The Effect of the Business Climate on a Firm's Inventory Performance: A Cross-Country Analysis

A thesis submitted to the
Graduate School of Natural and Applied Sciences

by

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in partial fulfillment for the
degree of Master of Science

in

Industrial and Systems Engineering

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Signed: Nuha

Date: 21.08.2019

"Learn everything you can, anytime you can, from anyone you can - there will always come a time when you will be grateful you did. "

Sarah Caldwell

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Abstract

In recent years, the business climate effects on firm performance and profitability started gaining increasing attention in both developed and developing economies. However, most of the past studies have been limited to investigating the possible effects of industrial policy and overall business climate on overall firm performance without questioning how the relationship is built. This thesis aims to bring a new, and much needed, perspective on this macro-micro economic relationship. The study aims to answer this important research question by analyzing and understanding to which extent to business climate, a macro level variable, can have a direct effect on inventory performance of a firm, a micro level firm operation. We hypothesize that the aggregate inventory level of a firm would be positively associated with the perceived obstacles in "infrastructure", "bureaucracy", and "finance". At the country level, we hypothesize that the country's development level would moderate that relationship and increase that positive effect.

Cross-country analysis is performed on the Eastern European and Central Asian region using the data from 2013. Empirical analysis techniques are used utilizing the World Bank's Enterprise Surveys' database as well as The Heritage Foundation's annual reports on 14,000 firms in 24 countries. A Hierarchical Linear Model is developed using IBM SPSS® statistical software, and seven business climate indicators are used as proxy for constraints realized in "infrastructure", "bureaucracy", and "finance" variables. Days of inventory is used as an indicator of the inventory performance of a company, and as our response variable.

Significant relationships between business climate and inventory performance are signaled by this study, and the results confirm our hypotheses in general. The results prompt improvements in the business climate to raise competitiveness by directing firms' operational efficiency. This study can primarily help firms to understand how their operations are consciously or unconsciously related to the business environment of the country. On a macro level, correctly directed operational policies can lead to an increase in firm-level performance, provide a sustainable growth outlook through higher efficiency, and diminish the severe unemployment problems of a country by encouraging both domestic and foreign investments.. . .

Keywords: Business Climate, Inventory Performance, Industrial Policy, Cross-Country Analysis, Eastern Europe and Central Asia

Tezin Türkçe Başlığı

Nuha Mohammed Kamel Hashem

Öz

Son yıllarda, iş ortamının firma performansı ve karlılığı üzerindeki etkileri hem gelişmiş hem de gelişmekte olan ekonomilerde artan ilgi görmeye başladı. Bununla birlikte, önceki çalışmaların çoğu, ilişkinin nasıl kurulduğunu sorgulamadan, sanayi politikasının ve genel iş ortamının genel firma performansı üzerindeki olası etkilerini araştırmakla sınırlı kalmıştır. Bu tez, bu makro-mikro ekonomik ilişki üzerine yeni ve çok ihtiyaç duyulan bir bakış açısı getirmeyi amaçlamaktadır. Çalışma, bu önemli araştırma sorusu olan bir makro seviye değişken olan iş ortamının ne dereceye kadar bir firmanın mikro düzeyde işletme operasyonu olan envanter performansı üzerinde etkiye sahip olabileceğini analiz edip anlamayı amaçlamaktadır. Bir firmanın toplam envanter seviyesinin altyapı, bürokrasi ve finans alanındaki algılanan engellerle pozitif ilişkili olup olmadığını test ediyoruz. Ülke düzeyinde, ülkenin gelişmişlik seviyesinin bu ilişkiyi daha da arttıracağı varsayımında bulunuyoruz.

2013 yılı için Doğu Avrupa ve Orta Asya bölgesindeki ülkeler üzerinde ülke karşılaştırmalı analiz yapılmıştır. Dünya Bankası'nın Kurumsal Araştırmalar veri tabanının yanısıra The Heritage Vakfı'nın 24 ülkede 14.000 firma hakkındaki yıllık raporları kullanılarak ampirik analiz teknikleri uygulanmıştır. IBM SPSS istatistik yazılımı kullanılarak Hiyerarşik Doğrusal Model geliştirilmiştir ve "altyapı", "bürokrasi" ve "finans" alanlarında yaşanan kısıtları ifade etmek için yedi iş ortamı göstergesi kullanılmaktadır. Envanter günleri bir şirketin envanter performansının bir göstergesi olarak ve bağımlı değişkenimiz olarak kullanılır.

İş ortamı ile envanter performansı arasındaki önemli ilişkiler bu çalışma ile gösterilmektedir ve sonuçlar genel olarak hipotezlerimizi doğrular. Sonuçlar, firmaların operasyonel verimliliğini yönlendirerek rekabet gücünü arttırmak için iş ortamında gelişmeler yapılmasını desteklemektedir . Bu çalışma öncelikle firmaların operasyonlarının ülkenin iş ortamı ile bilinçli ya da bilinçsiz olarak nasıl bağlantılı olduğunu anlamalarına yardımcı olabilir. Makro düzeyde, doğru yönlendirilmiş operasyonel politikalar firma düzeyinde performansta bir artışa yol açabilir, daha yüksek verimlilikle sürdürülebilir bir büyüme perspektifi sağlayabilir ve hem iç hem de yabancı yatırımları teşvik ederek bir ülkenin ciddi işsizlik sorunlarını yumuşatabilir. ...

Anahtar Sözcükler: İş Ortamı, Envanter Performansı, Sanayi Politikası, Karşılaştırmalı Ülke Analizi, Doğu Avrupa ve Orta Asya

Acknowledgments

I would like to start by acknowledging my thesis advisor, **Dr. Nagihan Çömez Dolgan**, for accepting me as her student and for always going out of her way to make sure I learn as much as I could. She dedicated her time and effort to meticulously ensure that we conduct a useful and contributing research. Moreover, she has given me a collaboration opportunity with **Dr. Lama Moussawi**, from the *American University of Beirut*, which has been a tremendous help to me thus far.

I also want to acknowledge and deeply thank my co-advisor, **Dr. Gökçen Arkalı Olcay** for being there whenever we needed her advice and expertise. I wouldn't have been able to write and present this work if it weren't for my advisors' consistent and invaluable feedback and guidance.

I want to thank the professors of *İstanbul Şehir University* for their crucial role in my development as an Industrial Engineering student as well as a blooming researcher. I would like to specifically thank **Dr. Hatice Tekiner Moğulkoç**, **Dr. Selim Zaim**, **Dr. Bahadır Tunaboylu**, and **Dr. Mete Şirvancı**.

Finally, and very importantly, I acknowledge the mental and moral support of **my family and friends**. I appreciate the ones who were always there for me and pushing me forward when I needed it the most.

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Abbreviations

AbI	**Ab**normal **I**nventory
BEEPS	**B**usiness **E**nvironment and **E**nterprise **P**erformance **S**urveys
CEO	**C**hief **E**xecutive **O**fficer
COGS	**C**ost **O**f **G**oods **S**old
CPI	**C**orruption **P**erceptions **I**ndex
DOI	**D**ays **O**f **I**nventory
ELI	**E**mpirical **L**eanness **I**ndicator
EOQ	**E**conomic **O**rdering **Q**uantity
FFC	**F**reedom **F**rom **C**orruption
GDP	**G**ross **D**omestic **P**roduct
HLM	**H**ierarchical **L**inear **M**odel
HR	**H**uman **R**esources
IT	**I**nventory **T**urnover
ItS	**I**nventory **t**o **S**ales
JIT	**J**ust **I**n **T**ime
LIFO	**L**ast **I**n **F**irst **O**ut
LMM	**L**inear **M**ixed **M**odel
MRP	**M**aterial **R**equirements **P**lanning
OM	**O**perations **M**anagement
ROA	**R**eturn **O**n **A**ssets
ROE	**R**eturn **O**n **E**quity
SD	**S**tandard **D**eviation
SME	**S**mall to **M**edium **E**enterprise
TPS	**T**oyota **P**roduction **S**ystem
UNECE	**U**nited **N**ations **E**conomic **C**ommission for **E**urope

WBES **W**orld **B**ank's **E**nterprise **S**urveys

WTO **W**orld **T**rade **O**rganization

Chapter 1

Introduction

Policy intercessions by governments to reshape the economical activity's construction and overall business climate of a country, which is partly shaped by industrial policy and other long-term regulatory, judicial and cultural practices have been generally dismissed by operations management scholars. Various terms related to a country's business environment are used interchangeably in both practice and academic literature. Some of these terms are the business environment, the industrial policy, the investment climate, and the nature of the economy. In recent years, such "business climate" effects on firm performance and profitability started gaining increasing support in many economies, particularly in manufacturing, by policy makers as well as by non-governmental organizations and chambers of industry and commerce.

For example, the off-shoring of manufacturing in developing economies over the past decade has been a serious concern. As a result, support for political interventions that reverses this trend is increasing, especially after the 2007-08 global financial crisis. Obama's government in the United States initiated the Advanced Manufacturing National Program Office. In Great Britain, the government of "2010 to 2015" started an "industrial strategy" to restore the economy to monetary services and production. In 2016, the election of the US president and the referendum of the UK on European Union membership resulted in making both the worldwide production sphere and the industrial tactic plan even more crucial in the political sphere [1].

However, despite many common concerns, there have been very few dialogues between the business climate and the discipline of operations management. We notice that, in

this recent and so far limited research literature, all studies are still at the stage of investigating the possible effects of industrial policy and overall business climate on overall firm performance without questioning how the relationship is built. In fact, there is another stream of studies that shows that firm performance and profitability are highly correlated with operational capability, which can be described as the firm's new product development and design, JIT, quality management, and inventory management policies.

Our study aims to fill this research gap, which yields an important question regarding the role of the business climate in controlling firm-level operational decisions. As [2] explicitly states, "we need to develop a better understanding of the link between firm choices (decisions) and the business climate in developing countries." For this purpose, through this study, we aim to understand the actual link between the business climate of a (developing) country and the operational strategies of firms performing, within each business climate. We specifically focus on Eastern Europe and Central Asia because it is an assembly of developing countries with rich political history and ongoing economic development in that region. The World Bank's Enterprise Surveys (WBES) [3] were utilized to conduct empirical analysis on 24 Eastern European and Central Asian countries. This cross-country analysis will be used to test the influence of the business climate of a country on the operational decisions of firms in that country, using days of inventory as a proxy for operational decisions. Our data was collected in the year 2013, which is the most recent bundle of data available for our region of interest.

Moreover, we inspect the moderation effect of the country's development level on the relationship between the business environment and the days of inventory. We use country-level variables, namely GDP per Capita and Freedom from Corruption Index (FFC), as indicators of the country's development level. These variables are gathered from The World Bank as well as The Heritage Foundation's reports on the freedom of economy in countries [4]. The Heritage Foundation is an institution that collects country-level information and publishes annual reports reflecting different aspects of the economic freedom of countries all over the world. We use The World Bank as well as The Heritage Foundation's resources to collect our country-level data for the year 2013.

The results of our study will primarily help firms understand how their operations are consciously or unconsciously tied to the business climate of the country. On the other hand, it can help high-level government officials, in terms of viewing how firm-level

performance is influenced by the business climate through operational decisions. It can also help them in assessing possible changes and improvements in industrial policies. Moreover, it is expected that the results of our study would enlighten institutions such as "Chamber of Industry and Trade" and other non-governmental organizations, which also affect the business environment of the country, while they work on more business development activities. If the significant relationships can be signaled by this study, improvements in the business climate may be suggested to raise competitiveness by directing firms' operational efficiency. As a result, correctly directed operational policies can lead to an increase in firm-level efficiency, provide a supportable development outlook through higher yield, and minimize the unemployment problems of a country through attracting both domestic and foreign investments.

In the next chapter, we will thoroughly review the topic's background and formulate our hypotheses accordingly. In Chapter 3, we describe our data sources in detail. Sampling and measurements will be discussed in Chapter 4. In Chapter 5, the statistical model will be presented along with an an exploration of the empirical results. Finally, in Chapter 6, we will conclude and suggest potential future research opportunities.

Chapter 2

Theoretical Background and Hypotheses

As far as we know, there is no similar study in the literature to address the question proposed in this thesis. However, this research topic is still related to the three well-developed branches of research in the literature. The first one is the stream of studies that explore the factors that control the performance of inventory management of a firm. The second stream investigates the connection between inventory management and firm performance. The third one is the set of studies that search for the effect of business environment on a firm's productivity, growth rate, and financial performance. After reviewing previous studies in each of these related areas, in Section 2.4, the hypotheses on the link between business climate and inventory performance of a firm are developed. In Section 2.5, the moderating effects of country-level variables on business climate-inventory relationship are stated.

2.1 Inventory Performance Predictors

Since the 1960s, there have been several process innovations, potentially to decrease inventories, such as JIT, MRP, fast response, reduction of cycle time, and development of technological procedures such as information technologies, bar-coding, and computerized warehousing. Firms became more interested in the amounts of inventory they keep during the 1980s with the rise of operational leanness philosophy. Lean philosophy originates

from the Toyota production system (TPS) and is designed to eliminate waste in every value added process including production, product design, supply chain, and customer relations. Waste can be in terms of unnecessary human resource, inventory, or space. The main goal is to make value analysis to eliminate waste, and thus decrease costs and increase outputs in order to improve firm performance and firm's competitive advantage. Operational leanness can be measured as the lack of slack equipment capacity, labor time, inventory, or financial resources.

Consistent with anecdotal evidence of rise of leanness applications, inventories have been reported to decrease in manufacturing [5] and also retail and wholesale industries [6]. Rajagopalan and Malhotra [7] explore whether greater advancement was observed in the after 1980s compared to the past period and discover that goods-in-progress and material inventories actually decreased in most of the industries over thirty years and showed higher development in about half the industries after 1980 compared to previous years. However, finished-goods inventories did no show a significantly higher decrease after 1980s.

From the operations management point of view, inventory performance should measure how long inventory is kept. There are various measures used in practice and research to measure inventory performance.

1. Days of Inventory (DOI): DOI measures the average number of days that it takes for the inventory to turn over. If the average inventory in one year is "I" and the COGS indicate the cost of goods sold of the firm. Therefore, days of inventory of the company during the year is DOI = I*365 days/COGS.

2. Inventory-to-sales (ItS): This measure indicates the average number of days it takes for the inventory to cover sales. It is calculates as I*365 days/Sales, where Sales is the annual total sales.

3. Inventory turnover (IT): IT measures how many times a year the inventory turns into sales. It is calculated as IT=COGS/I.

4. Abnormal Inventory (AbI): AbI controls for industry effect by taking the normalized deviation from the industry average. AbI is calculated such as AbI = (DOI - mean DOI of the firm's sector in the same year)/standard deviation of DOI of the sector that the firm belongs to in the same year [5]. AbI is unit-less.

5. Empirical Leanness Indicator (ELI): This inventory performance is calculated by contrasting a firm's inventory against a normal inventory level defined by firms with similar sales in the same industry. Specifically, for each specific industry and year, the following regression is estimated: $Ln(I_{it}) = \alpha_{it} + \beta_{it} * Ln(Sale_{it}) + \epsilon_{it}$. The inventory performance of a firm is the residual ϵ_{it} from the regression [8].

In the literature, various studies analyzed factors to estimate a firm's inventory performance. Some of these factors can be called internal predictors, which are mainly firm characteristics such as demand rate, gross margin, firm size, sales volatility, and sales surprise.

Classical inventory theory including economic ordering quantity (EOQ), order-up-to, and other stochastic models define average inventory levels as an increasing function of demand. For example, according to EOQ model, the mean inventory level is a square-root of the rate of demand. So, in following the inventory turnover rate of a firm following EOQ ordering, is also a square-root of demand. Rumyantsev and Netessine [9] empirically show that inventory is a concave increasing function of demand. They also show that inventories, generally, plummet with higher total sales(demand) growth. Gaur and Kesavan [10] confirm that inventory turnover rises with sales growth rate.

Inventory theorists model inventory management trade-offs such that larger understock costs cause higher optimal levels of inventory. Thus, theoretically, it is expected that a firm's inventory performance would decrease with the gross margin level. Rumyantsev and Netessine [9] study public U.S. companies between 1992 and 2002 and find empirical evidence that firms having higher gross margins have larger inventories. Gaur *et al.* [11] study U.S. retail firms for the years 1987-2000. They find that the levels of inventory for retail firms increase with gross margins.

Regarding the effect of firm size, Rumyantsev and Netessine [9] show that larger companies appear to gain advantage because of the economies of scale and thus have somehow reduced inventory when compared to small-scale enterprises. [10] analyze public retailers in the USA from 1985 to 2003 and discover that average inventory is negatively connected to the size of the firm, such that size is determined by the yearly sales of the firm in the preceding year. They also show that "inventory turnover increases with size at a slower rate for large firms than for small firms."

Sales volatility creates uncertainty, and thus risk for the firm. Keats and Hitt [12] show that demand dynamism has the dominant influence on the firm's decisions and performance. When demand is volatile, the firm generally keeps buffer in terms of inventory and/or production capacity causing increasing costs [13]. Rumyantsev and Netessine [9] provide proof that firms that are handling more uncertain demand have larger inventories. Kovach and Hora [14] show that as environmental vulnerability rises, surplus capacity enables firms to have the necessary operational cushion to manage unpredictable demand. Azadegan *et al.* [15] analyze newly-founded businesses in Sweden and investigate the effects of slack, measured in terms of production (PPE), labor, and inventory, on likelihood of venture failure. They show that in higher environmental dynamism, measured by sales variability, higher slack in all three terms lead to a higher chance of survival for new ventures. To summarize, most findings show that in higher sales volatility environment, the firm prefers to operate with higher slack inventory.

Sales surprise is defined as "the ratio of actual sales to expected sales for a year." [11] find that inventory performance increases for retail companies with higher sales surprise. Similarly, [10] indicate that sales ratio, which is "the ratio of sales in the current year to sales in the previous year", has a positive influence on the turnover of inventory.

There are also outside predictors. Different industries have different inventory needs. [5], [6], and [7] illustrate these differences in the United States. For example, in tobacco industry, the median days of inventory can go above 240, while it is below 40 in printing and publishing industry between 1980 and 2000.

Under more severe competition, it is more important to operate competitive by increasing efficiency and productivity through lean strategies such as total quality management. For example, when competition is high, there is a decrease in profit margins, which leads firms to hold fewer inventories [16]. On the other hand, [16] claim that when a firm operates with lower profit margins and so leaner under severe competition, the negative effects of not operating lean enough may not have strong effects on firm performance. Thus, as the competition level increases, the level of inventory kept for the firm should be less important.

There are also a handful of other studies, which analyze the influence of other components, for example, product diversity, number of stores, the amount of depositories, and the production flexibility in explaining inventory performance. See [17] and [18].

2.2 Inventory Management and Firm Performance Relationship

Although lean applications have been in practice since the 1980s, the report-able effects of leanness on firm performance have recently attracted operations research and management researchers' attention, as time required to observe and numerically record the results of leanness actions on firm performance. Performance is evaluated by equity performance such as ROA or ROE, stock returns, credit ratings, or survival probability.

Regarding the effect of leanness on firms' equity performance, most studies agree that inventory leanness has a general positive influence on ownership performance. Anecdotally, many agree that the efficient use of inventories would improve the firm performance in terms of higher return to assets and there will also be inventory accumulation when a firm performs poor, which may eventually lead to a business failure such as bankruptcy [19]. Modi and Mishra [20] examine the connection of production, inventory, and marketing resource effectiveness of enterprises with monetary performance on U.S. manufacturing companies, using Tobin's Q, ROA, and stock-returns. For inventory and production efficiency, they uncover evidence that confirm the positive effects on firm performance. Kovach and Hora [14] also use data from manufacturing industry of the USA, and measure the connection between operational slackness (opposite of leanness) in terms of inventory, capacity, supply chain and firm's ROA performance. They find that capacity and inventory slack have a negative effect on performance. Capkun *et al.* [21] look at the inventory performance in terms of discrete types of inventory and find a notable positive correlation between all types of inventorial and financial performance, which is measured by revenues before adding taxes and interests and gross profit, for firms in U.S. the manufacturing industry.

[5] and [6] show, respectively, that U.S. manufacturing firms and wholesale and retail enterprises, with irregularly elevated inventory levels are also companies that have unusually weak performance at the stock market in the long run.[22] use data from the retail firms of USA and exhibit that inventory productivity has a strong positive relationship with firms' stock returns. So, inventory performance can be utilized to foresee the stock returns. Steinker and Hoberg [23] use data on manufacturing companies in

USA, demonstrating that atypical annual inventory rise with respect to sales is notably associated with low abnormal stock returns.

There are also studies that question the effects of leanness on alternative performance standards, like on credit ratings. Bendig *et al.* [24] used U.S. data of manufacturing firms and demonstrate that inventory leanness is positively connected with credit ratings in an incurvate manner, while leanness of PPE is negatively associated with credit ratings in an incurvate relationship.

There is some work that explores the effects of operational leanness on new ventures survival success. Patel *et al.* [25] show that Portuguese retail ventures with leaner inventory denoted by faster inventory turnover have a higher likelihood of survival. Azadegan *et al.* [15] analyzed newly established firms, which are registered in Sweden from 2000 to 2005. They show that slack in terms of asset, labor, and inventory decreases the probability of the venture's collapse.

Recently, numerous studies have demonstrated the connection between leanness and firm performance as a positive one, in an incurvate function. At th beginning, monetary performance rises with leanness, until it reaches a specific turning point, after that, the gradual impact of leanness on performance becomes negative. First, Eroglu and Hofer [8] analyze manufacturing enterprises in the USA and show that the inventory and firm performance, measured by ROS and return on assets, has a concave relationship, which proposes that there is an ideal level of and when it is crossed, firm productivity starts to degenerate. Besides, the distinction and layout of the relationship changes considerably from one industry to another. Examining the effect of leanness in production, marketing expenses, and inventory's efficiency on equity firm performance, [20] find that all three kinds of leanness have a positive impact in diminishing returns. Bendig *et al.* [24] illustrated the concave relationship of the association of inventory and capacity leanness with credit ratings.

Over the past ten years, numerous firms have focused on enhancing the effectiveness of their supply chains by diminishing redundancy and slack. However, there certainly is another side of the coin that effectiveness may have caused supply chains to be more fragile [20]. This might have caused a negative impact on a company's ability to manage disturbances. Toyota dealers after the 2011 Japanese earthquake had shortages in

the supply chain. A Toyota dealer was able to get only one Corolla model from the manufacturer in May 2011, while it normally sells 58 per month [26].

Consistent with the findings on concave effects of operational slackness on firm performance, if the levels of inventory are too lean, the firm jeopardizes its well-being and its stock to be out. [27] show that such an operational glitch negatively impacts stock returns, which is a stronger effect on smaller and the higher the growth potential firms. Hendricks *et al.* [28] show that firms with more slack in their supply chain go through a reduced negative stock market reaction to supply chain disturbances. Tang [29] states the urgency to construct slack of crucial components to deal with disruptions. So, several other studies including [30], and [31] show that operating with slack such as excess capacity and inventory, multiple suppliers, etc. can lower the chance of observing disruptions and the chance of recovering from any observed disruption. Karacay [32] investigates public European manufacturing companies around 2007-8 financial crisis period by relatively inspecting their slack management as a firm and their enterprise performance. He uncovered that generally "slack-performance has a positive but a curvilinear relationship" and firms favor the usage of more tactical slack such as inventory instead of operating slack resources such as human resources during the monetary crisis.

To summarize, both practitioners and researchers state the existing trade-off between efficiency and flexibility in deciding the resource levels especially in manufacturing systems. So, leanness is starting to be treated as a double-edged sword. However, most studies that report a negative impact of operational leanness on firm performance underlines that this negative relationship is apparent especially for extreme levels of leanness, such as “zero-inventory" policy [31]. Thus, the common agreement among lean management studies is that there is a positive impact of inventory leanness on the firm’s financial and market performance.

2.3 Business Climate Effects on Firm Performance, Productivity and/or Growth

Many institutional, structural, and behavioral variables shape and drive firm operations and the resulting performance of the firm. As stated by [33] there are "rich and diverse set of complementary capabilities in the industrial ecosystem: suppliers, trade associations,

industrial collective research consortia, industrial research centers, university-industry collaborative, technical advisory committees." Thus, it is not possible to fathom the different fortuity of businesses in various countries without differentiating between the richness and depth of the resources that are within reach in the industrial sector across countries.

The industrial ecosystem can mainly be evaluated from two perspectives: first is the government's industrial policy, and second is the more general business climate, which can be a shaped by both the application of the industrial policies and their failures, as well as other policies of the government (including judicial, health, and infrastructure, etc.), cultural, and external effects.

Every government, all over the years, has been practicing some sort of industrial policy. The industrial policy of a country is its tactical effort to stimulate the growth of the manufacturing industry, as well as other sectors of the economy. Industrial policies targeting the prompt of industrial development and, ultimately, the alteration of the country's economy from a low-efficiency to a high-efficiency manufacturing and services.

Regarding the general business climate, which also includes the industrial policy, the most important variables that come together to describe the business climate are security, infrastructure (technological, transportation, utilities, customs, land, etc.), access to finance, and the regulatory or bureaucracy framework [34]. It is mainly determined by current and long-term accumulated industrial policies of governments. The business climate is defined as: "i) the set of location-specific factors shaping the opportunities and incentives for firms to invest productively, create jobs and expand, and ii) the institutional, policy and regulatory environment in which firms operate" [3].

The business environment affects country-wide economic activity through its influence on individual firms operations, which finally determines firm productivity, performance, and growth. There is a substantial literature that has analyzed the effect of business climate on enterprise productivity, growth and performance. Some of these studies used country-level data, and the rest have used firm-level data mostly benefiting from various firm surveys. The literature that has analyzed enterprise survey data in general presents proof that a favorbale business environment advocates growth by inspiring higher productivity and investment. Multiple security, finance, infrastructure, competition, and regulation variables have demonstrated a noteworthy influence on firm performance.

A weak business climate may discourage investment. Moreover, for the present businesses, it may lead them to operate inefficiently as they may need to invest in defensive measures to survive. For example, when there is difficulty to get access to financial resources in a country, then available financial resources may not be used effectively because of uncertainty in future needs. Figure 2.1 positions the perspectives of managers on business climate variables that they believe constraint the functioning of their enterprise, by geographic location. For example, in Europe and Central Asia region, most common business climate constraints indicated by the firms to their operations are tax rates, access to finance, and informal competitor practices.

Most Severe Constraint Perceived by Entrepreneurs, by Region (percentage of firms)

Region	Access to finance	Access to land	Corruption	Court system	Crime, theft, and disorder	Electricity	Inadequately educated workforce	Regulation	Political/ macro-economic framework	Informal sector competitor practices	Tax administration	Tax rates	Telecomm-unications	Transpor-tation
Africa	15.2	4.3	5.8	0.8	7.6	17.2	4.4	7.8	7.6	9.2	3.4	9.8	1.1	5.7
East Asia and Pacific	22.8	4.6	4.1	0.3	3.2	10.2	8.0	8.9	4.7	17.3	2.3	8.5	0.0	5.1
Europe and Central Asia	15.9	2.6	7.0	2.0	2.5	5.5	9.7	9.3	10.7	11.1	4.5	17.6	0.0	1.7
L. America and Caribbean	8.5	1.3	7.9	1.7	7.4	6.2	6.7	11.1	18.9	13.0	4.7	10.2	0.0	2.4
South Asia	13.4	6.3	4.8	0.2	9.6	17.8	3.6	7.2	26.4	2.9	2.1	2.8	0.0	3.0
All	12.8	2.7	6.8	1.4	6.4	9.9	6.6	9.6	13.3	11.6	4.1	11.2	0.3	3.5

Note: Data from 41,207 firms in 91 countries for the years 2006-09.
Source: Dethier vd. (2010)

FIGURE 2.1: "Most Severe Constraint Perceived by Entrepreneurs, By Region."

In following, improvements in business climate may raise competitiveness by increasing efficiency of firms' operations, which will lead to firm-level performance improvement, supply a maintainable growth outlook through higher productivity, and encourage both domestic and foreign investment in the country.

Next, we summarize some previous work on the business climate and firm performance relationship. For a complete review on these firm-level studies, please see [2].

Effect of Infrastructure:

On infrastructure, the pioneering macro view paper is [35]. This paper uncovers that infrastructure capital has a huge influence on TFP. Calderon *et al.* [36] find statistically significant contribution of infrastructure on output. For example, they state that "an increase in infrastructure from the median lower-middle income country level to that of the median upper-middle income country would yield an increase in output per worker of almost 5 percent."

Using firm-level data, [37] show that power losses have a noteworthy negative effect on TFP. [38] state that a higher occurrence of power cuts has a negative effect on the growth of employment in Africa. In [39], they report that a 1% growth in the average duration of power outages plummets productivity by about 0.02% to 0.10%, which generally has an effect on older plants. Productivity will be diminished by about 2% for every 1% rise in the portion of shipment misplacement, mainly in old and micro enterprises. [40] also find that small firms need public infrastructure more and that they go through more power outages than big firms because of the "economies of scale", which allows them to acquire their own water and electricity resources. Similarly, Aterido *et al.* [38] report that small firms indicate electricity as more constraining than larger firms in their operations.

Effect of Bureaucracy:

From a macro perspective, [41] and [37] find proof that long-run development is faster in countries with "better law enforcement, higher quality of legal institutions, improved central government bureaucracy, smoother operating formal sector financial markets, increased protection of private property rights, increased levels of democracy, and higher levels of trust." [3] records one of the useful insights of these macro-analyses; that good governance and safe property rights are essential for growth of the economy.

[42] show that bureaucratic obstacles such as tax rates and tax administration, macroeconomic stability, and policy uncertainty are the most crucial business obstacles in all countries. [43] focus on tax administration and labor regulations and emphasize that as the government has power to implement them, these obstacles become more consequential determinants of the business environment.

[44] find that bureaucratic obstacles have a significant negative effect on firm productivity but regulations do not exactly have a negative impact, but actually have a positive impact when they are consistently imposed. [38] and [45] find that congruous application of regulations has a visible positive effect on the growth of employment in developing countries. Atabek *et al.* [46] state that improvements in regulatory areas are highly likely to encourage efficiency and employment growth in the manufacturing industry. Yang [47] uses firm-level data from Latin America and show evidence that the revenues of innovative SMEs decrease more than firms who are not creative when regulatory or governance areas are weak. Hallward-Driemeier *et al.* [38] use a survey of 1500 Chinese enterprises and demonstrate that firm performance is positively associated with "light

regulatory burdens, limited corruption, technological infrastructure and labour market flexibility."

Effect of Financial Constraints:

The cost of access to finance is usually one of the most powerful obstacles faced by firms. Here, the firm size is important to mediate the financial constraint effect, because the size of the firm determines its ability to deal with financial institutions. Beck *et al.* [44] report that smaller firms have much higher monetary-related obstacles than big firms. [48] show that relaxing financial constraints are the most efficient ways to encourage firm growth. Qureshi *et al.* [49] use a sample of 30 developing economies, including Turkey, to empirically find evidence that obstacles to access to finance and open markets are notably related to differences in TFP growth in the post-global financial crisis period compared to the pre-crisis period - with countries with fewer obstacles showing stronger resilience and recovery.

2.4 Business Climate Effects on Inventory Performance: Hypotheses Development

There is substantial literature that has analyzed the effect of business climate on enterprise productivity, growth and performance. However, the exact channels through which business environment variables affect economic growth are still not very well understood. Firm performance is a final result of a firm's operational policy. Thus, the effect of business climate on firm performance should be mainly through the effect of business climate directly on operational policy as well as external factors such as demand rate. Even regarding the effect of business climate on external factors, these changes in external factors should be forcing a firm to change its operational policy to mitigate changing business environment. However, there is no study conducted on the relationship between business climate and firmsâ operational policies, which is explicitly emphasized by [50].

The intercessions of policy by governments to modify the structure of economic activity have either been disregarded or ignored by operations management (OM) scholars. However, in recent years, such industrial policy applications and measures have started to gain increasing attention in many economies by policy makers, as well as non-governmental

organizations and chambers of trade and industry. In fact there is an obvious relation between industrial policy and operations management activities of individual firms which are prone to these policies. However, there has been very little dialogue between industrial policy and the operations management discipline. This study seeks to establish such a dialogue by using firm-level for the first time in operations management literature, in order to understand how industrial policy and operations management can be combined to enhance the competitiveness of firms in various economies.

Business infrastructure that is available and related to a firmâs operations can include, but not limited to customs clearance, power and water supply, telecommunications (including phone and internet technologies), land, and transportation. The ability of a firm to allocate its resources to more productive uses and the efficiency of its investments may depend on available infrastructure to pursue operations. Firms that observe fewer restrictions in infrastructure can expect to have boosted productivity and growth. Literature on the infrastructure-firm growth relation show significant negative effects of infrastructural constraints on firm productivity and growth ([37], [38] and [39]).

On the other hand, there are evidences in the OM literature on decreasing effects of sales growth rate on a firm's inventory levels ([9] and [10]). Thus, in following one would expect that increasing infrastructure obstacles observed by a firm would decrease sales growth, which will lead to increased inventory levels.

There can be direct effects of infrastructure on inventory levels as well. Firms observing constraints in infrastructure may need to take costly actions to sustain their operations. For example, if there are realized difficulties in transportation to get goods to or from plants, higher inventories are held. Another example can be the relation between customs clearance time and inventory levels. According to the report prepared by Ernst and Young on Brexit [51], because of the potential for disruption and increased volatility at UK-EU customs borders after Brexit, lead times will increase, which will finally result in more inventories for firms trading.

Hypothesis 1. *Aggregate inventory level of a firm is positively associated with the perceived obstacles in infrastructure.*

Firms may encounter barriers to their operations because of unwieldy procedures for

acquiring licenses or construction permits, unstructured and complicated tax administration, as well as other administrative procedures in their operating environment. In general, bureaucratic climate that might be constraining a firm's operations can include tax rates, tax administration, crime and theft, corruption and regulations, and political instability.

The literature mostly agrees that the extent of legal obstacles has a significant negative influence on firm efficiency. On the other hand, consistent enforcement of regulation does not exactly have a negative effect, but sometimes it has a positive effect. [38] and [45] find that "consistent enforcement of regulations has a clear positive association with employment growth in most developing countries and is particularly marked for small firms." Both papers also acquire a predominantly positive impact of management time spent dealing with authorities, which they translate as a representation of the benefit from acquiring public stocks. Combining with the evidence that increased sales growth decreases the average firm inventory levels ([9] and [10]), it is expected that increasing bureaucratic obstacles observed by a firm would decrease sales growth, which will lead to increased inventory levels.

There are also some expected direct effects of legal issues on inventory levels. Frankel and Trezevant [52] show evidence that firms using last-in-first-out (LIFO) tax accounting are more likely to purchase extra inventory at year-end when they are prone to higher tax rates and those have low tax rates. On the other hand, increased political instability has similar expected effects on inventory levels. Zurich Insurance Group [53] reports that in recent years, we have seen politically oriented actions on free trade and globalization, which leads to protectionism. Protectionism is reported to raise costs for manufacturers as it leads transportation delays due to border controls and customs charges, new sourcing options searches. Finally, all will lead to increased inventory levels and costs.

Hypothesis 2. *Aggregate inventory level of a firm is positively associated with the perceived obstacles in bureaucracy.*

Financial aspects of a business climate can contain factors related to governance, investments, informalities in payments of sales and purchases, and accessibility and cost of financial resources. Acquiring financial funding is necessary for prosperous companies to grow their businesses and to achieve economies of scale, start projects in new market sectors, and embrace new technological methods that are essential for better efficiency.

Obstacles observed in financing have shown to have negative effects on firm performance and growth in the literature [2]. For example, obtaining credit from banks can help a firm to invest in new products or capacity, which would finally lead to firm growth. Aterido *et al.* [38] find that a higher share of externally financed investments leads to a larger employment growth.

As OM literature gives evidence on decreasing effects of sales growth rate on a firm's inventory levels ([9] and [10]), it is expected that increasing financial obstacles observed by a firm would decrease sales growth, which will lead to increased inventory levels.

Hypothesis 3. *Aggregate inventory level of a firm is positively associated with the perceived obstacles in finance.*

2.5 Country-level Effects on the Relationship between Business Climate and Inventory Performance: Hypotheses Development

Within a country, it is important to understand variations of firms' inventories with their exposition levels to business climate variables. However, across countries, these relationships may still differ, as each country is different in their development, regulatory, and policy settings. Cross-country comparisons are important because they can provide insights into the dynamics of business climate and individual firm operations relations such as development level. On the other hand, understanding the different effects of business climate on operations of firms can also help to understand the drivers of development level differences.

Past studies show that in more efficient markets, there is a high dynamism and inputs are allocated to businesses that are more productive. Thus, effect of a constraint in business climate can have a more severe result on firm productivity or growth. In following, the effect on firm operations such as inventory holdings can be highly observable.

On the other hand, it is reported that in more politically oppressive countries, firms use non-response and, potentially, false responses to business climate constraints. For example, Jensen *et al.* [54] show evidence that "firms in countries with less press freedom are more likely to provide non-response and false response on the issue of corruption."

Gelb *et al.* [43] state that the impression of labor regulations as a serious obstacle rises with the GDP level of the country. Thus, increasing the severity of the business climate constraints would finally increase the effects of these constraints on inventory holdings leading to our next hypothesis.

Hypothesis 4. *The country's development level increases the positive effect of business climate obstacles on aggregate inventory levels.*

In the next section, we will give a detailed description of our data sources and the type and scope of the data.

Chapter 3

Data Description

3.1 The World Bank's Enterprise Surveys

The World Bank's Enterprise Surveys (WBES) gather information from central service and manufacturing industries in most regions of the developing world. They use "standardized survey instruments and a uniform sampling methodology to produce data that is comparable across the world's economies" [3]. WBES is a firm-level survey of a country's private sector. These surveys document business leaders' perceptions on what they view as the most threatening obstacles to firm development, the subjective significance of different obstacles in inflating recruitment and efficiency. More importantly, they record the effects of a country's business climate on its international competitiveness. It is an unparalleled data assembly that has provided a set of corresponding institutional surveys, which include 135,000 firms in 139 countries, to date. These surveys provide country-level work environment measures, as well as myriad types of firm-level data. Especially, the collection of firm-level data has proven to be rewarding for researchers [3].

Different departments of the World Bank have been carrying out firm-level surveys since the 1990s. However, since 2005-2006, most data assemblies have been concentrated within the "Enterprise Analysis Unit". Previous data from different survey tools have been complemented with a former typical tool for distribution on the website. The raw country data, aggregated data, panel data, and all pertinent survey documentations are obtainable through the Enterprise Surveys' website [3]. The countries with surveys in

progress, one enterprise survey completed, and more than one enterprise survey conducted are shown in 3.1.

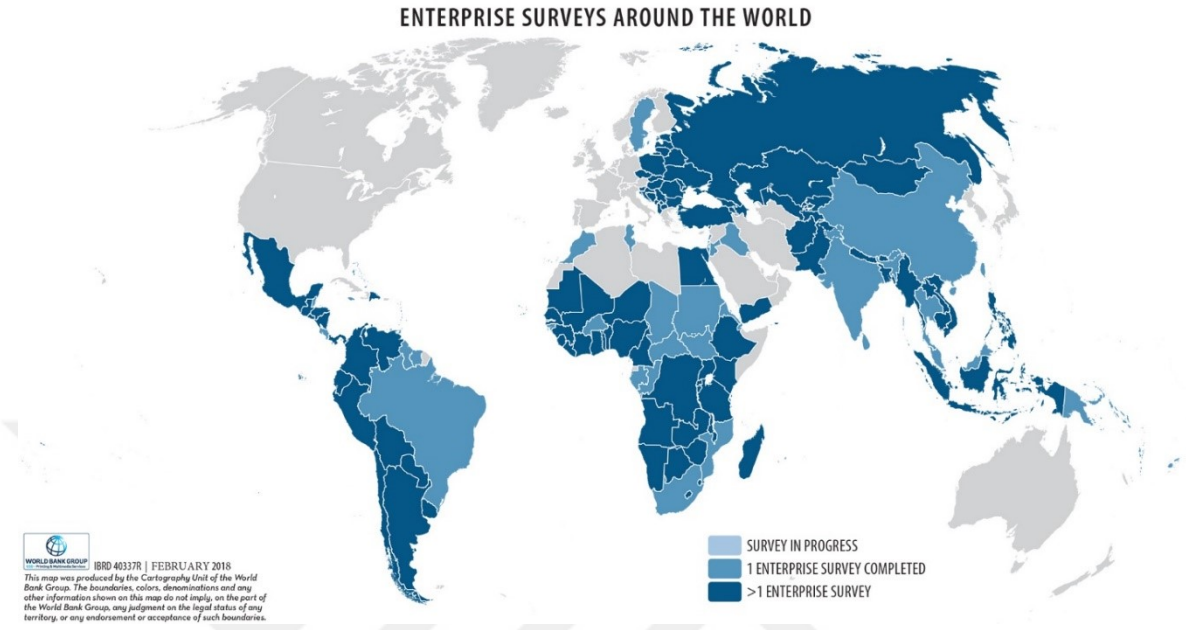

FIGURE 3.1: A Map of Enterprise Surveys around the World [3].

The survey is executed on two stages. In the first one, the interviewer applies the "Screener questionnaire" usually through phone, and the eligibility of the firm is decided. Besides the contact information, some additional control information is also gathered. In the second stage, one of the types of the questionnaire (Manufacturing or Services) is applied according to the eligibility type verified in the first stage. Freelance contractors carry out the surveys by authorization from the World Bank. Due to some delicate questions in the surveys, such as the ones addressing firm-government relationships and corruption inquiries, freelance contractors, instead of any government bureau or an institution/organization associated with the state, are recruited by the World Bank to gather the data [3].

Business owners, CEOs and top managers answer the surveys. About 90% of the questions establish characteristics of a country's business climate in an objective manner. The remaining questions evaluate the respondents' opinions and perceptions on "what the obstacles to firm growth and performance are." Those subjective variables will be used in our study. Since operational decisions are influenced by the managerial perceptions of what constitutes an obstacle, it is useful to utilize those subjective measures for a deeper insight.

The massive amount of data-sets available for researchers are ripe for the picking and can open many doors of insightful analyses. In this study, we are using firm-level data provided by WBES for the first time in business management literature to understand how business climate and operations management can be combined to increase the competitiveness of firms in various economies. The relationship between the business climate and the operational decisions of firms can be studied as country-level as well as through performing cross-country analysis on the available data-set. Our study is focused on cross-country analysis of manufacturing firms in the Eastern European and Central Asian region for the year 2013. It is the most recent cross-country data available on the WBES website for this region. It might be useful to note that the Enterprise Surveys executed in Eastern Europe and Central Asian countries are also named as Business Environment and Enterprise Performance Surveys (BEEPS) and are jointly carried out by the World Bank as well as the European Bank for Reconstruction and Development.

3.2 The Heritage Foundation

The Heritage Foundation is the United States' largest and most widely-supported conservative research and educational institution - a think tank - based in Washington, D.C. The Heritage is mainly tailored for public policy, and its personnel accomplish its mission by performing on-time, precise research on important policy matters and efficiently advertising these results to their main audiences: congressional representatives, central staff members of the Congress, policymakers in the management divisions, and the academic community. Moreover, the Heritage has regularly been ranked as one of the world's most influential think tanks [4].

Every year, the Heritage Foundation releases a comprehensive report regarding the Index of Economic Freedom for 186 countries across the world. The Index of Economic Freedom is a useful instrument that has multiple advantages for a diversity of audiences, including academics, teachers, students, and those who are working in finance and business. Using the Heritage Foundation's guide, users can learn creative ways to use the Index in research, business, and public policy. The Index is an efficient and objective instrument for inspecting countries all over the world. Each country page is a rich resource for a detailed examination of a country's economic and political advancements. In an economically free society, individuals are free to work and invest in the way that they

see fit. In economically free societies, governments enable capital, goods, and labor to move unrestricted, and abstain from oppression or restriction of liberty except for what is necessary to protect and sustain liberty itself [55].

Corruption corrodes economic freedom by allowing uncertainty and insecurity into relationships between economies. The indicator of corruption's score is taken from Transparency International's "Corruption Perceptions Index" (CPI), which measures the corruption level in 183 countries. The CPI is measured from 0 to 10, where a score of 10 means minimal corruption, while a score of 0 shows an extremely corrupt state. To calculate Freedom from Corruption, the Index transforms the CPI data to a scale of 0 to 100. As with the CPI, the more sever the level of corruption, the lower a country's FFC score (and the level of overall economic freedom) and vice versa. In our analysis, we will use FFC alongside GDP per capita as our country-level indicators, since those variables are highly indicative of the economic development (and thus the business environment) of a country.

3.3 Eastern Europe and Central Asia

The entire area of land in the Eastern European and Central Asian region accounts for around 15 percent of the world's land, and has a total population of approximately 303 million people, composing about 4.17% of the global population. The region covers the largest country in the world, Russia, and the largest landlocked country in the world, Kazakhstan. The area also covers 12 different time zones [56]. This makes it a unique region to study in terms of geographical location, being a clash of diverse cultures and economies, and covering a size-able portion of the world.

Developments such as Russia's entry into the WTO in 2012 and the formation of the Common Economic Space between Kazakhstan, Russia, and Belarus provide proof that some countries are taking positive steps towards reinforcing their participation in both regional and global trade networks. Social and economic progress have been witnessed, and according to UNECE, about 18% of the region's population have moved out of poverty since 1999. With one third of the population still considered vulnerable or poor, however, there is still a need for increased cooperation in trade-driven sustainable development [57].

According to the OECD's 2013-2015 Anti-Corruption Reforms, strategies and action plans have become more concentrated in that region. Some of those anti-corruption strategies are also evidence-based and consider the evaluation of existing corruption situations and corruption risks in different sectors. Countries have reinforced and diversified their education measures and started raising awareness on anti-corruption; however, such measures still lack a targeted approach [58].

Even though it is a close neighbor to the European Union, the region is facing a range of long-term challenges including declining productivity, weakening investment, aging populations, and climate change. As a result, the constituting countries are still labeled as "developing" economies. The corruption and the nonexistence of the property rights protection are some of the biggest issues, reflecting abiding problems of political instability and weak governance in that area. Therefore, we chose to take our sample from that region to understand more about the factors behind that hindered development, and to what extent a country's macro business climate can have an impact on something as micro as firms' inventory performance. Descriptive statistics of the country-level and firm-level variables, sample size, and more information about the countries contributing to our study are discussed in the following chapter.

Chapter 4

Measurement and Sample

As discussed in Chapter 3, we are using the data of WBES collected in the year 2013 from Eastern European and Central Asian firms. The original sample size is 14,000 firms across twenty-four economies and twenty-four industries. However, we clean our data by removing the top and bottom 1% in order to remove any undesired outliers while maintaining consistency. Tables 4.1 and 4.2 list the specific countries and industries, respectively, and the number of firms surveyed in each.

Table 4.1: Distribution of the Sample by Country

Country	**Number of Firms**	**Country**	**Number of Firms**
Albania	360	Mongolia	360
Armenia	360	Montenegro	150
Belarus	360	Poland	542
Bosnia and Herzegovina	360	Romania	540
Bulgaria	293	Russia	4,220
Croatia	360	Serbia	360
Georgia	360	Slovakia	268
Hungary	310	Slovenia	270
Kazakhstan	600	Tajikistan	359
Kosovo	202	Turkey	1,344
Kyrgyzstan	270	Ukraine	1,002
Moldova	360	Uzbekistan	390

Table 4.2: Distribution of the Sample by Sector

Industry	**Number of Firms**	**Industry**	**Number of Firms**
Basic Metals	75	Office Machinery	20
Chemicals	381	Other Manufacturing	2
Coke & Refined Petroleum	8	Other Transport Equipment	36
Communication Equipment	26	Paper & Paper Products	57
Electronics	213	Plastics & Rubber	277
Fabricated Metal Products	558	Precision Instruments	164
Food	971	Publishing, Printing & Recorded Media	330
Furniture	291	Recycling	35
Garments	540	Tanning & Leather	53
Machinery & Equipment	508	Textiles	299
Motor Vehicles	37	Tobacco Products	24
Non-metallic Mineral Products	649	Wood	269

In the coming section, we will give a detailed overview of the type of each variable used in this study: the dependent variable, independent (explanatory) variables, and control variables. We will present a thorough explanation of the firm-level as well as the country-level variables. The questions asked to the respondents during the interview, the answer choices, and the variables that correspond to those questions will be discussed to have a comprehensive understanding of the variables in our study.

4.1 Sample Description

4.1.1 Dependent Variable

The dependent variable used in our model is the *Average Days of Inventory* ***(DOI)*** in a firm. The question asked to the respondent as provided by the WBES questionnaire [3] is as follows:

At the present time, when this establishment receives delivery of its most important input, on average, how many days of inventory, measured in days of production, does this establishment keep?

This is a **continuous variable** and its values can take any positive integer number.

4.1.2 Independent (Explanatory) Variables

We have seven linear independent variables. Each variable is a subjective measure of one business climate obstacle as perceived by the respondent to the questionnaire. The question asked to the respondent as provided by the WBES questionnaire [3] is as follows:

Using the response options on the card (Table 4.3), to what degree is ***[Business Climate Indicator]**** an obstacle to the current operations of this establishment?

TABLE 4.3: Obstacle Description

No Obstacle	0
Minor Obstacle	1
Moderate Obstacle	2
Major Obstacle	3
Very Severe Obstacle	4

* ***The seven business climate indicators we use are:***

1) Customs and Trade Regulations.

2) Transport.

3) Access to Land.

4) Access to Finance.

5) Tax Rates.

6) Political Instability.

7) Labor Regulations.

We use "Customs and Trade Regulations", "Transport" and "Access to Land" as proxies for **Infrastructure**; "Tax Rates", "Political Instability" and "Labor Regulations" for **Burueacracy**; and "Access to Finance" for **Finance**. This break-down is more clearly demonstrated in Figure 4.1. Even though these variables are categorical, we use them

as continuous variables due to their ordinal nature, which signifies that as the numerical value increases, the severity of the obstacle increases. Moreover, these variables have a natural zero that indicates the nonexistence of the obstacle.

Categories.png Categories.png

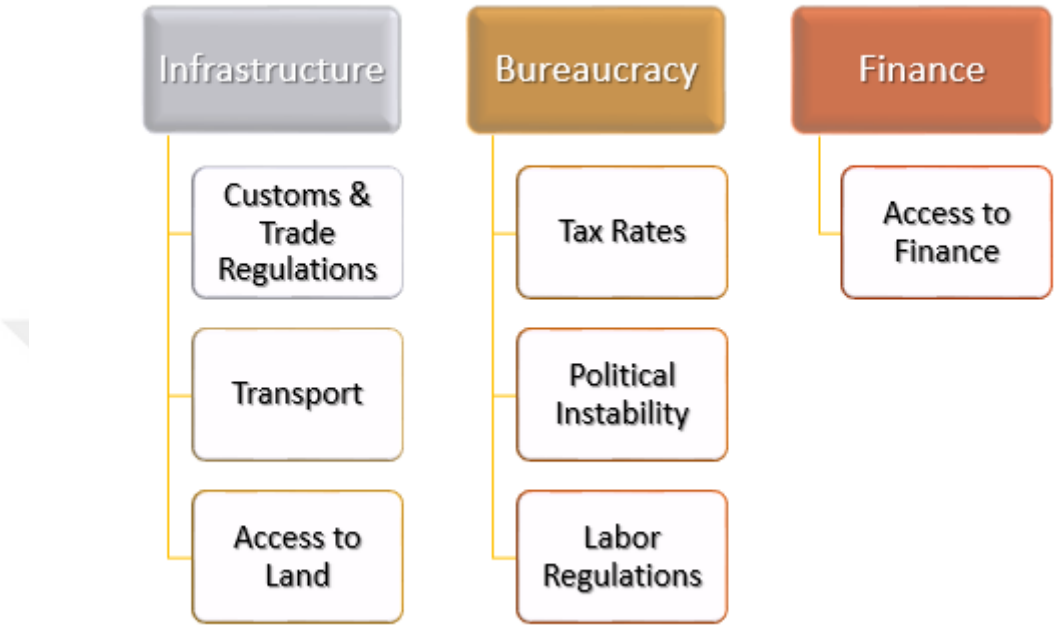

FIGURE 4.1: Business Climate Obstacles Break-down.

In addition to the linear variables, nonlinear variables are also used in some of our models. They are the interaction terms between each business climate variable and each of the following country-level variables one at a time:

1. **The Freedom from Corruption Index of the country.**
2. **The natural logarithm of the country's GDP per Capita.**

These variables are collected from the directories of *The World Bank* and *The Heritage Foundation* for the year 2013. They are used to test the moderating effect of each of those variables (country GDP and FFC) on the relationship between the business climate obstacles and the days of inventory.

4.1.3 Control Variables

The variables in Table 4.4 are used as control variables to ensure unbiased results by fixing them. Thus, clearly identifying the relationship between the dependent and explanatory

variables.

Table 4.4: Description of Control Variables

	Control Variable	Variable Type
1	Industry dummies using the two-digit Standard Industrial Classification (SIC) of manufacturing industries (Details of the industries are mentioned in Chapter 3).	**Dichotomous Variables:** Each dummy variable is binary with only two values [0 or 1].
2	The natural logarithm of the number of employees in the establishment *(Ln Firm Size)*.	**Continuous Variable**
3	The natural logarithm of the profitability of the establishment, measured by the return on assets *(Ln Profitability)*.	**Continuous Variable**
4	Whether this establishment is a part of a larger firm or not *(Part of Larger Firm)*.	**Dichotomous Variable:** Each dummy variable is binary with only two values [0 or 1].
5	Four Ownership Variables: *(Private Domestic, Private Foreign, Government/State, and Other)*.	**Continuous Variables:** Each variable is the percentage ownership with values ranging from 0 to 100.
6	Country-level Variable (*GDP per Capita (GDP)* or *Freedom from Corruption Index (FFC)*) - one in each model separately.	**Continuous Variables:** GDP can take any positive value, while FFC is on a scale of 0 to 100 (as explained in Chapter 3).

Note: For each variable in the surveys, there are three additional options for a response. The options and their coding numbers are shown in Table 4.5. For the purpose of our study, and to simplify the analysis, we program each of those answers as "Missing Values".

Table 4.5: Additional Survey Responses

Response	Meaning
-7	Does Not Apply
-8	Refuse to Answer
-9	Donât Know

4.2 Descriptive Statistics

Since we are testing the moderating effect of country-level variables on the relationship between the business climate obstacles and the days of inventory, we have collected those country-level data from the year 2013 from The World Bank and The Heritage Foundation (as discussed in Chapter 3). The GDP per Capita and Freedom from Corruption Index for each of the 24 countries can be found in Table 4.6.

The range of GDP per capita across all countries is $22,317.73 and the standard deviation is $5,686.6. This means that there is enough variance between the countries' GDP values to allow for an effect of GDP. This is why in the first group of models, we use GDP as a control variable, and in some models, as a moderator as well. The country with the lowest GDP of $1,040.21 is Tajikistan and the country with the highest GDP of $23,357.94 is Slovenia.

The range of FFC is 43 and the SD is 9.72. Given that FFC ranges only from 0 to 100, those numbers are also variant enough to allow for comparison. The country with the lowest FFC (least freedom from corruption or most corrupt) of 16 is Uzbekistan and the country with the highest FFC (most freedom from corruption or least corrupt) of 59 is Slovenia. Some general descriptive statistics, namely, the Number of Observations, the Mean and the Standard Deviation (SD), of key variables are presented in Table 4.7. Moreover, the mean and SD of the firm-level dependent and independent variables classified by country are presented in Appendix A.

Table 4.6: Country-level Data of the 24 Countries for the Year 2013

Country	**GDP per Capita (in USD)**	**Freedom from Corruption Index (FFC)**
Albania	4,413.08	31
Armenia	3,843.59	26
Belarus	7,978.87	24
Bosnia & Herzegovina	5,042.58	32
Bulgaria	7,674.86	33
Croatia	13,648.99	40
Georgia	4,274.38	41
Hungary	13,667.70	46
Kazakhstan	13,890.63	27
Kosovo	3,877.76	29
Kyrgyzstan	1,282.44	21
Moldova	2,243.98	29
Mongolia	4,385.38	27
Montenegro	7,186.43	40
Poland	13,781.06	55
Romania	9,585.27	36
Russia	16,007.09	24
Serbia	6,353.83	33
Slovakia	18,191.61	40
Slovenia	23,357.94	59
Tajikistan	1,040.21	23
Turkey	12,542.72	42
Ukraine	4,029.72	23
Uzbekistan	1,907.55	16

Table 4.7: General Descriptive Statistics of Key Variables

	Observations	Mean	SD
Dependent Variable (Firm-level)			
Average Days of Inventory	4,478	34.12	41.73
Business Climate Obstacles (Firm-level)			
Customs and Trade Regulations	12,582	0.61	1.08
Transport	13,767	0.82	1.18
Access to Land	13,107	0.64	1.16
Access to Finance	9,625	1.08	1.26
Tax Rates	13,857	1.89	1.39
Political Instability	13,659	1.33	1.41
Labor Regulations	13,860	0.57	0.97
Control Variables (Firm-level)			
% Ownership (Private Domestic)	13,889	93.73	21.83
% Ownership (Private Foreign)	13,872	4.56	19.01
% Ownership (Government/State)	13,871	0.98	8.07
% Ownership (Other)	13,879	0.72	7.5
Ln Firm Size	13,638	3.03	1.17
Ln Profitability	2,048	0.77	1.56
Part of a Larger Firm	14,000	0.09	0.2874
Control Variables (Country-level)			
GDP per Capita (GDP)	14,000	10,657.43	5686.62
Freedom from Corruption (FFC)	14,000	30.76	9.72

Chapter 5

Model and Empirical Results

5.1 Hierarchical Linear Models

To conduct cross-country analysis, we develop a multilevel regression model. This model has been known under a variety of different names: Hierarchical Linear Model (HLM), Linear Mixed Model (LMM), Random Coefficient Model, and Variance Component Model. The terminology "Mixed Model" is used due to the fact that it is a statistical model that contains both fixed and random effects. The LMM procedure expands the general linear model so that the data is permitted to display non-constant and correlated variability. Therefore, the LMM provides the flexibility of modeling not only the means of the data but also their variances and covariances [59].

More importantly, using multilevel regression allows for a hierarchical structure of the model by assuming that the data set is hierarchical. This means that the data set often consists of subjects nested within groups, with one single target (response) variable that is measured at the lowest level (firm-level in our case), and explanatory variables at all levels of the model (in this study, both firm-level and country-level) [60]. The reason we chose LMM is that our data is hierarchical, with firm-level variables as the first level, and country-level variables as the second level.

Whenever the data is sampled, the grouping variable is usually a random effect [61]. In our study, this is the country. When using Mixed Models in IBM SPSS® statistical package to perform our analysis, the country-level variables are automatically recognized as the higher level of the sample. Moreover, before choosing whether to perform a random

intercept or random coefficient analysis, a test for random slopes was performed and the result was insignificant. This indicates that there is no significant difference between the slopes of the independent variable over each country. Therefore, we do not need to allow for random slopes and only a random intercept model will be used.

We have developed four different groups of models, in each group there are seven regression equations that are identical except for the business climate obstacle (each obstacle is used separately in an equation). The first group is the direct effect of business climate obstacles (with all control variables present, including only GDP as the country-level control variable). The second group is both the direct effect of business climate obstacles as well as the moderation effect of GDP. The third group is the direct effect of business climate obstacles (with all control variables present, including only FFC as the country-level control variable). Finally, the fourth and final group is the direct effect of business climate obstacles as well as the moderation effect of FFC. The models are developed in the next section.

5.2 Model Development

5.2.1 Level 1 (Firm-level) Equation

The equation of the first level (which is the firm level) is identical in the four groups of models, and is developed as follows:

$$DOI_{ij} = \beta_{oj} + \beta_{1j}.BusinessClimate_{ij} + \beta_2.\mathbf{Industry_{ij}} + \beta_3.\mathbf{Ownership_{ij}} + \beta_4.Ln(FirmSize)_{ij} + \beta_5.Ln(Profitability)_{ij} + \beta_6.PartOfLargerFirm_{ij} + \varepsilon_{ij}$$

where DOI_{ij} is the average days of inventory (our dependent variable), β_{0j} is the intercept, $BusinessClimate_{ij}$ is each business climate obstacle (we use a separate model for each obstacle), β_{1j} is the coefficient (slope) of $BusinessClimate_{ij}$, $\mathbf{Industry_{ij}}$ is a vector of the industry dummies, $\mathbf{Ownership_{ij}}$ is a vector of the four ownership variables. β_2, β_3, β_4, β_5, and β_6 are the coefficients of each control variable, and ε_{ij} is the prediction error.

5.2.2 Level 2 (Country-level) Equations

The following sections will present the "Level 2" equations. Since the hierarchical nature of the data allows for nested equations, therefore, those "Level 2" equations could be substituted in the main "Level 1" equation to produce the full model equation for each of the four groups we will discuss.

5.2.2.1 First Group (GDP and Direct Effect Only)

$$\beta_{0j} = \gamma_{oo} + \gamma_{o1}.GDP_j + \mu_{oj}$$

$$\beta_{1j} = \gamma_{1o}$$

where γ_{oo} is the fixed component of the intercept (β_{oj}), γ_{o1} is the coefficient of GDP_j, μ_{oj} is the random component of the intercept, and γ_{1o} is the fixed (and only) component of the slope (β_{1j}). The subscript i represents the firms and the subscript j represents the countries. Note that when we substitute this equation into the main one, we get GDP as one of the control variables.

The above model is represented graphically in Figure 5.1 in a simplified way, which illustrates the sort of effect that we are testing with this model.

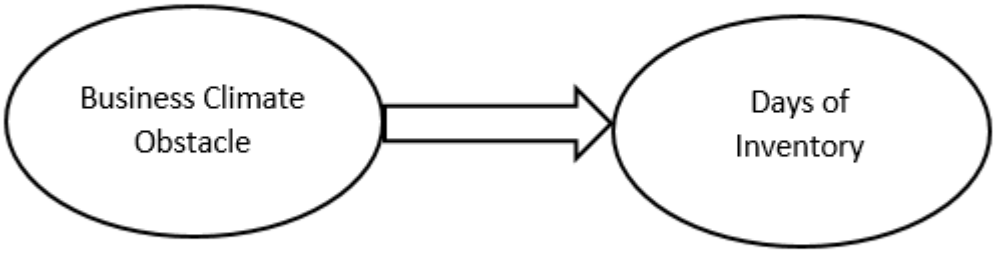

FIGURE 5.1: Direct Effect of Business Climate Obstacle on Days of Inventory.

5.2.2.2 Second Group (GDP with Direct Effect + Moderation Effect)

$$\beta_{oj} = \gamma_{oo} \ + \ \gamma_{o1}.GDP_j \ + \ \mu_{oj}$$

$$\beta_{1j} = \gamma_{1o} + \gamma_{11}.GDP_j$$

where γ_{oo} is the fixed component of the intercept (β_{oj}), γ_{o1} is the coefficient of GDP_j, μ_{oj} is the random component of the intercept, γ_{1o} is the fixed component of the slope (β_{1j}), and γ_{11} is the coefficient of the interaction term. The subscript i represents the firms and the subscript j represents the countries. Note that when we substitute this equation into the main one, we get GDP as one of the control variables as well as an interaction term between Business Climate and GDP.

The above model is represented graphically in Figure 5.2 in a simplified way, which illustrates the sort of effect that we are testing with this model.

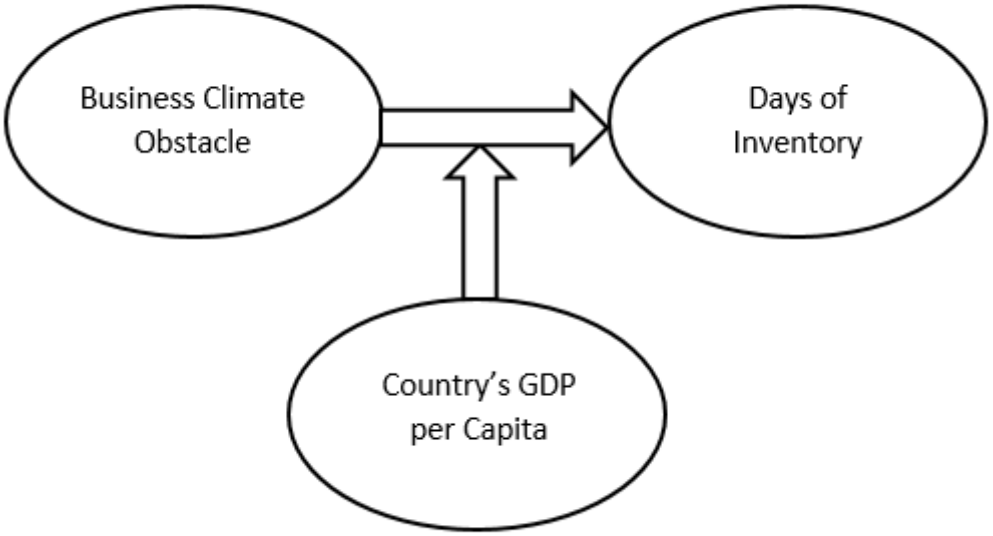

FIGURE 5.2: Moderating Effect of GDP per Capita on the relationship between Business Climate Obstacle and Days of Inventory.

5.2.2.3 Third Group (FFC and Direct Effect Only)

$$\beta_{0j} = \gamma_{oo} \ + \ \gamma_{o1}.FFC_j \ + \ \mu_{oj}$$

$$\beta_{1j} = \gamma_{1o}$$

where γ_{oo} is the fixed component of the intercept (β_{oj}), γ_{o1} is the coefficient of FFC_j , μ_{oj} is the random component of the intercept, and γ_{1o} is the fixed (and only) component of the slope (β_{1j}). The subscript i represents the firms and the subscript j represents the countries. Note that when we substitute this equation into the main one, we get FFC as one of the control variables.

The above model is represented graphically in Figure 5.1 in a simplified way, which illustrates the sort of effect that we are testing with this model.

5.2.2.4 Fourth Group (FFC with Direct Effect + Moderation Effect)

$$\beta_{oj} = \gamma_{oo} \ + \ \gamma_{o1}.FFC_j \ + \ \mu_{oj}$$

$$\beta_{1j} = \gamma_{1o} + \gamma_{11}.FFC_j$$

where γ_{oo} is the fixed component of the intercept (β_{oj}), γ_{o1} is the coefficient of GDP_j, μ_{oj} is the random component of the intercept, γ_{1o} is the fixed component of the slope (β_{1j}), and γ_{11} is the coefficient of the interaction term. The subscript i represents the firms and the subscript j represents the countries. Note that when we substitute this equation into the main one, we get FFC as one of the control variables as well as an interaction term between Business Climate and FFC.

The above model is represented graphically in Figure 5.3 in a simplified way, which illustrates the sort of effect that we are testing with this model.

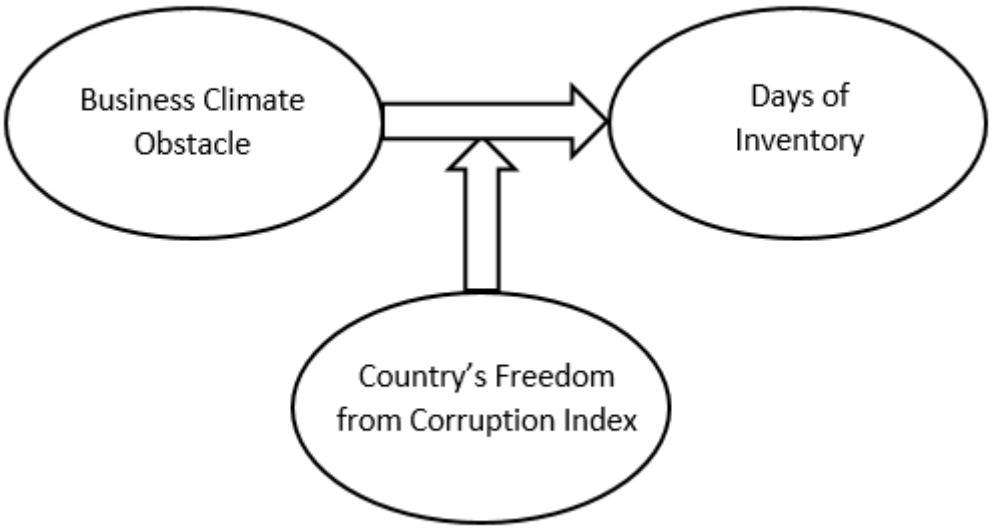

FIGURE 5.3: Moderating Effect of Freedom from Corruption on the relationship between Business Climate Obstacle and Days of Inventory.

5.3 Results

As discussed in Section 5.2, there are four groups of models and seven separate regression equations in each. The results of the first group, which is including GDP as one of the control variables and the direct effect of each business climate obstacle, are presented in Table 5.1. In equation 1, *Customs and Trade Regulations* is significant with a positive coefficient. We can see from the other 6 equations that *Transport, Access to Land, and Access to Finance* (equations 2, 3, and 4) also have the same effect. This means that as the perception of those business climate obstacles increases, the days of inventory kept by firms increase. Therefore, when using GDP as the country's development level indicator, our hypotheses #1 and #3 are supported. *Tax Rates, Political Instability, and Labor Regulations* (equations 5, 6 and 7) have insignificant effects. Therefore, hypothesis #2 is not supported in this case.

In the second group of models, after adding an interaction term between the country-level indicator (GDP) and the firm-level perception of each business climate obstacle (Tables 5.2 and 5.3), we find that the variables that had a significant effect in the first model have now become insignificant as direct effects. The interaction terms, however, are

significant for *Customs and Trade Regulations* and *Access to Finance* (equations 8 and 11) with positive coefficients. These results support hypothesis #4. We also notice that some of the variables that were insignificant in the foregoing model have now become significant as direct effects, namely *Tax Rates* and *Political Instability* (equations 12 and 13). Moreover, the interaction terms for those variables are also significant, but with a negative coefficient. This result contradicts with hypothesis #4 and gives an effect opposite to what was expected. *Transport*, *Access to Land* and *Labor Regulations* (equations 9, 10 and 14) are all insignificant, both as direct effects and as interaction terms. Even though these variables are insignificant, we still have a proxy from each business climate group to support hypotheses #1 and #2.

In the third group of models, we use FFC as a control variable and test the direct effects of the business climate obstacles (Table 5.4). We notice that the results agree with the results when using GDP as the country-level control variable (Table 5.1). This serves as a confirmation of the first model's results and shows that the business climate effect on inventory performance is strong.

In the fourth, and final, group (Tables 5.5 and 5.6), *Customs and Trade Regulations* (equation 22) is still significant as a direct effect, but with a negative coefficient in this case. In the same equation, the interaction term with FFC is significant with a positive coefficient. Both of these results do not agree with hypothesis #4. *Access to Land* and *Access to Finance* (equations 24 and 25) are both insignificant as direct effects, but significant in the interaction terms with positive coefficients, which gives support to hypothesis #4. *Tax Rates* (equation 26) has only a positive direct effect and no moderation effect, which agrees with hypothesis #2. However, the results of *Labor Regulations* (equation 27) were the most unexpected. Its direct effect is negative and the interaction effect is positive. This result clashes with both hypothesis #2 and hypothesis #4. *Transport* and *Political Instability* (equations 23 and 27) have no significant effects in this model.

Table 5.1: The impact of Business Climate Obstacles on Days of Inventory - GDP per Capita

	[1] Customs & Trade Regulations	[2] Transport	[3] Access to Land	[4] Access to Finance	[5] Tax Rates	[6] Political Instability	[7] Labor Regulations
Customs & Trade Regulations	2.641** (0.012)						
Transport		1.682* (0.079)					
Access to Land			3.325*** (0.000^{+})				
Access to Finance				2.383*** (0.009)			
Tax Rates					1.154 (0.184)		
Political Instability						1.268 (0.112)	
Labor Regulations							-0.414 (0.716)
GDP per Capita	-0.0004 (0.447)	-0.0004 (0.360)	-0.0004 (0.448)	-0.0004 (0.413)	-0.0004 (0.384)	-0.0003 (0.476)	-0.0004 (0.408)
Ownership (Private Domestic)	-0.973 (0.983)	-4.599 (0.917)	-1.241 (0.978)	-11.575 (0.783)	-3.765 (0.932)	-0.459 (0.992)	-2.895 (0.948)
Ownership (Private Foreign)	-0.971 (0.983)	-4.581 (0.918)	-1.217 (0.978)	-11.532 (0.784)	-3.745 (0.933)	-0.485 (0.991)	-2.876 (0.948)
Ownership (Government/State)	-0.839 (0.985)	-4.467 (0.920)	-1.016 (0.982)	-11.575 (0.783)	-3.631 (0.935)	0.601 (0.989)	-2.760 (0.950)
Ownership (Other)	-1.034 (0.982)	-4.652 (0.917)	-1.301 (0.977)	-11.623 (0.782)	-3.831 (0.931)	-0.405 (0.993)	-2.946 (0.947)
Ln Firm Size	2.265** (0.022)	2.502*** (0.008)	2.629*** (0.006)	1.977** (0.050)	2.524*** (0.007)	2.758*** (0.004)	2.550*** (0.007)
Part of Larger Firm	1.872 (0.643)	2.269 (0.563)	2.878 (0.469)	0.815 (0.841)	2.154 (0.582)	2.655 (0.497)	2.111 (0.589)
Ln Profitability	-0.874 (0.241)	-0.930 (0.187)	-0.808 (0.255)	-1.372* (0.078)	-0.901 (0.202)	-0.957 (0.175)	-0.966 (0.171)
Industry Dummies	Included	Included	Included	Included	Included	Included	Included

*, **, and *** are the significance levels at the 10%, 5%, and 1% respectively.

P-values are in parentheses.

Table 5.2: The Impact of Business Climate Obstacles on Days of Inventory + Moderation Effect - GDP per Capita (Explanatory Variables)

	[8] Customs & Trade Regulations	[9] Transport	[10] Access to Land	[11] Access to Finance	[12] Tax Rates	[13] Political Instability	[14] Labor Regulations
Customs & Trade Regulations	-0.612 (0.769)						
Customs & Trade Regulations * GDP	0.0003* (0.071)						
Transport		0.251 (0.902)					
Transport * GDP		0.0001 (0.427)					
Access to Land			2.200 (0.283)				
Access to Land * GDP			0.0001 (0.534)				
Access to Finance				-1.601 (0.348)			
Access to Finance * GDP				0.0004*** (0.006)			
Tax Rates					3.974** (0.023)		
Tax Rates * GDP					-0.0003* (0.062)		
Political Instability						4.034** (0.017)	
Political Instability * GDP						-0.0003* (0.064)	
Labor Regulations							-3.827 (0.141)
Labor Regulations * GDP							0.0003 (0.145)

*, **, and *** are the significance levels at the 10%, 5%, and 1% respectively.

P-values are in parentheses.

Table 5.3: The Impact of Business Climate Obstacles on Days of Inventory + Moderation Effect - GDP per Capita (Control Variables)

	[8] Customs & Trade Regulations	[9] Transport	[10] Access to Land	[11] Access to Finance	[12] Tax Rates	[13] Political Instability	[14] Labor Regulations
GDP per Capita	-0.0006 (0.251)	-0.0005 (0.275)	-0.0004 (0.391)	-0.0009* (0.086)	0.00006 (0.908)	0.00006 (0.907)	-0.0006 (0.233)
Ownership (Private Domestic)	-2.236 (0.960)	-3.25 (0.942)	-1.394 (0.975)	-8.366 (0.842)	-5.736 (0.897)	3.728 (0.933)	-3.409 (0.939)
Ownership (Private Foreign)	-2.227 (0.960)	-3.240 (0.942)	-1.370 (0.975)	-8.320 (0.843)	-5.718 (0.897)	3.753 (0.933)	-3.393 (0.939)
Ownership (Government/State)	-2.105 (0.963)	-3.126 (0.944)	-1.172 (0.979)	-8.379 (0.842)	-5.610 (0.899)	3.870 (0.930)	-3.275 (0.941)
Ownership (Other)	-2.304 (0.959)	-3.310 (0.941)	-1.453 (0.974)	-8.410 (0.841)	-5.793 (0.896)	3.689 (0.934)	-3.467 (0.938)
Ln Firm Size	2.225** (0.024)	2.515*** (0.008)	2.597*** (0.007)	1.898* (0.059)	2.546*** (0.007)	2.774*** (0.004)	2.513*** (0.008)
Part of Larger Firm	2.062 (0.610)	2.345 (0.550)	2.802 (0.481)	1.006 (0.804)	2.185 (0.576)	2.776 (0.477)	2.061 (0.598)
Ln Profitability	-0.880 (0.237)	-0.932 (0.185)	-0.803 (0.258)	-1.411* (0.069)	-0.884 (0.210)	-1.001 (0.156)	-0.962 (0.173)
Industry Dummies	Included	Included	Included	Included	Included	Included	Included

*, **, and *** are the significance levels at the 10%, 5%, and 1% respectively.

P-values are in parentheses.

TABLE 5.4: Impact of Business Climate Obstacles on Days of Inventory - Freedom from Corruption Index

	[15] Customs & Trade Regulations	[16] Transport	[17] Access to Land	[18] Access to Finance	[19] Tax Rates	[20] Political Instability	[21] Labor Regulations
Customs & Trade Regulations	2.659** (0.012)						
Transport		1.651* (0.085)					
Access to Land			3.309*** (0.001)				
Access to Finance				2.386*** (0.009)			
Tax Rates					1.138 (0.190)		
Political Instability						1.299 (0.103)	
Labor Regulations							-0.434 (0.703)
FFC	-0.209 (0.461)	-0.193 (0.479)	-0.153 (0.572)	-0.218 (0.449)	-0.186 (0.497)	-0.201 (0.444)	-0.181 (0.504)
Ownership (Private Domestic)	-0.013 (1.000)	-3.536 (0.936)	-0.406 (0.993)	-10.815 (0.797)	-2.780 (0.950)	1.419 (0.974)	-1.935 (0.965)
Ownership (Private Foreign)	-0.011 (1.000)	-3.517 (0.937)	-0.382 (0.993)	-10.773 (0.798)	-2.761 (0.950)	1.445 (0.974)	-1.916 (0.966)
Ownership (Government/State)	-0.119 (0.998)	-3.404 (0.939)	-0.182 (0.997)	-10.818 (0.797)	-2.647 (0.952)	1.560 (0.972)	-1.801 (0.968)
Ownership (Other)	-0.075 (0.999)	-3.589 (0.936)	-0.466 (0.992)	-10.864 (0.796)	-2.846 (0.949)	1.366 (0.975)	-1.986 (0.964)
Ln Firm Size	2.236** (0.024)	2.476*** (0.009)	2.605*** (0.007)	1.958* (0.052)	2.499** (0.008)	2.732*** (0.004)	2.527*** (0.008)
Part of Larger Firm	1.870 (0.644)	2.271 (0.562)	2.882 (0.468)	0.807 (0.842)	2.161 (0.580)	2.658 (0.496)	2.114 (0.589)
Ln Profitability	-0.877 (0.239)	-0.938 (0.183)	-0.815 (0.251)	-1.369* (0.078)	-0.908 (0.199)	-0.957 (0.175)	-0.973 (0.168)
Industry Dummies	Included	Included	Included	Included	Included	Included	Included

*, **, and *** are the significance levels at the 10%, 5%, and 1% respectively.

P-values are in parentheses.

Table 5.5: Impact of Business Climate Obstacles on Days of Inventory + Moderation Effect - Freedom from Corruption Index (Explanatory Variables)

	[22] Customs & Trade Regulations	[23] Transport	[24] Access to Land	[25] Access to Finance	[26] Tax Rates	[27] Political Instability	[28] Labor Regulations
Customs & Trade Regulations	-8.759** (0.018)						
Customs & Trade Regulations * FFC	0.366*** (0.001)						
Transport		-1.930 (0.557)					
Transport * FFC		0.114 (0.254)					
Access to Land			-4.303 (0.200)				
Access to Land * FFC			0.254** (0.018)				
Access to Finance				-3.760 (0.236)			
Access to Finance * FFC				0.175** (0.044)			
Tax Rates					7.170** (0.014)		
Tax Rates * FFC					-0.184 (0.030)		
Political Instability						2.286 (0.418)	
Political Instability * FFC						-0.029 (0.716)	
Labor Regulations							-6.645* (0.087)
Labor Regulations * FFC							0.182* (0.095)

*, **, and *** are the significance levels at the 10%, 5%, and 1% respectively.

P-values are in parentheses.

Table 5.6: Impact of Business Climate Obstacles on Days of Inventory + Moderation Effect - Freedom from Corruption Index (Control Variables)

	[22] Customs & Trade Regulations	[23] Transport	[24] Access to Land	[25] Access to Finance	[26] Tax Rates	[27] Political Instability	[28] Labor Regulations
FFC	-0.430 (0.159)	-0.279 (0.329)	-0.272 (0.329)	-0.415 (0.172)	0.101 (0.738)	-0.163 (0.557)	-0.314 (0.262)
Ownership (Private Domestic)	1.165 (0.979)	-5.346 (0.904)	0.840 (0.985)	-13.348 (0.750)	-0.150 (0.997)	1.062 (0.981)	-0.965 (0.983)
Ownership (Private Foreign)	1.175 (0.979)	-5.328 (0.904)	0.866 (0.984)	-13.303 (0.751)	-0.128 (0.998)	1.088 (0.980)	-0.948 (0.983)
Ownership (Government/State)	1.278 (0.977)	-5.214 (0.906)	1.051 (0.981)	-13.367 (0.750)	-0.033 (0.999)	1.205 (0.978)	-0.838 (0.985)
Ownership (Other)	1.099 (0.980)	-5.398 (0.903)	0.780 (0.986)	-13.393 (0.750)	-0.200 (0.996)	1.010 (0.982)	-1.023 (0.982)
Ln Firm Size	2.253** (0.022)	2.471*** (0.009)	2.640*** (0.006)	1.904* (0.059)	2.484** (0.008)	2.737*** (0.004)	2.488*** (0.009)
Part of Larger Firm	2.068 (0.608)	2.413 (0.538)	3.173 (0.424)	1.069 (0.792)	2.007 (0.607)	2.644 (0.499)	2.118 (0.588)
Ln Profitability	-0.797 (0.283)	-0.956 (0.175)	-0.759 (0.284)	-1.418* (0.068)	-0.965 (0.172)	-0.964 (0.172)	-0.982 (0.163)
Industry Dummies	Included	Included	Included	Included	Included	Included	Included

*, **, and *** are the significance levels at the 10%, 5%, and 1% respectively.

P-values are in parentheses.

Chapter 6

Conclusion

The literature of business climate has been gaining increasing attention and support in the recent years. Moreover, the inventory management field of study is a highly developed one. However, most of the literature focuses on the relationship between business climate indicators and firm performance [62], productivity [63] or employment growth [64]. On the other hand, studies have been conducted to test the impact of inventory management on a firm's financial performance [65]. An interconnection between these two streams of study is yet to be made. In this empirical study, we identified the importance of the relationship between business climate and a company's operational decisions (manifested in inventory performance, for the purpose of our study). We emphasized how a comprehensive understanding of that connection would be rewarding in multiple disciplines, especially when focusing on developing countries. The need for more studies of this kind to help firms understand how their operations are consciously or unconsciously affected by the business climate of the country is becoming loud and clear. Moreover, the efforts of the World Bank to gift researchers with a collection of firm-level data from developing countries that is tremendous and unprecedently assorted makes it easier to conduct manifold studies and reap the benefits of these resources.

We chose to conduct our study on Eastern Europe and Central Asia because of the region's large size and population, and diverse economic status. Using WBES, we have utilized the firm-level data of 24 countries, over 24 manufacturing industries and 14,000 firms in the year 2013. We collected the country-level indicators from The Heritage Foundation. Cross-country analysis was conducted, and a Hierarchical Linear Model

was developed due to the nested nature of our data. We developed four groups of models. The first two groups include GDP as the country-level control variable. One group has only the direct effects of business climate indicators and the second group includes both the direct effect and the moderation effect of GDP on the observed relationship. The second two groups include FFC as the country-level control variable. Again, one of the groups includes FFC as the country-level variable and the other group includes the direct effect and the moderation effect of FFC on the observed relationship.

We have demonstrated that macroeconomic business climate obstacles can have significant direct effects on micro-level firm operations. In most cases, the *Infrastructure* and *Finance* obstacles have proven to have a consistently positive effect on the days of inventory. The *Bureaucracy* group of obstacles have a positive effect on days of inventory, but only when an interaction term with a country-level variable is entered in the same model. A country's development level (measured in *GDP* and *FFC*) increases the positive effect of *Finance* obstacle on the days of inventory. It increases the effect of *Infrastructure* as well in some cases.

This study will contribute to the literature in terms of shedding light on an unexplored stream of research that can prove to be very fruitful and rewarding if pursued. We are hoping that this study, with its limitations, will serve as a baseline for starting to understand more about how the our surrounding macro-level business environment can have even a direct impact on our micro-level operations. By digging more into this research area, we hope that with time, governments and chambers of industry and commerce in developing countries would start to make the necessary modifications to their policies in order to reach a more prosperous economy. Furthermore, correctly directed operational policies can lead to an increase in firm-level performance and provide a sustainable growth outlook through higher productivity on the macro and micro level.

Appendix A

Descriptive Statistics by Country

TABLE A.1: Mean and SD of Key Variables for Albania, Belarus and Georgia

	Albania		**Belarus**		**Georgia**	
	Mean	SD	Mean	SD	Mean	SD
Average Days of Inventory	12.4	18.3	37.3	46.7	30.8	34.9
Customs and Trade Regulations	0.34	0.78	0.62	1.06	0.22	0.74
Transport	0.41	0.82	0.64	1.02	0.41	0.99
Access to Land	0.79	1.25	0.79	1.26	0.19	0.70
Access to Finance	0.74	1.01	0.99	1.19	1.06	1.29
Tax Rates	1.25	1.06	1.56	1.26	1.22	1.31
Political Instability	0.89	1.18	0.76	1.17	1.69	1.56
Labor Regulations	0.26	0.69	0.50	0.86	0.11	0.49

TABLE A.2: Mean and SD of Key Variables for Tajikistan, Turkey and Ukraine

	Tajikistan		**Turkey**		**Ukraine**	
	Mean	SD	Mean	SD	Mean	SD
Average Days of Inventory	47.5	51.2	34.7	38.4	31.5	29.6
Customs and Trade Regulations	0.63	1.13	0.49	0.88	0.55	1.01
Transport	0.85	1.21	0.70	1.04	0.75	1.02
Access to Land	0.59	1.13	0.51	0.94	0.71	1.16
Access to Finance	1.12	1.29	0.72	1.10	1.32	1.24
Tax Rates	1.59	1.43	1.42	1.30	1.92	1.30
Political Instability	1.48	1.61	1.08	1.36	1.75	1.32
Labor Regulations	0.26	0.73	0.54	0.90	0.44	0.87

Table A.3: Mean and SD of Key Variables for Hungary, Slovakia and Slovenia

	Hungary		**Slovakia**		**Slovenia**	
	Mean	SD	Mean	SD	Mean	SD
Average Days of Inventory	18.8	25.0	24.0	20.8	48.1	50.8
Customs and Trade Regulations	0.38	0.77	0.70	1.00	0.42	0.86
Transport	0.51	0.97	1.03	1.26	0.50	0.94
Access to Land	0.30	0.75	0.37	0.84	0.45	0.95
Access to Finance	0.79	1.06	1.05	1.07	1.20	1.43
Tax Rates	1.54	1.38	1.82	1.22	1.52	1.32
Political Instability	0.98	1.29	1.16	1.20	1.75	1.40
Labor Regulations	0.79	0.99	1.04	1.11	1.21	1.19

Table A.4: Mean and SD of Key Variables for Bulgaria, Croatia and Montenegro

	Bulgaria		**Croatia**		**Montenegro**	
	Mean	SD	Mean	SD	Mean	SD
Average Days of Inventory	26.9	36.7	34.4	41.6	39.8	51.2
Customs and Trade Regulations	0.32	0.80	0.61	1.05	0.62	0.91
Transport	0.39	0.83	0.44	0.87	0.44	0.74
Access to Land	0.32	0.90	0.31	0.85	0.28	0.71
Access to Finance	0.96	1.30	1.28	1.35	1.28	1.22
Tax Rates	1.00	1.21	2.21	1.34	1.19	1.07
Political Instability	1.52	1.43	1.12	1.30	0.38	0.85
Labor Regulations	0.78	1.18	1.03	1.12	0.36	0.71

Table A.5: Mean and SD of Key Variables for Uzbekistan, Russia and Poland

	Uzbekistan		**Russia**		**Poland**	
	Mean	SD	Mean	SD	Mean	SD
Average Days of Inventory	39.8	38.3	35.7	49.0	30.5	39.0
Customs and Trade Regulations	0.13	0.52	0.62	1.14	0.78	1.05
Transport	0.18	0.59	1.09	1.33	0.78	1.14
Access to Land	0.17	0.67	0.85	1.34	0.52	0.99
Access to Finance	0.42	0.91	-	-	1.07	1.27
Tax Rates	0.70	1.14	2.50	1.29	1.95	1.24
Political Instability	0.17	0.66	1.30	1.35	1.10	1.24
Labor Regulations	0.06	0.32	0.55	0.95	1.11	1.20

Table A.6: Mean and SD of Key Variables for Romania, Serbia and Kazakhstan

	Romania		**Serbia**		**Kazakhstan**	
	Mean	SD	Mean	SD	Mean	SD
Average Days of Inventory	34.4	49.0	37.8	44.7	34.1	34.3
Customs and Trade Regulations	0.63	1.13	0.67	1.02	0.58	0.98
Transport	1.04	1.43	0.47	0.86	0.91	1.10
Access to Land	0.75	1.35	0.36	0.90	0.69	1.12
Access to Finance	1.49	1.51	1.18	1.23	0.86	1.07
Tax Rates	3.00	1.06	1.74	1.13	1.15	1.12
Political Instability	2.16	1.46	1.76	1.35	0.46	0.90
Labor Regulations	1.20	1.30	0.78	0.95	0.34	0.72

Table A.7: Mean and SD of Key Variables for Moldova, Bosnia & Herzegovina and Armenia

	Moldova		**Bosnia & Herzegovina**		**Armenia**	
	Mean	SD	Mean	SD	Mean	SD
Average Days of Inventory	22.1	35.5	30.3	43.0	30.3	20.1
Customs and Trade Regulations	0.52	1.07	0.88	1.09	1.17	1.42
Transport	0.88	1.32	0.62	0.96	0.82	1.13
Access to Land	0.34	0.85	0.28	0.76	0.78	1.05
Access to Finance	0.65	1.10	1.23	1.24	1.72	1.15
Tax Rates	1.15	1.31	1.56	1.28	2.00	1.27
Political Instability	1.49	1.46	1.97	1.54	1.24	1.36
Labor Regulations	0.48	0.96	0.61	1.01	0.31	0.78

Table A.8: Mean and SD of Key Variables for Kyrgyzstan, Mongolia and Kosovo

	Kyrgyzstan		**Mongolia**		**Kosovo**	
	Mean	SD	Mean	SD	Mean	SD
Average Days of Inventory	58.3	74.4	43.2	48.0	28.0	38.3
Customs and Trade Regulations	0.77	1.26	1.21	1.23	1.38	1.61
Transport	0.95	1.24	0.95	1.06	1.19	1.37
Access to Land	0.77	1.21	1.22	1.46	1.00	1.38
Access to Finance	1.21	1.31	1.58	1.20	2.00	1.53
Tax Rates	1.67	1.31	1.55	1.26	1.85	1.38
Political Instability	3.12	1.18	1.19	1.25	1.88	1.54
Labor Regulations	0.25	0.70	0.49	0.75	0.40	0.85

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