge University Press.

Haber, S.H. (1991). Industrial concentration and the capital markets: A comparative study of Brazil, Mexico, and the United States 1830– 1930. *Journal of Economics History, 51(3),* 559–580.

Haber, S.H., (1996). *Capital immobilities and industrial development: A comparative study of Brazil, Mexico, and the United States, 1840–1930.* Stanford University.

Hair, J.F., Black, W.C., Babin, B.J., Anderson, R. E., & Tatham, H.A. (2009). *Multivariate Data Analysis (7th Edition).* Pearson Prentice-Hall, Upper Saddle River, NJ.

Hair, J.F., Ringle, C.M., & Sarstedt, M. (2011). PLS-SEM: indeed a silver bullet. *Journal of Marketing Theory and Practice 19 (2),* 139-151.

Hair, J.F.Jr., Ringle, C.M., & Sarstedt, M. (2012a). Editorial, partial least squares: The better approach structural equation modeling? *Long Range Planning, Vol.45, Issues 5-6,* 312-319.

Hair, J.F., Sarstedt, M., Ringle, C.M., & Mena, J.A. (2012b). An assessment of the use of partial least squares structural equation modeling in marketing research. *Journal of the Academy of Marketing Science 40 (3),* 414-433.

Hair, J.F.Jr., Ringle, C.M., & Sarstedt, M. (2013). Editorial Partial Least Squares Structural Equation Modeling: Rigorous Applications, Better Results and Higher Acceptance. *Long Range Planning, Volume 46, Issue 1-2,* 1-12.

Hair, J.F.Jr., Hult, G.T.M., Ringle, C.M. & Sarstedt, M. (2016). *A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM).* SAGE Publications. Kindle Edition.

Haksever, C. & Render, B. (2013). *Service Management, An Integrated Approach to Supply Chain Management and Operations.* New Jersey: FT Press.

Harrison, A. & van Hoek, R. (2008). *Logistics Management and Strategy, Competing through the Supply Chain,* 3rd Edition. Essex, England: Financial Times.

Hausman, W.H., Lee, H.L., & Subramanian, U. (2005). *Global logistics indicators, supply chain metrics* (World Bank Policy Research Working Paper No.3773).

Henseler, J., Ringle, C. M., & Sinkovics, R. R. (2009). The use of partial least squares path modeling in international marketing. *Advances in International Marketing, 20,* 277– 320.

Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A New Criterion for Assessing Discriminant Validity in Variance-based Structural Equation Modeling. *Journal of the Academy of Marketing Science, 43(1),* 115-135. Retrieved from http://link.springer.com/article/10.1007%2Fs11747-014-0403-8.

Henseler, J., Hubona, G.S. & Ray, P.A. (2016). Using PLS Path Modeling in New Technology Research: Updated Guidelines. *Industrial Management & Data Systems, Volume 116 (2016), Issue 1,* 1-19.

Hertwig, P. & Rau, P. (2010). *Risk Management in the Air Cargo Industry Revenue Management, Capacity Options and Financial Intermediation.* Hamburg: Diplomica Verlag GmbH.

Hicks, J.R., (1969). Automatists, Hawtreyans and Keynesians. *Journal of Money, Credit and Banking, 1(3),* 307-317.

Hoekman, B.M. (2012). *A 21st Century Trade Agenda: Global Supply Chains and Logistics Services.* Retrieved from http://www.wto.org/english/forums_e/public_forum12_e/art_pf12_e/article_e.htm?art=5

Hofmann, E. (2005). Supply chain finance: some conceptual insights. In: Lasch, R. and Janker, C.G. (Hrsg.). *Logistik Management - Innovative Logistikkonzepte, Wiesbaden,* 03-214. Retrieved from https://www.alexandria.unisg.ch/export/DL/29025.pdf

Hofmann, E. (2009). Inventory Financing in Supply Chains: A Logistics Service Provider-Approach. *International Journal of Physical Distribution and Logistics Management, 39(9),* 716–740.

Hofmann, E. & Kotzab, H. (2010). A Supply Chain-Oriented Approach of Working Capital Management*. Journal of Business Logistics 31(2),* 305-330.

Hollweg, C. & Wong, M. (2009). *Measuring regulatory restrictions in logistics services (*ERIA Discussion Paper Series, ERIA-DP-2009– 14).

Hsu, P., Tian, X., & Xu, Y. (2014). Financial development and innovation: Crosscountry evidence. *Journal of Financial Economics, vol. 112, issue 1,* 116-135

International Monetary Fund (IMF). (2005). *Financial Sector Assessment A Handbook Chapter 2 Indicators of Financial Structure, Development, and Soundness.* Washington, D.C. Retrieved from http://www.imf.org/external/pubs/ft/fsa/eng/.

International Monetary Fund (IMF). (2006). *Financial Soundness Indicators.* Washington, D.C. Retrieved from htpp://www.imf.org.

International Monetary Fund (IMF). (2016). *Statistics Manual And Compilation Guide Manual.* Washington, D.C.: International Monetary Fund.

Jarvis, C.B., MacKenzie, S.B., & Podsakoff,P.M. (2003). A critical review of construct indicators and measurement model misspecification in marketing and consumer research. *Journal of Consumer Research, 30(2),* 199–218.

Kaufmann, D., Krayy, A. & Mastuzzi, M. (2010). *The worldwide governance indicators: Methodology and analytical issues.* Global Economy and Development at Brookings.

Kavussanos, M.G. & Visvikis, I., (2006). *Derivatives and Risk Management in Shipping, 1st Edition.* London: Witherbys Publishing.

Ketchen, D.J.Jr. (2013). Book Review: A Primer on Partial Least Squares Structural Equation Modeling. *Long Range Planning, Vol.46, Issues 1–2*, 184-185. doi:10.1016/j.lrp.2013.01.002.

Khan, M., Senhadji, A. & Smith, B. (2001). *Inflation and Financial Depth,* (Working Paper 01/44). International Monetary Fund, Washington, DC.

King, R.G. & Levine, R. (1993). Finance and growth: Schumpeter might be right. *Quarterly Journal of Economics, 108,* 717–738.

Kleindorfer, P.R. & Visvikis, I., (2007, November 9). *Integration of Financial and Physical Networks in Global Logistics.* Presented at the Wharton-INSEAD Alliance Conference: Network-based Strategies and Competencies, Philadelphia.

Klein, M.A., (1973). The Economics of Security Divisibility and Financial Intermediation. *Journal of Finance, 27,* 79-87.

Kwong, K. & Wong, K. (2013). Partial least squares structural equation modeling (PLS-SEM) techniques using SmartPLS. *Marketing Bulletin, 24, Technical Note 1.*

La Porta, R., Pole-de-Silanes, F., Shleifer, A., & Vishny, R.W. (1998). Law and Finance. *Journal of Political Economy Vol. 106, No. 6,* 1113-1155. Retrieved from http://www.jstor.org/stable/10.1086/250042

Larson, P.D., Poist, R.F. & Halldosson, A. (2007). Perspectives on logistics vs. supply chain management. Journal *of Business Logistics, Vol. 28 No. 1,* 1-24.

Levine, O. & Warusawitharana, M. (2014). Finance and productivity growth: Firm-level evidence, (Finance and Economics Discussion Series, 2014-17). Board of Governors of the Federal Reserve System (U.S.).

Levine, R. (1997). Financial development and economic growth: views and agenda. *Journal of Economic Literature,* 688-726.

Levine, R. (2005). *Finance and Growth: Theory and Evidence.* In Handbook of Economic Growth. Philippe Aghion and Steven Durlauf (Ed.). 865–934.

Levine, R., & Zervos, S. (1998). Stock markets and economic growth. *American Economic Review 88(3),* 537–558.

Lohmöller, J.B. (1989). *Latent variable path modeling with partial least squares.* New York: Springer-Verlag.

Manuj, I. & Mentzer, J.T. (2008). Global supply chain risk management strategies. *International Journal of Physical Distribution & Logistics Management, Vol. 38 Iss 3,*192-223. Retrieved from: http://dx.doi.org/10.1108/09600030810866986

Martia, L., Puertasa, R., & Garciab, L. (2014). The importance of the Logistics Performance Index in international trade. *Applied Economics, Vol. 46, No. 24,* 2982–2992. Retrieved from http://dx.doi.org/10.1080/00036846.2014.916394.

McKinnon, R. (1973). *Money and Capital in Economic Development*. Washington: The Brookings Institution.

Mentzer, J.T., DeWitt, W., Keebler, J.S., Min, M., Nix, N.M., Smith, C.D. & Zacharia, Z.G. (2001). Defining supply chain management. *Journal of Business Logistics. Vol. 22, No. 2,* 1-25.

Mentzer, J.T., Soonhong, M., & Bobbitt, L.M. (2004). Toward a Unified Theory of Logistics. *International Journal of Physical Distribution and Logistics Management 34(8),* 606–627.

Merton, R.C. (1995, Summer). A functional perspective of financial intermediation. *Financial Management, Vol. 24, No. 2, Silver Anniversary Commemoration,* 23-41.

Merton, R.C. & Bodie, Z. (1995). *A conceptual framework for analyzing the financial environment in the global financial system: A functional perspective.* Dwight B. Crane et al. (Ed.). Boston, MA: Harvard Business School Press.

Metric, A., & Yasuda, Ayoka. (2014), *Venture Capital & the Finance of Innovation.* United States: John Wiley & Sons, Inc.

Mishkin, F.S. (2006). *The next generation globalization: how disadvantaged nations can harness their financial system to get rich.* New Jersey: Princeton University Press.

Nardo, M., Saisana, M., Saltelli, A. & Tarantola, S. (2005). *Tools for Composite Indicators Building,* (European Commission Report EUR 21682 EN). Retrieved from http://publications.jrc.ec.europa.eu/repository/bitstream/JRC31473/EUR%2021682%20EN.pdf

Nili, M., & Rastad, M. (2007). Addressing the Growth Failure of the Oil Economies: The Role of Financial Development. *Quarterly Journal of Economics and Finance 46 (5),* 726–740.

OECD. (2008). *Handbook on Constructing Composite Indicators Methodology and User Guide.* Retrieved from http://www.oecd.org/std/leading-indicators/42495745.pdf.

OECD & WTO. (2013). *Aid For Trade and Value Chains in Transport and Logistics,* (OECD and WTO Report).

OECD. (2014). *Latin American Economic Outlook 2014: Logistics and competitiveness for development,* (OECD Publishing). Paris. Doi:10.1787/leo-2014-en

Outreville, J. F. (1999). Financial development, human capital and political stability (UNCTAD Discussion Paper No. 142).

Peia, O., & Roszbach, K. (2015). Finance and growth: Time series evidence on causality. *Journal of Financial Stability, 19,* 105-118.

Peng, D.X. & Lai, F. (2012). Using partial least squares in operations management research: A practical guideline and summary of past research. *Journal of Operations Management. Vol.30,* 467-480.

Poloz, S.S. (2012). *Financial intermediation under the new trade paradigm: EDC and integrative trade.* Retrieved from https://www.edc.ca/EN/Knowledge-Centre/Economic-Analysis-and-Research/Pages/financial-intermediation-new-trade-paradigm.aspx

PriceWaterhouseCoopers. (2013). *Aviation finance, fasten your seatbelts.* Retrieved from http://www.pwc.com/gx/en/aerospace-defence-and-security/publications/aviation-finance-fasten-your-seatbelts.jhtml

Protopappa-Sieke, M. & Seifert, R.W. (2010). Interrelating Operational and Financial Performance Measurements in Inventory Control. *European Journal of Operational Research 204(3),* 439–448.

Rajan, R., & Zingales, L. (1998). Financial development and growth. *American Economic Review 88,* 559-551.

Reinartz, W.J., Heanlein, M. & Henseler, J. (2009). An empirical comparison of the efficacy of covariance-based and variance based SEM, (Faculty&Research Working Paper, INSEAD, The Business School for the World).

Reuttner, I, & Glass, T. (2012). *The financial development index 2012: Stalled Recovery- In search of Growth, Chapter1.1.* The Financial Development Report, The World Economic Forum.

Richter, N.F., Sinkovic, R.R., Ringle, C.M. & Schlägel, C. (2016). A Critical Look at the Use of SEM in International Business Research. *International Marketing Review, Volume 33, Issue 3,* 376-404.

Ringle, C.M., Sarstedt, M. & Straub, D.W. (2012). A critical look at the use of PLS-SEM in MIS quarterly. *MIS Quarterly 36 (1),* iii-xiv.

Ringle, C. M., Wende, S., & Becker, J.M. (2015). *SmartPLS 3, Computer software.* Retrieved from http:// www.smartpls.com

Ringle, C.M. & Sarstedt, M. (2016). Gain More Insight from Your PLS-SEM Results: The Importance-Performance Map Analysis. *Industrial Management & Data Systems, Volume 119,* 1865-1889

Rousseau, P., & Wachtel, P. (2000). Equity markets and growth: Cross-country evidence on timing and outcomes, 1980-1995. *Journal of Banking and Finance 24,* 1933-1957.

Rousseau, P. & Wachtel, P. (2011). What is Happening to the Impact of Financial Deepening on Economic Growth?" *Economic Inquiry 49 (1),* 276–288.

Ruiyu, H. & Yuxi, W. (2014). Study on the Solution to the Financing of Enterprises in Supply Chain Finance. *International Journal of Business and Social Science Vol. 5, No. 7(1),* 114-118.

Sahay, R., Cihak, M., N'Diaye, P., Barajas, A., Bi, R., Ayala, D., Gao, Y., Kyobe, A., Ngyuen, L., Saborowski, C., Svirydzenka, K., and Yousefi, S.R. (2015). *Rethinking Financial Deepening: Stability and Growth in Emerging Markets,* (IMF Discussion Note SDN/15/08).

Samans, R., Blanke, J., Corrigan, G. & Drzeniek, M. (2015). *The Inclusive Growth and Development Report.* Geneve: The World Bank Insight Report.

Santomero, A.M. (1984). Modeling the Banking Firm: A Survey. *Journal of Money, Credit and Banking, Vol. 16, No. 4, Part 2: Bank Market Studies,* 576-602.

Sarstedt, M., Ringle, C., Smith, D., Reams, R. & Hair J.F.Jr. (2014). Partial least squares structural equation modeling (PLS-SEM): A useful tool for family business researchers. *Journal of Family Business Strategy. Vol.5,* 105-115.

Schramm, H.J. (2012). *Freight Forwarder's Intermediary Role in Multimodal Transport Chain.* New York: Physical-Verlog, Springer Heildelberg Dordrecht.

Schumpeteri J.A. (1912). *The Theory of Economic Development.* Cambridge MA: Harvard University Press.

Shaw, E. (1973). *Financial Deepening in Economic Development.* New York: Oxford University Press.

Shi, Y., Guan, Z. & Xie, X. (2014). Risk Evaluation Model Building of Logistics Financial Business for the Bank and Empirical Research. *Journal of System and Management Sciences, Vol. 4, No. 1,* 53-61.

Shumpeter, J. (1934). *The theory of economic development and growth.* Translated by Redvers Opie. Cambriedge, MA:Harvard University Press,

Sirri, E.R., & Tufano, P. (1995). The Economics of Pooling in D.B., Crane (ed.), The Global Financial System: A Functional Perspective, 81-128.. Boston, MA: Harvard Business School Press.

Skjott-Larsen, T. (1999). Supply chain management: A new challenge for researchers and managers in logistics. *The International Journal of Logistics Management, Vol. 10, No. 2,* 41-53.

Solakivi, T., Ojala, L., Lorentz., Laari, S. & Töyli, J. (2012). Finland State of Logistics 2012, (Publications of the Finnish Ministry of Transport and Communications 25/2012).

Soytaş, U. & E.Kucukkaya. (2011). Economic Growth and Financial Development in Turkey: New Evidence. *Applied Economic Letters, Volume 18-6,* 595-600.

Stefansson, G. (2006). Collaborative logistics management and the role of third-party service providers. *International Journal of Physical Distribution & Logistics Management, Vol. 36 No. 2,* 76-92.

Stiglitz, J.E. (1985). Credit markets and the control of capital. *Journal of Money, Credit, and Banking 17,* 133–152.

Stone, M. (1974). Cross-validatory choice and assessment of statistical predictions. *Journal of the Royal Statistical Society, 36,* 111–147.

Subramanian, U. (2012). Trade logistics reforms: Linking Business to Global Markets, (Note Number: 335). Washington DC: The International Bank for Reconstruction and Development / The World Bank.

Transportation Financing. (n.d.) Retrieved from https://www.ingcb.com/products-services/finance-your-business/industry-lending/transportation-and-logistics

Töyli, J., Hakkinen, L., Ojala, L. & Naula, T. (2008). Logistics and financial performance, An analysis of 424 Finnish small and medium-sized enterprises. *International Journal of Physical Distribution & Logistics Management Vol. 38 No. 1,* 57-80.

U.S. Armed Forces. (2013, 16 October). *Joint Logistics, Joint Publication 4-0.* Retrieved from https://www.fas.org/irp/doddir/dod/jp4_0.pdf.

Vyas, S. & Kumaranayake, L. (2006). Constructing socio-economic status indices: how to use principal components analysis. *Health Policy Plan. 21(6),* Oxford University Press in association with The London School of Hygiene and Tropical Medicine, 459-468.

Westland, J.C. (2007). *Confirmatory Analysis with Partial Least Squares.* Clearwater Bay, Hong Kong: University of Science & Technology. Retrieved from http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.117.3014&rep=rep1&type=pdf

World Bank. (n.d.). *Financial Development.* Retrieved from http://www.worldbank.org/en/publication/gfdr/background/financial-development

World Bank. (2008). *Finance for All? Policies and Pitfalls in Expanding Access.* A World Bank Policy Research Report. Washington DC: The International Bank for Reconstruction and Development / The World Bank.

World Bank. (2012). *Doing business in a more transparent world.* Washington, DC: The International Bank for Reconstruction and Development/The World Bank. Retrieved from http://www.doingbusiness.org/~/media/GIAWB/Doing%20Business/Documents /Annual-Reports/ English/DB12-FullReport.pdf.

World Bank. (2013). *Global financial development report 2013: Rethinking the role of the state in finance.* Washington, DC: The International Bank for Reconstruction and Development/The World Bank.

World Bank. (2014). *Global financial development report 2014: Financial Inclusion.* Washington, DC: The International Bank for Reconstruction and Development/The World Bank.

World Bank (2015). *Worldwide governance indicators (DATABANK).* Retrieved from www.govindicators.org.

World Economic Forum (WEF). (2012a). *Financial Development Report 2012.* The World Economic Forum USA Inc.

World Economic Forum (WEF). (2012b). *The Global Competitiveness Report 2012-2013.* Switzerland, Geneva. Retrieved from http://www3.weforum.org/docs/WEF_GlobalCompetitivenessReport_2012-13.pdf.

World Economic Forum (WEF). (2014). *The Global Competitiveness Report 2014-2015.* Switzerland, Geneva. Retrieved from http://www3.weforum.org/docs/WEF_GlobalCompetitivenessReport_2014-15.pdf.

World Economic Forum (WEF). (2015). *The Global Competitiveness Report 2015-2016.* Switzerland, Geneva. Retrieved from http://www3.weforum.org/docs/gcr/2015-2016/Global_Competitiveness_Report_2015-2016.pdf.

Wuttke, D.A., Blome, C., Foerstl, K., & Henke, M. (2013). Managing the Innovation Adoption of Supply Chain Finance-Empirical Evidence From Six European Case Studies. *Journal of Business Logistics, 34(2),* 148-166.

Xanthopoulos, A., Vlachos, D., Iakovou, E. (2012). Optimal newsvendor policies for dual-sourcing supply chains: a disruption risk management framework. *Computers and Operations Research, 39,* 350–357. Retrieved from: http://dx.doi.org/10.1016/j.cor.2011.04.010

Yang, J., & XU, H. (2010). *Factors of restricting the development of logistics financial services and solution.* Retrieved from http://www.seiofbluemountain.com/search/detail.php?id=5432

Yongping, W. (2009). *Analysis on the Value of Logistics Finance to Small and Medium-sized Enterprises.* Retrieved from http://www.seiofbluemountain.com/en/search/index.php?act=all&date=2009-10.

Zhen, X., Li, Y., Cai, G. & Shi, D. (2016). Transportation disruption risk management: business interruption insurance and backup transportation. *Transportation Research Part E 90,* 51–68.

Zhou, L., Jinsheng, J., & Bingwu, L. (2012). *The research on modes and application of inventory financing.* In Jia Luo (Ed.) Advances in Intelligent and Soft Computing, Springer, 35-42.

APPENDICES

A: Name of the Countries Added into Analysis

Argentina
Armenia
Australia
Austria
Azerbaijan
Bahrain
Belgium
Bolivia
Botswana
Brazil
Bulgaria
Canada
Chile
China
Colombia
Costa Rica
Cote d'Ivoire
Croatia
Cyprus
Czech Republic
Denmark
Dominican Republic
Ecuador
Egypt, Arab Rep.
El Salvador
Estonia
Finland
France
Georgia
Germany
Ghana
Greece
Guyana
Haiti
Hong Kong SAR, China
Hungary
Iceland
India
Indonesia
Iran, Islamic Rep.
Ireland
Italy
Jamaica
Japan
Jordan
Kazakhstan
Kenya
Korea, Rep.
Kuwait
Kyrgyz Republic
Latvia
Lebanon
Lithuania
Luxembourg
Macedonia, FYR
Malawi
Malaysia
Malta
Mauritius
Mexico
Moldova
Mongolia
Montenegro
Morocco
Namibia
Nepal
Netherlands
New Zealand
Nigeria
Norway
Oman
Pakistan
Panama
Paraguay
Peru
Philippines
Poland
Portugal
Qatar
Romania
Russian Federation
Saudi Arabia
Serbia
Singapore
Slovak Republic
Slovenia
South Africa
Spain
Sri Lanka
Sweden
Switzerland
Tanzania
Thailand
Turkey
Ukraine
United Arab Emirates
United Kingdom
United States
Uruguay
Venezuela, RB
Vietnam

B: WEF's Global Competitiveness Indicators

Basic requirements

1st pillar: Institutions

A. Public institutions

1. Property rights

1.01 Property rights, 1-7 (best)

1.02 Intellectual property protection, 1-7 (best)

2. Ethics and corruption

1.03 Diversion of public funds, 1-7 (best)

1.04 Public trust in politicians, 1-7 (best)

1.05 Irregular payments and bribes, 1-7 (best)

3. Undue influence

1.06 Judicial independence, 1-7 (best)

1.07 Favoritism in decisions of government officials, 1-7 (best)

4. Government efficiency

1.08 Wastefulness of government spending, 1-7 (best)

1.09 Burden of government regulation, 1-7 (best)

1.10 Efficiency of legal framework in settling disputes, 1-7 (best)

1.11 Efficiency of legal framework in challenging regs., 1-7 (best)

1.12 Transparency of government policymaking, 1-7 (best)

1.13 Provision of government services for improved business performance

5. Security

1.14 Business costs of terrorism, 1-7 (best)

1.15 Business costs of crime and violence, 1-7 (best)

1.16 Organized crime, 1-7 (best)

1.17 Reliability of police services, 1-7 (best)

B. Private institutions

1. Corporate ethics

1.18 Ethical behavior of firms, 1-7 (best)

2. Accountability

1.19 Strength of auditing and reporting standards, 1-7 (best)

1.20 Efficacy of corporate boards, 1-7 (best)

1.21 Protection of minority shareholders' interests, 1-7 (best)

1.22 Strength of investor protection, 0–10 (best)

2nd pillar: Infrastructure

A. Transport infrastructure

2.01 Quality of overall infrastructure, 1-7 (best)

2.02 Quality of roads, 1-7 (best)

2.03 Quality of railroad infrastructure, 1-7 (best)

2.04 Quality of port infrastructure, 1-7 (best)

2.05 Quality of air transport infrastructure, 1-7 (best)

2.06 Available airline seat km/week, millions

B. Electricity and telephony infrastructure

2.07 Quality of electricity supply, 1-7 (best)

2.08 Mobile telephone subscriptions/100 pop.

2.09 Fixed telephone lines/100 pop.

3rd pillar: Macroeconomic environment

3.01 Government budget balance, % GDP

3.02 Gross national savings, % GDP

3.03 Inflation, annual % change

3.04 General government debt, % GDP

3.05 Country credit rating, 0–100 (best)

4th pillar: Health and primary education

A. Health

4.01 Malaria cases/100,000 pop.

4.02 Business impact of malaria, 1-7 (best)

4.03 Tuberculosis cases/100,000 pop.

4.04 Business impact of tuberculosis, 1-7 (best)

4.05 HIV prevalence, % adult pop.

4.06 Business impact of HIV/AIDS, 1-7 (best)

4.07 Infant mortality, deaths/1,000 live births

4.08 Life expectancy, years

B. Primary education

4.09 Quality of primary education, 1-7 (best)

4.10 Primary education enrollment, net %

Efficiency enhancers

5th pillar: Higher education and training

A. Quantity of education

5.01 Secondary education enrollment, gross %

5.02 Tertiary education enrollment, gross %

B. Quality of education

5.03 Quality of the education system, 1-7 (best)

5.04 Quality of math and science education, 1-7 (best)

5.05 Quality of management schools, 1-7 (best)

5.06 Internet access in schools, 1-7 (best)

C. On-the-job training

5.07 Availability of research and training services, 1-7 (best)

5.08 Extent of staff training, 1-7 (best)

6th pillar: Goods market efficiency

A. Competition

1. Domestic competition

6.01 Intensity of local competition, 1-7 (best)

6.02 Extent of market dominance, 1-7 (best)

6.03 Effectiveness of anti-monopoly policy, 1-7 (best)

6.04 Extent and effect of taxation

6.05 Total tax rate, % profits

6.06 No. procedures to start a business

6.07 No. days to start a business

6.08 Agricultural policy costs, 1-7 (best)

2. Foreign competition

6.09 Prevalence of trade barriers, 1-7 (best)

6.10 Trade tariffs, % duty

6.11 Prevalence of foreign ownership, 1-7 (best)

6.12 Business impact of rules on FDI, 1-7 (best)

6.13 Burden of customs procedures, 1-7 (best)

6.14 Imports as a percentage of GDP

B. Quality of demand conditions

6.15 Degree of customer orientation, 1-7 (best)

6.16 Buyer sophistication, 1-7 (best)

7th pillar: Labor market efficiency

A. Flexibility

7.01 Cooperation in labor-employer relations, 1-7 (best)

7.02 Flexibility of wage determination, 1-7 (best)

7.03 Hiring and firing practices, 1-7 (best)

7.04 Redundancy costs, weeks of salary

B. Efficient use of talent

7.05 Pay and productivity, 1-7 (best)

7.06 Reliance on professional management, 1-7 (best)

7.07 Brain drain

7.08 Women in labor force, ratio to men

8th pillar: Financial market development

A. Efficiency

8.01 Availability of financial services, 1-7 (best)

8.02 Affordability of financial services, 1-7 (best)

8.03 Financing through local equity market, 1-7 (best)

8.04 Ease of access to loans, 1-7 (best)

8.05 Venture capital availability, 1-7 (best)

B. Trustworthiness and confidence

8.06 Soundness of banks, 1-7 (best)

8.07 Regulation of securities exchanges, 1-7 (best)

8.08 Legal rights index, 0–10 (best)

9th pillar: Technological readiness

A. Technological adoption

9.01 Availability of latest technologies, 1-7 (best)

9.02 Firm-level technology absorption, 1-7 (best)

9.03 FDI and technology transfer, 1-7 (best)

B. ICT use

9.04 Individuals using Internet, %

9.05 Fixed broadband Internet subscriptions/100 pop

9.06 Int'l Internet bandwidth, kb/s per user

9.07 Mobile broadband subscriptions/100 pop

10th pillar: Market size

A. Domestic market size

10.01 Domestic market size index

B. Foreign market size

10.02 Foreign market size index

Innovation and Business Sophistication Factors

11th pillar: Business sophistication

11.01 Local supplier quantity, 1-7 (best)

11.02 Local supplier quality, 1-7 (best)

11.03 State of cluster development, 1-7 (best)

11.04 Nature of competitive advantage, 1-7 (best)

11.05 Value chain breadth, 1-7 (best)

11.06 Control of international distribution, 1-7 (best)

11.07 Production process sophistication, 1-7 (best)

11.08 Extent of marketing, 1-7 (best)

11.09 Willingness to delegate authority, 1-7 (best)

12th pillar: Innovation

12.01 Capacity for innovation, 1-7 (best)

12.02 Quality of scientific research institutions, 1-7 (best)

12.03 Company spending on R&D, 1-7 (best)

12.04 University-industry collaboration in R&D, 1-7 (best)

12.05 Gov’t procurement of advanced tech products, 1-7 (best)

12.06 Availability of scientists and engineers, 1-7 (best)

12.07 PCT patents, applications/million pop

C: Missing Data of Financial Development Indicators

Variable Symbol	Variable Name	Number of Missing Data
DPH1	Stock market capitalization to GDP (%)	4
DPH2	Private credit by deposit money banks and other financial institutions to GDP (%)	3
DPH3	Venture capital availability	-
DPH4	Life and Nonlife insurance premium volume to GDP (%)	-
DPH5	Financial system deposits to GDP (%)	4
DPH6	Deposit money banks' assets to GDP (%)	3
DPH7	Stock market total value traded to GDP (%)	5
ACC1	Financing through local equity market	-
ACC2	Bank branches per 100,000 adults	2
ACC3	ATMs per 100,000 adults	5
ACC4	Availability of financial services	-
ACC5	Affordability of financial services	-
ACC6	Ease of access to loans	-
EFF1	Stock market turnover ratio (%)	5
EFF2	Bank return on assets (%, after tax)	2
EFF3	Bank return on equity (%, after tax)	1
EFF4	Bank overhead costs to total assets (%)	3
EFF6	Bank net interest margin (%)	1

D: Data Distribution

	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	SE	Statistic	SE
GQ1	-1.8114	1.7525	0.2547	0.9030	-0.186	0.24	-0.868	0.476
GQ2	-2.6863	1.3984	0.0803	0.9023	-0.546	0.24	-0.337	0.476
GQ3	-1.626	2.2145	0.4065	0.903	0.176	0.24	-0.935	0.476
GQ4	-1.5376	1.9631	0.4412	0.8540	-0.048	0.24	-0.786	0.476
GQ5	-1.6856	1.9491	0.2924	0.9770	0.203	0.24	-1.134	0.476
GQ6	-1.245	2.3913	0.2618	1.0468	0.569	0.24	-0.903	0.476
DEPTHINDEX	0.0184	0.9882	0.3527	0.2291	0.774	0.24	-0.192	0.476
DPH1	0	1	0.3420	0.3033	0.899	0.24	-0.22	0.476
DPH2	0	1	0.3689	0.292	0.789	0.24	-0.334	0.476
DPH3	0	1	0.4215	0.2266	0.591	0.24	-0.327	0.476
DPH4	0	1	0.3288	0.3008	0.977	0.24	-0.156	0.476
DPH5	0	1	0.3809	0.2882	0.747	0.24	-0.303	0.476
DPH6	0	1	0.3696	0.28	0.741	0.24	-0.359	0.476
DPH7	0	1	0.2346	0.3256	1.365	0.24	0.454	0.476
ACCESSINDEX	0.0737	0.8637	0.4378	0.1701	0.087	0.24	-0.686	0.476
ACC1	0	1	0.5136	0.2134	-0.09	0.24	-0.545	0.476
ACC2	0	1	0.3250	0.2791	1.109	0.24	0.453	0.476
ACC3	0	1	0.4282	0.2798	0.57	0.24	-0.393	0.476
ACC4	0	1	0.5307	0.2389	0.067	0.24	-0.759	0.476
ACC5	0	1	0.5083	0.2296	0.221	0.24	-0.71	0.476
ACC6	0	1	0.4288	0.2412	0.382	0.24	-0.511	0.476
EFFICIENCYINDEX	0.1209	0.8026	0.5374	0.1250	-0.474	0.24	0.365	0.476
EFF1	0	1	0.2807	0.3183	1.125	0.24	0.013	0.476
EFF2	0	1	0.4275	0.2718	0.485	0.24	-0.326	0.476
EFF3	0	1	0.6139	0.2371	-0.779	0.24	0.806	0.476
EFF4	0	1	0.6284	0.2877	-0.717	0.24	-0.424	0.476
EFF5	0	1	0.6129	0.290	-0.686	0.24	-0.461	0.476
LOGPER	12.1275	24.7658	18.5507	3.2054	0.306	0.24	-0.865	0.476
LP1	1.7832	4.0989	2.8618	0.5763	0.383	0.24	-0.878	0.476
LP2	1.7778	4.2575	3.0352	0.6317	0.364	0.24	-0.895	0.476
LP3	1.7376	4.1442	3.0426	0.5732	0.261	0.24	-0.644	0.476
LP4	2.2081	4.3944	3.4671	0.5019	-0.041	0.24	-0.858	0.476
LP5	1.8599	4.1751	3.0148	0.4787	-0.001	0.24	-0.323	0.476
LP6	1.9504	4.1442	3.1290	0.5630	0.179	0.24	-0.978	0.476
BASICREQ	3.3481	6.2862	4.9083	0.6752	0.124	0.24	-0.439	0.476
GC1	2.3616	6.0717	4.1852	0.8958	0.395	0.24	-0.798	0.476
GC2	2.4212	6.6646	4.8208	0.9539	0.005	0.24	-0.521	0.476
GC3	3.2046	6.8235	5.7189	0.7120	-1.291	0.24	2.091	0.476
EFFICINCYENHANCER	2.801	5.7471	4.3446	0.636	0.246	0.24	-0.562	0.476
GC4	1.899	6.1778	4.4778	0.8354	-0.271	0.24	-0.018	0.476
GC5	2.7774	5.6021	4.4040	0.5408	-0.122	0.24	0.198	0.476
GC6	2.8772	5.8989	4.3889	0.5657	0.085	0.24	0.416	0.476
GC7	2.493	6.2871	4.3503	1.0414	0.244	0.24	-1.068	0.476
GC8	2.0264	6.931	4.1021	1.1021	0.238	0.24	-0.505	0.476
BS&INNOV	2.4105	5.785	3.9055	0.7973	0.74	0.24	-0.364	0.476
GC9	2.772	5.798	4.2186	0.7092	0.499	0.24	-0.539	0.476
GC10	2.049	5.7844	3.5924	0.9127	0.855	0.24	-0.237	0.476

E: Principal Components Analysis Eigenvalues

Eigenvalues of Finanical Depth Indicators

Component	Initial Eigenvalues			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	**4.482**	**64.026**	**64.026**	**3.225**	**46.067**	**46.067**
2	**1.032**	**14.743**	**78.770**	**2.289**	**32.703**	**78.770**
3	.646	9.232	88.002			
4	.317	4.532	92.533			
5	.291	4.157	96.691			
6	.170	2.434	99.125			
7	.061	.875	100.000			

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

Eigenvalues of Finanical Access Indicators

Component	Initial Eigenvalues			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	**3.382**	**56.372**	**56.372**	**3.321**	**55.350**	**55.350**
2	**1.506**	**25.101**	**81.473**	**1.567**	**26.123**	**81.473**
3	.513	8.558	90.031			
4	.292	4.863	94.895			
5	.224	3.727	98.622			
6	.083	1.378	100.000			

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

Eigenvalues of Finanical Efficiency Indicators

Component	Initial Eigenvalues		
	Total	% of Variance	Cumulative %
1	**2.882**	**57.641**	**57.641**
2	.935	18.696	76.337
3	.696	13.927	90.264
4	.302	6.040	96.304
5	.185	3.696	100.000

Extraction Method: Principal Component Analysis.

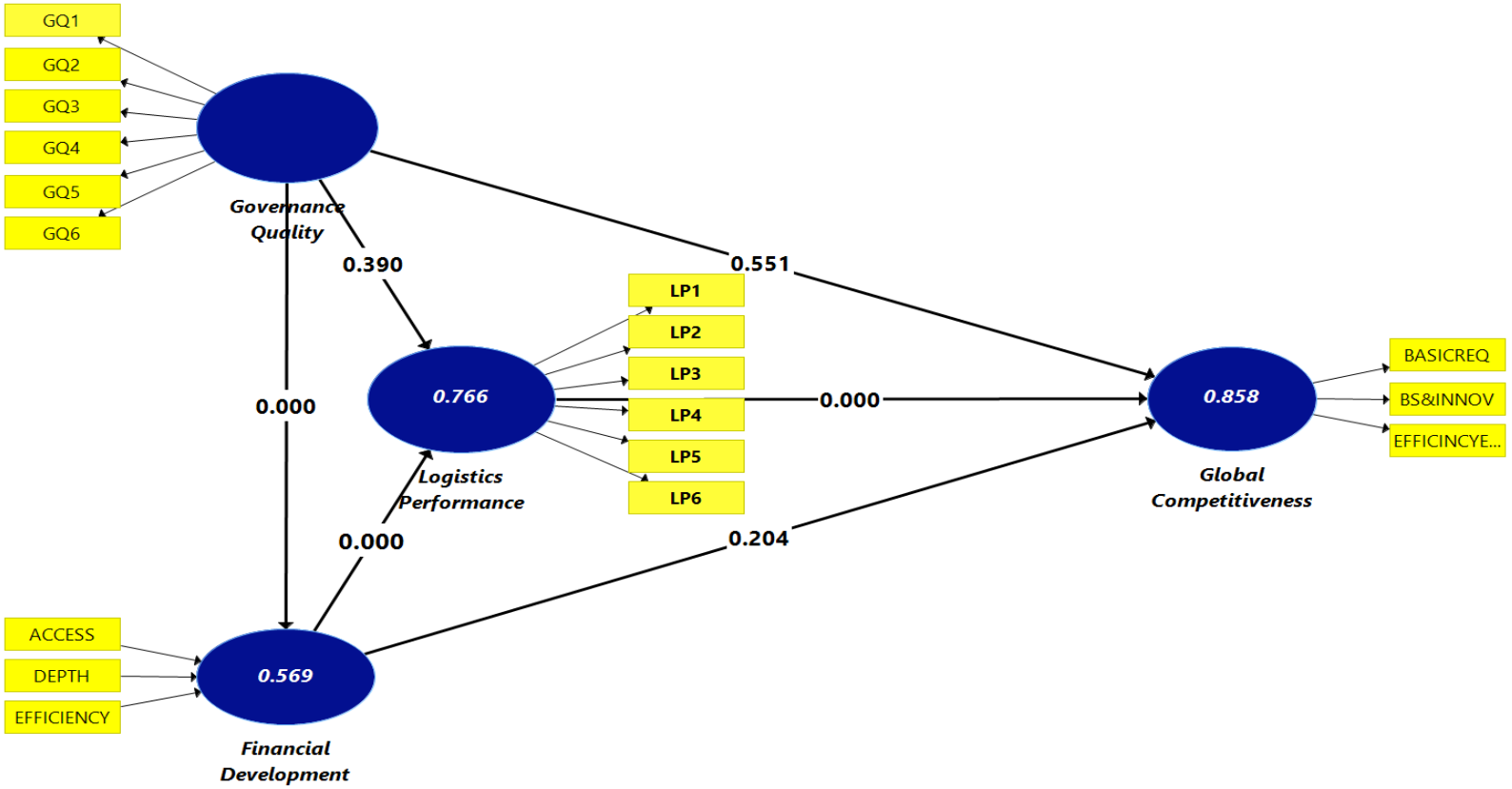
F: Statistics for Outer Loadings

	Sample Mean	Standard Deviation	T Statistics	P Values	Confidence Interval	
					0.50%	99.50%
GQ1 <- Governance Quality	0.845	0.038	22.373	0.000	0.719	0.929
GQ2 <- Governance Quality	0.853	0.022	38.314	0.000	0.788	0.901
GQ3 <- Governance Quality	0.973	0.004	255.982	0.000	0.963	0.982
GQ4 <- Governance Quality	0.958	0.006	147.440	0.000	0.938	0.973
GQ5 <- Governance Quality	0.980	0.004	276.695	0.000	0.969	0.987
GQ6 <- Governance Quality	0.967	0.005	179.440	0.000	0.951	0.979
LP1 <- Logistics Performance	0.958	0.008	118.693	0.000	0.931	0.976
LP2 <- Logistics Performance	0.978	0.004	220.588	0.000	0.965	0.988
LP3 <- Logistics Performance	0.980	0.003	282.314	0.000	0.970	0.988
LP4 <- Logistics Performance	0.939	0.011	83.807	0.000	0.905	0.963
LP5 <- Logistics Performance	0.949	0.009	104.924	0.000	0.921	0.969
LP6 <- Logistics Performance	0.971	0.005	177.594	0.000	0.954	0.983
BASICREQ <- Global Competitiveness	0.903	0.020	44.136	0.000	0.835	0.946
BS&INNOV <- Global Competitiveness	0.955	0.007	140.928	0.000	0.934	0.970
EFFICINCYENHANCER <- Global Competitiveness	0.968	0.005	212.350	0.000	0.956	0.979

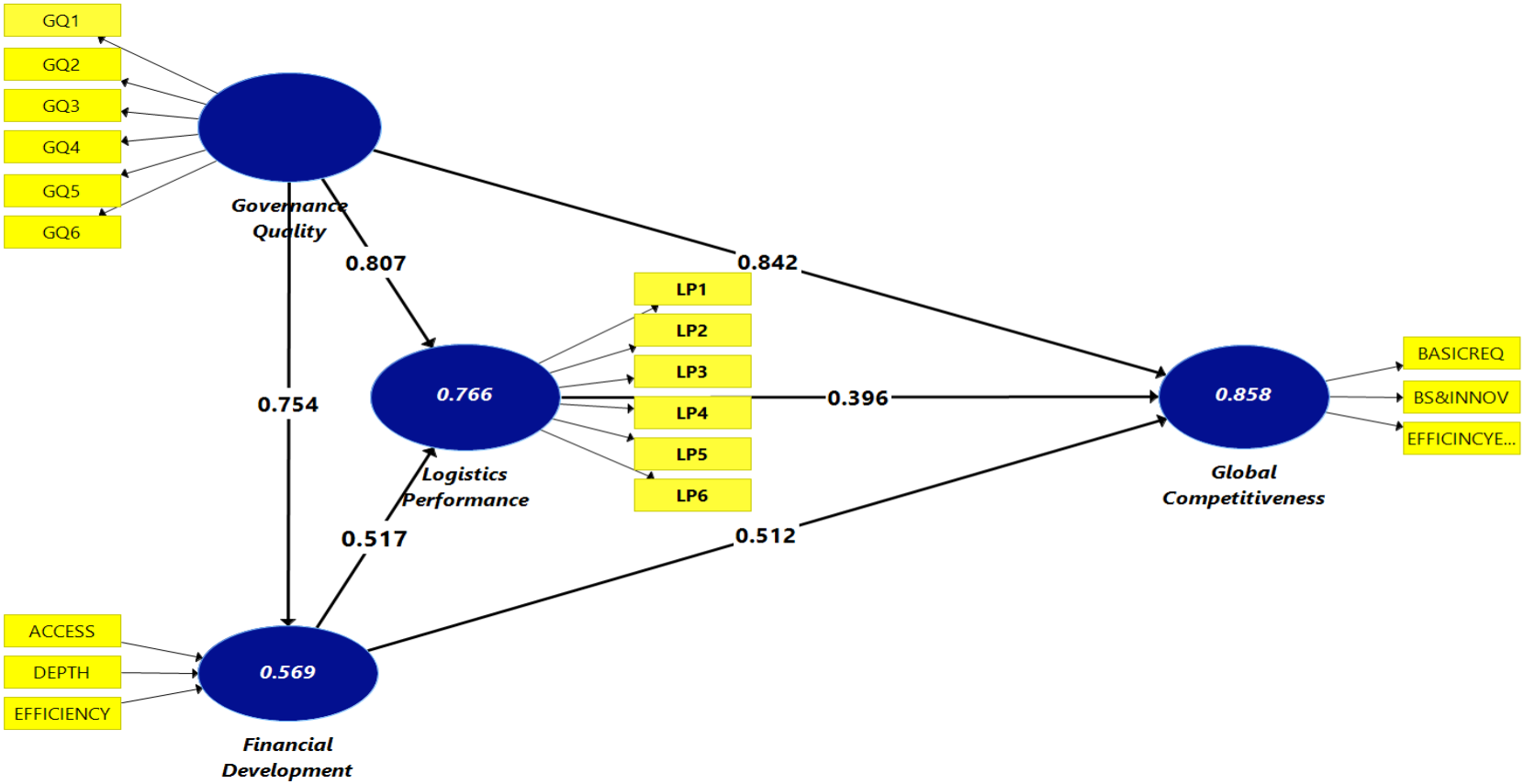
G: Statistics for Structural Model

	Sample Mean	Standard Deviation	T Statistics	P Values	Confidence Interval	
					0.5%	99.5%
Financial Development -> Global Competitiveness	0.312	0.063	4.917	0.000	0.142	0.474
Financial Development -> Logistics Performance	0.522	0.061	8.438	0.000	0.362	0.681
Governance Quality -> Financial Development	0.758	0.036	20.873	0.000	0.654	0.838
Governance Quality -> Global Competitiveness	0.288	0.069	4.233	0.000	0.111	0.461
Governance Quality -> Logistics Performance	0.411	0.065	6.464	0.000	0.237	0.572
Logistics Performance -> Global Competitiveness	0.393	0.078	5.096	0.000	0.195	0.601

H: PLS-SEM Indirect Effects



I: PLS-SEM Total Effects



J: PLS-SEM Indirect Effect and Total Effects Statistical Information Indirect Effects

	Original Sample	Standard Deviation	T Statistics	P Values	Confidence Interval	
					0.5%	99.5%
Financial Development -> Global Competitiveness	0.204	0.045	4.548	0.000	0.101	0.336
Financial Development -> Logistics Performance						
Governance Quality -> Financial Development						
Governance Quality -> Global Competitiveness	0.551	0.057	9.722	0.000	0.409	0.702
Governance Quality -> Logistics Performance	0.390	0.050	7.805	0.000	0.272	0.531
Logistics Performance -> Global Competitiveness						

Total Effects

	Original Sample	Standard Deviation	T Statistics	P Values	Confidence Interval	
					0.5%	99.5%
Financial Development -> Global Competitiveness	0.512	0.054	9.477	0.000	0.372	0.658
Financial Development -> Logistics Performance	0.517	0.062	8.355	0.000	0.362	0.681
Governance Quality -> Financial Development	0.754	0.035	21.413	0.000	0.654	0.838
Governance Quality -> Global Competitiveness	0.842	0.026	32.375	0.000	0.762	0.901
Governance Quality -> Logistics Performance	0.807	0.030	26.837	0.000	0.718	0.873
Logistics Performance -> Global Competitiveness	0.396	0.077	5.105	0.000	0.195	0.601

K: HTMT Confidence Intervals

Panel-A HTMT Confidence Interval with Financial Depth

	Original Sample	Sample Mean	0.50%	99.50%
Financial Depth-> Governance Quality	0.749	0.749	0.610	0.853
Logistics Performance -> Governance Quality	0.813	0.812	0.713	0.881
Logistics Performance -> Financial Depth	0.855	0.854	0.771	0.918
Global Competitiveness -> Governance Quality	0.867	0.866	0.773	0.929
Global Competitiveness -> Financial Depth	0.854	0.852	0.751	0.928
Global Competitiveness -> Logistics Performance	0.917	0.915	0.854	0.960

Panel-B HTMT Confidence Interval with Financial Access

	Original Sample	Sample Mean	0.50%	99.50%
Financial Access-> Governance Quality	0.726	0.724	0.558	0.847
Logistics Performance -> Governance Quality	0.813	0.813	0.715	0.883
Logistics Performance -> Financial Access	0.822	0.818	0.687	0.908
Global Competitiveness -> Governance Quality	0.867	0.866	0.775	0.931
Global Competitiveness -> Financial Access	0.925	0.921	0.812	0.996
Global Competitiveness -> Logistics Performance	0.917	0.916	0.857	0.961

Panel-C HTMT Confidence Interval with Financial Efficiency

	Original Sample	Sample Mean	0.50%	99.50%
Financial Efficiency-> Governance Quality	0.717	0.718	0.550	0.859
Logistics Performance -> Governance Quality	0.813	0.812	0.716	0.881
Logistics Performance -> Financial Efficiency	0.846	0.848	0.733	0.953
Global Competitiveness -> Governance Quality	0.867	0.866	0.777	0.929
Global Competitiveness -> Financial Efficiency	0.893	0.894	0.785	0.992
Global Competitiveness -> Logistics Performance	0.917	0.916	0.855	0.961

L: CURRICULUM VITAE

PERSONAL INFORMATION

Surname, Name: Özdemir, Levent
Nationality: Turkish (TC)
Date and Place of Birth: 06 May 1978, Konya
Marital Status: Married, two kids
Phone: +90 533 573 46 70
email: levent4775@yahoo.com

EDUCATION

Degree	Institution	Year of Graduation
MBA	Naval Postgraduate School, California, USA, Acquisition and Contract Management	2009
BS	Turkish Military Academy, Ankara, System Engineer	2000
High School	Işıklar Military High School, Bursa	1996

WORK and COURSE EXPERIENCE

Year	Place	Enrollment
2015-Now	51st Brigade, Hozat/Tunceli	Chief of Finance and Budget Section
2010-2015	Turkish Army Logistics Command, Ovearseas Acquision and Contract Management Section	Chief of Section
2008-2010	Naval Post Graduate School, California/USA	MBA Student
June-Dec 2007	U.S. Army Finance Captains' Carrier Course, South Carolina/USA	Student
2006-2008	NATO Center of Excellence Defence Against Terrorism (COE-DAT)	Fiscal Officer

June-Dec 2005	U.S. Army Finance Officers Basic Course, South Carolina/USA	Student
2003-2006	49th Brigade, Bingöl	Chief of Finance and Budget Section
2000-2003	11st Brigade, Söke/Aydın	Chief of Finance and Budget Section

FOREIGN LANGUAGES

Advanced English, Basic French

PUBLICATIONS

Ozdemir, Levent. (December, 2009). Analyzing the Multi-national Cooperative Acquisition Aspect of the Joint Strike Fighter (JSF) Program. *Monterey, California, USA, Naval Post Graduate School: MBA professional report.* pp. 1-115. URI: http://hdl.handle.net/10945/10415

M: TURKISH SUMMARY / TÜRKÇE ÖZET

FİNANSAL GELİŞMİŞLİK VE LOJİSTİK PERFORMANS ARASINDAKİ İLİŞKİ VE ÜLKELERİN REKABET GÜÇLERİNE ETKİLERİ: ÜLKELER BAZINDA AMPİRİK ÇALIŞMA

Finansal sistemin güçlendirilmesi ve finansal kurum ve piyasaların performanslarının arttırılması bir çok politik, hukuksal, sosyal ve çevresel faktörlere bağlıdır. Hükûmet bürokrasinin etkinliği, siyasi istikrar, siyasi sistemde hesap verilebilirlik, yasal mevzuatın kalitesi ve tutarlılığı, hukukun üstünlüğü ve devlet görevlilerinin yolsuzlukla mücadele konusundaki kararlılıkları finansal gelişmenin belirleyici unsurlarıdır. Bir ülkede siyasi istikrar yoksa, muhasebe ve raporlama standartları iyi değilse ya da usulsüzlük, yolsuzluk, dolandırıcılık ileri seviyede ve şeffaflık yoksa finansal kurumlar ve piyasalar reel sektöre etkili finansal hizmeti sağlayamaz. Yani yönetim kalitesinin düşük olduğu yerlerde finansal kurumlar ve piyasalar, parası olup projesi olmayandan tasarruflarını toparlayıp projesi olup parası olmayana etkili bir şekilde aktaramaz. Diğer bir deyişle, ülkelerin yönetim kalitesi, ülkelerin finansal gelişimi üzerinde önemli bir etkiye sahiptir; dahası, finansal gelişme için iyi yönetim kalitesi bir ön şarttır.

Diğer taraftan finansal gelişmişliğin ülkelerin ve bölgelerin makro ekonomik ortamı, kurumları, eğitim kalitesi, iş ve mal piyasası verimliliği, teknolojik gelişmesi, işletme yeniliği ve gelişmişliği üzerinde önemli etkisi vardır. Bütün bu sayılan faktörler, ülkelerin veya bölgelerin küresel rekabet gücünün göstergesidir. Dünya Ekonomik Forumu (WEF) tarafından 35 yıldan beri yayınlanan Küresel Rekabetçilik Raporunda (Global Competitiveness Report), rekabet edebilirlik terimi "bir ülkenin verimlilik seviyesini belirleyen kurum, politika ve faktörlerin toplamı" olarak tanımlanmaktadır (WEF, 2015, s. 35). Verimlilik seviyesi, bir toplumun refah düzeyini belirtir ve bir ekonomideki yatırımlar neticesinde elde edilen kazanç oranını belirler. Söz konusu bu kazanç bir toplumdaki büyüme oranın en belirgin göstergesidir (WEF, 2014). Genel olarak, verimlilik düzeyini arttırmak potansiyel kazancı artırır ve bu nedenle genel büyümeyi artırmaya önemli katkıda bulunur (WEF, 2015). Açıkçası, rekabet gücü yüksek ülkeler kendi ekonomik ve insan kaynaklarını etkin bir şekilde yönetebilir ve vatandaşları için yüksek gelir seviyesine

ulaşabilirler. Böylece, küresel rekabet gücü düzeyi yükseldiğinde, toplumun yaşam standardı artar.

Akademik çalışmalar, özellikle teorik olanlar, finansal gelişmişliğin ve ülkelerin yönetim kalitesinin yanında lojistik performanslarının da ülkelerin küresel güç faktörlerini önemli oranda arttırdığını vurgulamaktadır. Lojistik; üretim, ticaret, işletme, bakım ve idame ile geri dönüşüm aşamasında istenilen mal, hizmet ve bilginin güvenli bir şekilde maliyet-etkin olarak istenilen noktaya transfer edilmesini ifade etmektedir. Bu nedenle lojistik mal, hizmet ve bilgi üreten, işleyen ve kullanan her firma ve organizasyon için hayati öneme haizdir. Yani lojistik ticaretin olmazsa olmazı, omurgasıdır. Bu nedenle; Kleindorfer and Visvikis (2007) gibi akademisyenler lojistiğin yerel ve uluslararası ticaret için vazgeçilmez olduğunu vurgulamaktadırlar. Akademik çalışmalar, lojistiği, ticarette üreticileri yerel ve uluslararası piyasalarla buluşturan etken olarak tanımlamaktadırlar.

Lojistiğin üreticileri ve satıcıları buluşturması üretimin artmasına sağlamakta, ticareti kolaylaştırmakta ve dolayısıyla toplumların refah düzeyinin artmasına vesile olmaktadır. Üretilen mal, hizmet ve bilgi müşteriye veya pazara güvenli bir şekilde, ucuza ve zamanında taşınamazsa, düşük üretim maliyetine veya verimli üretim stratejilerine sahip olmak anlamsızlaşmaktadır. Bu nedenle, küresel rekabet gücünü arttırmak isteyen ülkeler iyi işleyen lojistik sistemine sahip olmaları gerekir. İyi işleyen lojistik sektöründen kasıt malların ve hizmetin ticaretini kolaylaştıran, üretkenliğin artmasına vesile olan, güvenilir ve yeterli altyapıya sahip, teslimatları zamanında ve istenilen nitelikte yapabilen, yüksek kaliteli ve etkin gümrük işletmeciliğine sistem gerektirmektedir. Dolayısıyla mal, hizmet veya bilgi üreten endüstrilerin başarısı etkili lojistik sisteme bağlıdır. Şayet lojistik bir pazarda gerektiği gibi işlev görürse ekonomilerin inşa edildiği temeli oluşturur (Arvis vd., 2016).

Bu bağlamda, lojistik sistemin etkinliğinin ülkelerin veya bölgelerin genel olarak rekabet gücü, özel olarak ise ekonomik büyüme üzerindeki etkileri konusunda farkındalık son yıllarda artmıştır. Küresel anlamda lojistiğin önemi, Dünya Bankasının desteği ile yayımlanan “Connecting to Complete Trade Logistics in the Global Economy” raporu (Arvis vd., 2007, 2010, 2012, 2014 ve 2016) veya Avrupa Ekonomik İşbirliği Örgütünün (OECD) “Latin American Economic Outlook 2014: Logistics and Competitiveness for Development” gibi raporu gibi birçok belgede vurgulanmıştır. Bu raporlar, iyi işleyen lojistik sisteminin, ülkelerin yüksek düzeyde küresel rekabet gücü için bir ön şart olduğunu belirtmektedir.

Diğer taraftan lojistik sektörü ulaşım, döviz, ödeme ve kargo riskleri, altyapı yetersizliği, yatırım için sermaye gereksinimleri, depolama ya da envanter gibi doğasında olan risklere ve belirsizliklere karşı savunmasızdır. Ayrıca son yirmi beş - otuz yılda lojistik sektörü daha karmaşık hale gelmiştir. Lojistik sektörü çeşitli sosyal, finansal, güvenlik, çevresel ve diğer düzenlemeler ve küreselleşme nedeniyle artan uluslararası ticaret nedeniyle son yıllarda ciddi değişime uğramıştır. Bu sebeple, Prof. Donald J. Bowersox 1990'lı yılları "Lojistik Sektörünün Rönesans'ı" olarak tanımlamış ve endüstri devriminden bu yana lojistik sektöründe en fazla değişikliğin bu dönemde olduğunu savunmuştur (Goldby ve Zinn, 2016). Kısacası, son yıllarda özellikle küreselleşme nedeniyle artan uluslararası ticaret ve iç ticaret nedeniyle lojistik sektöründe görülen değişimler, lojistik endüstrisi için risk ve belirsizliklerin sayısının ve büyüklüğünün artmasına neden olmuştur. Fakat finansal kurumlar ve piyasalar lojistik sektörüne çeşitli çözümler ve destek sağlamıştır.

Finans sektörünün lojistik sektörüne sağladığı katkıların önemi çeşitli teorik çalışmalarda vurgulanmakta ve etkin lojistik performans için finans sektörünün önemi anlatılmaktadır (Ellram 1991; Bowersox & Closs 1996; Mentzer vd., 2004; Fugate vd., 2010; Gupta ve Dutta 2011). Finansal açıdan gelişmiş ülkelerde, finansal aracılar ve piyasalar, pazardaki kusurları hafiflettiği ve hanehalkları tarafından tasarruf edilen kaynakları en verimli lojistik işletmelerine yönlendirirken bilgi asimetrisi ve maliyetini azalttığı için yüksek kaliteli finansal hizmetler sunması beklenmektedir. Ayrıca, Diamond (1984) tarafından belirtildiği üzere, yetkilendirilmiş gözlem "delegated monitoring" sayesinde, finansal aracılar lojistik işletmelerinin kendi çıkarlarını gözetmekten alıkoyarak izlemektedir. Bu hususun yanında, finansal kuruluş ve piyasalar işletmelerin, firmaların ve ülkelerin lojistik performansını önemli derecede etkileyen önemli finansal ürün ile hizmetleri bu sektörün hizmetine sunmaktadır.

Mesela lojistik sektörü taşıma, yükleme, boşaltma, depolama alanlarında bir çok riske ve belirsizliğe maruz kalmaktadır. Sadece transfer, bekleme sırasında meydana gelebilecek hasarlar, gecikme veya kaybolma değil ayrıca lokavt, grev, terörizm, ayaklanma, dolandırıcılık, hırsızlık gibi konularda finansal kuruluşlarının sağladığı sigortacılık ürün ve hizmetleri lojistik sektör için vazgeçilmezdir. Yüksek performans lojistik için dikkatle hazırlanmış sigortacılık ürün ve hizmetleri şarttır.

Lojistik iş makineleri, nakliye araçları, depolama hizmetleri, yükleme, boşaltma gibi alanlarda kullanılmak üzere pahalı makine veya teçhizat gerektiren bir sektördür (Bidgoli, 2010). Ayrıca lojistik sektörünün başarısı için liman, hava alanı,

yol gibi altyapı tesisleri elzemdir. Tüm bu sayılan makine, teçhizat ve altyapı ciddi bir yatırım gerektirmektedir. Yatırım ise kaynak/kredi sağlayacak finansal kurum ve kuruluşları gerektirir. Bu nedenledir ki finansal olarak gelişmiş ülkelerde bu tür yatırımlar için kaynaklar/krediler maliyet-etkin ve kolay bulunabilir.

Lojistik sektörü, özellikle deniz taşımacılığı (Alizadeh vd., 2015) ve hava yolu taşımacılığı (Hertwig and Rau, 2010), büyük işletme ve ticari risk ve belirsizliklere açıktır. Özellikle taşıma fiyatlarındaki ve dövizdeki dalgalanma bu sektör için ciddi risk oluşturmaktadır. Bu nedenle finansal türev piyasaları bu tür risklerden kaçınmak, ortadan kaldırmak veya etkisini azaltmak için lojistik sektörüne önemli ürün ve hizmetler sunmaktadır.

Ancak akademik çalışmalar genellikle yukarıda özetle sayılan spesifik finansal ürün veya hizmetlerin lojistik sektörü için önemini teorik olarak anlatmaktadır. Gelişmiş finansal sektörün lojistik sektörü için önemi teorik olarak akademik çalışmalarda vurgulanmasına rağmen ampirik olarak söz konusu ilişkiyi inceleyen bir çalışma halen bulunmamaktadır.

Bu sebeple bu çalışmada ampirik olarak analiz etmek için dokuz adet test edilebilir hipotez önerilmiştir. Birinci hipotez, ülkelerin yönetim kalitesi finansal gelişmişliklerini olumlu yönde etkilemektedir. İkinci hipotez, ülkelerin yönetim kaliteleri lojistik performanslarını olumlu yönde etkilemektedir. Üçüncü hipotez, ülkelerin finansal gelişmişlikleri lojistik performanslarını olumlu yönde etkilemektedir. Üçüncü hipotez üç alt hipotezle geliştirilmiştir. Modelde yer alan finansal gelişmişlik örtük değişkeni sırayla finansal gelişmişliğin karakteristikleri olan finansal derinlik, finansal ulaşılabilirlik ve finansal etkinlik örtük değişkenleri yer değiştirmiştir. Böylece modelde yer alan H3 hipotezine ilave orak sırayla H3A hipotezi ile “finansal derinlik lojistik performansı pozitif olarak etkilemektedir”, H3B hipotezi “finansal ulaşılabilirlik lojistik performansı pozitif olarak etkilemektedir” ve H3C “finansal etkinlik lojistik performansı olumlu yönde etkilemektedir” test edilmiştir. Bu şekilde üçüncü hipotezin çeşitlendirilmesinin sebebi; “hipotez geliştirme” bölümünde grafiklerle gösterildiği gibi bir ülke finansal olarak derin kurum ve piyasalara sahip olmasına rağmen finansal ulaşılabilirliği nispeten kısıtlı olabilmektedir. Grafik-12’de görüldüğü üzere, Kore ve Ürdün hemen hemen aynı seviyede finansal derinliğe sahip olmalarına rağmen Kore’nin finansal etkinliği Ürdün’ün finansal etkinliğinden on üç kat üstün olabilmektedir. Bu nedenle finansal gelişmişliğin karakteristiği olarak literatürde tanımlanan finansal derinlik, finansal ulaşılabilirlik ve finansal etkinliğin (Sahay vd., 2015; Cihak vd., 2012) lojistik performans üzerine olan etkisi ayrı ayrı test edilmesi planlanmıştır. Dördüncü

hipotezde ise ülkelerin yönetim kalitesinin küresel rekabet gücünü pozitif etkilediği konusu test edilmektedir. Beşinci hipotezde ülkelerin finansal gelişmişliklerinin küresel rekabet güçlerini pozitif olarak etkilediği test edilmektedir. Son olarak ise ülkelerin lojistik performanslarının küresel rekabet güçlerini pozitif olarak etkilediği hipotezi test edilmektedir.

Yukarıda sunulan hipotezleri test etmek için 101 ülkenin verileri kullanılmıştır. Veri yılı olarak 2012 yılına ait veriler kullanılmıştır. Çünkü lojistik performans verileri Arvis vd. (2007, 2010, 2012, 2014 ve 2016) tarafından Dünya Bankasının desteği ile 2007, 2012, 2014 ve 2016 yıllarıda yayımlanmıştır. Diğer yandan Dünya Bankası tarafından sunulan finansal gelişmişlik verileri, özellikle borsaya ait veriler, 2012 yılında en geniş veri setini sağlayacak şekilde verilmiştir. Veri setinde 101 ülkeye ait verilerin kullanılmasında borsaya ait verilerin mevcudiyeti belirleyici olmuştur. Çünkü sadece 107 ülkeye ait borsa verilerine ulaşılabilmektedir. Ancak Bangladeş, Barbados, Bermuda, İsrail, Trinidad ve Tobago, Uganda ve Zambiya'nın borsa verileri olmasına rağmen lojistik performans verisi bulunmamaktadır. Benzer şekilde Fiji, Papua Yeni Gine ve Tunus'un borsa verileri olmasına rağmen küresel rekabet verileri bulunmamaktadır. Bu nedenle lojistik performans veya küresel rekabet verisi olmayan bu on ülke veri setine dahil edilmemiştir. Ancak borsa verisi olmamasına rağmen diğer verileri bulunan Azerbaycan, Dominik Cumhuriyeti, Haiti ve Moldova veri setine eklenmiştir. Veri setinde kullanılan ülkeler EK-A'da sunulmuştur.

Ülkelerin yönetim kalitesini gösteren veriler Dünya Bankası Veritabanından alınmıştır. Dünya Bankası tarafından 1996 yılından beri yaklaşık 200 ülkeye ait yönetim kalitesini gösteren veriler yayımlanmaktadır. 1996-2002 yılları arasında iki yılda bir yayımlanan veriler 2003 tarihinden itibaren her yıl yayımlanmaya başlanmıştır (Kaufman vd., 2010). Yönetim kalitesinin göstergeleri hesap verebilirlik, politik istikrar, devlet etkinliği, kanun ve nizamların kalitesi, hukukun üstünlüğüne olan inanç ve yolsuzlukla mücadeledir. Kaufman vd. (2010)'a göre hesap verebilirlik ve politik istikrar bir ülkede hükûmetin nasıl seçildiği ve denetlendiği konusunda bilgi vermektedir. Devlet etkinliği, kanun ve nizamların kalitesi hükûmetlerin politikaları nasıl uyguladıkları hakkında ipucu vermektedir. Son olarak, hukukun üstünlüğüne olan inanç ve yolsuzlukla mücadele göstergeleri ise vatandaşın ve hükûmetin ekonomik ve sosyal kurumlara olan yaklaşımını göstermektedir. Kolaylıkla anlaşılacağı gibi bu veri seti yönetim kalitesinin karakteristiği olmaktan ziyade göstergeleridir. Ayrıca söz konusu altı adet gösterge birbiri ile yüksek oranda bağlantılıdır. Bu nedenle yönetim kalitesinin göstergeleri

olan değişkenler PLS-SEM'de yansıtıcı ölçüm modeli (reflective model) olarak dizayn edilmiştir.

Lojistik performans verileri de Dünya Bankası Veritabanından alınmıştır. Dünya Bankası'nın desteği ile Arvis vd. tarafından 2007, 2010, 2012, 2014 ve 2016 yıllarında lojistik performans verileri yayımlanmıştır. Lojistik performans verileri her yıl ortalama 150-160 civarında ülkeyi kapsamaktadır. Lojistik performans verileri dünya çapında lojistik sektöründe çalışan yaklaşık 6,000 kişiye anket yapmak suretiyle elde edilmektedir. Ankete katılan kişilerden en çok irtibatta oldukları veya çalıştıkları sekiz ülkenin lojistik sistemi altyapısı, gümrük işlemlerinin kolaylığı, sevkiyat kolaylığı, lojistik hizmet kalitesi, sevkıyatın zamanın ulaşıp ulaşmadığı ve yük takip kabiliyeti konusunda değerlendirme yapmaları istenmektedir. Lojistik performansı temsil eden söz konusu bu altı gösterge lojistik performansın karakteristiği olmaktan ziyade göstergesidir. Bu nedenle lojistik performans örtük değişkeni ile ilişkili gösterge değişkenleri PLS-SEM'de yansıtıcı ölçüm modeli olarak dizayn edilmiştir.

Küresel rekabet gücü verileri ise Dünya Ekonomik Forumu (WEF) Veribankasından alınmıştır. WEF tarafından 2004 yılından beri her yıl küresel rekabet gücünü gösteren veri seti yayımlanmaktadır. WEF tarafında yayımlanan küresel rekabet veri seti toplam 12 adet değişkenden oluşmaktadır ancak söz konusu değişkenler üç alt başlık altında incelenmektedir. Üç ana alt başlık temel gereksinimler, verimlilik artırıcılar ile iş dünyasında sofistike olma ve yenilik faktörleridir. Küresel rekabetin gücü değişkeninin gösterge değişkenleri PLS-SEM'de yansıtıcı ölçüm modeli olarak ilave edilmiştir.

Finansal gelişmişlik akademik çalışmaların çoğunda genellikle bankacılık siteminin büyüklüğü veya özel sektöre verilen kredinin gayrisafi yurt içi hasılaya oranı ile ölçülmektedir. Son zamanda Cihak vd. (2012) and Sahay vd. (2015) gibi çalışmalarda finansal gelişmişliğin bankacılık sisteminin yanında borsa piyasası, tahvil-bono piyasası, sigortacılık sektörü gibi finansal sistemi oluşturan unsurların finansal derinlik, ulaşılabilirlik ve etkinliğin ölçülerek belirlenmesi gerektiğinin önemi vurgulanmaktadır. Bu nedenle bu doktora tezinde bankacılık, borsa, sigorta şirketleri ve girişim sermayedarlarının sağladığı finansal derinlik, ulaşılabilirlik ve etkinliği temsil eden göstergeler tespit edilerek modele dahil edilmiştir.

Finansal gelişmişlik verisi Dünya Bankası Veritabanı ve Dünya Ekonomik Forumu Veritabanından alınmıştır. Finans literatüründe finansal derinlik, finansal ulaşılabilirlik ve finansal etkinlik finansal gelişimin üç temel karakteristiği veya

boyutu olarak tanımlanmaktadır. Bu denenle bu üç gösterge PLS-SEM modeline belirleyici ölçüm modeli (formative model) olarak dahil edilmiştir.

Finansal gelişim örtük değişkenin göstergeleri olan finansal derinlik, finansal ulaşılabilirlik ve finansal etkinlik göstergeleri Temel Bileşenler Analizi (Principal Component Analysis-PCA) sonucunda elde edilen katsayılar kullanılarak elde edilen endekslerdir. Finansal derinlik endeksi oluşturmak için şu değişkenler kullanılmıştır: borsa hisse senedi piyasa değerinin gayrisafi yurt içi hasılaya oranı, mevduat bankaları ve diğer finansal kuruluşlar tarafından sağlanan kredi miktarının gayrisafi yurt içi hasılaya oranı, girişim sermayedarlığının olup olmadığı, hayat ve diğer sigortacılık primlerinin gayrisafi yurt içi hasılaya oranı, finansal sistemdeki mevduat toplamının gayrisafi yurt içi hasılaya oranı, mevduat bankaların aktif varlıklarının gayrisafi yurt içi hasılaya oranı ve son gösterge olarak borsada işlem hacminin gayrisafi yurt içi hasılaya oranı. Finansal ulaşılabilirlik endeksi ise toplam altı adet gösterge kullanılarak oluşturulmuştur. Finansal ulaşılabilirlik endeksi oluşturmak için kullanılan değişkenler: yatırımların borsa vasıtasıyla finanse edilebilirliği, her 100,000 yetişkine düşen banka şube sayısı, her 100,000 yetişkine düşen ATM sayısı, finansal hizmetlerin mevcudiyeti, finansal hizmetlerin maliyet etkin şekilde elde edilebilirliği ve son olarak kredi alma kolaylığıdır. Finansal etkinlik endeksi ise beş adet değişken kullanılarak oluşturulmuştur. Söz konusu değişkenler: borsanın devir hızı oranı, vergiden sonraki bankaların aktif varlıklardan elde ettiği getiri, vergiden sonra bankaların özsermaye getirileri, bankaların genel giderlerinin aktif varlıklara oranı ve net faiz marj oranıdır.

Kayıp veriler sağlam ve geçerli endeks kurulmasını önlediğinden eksik verilere çözüm bulunması önem arz etmektedir. Ancak Hair vd. (2016) tarafında belirtildiği üzere şayet eksik veri sayısı toplam verinin %5'inden az ise verinin aritmetik ortalaması kayıp veri boşluklarını doldurmak için kullanılabilmektedir. Bu çalışmada kullanılan veri setinde kayıp veri sayısı her bir değişken için %5'den az olduğu için kayıp veriler aritmetik ortalama ile doldurulmuştur. Benzer şekilde anormal büyük ve küçük verilerin bizi yanıltıcı sonuçlara götürmemesi için anormal küçük verilerin yerine en küçük 5'inci veri ile en büyük verilerin yerine ise 95'inci büyük veri konmuştur. Müteakiben bütün veriler 0 ile 1 arasında normalleştirilmiştir.

PLS-SEM parametrik olmayan istatistik tekniği olması nedeniyle veri dağılımı olarak normal dağılımı zorunlu kılmamaktadır. Ancak Hair vd. (2016) PLS-SEM'in normal dağılımı zorunlu kılmamasına rağmen aşırı normal olmayan dağılımların parametrelerin analizinde sorun yaratabileceğini ifade ederek veri dağılımının test aşamasında gözden geçirilmesini tavsiye etmektedir. Bu nedenle bu çalışmamızda

veri dağılımı incelendiğinde bazı göstergelerin basıklık ve çarpıklığın normal kabul edilen -1 ila +1 aralığı dışında olmasına rağmen dikkat çeken aşırı anormallik olmadığı görüldüğünden analize devam edilmiştir.

OECD (2008) ve Sahay (2015)'in de tavsiye ettiği üzere Temel Bileşenler Analizi kullanılarak endekste kullanılacak katsayılar elde edilmiştir. Temel Bileşenler Analizi değişkenler arasındaki bağımlılık yapısının boyutunun indirgenmesi veya yok edilmesi amacıyla kullanılmaktadır. Çoğu zaman tek başına bir analiz yöntemi olarak kullanılmasına rağmen bu tez çalışmasında olduğu gibi başka analizler için veriyi hazırlamaya yardımcı teknik olarakta kullanılabilmektedir. SPSS 20 İstatistik programında elde ettiğimiz veriler neticesinde finansal derinlik ve ulaşılabilirlik için iki tane temel bileşen, finansal etkinlik için ise bir adet temel bileşen bulunmuştur. Bileşen değerlerinin karesinin özdeğere bölünmesi neticesinde endekslerde kullanılacak katsayılar elde edilmiştir.

Analiz ve hipotezlerinin testi için Kısmı En Küçük Kareler Yapısal Eşitlik Modeli (PLS-SEM) kullanılmıştır. PLS-SEM yöntemi, Hermann Wold tarafından 1960'lı yıllarda temeli atılmış ve müteakiben Lohmöller (1989) tarafından geliştirilmiş ikinci nesil çok boyutlu ve doğrudan gözlemlenemeyen örtük değişkenler arasındaki yapısal ilişkileri analiz etmek için kullanılan istatistik metodudur (Henseler vd., 2009). PLS-SEM eşzamanlı olarak birden fazla bağımlı ve bağımsız değişkenin olduğu karmaşık modelleri analiz etmede etkin olarak kullanılmaktadır. PLS-SEM tekniği özellikle tahmin maksatlı teori geliştirme safhasının başında veya erken safhalarında kullanılmaktadır (Hair vd., 2012a, 2016; Garson, 2016). Kovaryans temelli yapısal eşitlik modelinin (SEM) aksine varyans temelli olan PLS-SEM yöntemi açıklanan varyansı en üst düzeye çıkarmak için en küçük kareler regresyonunu kullanmaktadır. PLS-SEM modelinde yer alan örtük değişkenlere (constructs veya unobserved variables) ait parametreler ilintili oldukları gözlemlenebilen gösterge değişkenler vasıtasıyla hesaplanmaktadır. Bu sebeple; Hair vd., (2016) PLS-SEM'i varyans tabanlı, parametrik olmayan yapısal eşitlik tahmin yöntemi olarak tanımlamaktadır.

PLS-SEM kovaryans tabanlı parametrik SEM metoduyla mukayese edildiğinde veri dağılımı hakkında normal dağılımı şart olarak öne sürmemektedir. Ayrıca karmaşık modellerde ve küçük veri setinde dahi geçerli ve güvenilir sonuçlar sunmaktadır. Hair vd. (2016)'nın ifade ettiği gibi PLS-SEM için en az 60 veri yeterli olmaktadır. Bu kapsamda bu doktora tezinde veri seti 101 ülkeden oluştuğundan PLS-SEM güvenle kullanılmıştır.

PLS-SEM analizi iki aşamadan oluşmaktadır. Analizin birinci aşamasında, gözlemlenebilen diğer bir ifade ile doğrudan ölçülebilen gösterge değişkenler ile örtük yanı doğrudan ölçülemeyen değişkenler arasındaki doğrusal ilişkiler belirlenerek önerilen modelin geçerliliği ve güvenirliği test edilir. Modelin geçerliliği ve güvenirliğine ilişkin sonuçlar elde edildiğinde bir sonraki aşamaya geçilir. İkinci aşama ise yapısal model analizdir ki bu aşamada örtük değişkenler arasındaki doğrusal ilişkiler belirlenerek test edilir.

PLS-SEM'de örtük değişkenler arasındaki ilişki tek yönlü olarak belirlenebilmektedir. İki yönünde işaret eden okların kullanılması mümkün değildir. İlave olarak şayet gösterge değişkenler örtük değişkenin karakteristiğini oluşturuyorsa belirleyici ölçüm modeli kullanılır ve okların yönü örtük değişkenden gösterge değişkenleri işaret eder. Diğer taraftan okların yönü gösterge değişkenlerden örtük değişkene doğruysa yansıtıcı ölçüm modeli kullanılır. Bu kapsamda finansal gelişmişlik örtük değişkenin gösterge değişkenleri finansal gelişmişliğin karakteristiğini temsil ettiğinden bu değişken belirleyici ölçüm modeli olarak tespit edilmiştir. Diğer örtük ölçüm modelleri ise yansıtıcı ölçüm modeli olarak belirlenmiştir.

Bu tez çalışmasında yukarıda ifade edilen avantajlar dikkate alınarak araştırma tekniği olarak PLS-SEM seçilmiş ve Ringle vd., (2015) tarafından geliştirilen SmartPLS 3 istatistik paket programı kullanılmıştır.

Ancak PLS-SEM sonuçlarına geçmeden önce modelimizde bulunan dört adet değişken arasındaki ilişki basit regresyonla analiz edilmiştir. İlk aşamada yönetim kalitesi bağımsız değişken olarak belirlenmiş ve bağılı değişken olan finansal gelişmişlik, lojistik performans ve küresel rekabet gücünün varyansını nasıl açıkladığı tek tek analiz edilmiştir. Bağımsız değişken yönetim kalitesi bütün bağımlı değişkenlerle pozitif doğrusal ilişkisi olduğu Grafik-18, Grafik 19 ve Grafik-20'de görülmektedir. Yönetim kalitesi, finansal gelişmişlik bağımlı değişkenin varyansının %54,54'ünü, lojistik performans bağımlı değişkenin varyansının %63,64'ünü ve küresel rekabet gücünün varyansının %64.63'ünü açıklamaktadır. Diğer taraftan Grafik-21'de görüldüğü üzere finansal gelişmişlik bağımsız değişkeni lojistik performans bağımlı değişkenin varyansının %69,20'sini açıklamaktadır ve aralarında pozitif doğrusal ilişki vardır. Grafik-22 ise finansal gelişmişlik bağımsız değişkeni ile küresel rekabet gücü arasındaki pozitif doğrusal ilişkiyi açıkça göstermektedir. Son olarak lojistik performans bağımsız değişkeni küresel rekabet gücü bağımlı değişkenin varyansının %76,30'unu açıklamakta ve diğer ilişkilerde olduğu gibi pozitif doğrusal ilişki burada da mevcuttur.

PLS-SEM sayesinde eşzamanlı olarak yönetim kalitesi değişkenin finansal gelişmişlik, lojistik performans ve küresel rekabet gücü değişkenlerine etkisi, aynı şekilde finansal gelişmişlik değişkenin lojistik performans ve küresel rekabet gücü değişkenine olan etkisi ve lojistik performans değişkenin küresel rekabet gücü değişkenine olan etkisini analiz edilmiştir. Müteakiben finansal gelişmişlik değişkeni finansal derinlik, finansal ulaşılabilirlik ve finansal etkinlik değişkenleri ile yer değiştirerek bu finansal gelişmişliğin farklı boyutlarını temsil eden bu değişkenlerden hangisinin lojistik performans üzerinde daha fazla etkisi olduğu tespit edilmeye çalışılmıştır.

Modelimizde yer alan dört adet değişkenden finansal gelişmişlik örtük değişkeni belirleyici ölçüm modeliyle ve geri kalan üç adet değişken ise yansıtıcı ölçüm modeli ile analiz edilmiştir. Bu iki ölçüm modelinin analiz yöntemleri birbirlerinden büyük oranda farklı olması nedeniyle belirleyici ve yansıtıcı ölçüm modelleri ayrı ayrı analiz edilmiştir.

Analize yansıtıcı ölçüm modellerinin analizi ile başlanmıştır. Sırasıyla Cronbach'nın alfası, birleşik güvenirlik testleri sayesinde modelin içsel güvenirliği/tutarlılığı test edilmiştir. Müteakiben faktör yüklerinin karesi ve ortalama açıklanan varyans (AVE) kontrol edilerek yansıtıcı ölçüm modellerinin uyuşum geçerliğini (convergent validity) sağlayıp sağlamadığı test edilmiştir. Müteakiben boyutların ıraksaklık (ayrışma) geçerliliğini sağlanıp sağlanmadığını analiz etmek için Fornell-Larcker değerlendirme kriterleri ve çapraz faktör yükleri ve HTMT kullanılmıştır.

Hair vd. (2016) şayet Cronbach'nın alfa değeri ile birleşik güvenirlik değeri 0.70'den büyükse modelde yer alan örtük değişkenlerin içsel tutarlılığının sağlanacağını belirtmişlerdir. Bu kapsamda; yönetim kalitesi, lojistik performans ve küresel rekabet gücü değişkenlerinin Cronbach'nın alfası ve birleşik güvenirlik değerleri incelendiğinde hepsinin 0.70'den büyük oldukları ve modeldeki bütün yansıtıcı ölçüm modellerinin içsel tutarlılığı sağladığı görülmektedir.

Ancak ölçeğin güvenilir/tutarlı olması geçerli olacağı anlamına gelmediğinden uyuşum geçerliliği ve ıraksaklık geçerliliğinin incelenmesi gerekmektedir (Hair vd., 2016). Uyuşum geçerliliği faktör yüklerinin karesi ve ortalama açıklanan varyans (AVE) ile incelenmiştir. Tablo-15'de yönetim kalitesi, lojistik performans ve küresel rekabet güçleri örtük değişkenlerinin ilişkili gösterge değişkenlerinin faktör yüklerinin 0.846 ile 0.961 aralığında yer alması nedeniyle faktör yükleri karelerinin eşik değer 0.50'den büyük olduğu görülmüştür. Yani örtük değişkenler ilişkili olduğu her bir gösterge değişkenin varyansının %50'sinden fazlasını açıklamaktadır. Yine Tablo-

15’de ikinci kriter olan ortalama açıklanan varyans (AVE) değerleri incelendiğinde yönetim kalitesi örtük değişkenin kendisini oluşturan gösterge değişkenlerin varyansının %86,6’sını, lojistik performans %92,7 ve küresel rekabet gücü ise %88.8’ini açıkladığı görülmüştür. Bu sonuçlardan anlaşılacağı üzere uyuşum geçerliliği kriterleri sağlanmıştır. Bu nedenle; gözlemlenen gösterge değişkenlerin ait oldukları örtük değişkeni yeterli oranda ve birbirleri ile tutarlı bir şekilde açıkladıkları sonucuna varıyoruz.

Uyum geçerliği değerlerinden sonra yansıtıcı ölçüm modellerinin ıraksaklık geçerliliği incelenmiştir. Modelin ıraksaklık geçerliliği çapraz faktör yükü, Fornell-Larcker değerlendirme kriteri ve HTMT ile incelenmiştir. Söz konusu bu metodolojiler birbirini tamamlayıcı olmayıp alternatiftir. Sağlıklı sonuçlar elde etmek için bütün metodolojiler incelenerek sonuçlar sunulmuştur. Tablo-16’da bütün gösterge değişkenlerin bütün örtük değişkenler için çapraz faktör yükleri sunulmuştur. Görüldüğü gibi gösterge değişkenlerin faktör yüklerinin en yüksek olduğu yer ilintili oldukları örtük değişkenlerdir.

Fornell-Larcker değerlendirme kriterine göre ıraksaklık geçerliliğinin sağlanması için bir örtük değişkene ait ortalama açıklanan varyans değeri (AVE) karekökünün diğer faktörlerle olan korelasyon değerlerinden büyük olması gerekmektedir. Tablo-17’de görüldüğü üzere bu şartın sağlandığı görülmektedir. Çünkü örtük değişkenler arasındaki korelasyonlar 0,90 sınırının altındadır ve tamamı açıklanan varyans değerlerinden daha küçüktür.

Son ıraksak geçerlilik metodu HTMT’dir. Hair vd. (2016)’ya göre HTMT değeri 0,90’ın altındaysa ıraksak geçerliliğin sağlandığı sonucunda ulaşılabilir. Ancak HTMT değeri 0,90’ın üzerinde ise bootstrapping yöntemi %5 veya daha küçük hata terimi kullanılarak güven aralığı tespit edilmekte ve şayet güven aralığı 1’i içeriyorsa ıraksaklık geçerliliği ihlal edilmiş olarak değerlendirilmektedir. Tablo-18 incelendiğinde lojistik performans değişkenine ait HTMT değeri 0.917 olarak tespit edilmiş müteakiben ise bootstrapping yöntemi ile güven aralığı incelendiğinde 1 değerini içermediği görülmüştür. Bu nedenle ıraksaklık geçerliliğin sağlandığı sonucuna ulaşılmıştır. Iraksaklık geçerlilik sonuçlarından hareketle yönetim kalitesi, lojistik performans ve küresel rekabet gücü örtül değişkenlerinin her bir göstergesinin kendi örtük değişkeni üzerinde diğer örtük değişkenlere oranla daha fazla etkiye sahip olduğu görülmüştür.

Yansıtıcı ölçüm modelinin incelenmesinden sonra finansal gelişmişlik için belirleyici ölçüm modeli analizine geçilmiştir. Belirleyici ölçüm modeli analizi yöntemi yansıtıcı ölçüm modelinden farklıdır. Bu nedenle finansal gelişmişlik ölçüm modeli

analizinde öncelikle ıraksaklık geçerliliği ile başlanmıştır. Müteakiben eşdoğrusal bağlantı analizi ve faktör ağırlıklarının büyüklüğü ve istatistiksel anlamlılığı analiz edilerek tamamlanmıştır.

PLS-SEM'de yer alan belirleyici ölçüm modelli finansal gelişmişlik değişkeninin ıraksaklık geçerlilik analizi aynı değişkenin başka gösterge değişkenlerden oluşan yansıtıcı ölçüm modeliyle mukayese edilerek yapılmıştır. Hair vd. (2016)'ya göre şayet yol parametresi 0,70'den, belirleme katsayısı (R^2) ise 0,50'den büyükse belirleyici ölçüm modelinin ıraksaklık geçerlilik şartını sağlamış olarak kabul edilecektir. Bu nedenle mevcut finansal gelişmişlik örtük değişkeni Dünya Kalkınma Forumu tarafından 2012 yılında yayımlanan Küresel Rekabet Raporu'nda yere alan finansal piyasaların gelişmişliği değişkeni ile karşılaştırılmıştır. Grafik-27'de görüldüğü gibi karşılaştırma neticesinde yol parametresi 0,742 ve R^2 ise 0,551 olarak bulunmuştur. Bu kapsamda; belirleyici ölçüm modeline sahip finansal gelişmişlik değişkenin ıraksaklık geçerlilik şartını sağladığı anlaşılmıştır. Müteakiben gözlemlenen değişkenlerin arasında eşdoğrusal bağlantı olup olmadığı varyans şişirme faktörü (VIF) ile incelenmiştir. Tablo-20'de varyans şişirme faktör değerleri sunulmuştur. Hiçbir gözlemlenen değişkenin varyans şişirme faktörü eşik değer olan 5'in üzerinde olmadığı için gözlemlenen değişkenler arasında eşdoğrusal bağlantı olmadığı görülmüştür. Son olarak faktör yüklerinin istatistiksel anlamlılığı bootstrapping yöntemi ile incelenmiştir. Tablo-21'de görüldüğü gibi finansal gelişmişlik değişkenin faktör yükleri %5 hata seviyesinde anlamlı olduğu görülmektedir. Kısaca, finansal gelişmişlik değişkeninin güvenilir ve geçerli olduğu sonucuna varılmıştır.

PLS-SEM'de modelin güvenirliği ve geçerliliği onaylandıktan sonra ikici aşama olan yapısal analiz kısmına geçilmiştir. Ancak SEM'in aksine PLS-SEM'de modellerin uyum iyiliğini (goodness-of-fit) ölçen genel kabul görmüş Ki-Kare testi gibi bir ölçüt olmadığından model içerisindeki bağımlı değişkenlerin tahmin edilebilme becerileri incelenmektedir (Sarstedt vd., 2014; Hair vd., 2016). Hair vd. (2016) yapısal analiz için eşdoğrusal bağlantı (collinearity), yolların istatistiki anlamlılık düzeyleri ile büyüklükleri, modelin belirleme katsayısı (R^2), kestirim uygunluğu (Q^2), etki büyüklük testleri f^2 ve q^2 gibi testleri önermiştir.

Yapısal analize örtük değişkenler arasında eşdoğrusal bağlantı olup olmadığı incelenerek başlanmıştır. Grafik-28'de görüldüğü üzere bütün varyans şişirme faktörleri eşik değer olan 5 değerinin altında olduğundan örtük değişkenler arasında eşdoğrusal bağlantı olmadığını söyleyebiliriz.

PLS-SEM yol parametreleri -1 ila +1 arasında değerler alabilmektedir. Şayet yol değerleri -1 değerine yakınsa örtük değişkenler arasında negatif güçlü ilişki olduğu söylenebilir. Fakat yol parametreleri +1 değerine yakınsa örtük değişkenler arasında pozitif güçlü ilişki olduğu söylenebilir. Diğer yandan 0 değerine yakın yol parametreleri zayıf ve muhtemelen istatistiksel olarak anlamlı olmayan ilişkilerin işaretçisidir. Grafik-29 incelendiğinde modelde yer alan örtük değişkenler arasında istatistiksel olarak %99 güvenirlik seviyesinde kuvvetli pozitif ilişkiler olduğu görülmektedir. Yönetim kalitesi ve finansal gelişmişlik yol parametresinin 0,754 (t-değeri=21.452), yönetim kalitesi ve lojistik performans yol parametresinin 0,417 (t-değeri= 6,343), finansal gelişmişlik ve lojistik performans yol parametresinin 0,517 (t-değeri=8,329), yönetim kalitesi ve küresel rekabet gücü yol parametresinin 0,290 (t-değer=4.232), finansal gelişmişlik ve küresel rekabet gücü yol parametresinin 0,308 (t-değer=4.836), lojistik performans ve küresel rekabet gücü yol parametresinin 0,396 (t-değer=5.108) olduğu görülmektedir. Bu kapsamda modelde yer alan bütün bağımsız değişenlerin bağımlı değişkenleri açıklama becerisinin yüksek olduğu anlaşılmaktadır. Bu kapsamda H1, H2, H3, H4, H5 ve H6 hipotezleri %99 güven aralığında kabul edilmiştir. Bu sonuçlarla tezimin çıkış noktası olan "ülkelerin finansal gelişmişliği lojistik performanslarını pozitif yönde etkiler" hipotezi doğrulanmıştır.

Yapısal model analizde üçüncü aşama ise belirleme katsayısı, R^2, analizidir. Grafik-30'da görüldüğü üzere yönetim kalitesi değişkeni, finansal gelişmişlik değişkenin varyansını %56,9 oranında açıklamaktadır. Yönetim kalitesi ve finansal gelişmişlik değişkenleri ise lojistik performans değişkenin varyansını %76,6 oranında açıklamaktadır. Son olarak bütün bağımsız örtük değişkenler küresel rekabet gücü değişkenin varyansını %85,8 oranında açıklamaktadır. İlave olarak Tablo-22'de görüldüğü üzere finansal gelişmişlik örtük değişkeninin lojistik performans değişkenin varyansı üzerinde büyük oranda etkisi varken küresel rekabet gücünün varyansı üzerinde orta seviyede etkisi vardır.

Bağımsız değişkenlerin tahmin becerisini (kestirim uygunluğu) gösteren Q^2 değeri göz bağlama (blindfolding) metoduyla hesaplanmıştır (Geisser, 1974; Stone, 1974). Göz bağlama metodunda örtük değişkenle ilgili göstergelerin belli veri noktaları toplam veri setinden ayrılarak model tarafından tekrar tahmin edilmek suretiyle bulunmaktadır. Müteakiben asıl veri değerleriyle göz bağlama metoduyla tahmin edilen değerler arasındaki fark hesaplanarak modelin tahmin yeteneği hakkında değerlendirme yapılabilmektedir. Şayet Q^2 değeri 0 değerinden büyükse bağımsız örtük değişkenin bağımlı örtük değişkeni kestirim uygunluğu (predictive

relevance) var sonucu çıkarılabilmektedir. Tablo-23'de görüldüğü üzere modelde yer alan bütün bağımsız değişkenlerin Q^2 değerleri 0 değerinden büyük olduğu için modeldeki bağımsız değişkenlerin bağımlı değişkenleri kestirim uygunluğuna işaret etmektedir. Q^2 değerleri bağımsız değişkenlerin bağımlı değişkenler üzerindeki kestirim uygunluğu hakkında bilgi vermesine rağmen şayet birden fazla bağımsız değişken varsa hangi bağımsız değişkenin ilgili bağımlı değişken üzerinde daha fazla kestirim uygunluğu etkisi olduğu hakkında bilgi vermemektedir. Bu nedenle q^2 testi sayesinde bu probleme çözüm bulunmuştur. Tablo-24'de anlaşılacağı üzere finansal gelişmişlik değişkenin lojistik performansın üzerinde büyük oranda kestirim uygunluğuna sahip olduğu görülmektedir.

Önerilen PLS-SEM analiz edildikten sonra hangi finansal gelişmişlik karakteristiğinin lojistik performans ve küresel rekabet gücü değişkenleri üzerinde etkisi olduğunu anlamak için modelde ki finansal gelişmişlik değişkeni sırasıyla finansal derinlik, finansal ulaşılabilirlik ve finansal etkinlik değişkenleri ile değiştirilerek aşağıdaki hipotezler test edilmiştir;

H3A: Ülkelerin finansal derinliği lojistik performanslarını pozitif olarak etkiler.

H3B: Ülkelerin finansal ulaşılabilirliği lojistik performanslarını pozitif olarak etkiler.

H3C: Ülkelerin finansal etkinliğini lojistik performanslarını pozitif olarak etkiler.

Bu bölümde bir önceki bölümden farklı olarak bütün örtük değişkenler yansıtıcı ölçüm modeli ile analiz edilmiştir. Çünkü literatürde finansal derinlik, ulaşılabilirlik ve etkinliğin karakteristikleri gösterge değişkenlerinin ne olduğu hakkında ortak bir kanı olmadığı için bütün gösterge değişkenler modelde yansıtıcı ölçü modeli olarak yer almıştır.

Finansal derinlik için 7 adet gösterge değişken tespit edilmiştir. Ancak DPH3 (risk sermayesi mevcudiyeti) gösterge değişkeninin faktör yükü 0,618'dir. Yani eşik değer olan 0,70 değerinden düşüktür. Ancak Hair vd. (2010, 2016) şayet faktör yükü 0,40-0,70 aralığında ise ve gösterge değişkenin modelden çıkarılması modelin güvenirliği ve geçerliğinde bir artışa sebep olmuyorsa gösterge değişkenin modelde kalması gerektiğini ifade etmişlerdir. Bu kapsamda; DPH3 gösterge değişkeni modelde tutulmuştur.

Tablo-26 incelendiğinde finansal derinliğin dahil olduğu modelde güvenirlik ve geçerliliğin sağlandığı görülmektedir. Müteakiben Grafik-31 incelendiğinde finansal derinlik ve küresel rekabet gücü yol parametresinin %95 güvenirlik seviyesinde geri

kalan yol parametrelerinin ise %99 güvenirlik seviyesinde anlamlı olduğu ve yol parametrelerinin kuvvetli pozitif ilişkilere işaret ettiği görülmektedir. Yönetim kalitesi ve finansal derinlik değişenleri arasındaki yol parametresi 0,720 (t-değeri = 17.101), yönetim kalitesi ve lojistik performans değişkenleri arasındaki yol parametresi ise 0,461 (t-değeri = 7,855), finansal derinlik ve lojistik performans değişkenleri arasındaki yol parametresi 0,480 (t-değeri = 7,890), yönetim kalitesi ve küresel rekabet gücü değişkenlerinin yol parametresi 0,335 (t-değer = 4,741), finansal derinlik ve küresel rekabet gücü değişkenlerinin arasındaki yol parametresi ise 0,146 (t-değer = 2.294), son olarak lojistik performans ve küresel rekabet gücü arasındaki yol parametresi ise 0,498'dir (t-değer = 6.314). Bu kapsamda modelde yer alan bütün bağımsız değişenlerin bağımlı değişkenleri açıklama becerisinin yüksek olduğu anlaşılmaktadır. f^2 değeri finansal derinlik değişkenin lojistik performansın varyansı üzerinde büyük etkisi olduğu, q^2 değerleri incelendiğinde finansal derinlik değişkenin lojistik performans değişkeni üzerinde büyük kestirim uygunluğu olduğu görülmektedir. Sonuç olarak; ülkelerin finansal derinliğinin ülkelerin lojistik performanslarına pozitif ve istastiksel olarak anlamlı ettiği ettiği hipotezi doğrulanmıştır.

Finansal ulaşılabilirlik örtük değişkeni altı tane gösterge değişkenle modele dahil edilmiştir. Ancak ACC2 (100.000 yetişkine düşen banka şube sayısı) değişkenin faktör yükü 0,245'dir. Yani eşik değer olan 0,4 değerinin altına olduğu için modelden çıkarılmıştır. Ancak ACC3 (100.000 yetişkine düşen ATM sayısı) değişkenin faktör yükü 0.485'dir. 0,40-0,70 aralığında olduğu ve bu değişkeni modelden çıkarmak güvenirlik ve geçerliği arttırmadığı için modelden çıkarılmamıştır. Kısaca finansal ulaşılabilirlik değişkeni ile modelin güvenir ve geçerli olduğu test sonuçlarından anlaşılmaktadır. Ayrıca Grafik-32 incelendiğinde bütün yol parametrelerinin %99 güvenirlik seviyesinde istatistiksel olarak anlamlı olduğu görülmektedir.

Yönetim kalitesi ve finansal ulaşılabilirlik değişkenleri arasındaki yol parametresi 0,687 (t-değeri = 14.742), yönetim kalitesi ve lojistik performans değişkenler arasındaki yol parametresi ise 0,544 (t-değeri = 8,827), finansal ulaşılabilirlik ve lojistik performans değişkenleri arasında yol parametresi 0,383 (t-değeri = 6,423), yönetim kalitesi ve küresel rekabet gücü yol parametresi ise 0,299 (t-değer = 4,175), finansal ulaşılabilirlik ve küresel rekabet gücü yol parametresi 0,316 (t-değer=5,854), lojistik performans ve küresel rekabet gücü yol parametresi 0,405'dir (t-değer = 5.726). Bu kapsamda modelde yer alan bütün bağımsız değişenlerin bağımlı değişkenleri açıklama becerisinin yüksek olduğu

anlaşılmaktadır. Ancak f^2 değerleri mukayese edildiğinde finansal derinlik değişkenin lojistik performans değişkeninin varyansı üzerinde büyük etkisi varken finansal ulaşılabilirlik değişkenin lojistik performansın varyansı üzerinde orta seviyede etkisi olduğu görülmüştür. q^2 değerleri incelendiğinde ise finansal ulaşılabilirlik değişkenin lojistik performans değişkeni üzerinde büyük kestirim uygunluğu olduğu görülmektedir. Sonuç olarak; ülkelerin finansal ulaşılabilirliği ülkelerin lojistik performanslarına pozitif ve istatistiksel olarak anlamlı ettiği hipotezi doğrulanmıştır.

Finansal etkinlik örtük değişkeni modele beş adet gösterge değişkenle dahil edilmiştir. Ancak içsel tutarlılık göstergeleri Cronbach's alfa ve birleşik güvenirlik sonuçlarının eşik değer olan 0,70'in altında kalması nedeniyle modelin güvenilir kabul edilemeyeceği görülmüştür. Hair vd. (2016)'da belirtildiği şekilde faktör yükleri düşük olan EFF2 (bankaların varlıklara oranla karlılığı) ve EFF3 (bankaların özsermayeye oranla karlılığı) modelden çıkarılarak içsel tutarlılığın eşik değerin üzerine çıkması sağlanmıştır. Bütün güvenirlik ve geçerlilik sonuçları eşik değerlerin üzerinde olduğu için yapısal analize geçilmiş ve bütün yol parametrelerinin %99 güvenirlik seviyesinde anlamlı olduğu görülmüştür. Özellikle vurgulamak gerekirse finansal etkinlik ve lojistik performans yol parametresi 0,377'dir ve t-değeri ise 6.191'dir. Buradan sonuçla finansal etkinliğin lojistik performans üzerinde pozitif ve istatistiksel olarak anlamlı etkisi olduğu sonucuna varabiliriz.

Finansal gelişmişliğin karakteristiği olan üç değişkeninde lojistik performans üzerinde etkisi olduğu yukarıda sunulan sonuçlardan anlaşılmaktadır. Ancak yol parametre büyüklükleri dikkate alındığında lojistik performans üzerinde en çok finansal derinlik, sonra finansal ulaşılabilirlik ve en son finansal etkinlik değişkeninin etkisi olduğu sonucuna varılabilir.

Son yıllarda literatürde sigortacılık ürün ve hizmetlerinin lojistik sektöre faydası, finansal türev piyasalarının deniz ve hava lojistik sektörüne katkıları, bankalar ile borç ve hisse piyasalarının lojistik sektörüne kredi sağlama konusundaki destekleri veya finansal aracıların lojistikçilerin envanter yönetime ve likidite yönetimlerine etkileri gibi teorik konular artan bir hızla çalışılmaktadır. Tüm bu çalışmalar finansal kurum ve piyasaların gelişmişliğinin lojistik sektör üzerindeki önemli ve rolünü teorik olarak vurgulamasına rağmen ampirik olarak finansal gelişmişlik ve lojistik performans arasındaki ilişkinin analizini yapan çalışma bulunmamaktadır. Bu doktora tezinin maksadı spesifik teorik çalışmaları finansal gelişmişlik çatısı altında toparlayarak finansal gelişmişliğin lojistik performansı olumlu yönde etkilediği hipotezini test etmektir. Yukarıda sunulduğu üzere test

sonuçları finansal gelişmişlik ve lojistik performans arasında güçlü pozitif ve istatistiksel olarak anlamlı ilişki olduğunu göstermektedir. Yani ülkelerin yüksek lojistik performansı ve sonucunda ileri seviyede küresel rekabet gücü için iyi yönetilmelerine ve finansal kurum ile marketlerinin gelişmesine ihtiyaç duyulmaktadır. Çünkü ticaretin omurgası olan lojistik sektörü küresel, yerel, finansal ve çevresel onlarca risk ve belirsizliğe açıktır. Söz konusu bu risk ve belirsizliklerin büyük kısmı finansal kurum ve piyasaların sağladığı ürün ve hizmetlerle engellenebilmekte veya seviyesi aşağılara çekilebilmektedir.

N: TEZ FOTOKOPİSİ İZİN FORMU

ENSTİTÜ

Fen Bilimleri Enstitüsü	
Sosyal Bilimler Enstitüsü	X
Uygulamalı Matematik Enstitüsü	
Enformatik Enstitüsü	
Deniz Bilimleri Enstitüsü	

YAZARIN

Soyadı : Özdemir

Adı : Levent

Bölümü : İşletme

TEZİN ADI : Relationship between financial development and logistics performance and their effects on the competitiveness: An empirical cross-country study.

TEZİN TÜRÜ : Yüksek Lisans [ ] Doktora [X]

1. Tezimin tamamından kaynak gösterilmek şartıyla fotokopi alınabilir. [ ]
2. Tezimin içindekiler sayfası, özet, indeks sayfalarından ve/veya bir bölümünden kaynak gösterilmek şartıyla fotokopi alınabilir. [ ]
3. Tezimden bir (1) yıl süreyle fotokopi alınamaz. [X]

TEZİN KÜTÜPHANEYE TESLİM TARİHİ: