UNCERTAINTY AND LEVERAGE-INVESTMENT ASSOCIATION: AN EMPIRICAL ANALYSIS OF FIRMS LISTED ON PSX.

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CERTIFICATE

This is to certify that this thesis entitled: **"UNCERTAINTY AND LEVERAGE-INVESTMENT ASSOCIATION: AN EMPIRICAL ANALYSIS OF FIRMS LISTED ON PSX".** submitted by **Ms. Sanila** is accepted in its present form by the PIDE School of Economics, Pakistan Institute of Development Economics (PIDE), Islamabad as satisfying the requirements for partial fulfilment of the degree in Master of Philosophy in Economics and Finance.

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I Sanila hereby state that my Mphil thesis titled "**Uncertainty and Leverage -Investment Association: An Empirical Analysis of Firms Listed on PSX.** is my own work and has not been submitted previously by me for taking any degree from Pakistan Institute of Development Economics or anywhere else in the country/world. At any time if my statement is found to be incorrect even after my Graduation the university has the right to withdraw my Mphil degree.

Date: 22-10-2024

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DEDICATION

I dedicate this research to my cherished parents, whose unwavering love and support have been an endless source of inspiration throughout my journey. Their encouragement has been a guiding light at every stage of my life, especially during my studies at PIDE. Additionally, I dedicate this humble endeavor to my dear brothers and sister, whose love, trust, and prayers have left an indelible mark on my heart. (SANILA)

ABSTRACT

This study examines the impact of uncertainty on the leverage-investment relationship in non-financial firms listed on the Pakistan Stock Exchange (PSX) from 2011 to 2022. Employing the two-step System Generalized Method of Moments (GMM) technique, the study integrates various measures of uncertainty, such as firm-specific, CAPM-based, and economic policy uncertainty. The findings indicate that uncertainty has a moderating effect on the leverage-investment relationship, with the nature of this impact varying depending on the type of uncertainty and the ownership structure of the firms involved.

The robust two-step System-GMM analysis reveals no significant correlation between firm-specific uncertainty and the leverage-investment relationship under the null hypothesis. However, leverage shows a significant impact on investment for Sate Owned Enterprises (SOEs) across all models. Whereas for Non-State Owned Enterprises (Non-SOEs), firm-specific uncertainty intensifies the negative impact of leverage on investment, consistent with the predictions of agency theory, which suggests a tendency toward under-investment in environment of heightened firm-specific risk.

The interaction between CAPM-based uncertainty and leverage suggests that this form of uncertainty amplifies the positive effects of leverage on investment for both SOEs and Non-SOEs. This implies that firms with higher leverage are more likely to increase investment in periods of high CAPM-based uncertainty, consistent with the predictions of agency theory of under-investment. Such firms may leverage uncertainty to pursue investment opportunities, reflecting their confidence in navigating market volatility.

Additionally, the study highlights that the effect of uncertainty can either exacerbate or mitigate the relationship between leverage and investment, depending on the type of uncertainty and the firm's ownership structure. SOEs appear to make more investment in face of economic policy uncertainty, potentially due to government backing or long-term strategic objective that are less susceptible to short term policy change. Non-SOEs tend to reduce investment during periods of economic policy uncertainty, likely dived by a lack of government safety nets, heightened sensitivity to market conditions, and the necessity to maintain liquidity and operational flexibility in uncertain environment.

The study makes a significant contribution to the existing literature on corporate finance and investment behaviour in emerging markets, particularly in the context of uncertainty. by providing empirical evidence on how different types of uncertainty influence that leverage-investment association, this study deepens our understanding of corporate financial behaviour in volatile environment, offering practical implication for firms operating in similar market conditions.

Contents

Chapter 1

1 Introduction

Leverage and firm investment are fundamental aspects of a company, as the value of the company is closely linked to its future cash inflow from its investments. However, the mechanism through which leverage of a firm impacts its investment behavior is complex and require further clarification. According to Myers [1977], firms with high levels of debt and financial constraints often miss out on beneficial investment opportunities due to a phenomenon known as the debt overhang problem. This arises because, in high-levered firms, bondholders typically benefit more from projects with positive net present value (NPV) than shareholders. Consequently, this leads to reduction in firm's investment motivation resulting in underinvestment.

Moreover, the relationship between leverage and investment can further be explained through the lens of over-investment theory, which addresses the agency problems that occurs between management and shareholder. This theory states that managers tend to invest in projects with negative NPV to maximize their personal gains, leading to over-investment. Shareholders, in response, to counter over-investment limit the access to free cash flows. This action in turn induces management to take on more debt. Thus, taking on more debt solves the issue of overinvestment creating an inverse relation between debt and investment.

The level of leverage a firm uses for financing its investments relies on different factors, like the amount of investment needed, prevailing macroeconomic conditions, and level of uncertainty in the market. When firms have positive NPV projects, they may choose more debt financing to leverage the benefit of tax free cash and lower the firm's capital cost. However, firms make conservative investment decisions under high uncertainty. High uncertainty increases the project risk, leading to lower expected returns. This leads to a decrease in investment activity and reduction in leverage. Moreover, higher uncertainty turns off the willingness of creditors to lend, which may force firms to reduce their reliance on debt financing. Furthermore, the risk-return tradeoff has the potential to tamper with the relation between leverage and investment. High levels of leverage can increase the risk of a firm's investments, and as a result, investors may require higher profits to overcome the incremental risk. In such cases, firms may reduce their leverage and investment to lower the risk of their investments and meet investors' return expectations Arif and Jebran [2019].

Macroeconomic factors, such as interest rate and inflation, play a crucial role in defining the leverage-investment association. Interest rates significantly impact this leverage-investment asso-

ciation. When interest rates are low, firms are incentivized to borrow and invest in productive assets due to relatively lower borrowing costs. This results in higher leverage levels and increased investment activity Behera et al. [2023]. On the other hand, high-interest rates increase borrowing cost, leading to reduced leverage and potentially lower investment levels Danso et al. [2019].

Likewise, inflation also affects the leverage-investment relationship. High inflation can erode the purchasing power of cash flows and increase the cost of borrowing, negatively affecting investment decisions and potentially leading to lower leverage levels Danso et al. [2019]. Conversely, low inflation may provide a favorable environment for investment and borrowing, which may result in higher leverage levels as outlined by Ibrahim and Isiaka [2020].

The current study aims to examine the impact of uncertainties on the leverage-investment relationship, focusing on three distinct types of uncertainties. Economic policy uncertainty refers to the unpredictability of economic policies. When there is economic policy uncertainty, firms may be hesitant to invest in new projects and may opt for lower levels of leverage since these policy changes can significantly affect the firm's cash flows, profitability, and cost of capital. According to Baker et al. [2016], uncertainty of economic policies is measured using a news-based index that tracks newspaper articles discussing economic policy uncertainty.

Secondly, CAPM-based uncertainty relates to the volatility of returns on the market portfolio. When faced with high CAPM-based uncertainty, investors often require higher returns to compensate for the additional risk, leading to higher costs of equity financing. As a result, firms may reduce their leverage and investment, given the rising cost of financing. Liu and Zhang [2020] use a measure of CAPM-based uncertainty to analyze how stock returns react to a particular uncertainty.

Lastly, Firm-specific uncertainty relates to the uncertainty associated with a specific firm, such as changes in management, product innovation, or technological disruptions. When firms face high levels of firm-specific uncertainty, they may reduce their investment and leverage since these uncertainties increase the risk of their projects and can result in lower returns. Bloom [2009] employes survey data on firms' expectations to measure this type of uncertainty, demonstrating its negative affect on both investment and employment.

This paper explores and analyzes the effect of uncertainty on the leverage-investment association for 100 non-financial firms at PSX list between 2010 to 2022. This study contributes to understanding the mechanisms by which uncertainty affects corporate financial behavior and has important implications for policymakers, investors, and firms alike.

The findings of this study provides insights into the extent to which firms respond to uncertainty by adjusting their leverage and investment levels and shed light on the nature of the leverage-investment

relation in uncertain times. The findings of this paper are of great interest to scholars and stakeholders in the field of finance and economics, as they provide a deeper understanding of the association between financial behavior of a firm and uncertainty. This paper explores the relationship between leverage and investment in Pakistani nonfinancial firms listed on PSX from 2011 to 2022. Using two-step system-GMM method, it analyzes the impact of three types of uncertainty: firm-specific uncertainty, CAPM-based uncertainty, and economic policy uncertainty.

1.1 Research Gap

Previous studies like Umutlu [2010] and Aivazian [2005] have probed the influence of leveraging firm's finances its investment decisions by examining different entities with the help of panel data methodology. The results from these studies showed that leverage and investment were inversely related, at the same time that the relationship significantly varied among low growth firm and firm with healthy financial status. The studies support agency theories of corporate debt taking and predict that this leverage work as a protection for firm with low growth and stop them from taking unnecessary risks. Further, Baum and Talavera [2010] examines the effect of uncertainties like macroeconomic and idiosyncratic on the leveraging capacity of non-financial institutions in the US during 1993-2003. Like previous studies this study also finds that the two variable are negatively related, it also revealed that low growth firms showed larger sensitivity to macroeconomic uncertainty. According to research, fluctuations in the overall economic conditions can impact the financial structure of nonfinancial companies, which in turn influences their investment patterns. A study conducted by Danso et al. [2019] examined the influence of political uncertainty on company's expansion financing options in China. The study revealed that Chinese businesses tend to lower their investment activities significantly after alteration in local government officials, particularly capital-intensive firms that reduce their investments to a greater extent to explore the impact of various types of uncertainty, such as internal and external factors, on firms' investment behavior. After analyzing the available literature, it can be seen that previous studies have examined the association of firm's leverage and investment in countries like China, Canada and the United states but countries like Pakistani have not been studied. The results of the above studies cannot be directly extrapolated without studying the firms in Pakistan. There is a huge difference between business environment, cost of doing business and the regulatory framework of the countries. The research gaps which this study tries to fill up include examining the relationship between various uncertainties and investment decisions of a firm. There is a need for research that compares the impact of

these uncertainties on firm investment decision in Pakistan and other countries; and majority of the studies on the topic Baum and Talavera [2010]; Drobetz et al. [2018] focus on short term effects of these uncertainties on investment decisions of firm, which further identifies the need for examining the effects of economic, political and policy uncertainty on firm investment decisions in the long run. The literature delineating the "leverage-investment association" has extensively explored the effects of various determinants on this relationship. However, the empirical evidence on the effect of uncertainties on the leverage-investment association, particularly in the context of Pakistani listed firms, is relatively limited.

Previous studies like Umutlu [2010] and Aivazian [2005] have probed the influence of leveraging firm's finances its investment decisions by examining different entities with the help of panel data methodology. The results from these studies showed that leverage and investment were inversely related, at the same time that the relationship significantly varied among low growth firm and firm with healthy financial status. The studies support agency theories of corporate debt taking and predict that this leverage work as a protection for firm with low growth and stop them from taking unnecessary risks. Further, Baum and Talavera [2010] examines the effect of uncertainties like macroeconomic and idiosyncratic on the leveraging capacity of non-financial institutions in the US during 1993-2003. Like previous studies this study also finds that the two variable are negatively related, it also revealed that low growth firms showed larger sensitivity to macroeconomic uncertainty. According to research, fluctuations in the overall economic conditions can impact the financial structure of nonfinancial companies, which in turn influences their investment patterns. A study conducted by Danso et al. [2019] examined the influence of political uncertainty on company's expansion financing options in China. The study revealed that Chinese businesses tend to lower their investment activities significantly after alteration in local government officials, particularly capital-intensive firms that reduce their investments to a greater extent to explore the impact of various types of uncertainty, such as internal and external factors, on firms' investment behavior. After analyzing the available literature, it can be seen that previous studies have examined the association of firm's leverage and investment in countries like China, Canada and the United states but countries like Pakistani have not been studied. The results of the above studies cannot be directly extrapolated without studying the firms in Pakistan. There is a huge difference between business environment, cost of doing business and the regulatory framework of the countries. The research gaps which this study tries to fill up include examining the relationship between various uncertainties and investment decisions of a firm. There is a need for research that compares the impact of these

uncertainties on firm investment decision in Pakistan and other countries; and majority of the studies on the topic Baum and Talavera [2010]; Drobetz et al. [2018] focus on short term effects of these uncertainties on investment decisions of firm, which further identifies the need for examining the effects of economic, political and policy uncertainty on firm investment decisions in the long run. Akbar et al. [2021] conducted a study on the impact of economic and policy uncertainty emanating out of around elections in Pakistan on the investment decisions of firms in Pakistan. They found that Pakistani firms exhibit a high degree of sensitivity to both economic and policy uncertainty which affects their investment patterns significantly. The study has specifically examined the effects of uncertainty around the election period, however, in developing nations the political instability remains throughout the cycle of a government which necessitates further study on the topic. Further, Hussain et al. [2023] explored the characteristics of leverage and investment decisions in developing markets, highlighting that there exists a negative relation between leverage and investment, however, the sensitivity changes according to the prevailing uncertainties in the market. Their findings suggest that developing markets, like Pakistan, show peculiar traits due to the different macroeconomic conditions and institutional settings. The study indicates that the investment decisions of market dependent enterprises are more vulnerable to the unpredictability of economic policies. This study has particularly studies and energy and petroleum sector leaving out other sectors which the current paper tries to cover. The literature delineating the "leverage-investment association" has extensively explored the effects of various determinants on this relationship. However, the empirical evidence on the effect of uncertainties on the leverage-investment association, particularly in the context of Pakistani listed firms, is relatively limited.

1.2 Problem Statement

Investments are the most important feature of any firm's strategic decision making process. They shape the future of a making defining its competitiveness and market position. Firms spend a major part of their income on research and development, so that they would develop a project or asset which provides them an output which surpass the investment made on the project or asset. This activity is important for businesses focusing to increase the scope of their operations, develop new products, improve efficiency, or enter new markets Asimakopulos [2019]. Developing a well-thought and profitable investment decision will result in more profits hence increasing the overall value of the firm and attract more investors.

The significance of sound investment decision surpasses the immediate returns. A viable investment

decision based on comprehensive market research can change the course of a business. It can lead to innovation, technological advancement, and operational excellence, providing the firm competitive advantage in the market Cleary [1999]. On the other hand, poor investment decisions can lead to loss and downgrade the future prospects of a firm. Overtime these poor strategic decisions will decrease the shareholder confidence in the business. There are several factors which can impact a firm's investment decisions. These include market uncertainty, regulatory environment, economic policy uncertainty, technological advancements, competitive pressures, and internal capabilities and resources Asimakopulos [2019]. Businesses in an uncertain, volatile and asymmetric market may not be able to comprehensively assess the opportunities, manage risks and secure funds. Modigliani and Miller [1958] put forward the capital structure irrelevance theory which says that in an perfect competition and where there is no information asymmetry a firm's will only consider profit, cash flow and net worth of an investment. They argue a firm's investment decision will only depend on the net present value of a project instead of choosing debt of equity for financing. Conversely, in an imperfect market firm significantly think about their leverage and its effect on the investment. When it comes to analyzing the impact of uncertainty on leverage investment decision, it is crucial to consider specific features of each firm and the economic circumstances surrounding it. The agency conflict theory discusses the association of leverage-investment in detail which leads to over or under-investment problem. In Pakistan studying uncertainties can help explore the connection of leverage and investment. Studying firms listed on Pakistan Stock Exchange and assessing the effect of uncertainty on their leverage investment connection can provide insights into how firms adjust their financial decisions in response to uncertain events and conditions. It will help understand firm's management of risks, their strategic decisions making, and response to market conditions when faced with uncertainty. Examining these factors will provide a precise understanding of how uncertainties impact the leverage-investment relation of firms listed on Pakistan Stock Exchange and how firms adapt their financial strategies to cope with uncertain conditions. In recent time there has been a significant decrease in the investment of firms in Pakistan. This reduction of investment correlates with the increasing uncertainty in Pakistani market highlighting the need to study the impact of uncertainty on leverage investment of firms in Pakistan.

1.3 Research Questions

The fundamental question that this study aim to answer is the influence of uncertainties on leverage and firm's financing decisions. From the theoretical background discussed above, which establish

the relevance of uncertainties and their impact on financial leverage and firm investment relation, we present the following research questions;

1. What is the effect of firm leverage on its investment decisions?

2. How uncertainty (firm-specific, CAPM-based, economic policy) affects firm's investment decisions?

3. What are the policies related to leverage and investment in Pakistan.

1.4 Research Objective

In the dynamic landscape of financial management, the interplay between firm leverage, investment decisions, and the influence of uncertainties stands as a pivotal area of inquiry. This research aims to delve into key questions that are central to understanding the strategic financial behavior of firms, particularly those listed on the Pakistan Stock Exchange (PSX). By answering these questions, the study seeks to contribute to the fields of corporate finance and risk management, with implications for both academia and industry practitioners.

1. To examine the relationship between a firm's use of borrowed money and its investment decisions.

2. To evaluate the leverage-investment association in the presence of uncertainties.

3. To examine the policies related to leverage and investment in Pakistan.

1.5 Theoritical Framework

The relation of leverage and investment and their association with different uncertainties is a constant moot point in the finance and investment industry. Different scholars have come up with different theoretical frameworks to understand the association. Some key theoretical perspectives in this area include:

1.5.1 Agency Theory

This theory points that the influence of the outcome of an investment on various stakeholders of a firm can lead to conflicting decisions regarding the use of leverage. As use of leverage and investment decision can be influenced by uncertainties and these uncertainties can have different impact on different stakeholders, such as shareholders, managers and debt holder Nugroho et al. [2018]. For instance, managers are interested in the short term returns of the investment, therefore

use excessive leverage while on the other hand, investor and debt holders may be concerned about the risk of uncertainty and want to limit the usage of leverage. To sum up the theory highlights the role of conflict of interest and uncertainty in investment decision making. Many Studies shows that with the increase in interest rate and amount of Debt decreases the value of equity and has a negative impact on firm performance Jou and Lee* [2004]. While the amount of debt has a positive impact on firm ROA. Results of many research shows that financial leverage positively impacts firm performance, if the amount of debts do not exceed the amount of equity. Agency theory shows that in times of uncertainty agency conflict increases between managers and shareholders so this theory can best describe the theoretical perspective of this research. However, leverage significantly impacts investment in SOEs across all models, whereas for non-SOEs, firm-specific uncertainty exacerbates the negative impact on investment, aligning with agency theory predictions of under-investment Nugroho et al. [2018]. The interaction between CAPM-based uncertainty and leverage suggests that this type of uncertainty amplifies the positive effects of leverage on investment for both SOEs and non-SOEs. This indicates that highly leveraged firms tend to increase investment under high CAPM-based uncertainty, supporting the agency theory of under-investment

1.5.2 Capital Structure Theory

theory is about the optimal combination of debt and equity funding for a company. In the face of uncertainties, the best capital structure may be altered due to shifts in costs of debts and equities, investors' risk preferences, among other factors Harris and Raviv [1991]. Uncertainties can influence decisions on the use of leverage since they change the advantage and disadvantage of borrowing. As an illustration, uncertainties may heighten perceived risks of debt hence reducing the propensity to use leverage. Capital structure theory explains how uncertainty can impact on optimal employment of borrowed funds in investment choices Harris and Raviv [1991]. The study by Modigliani and Miller [1958] claimed that in an economy where no taxes exist the firm value is independent of its capital raising structure. However, when taxes are included in the capital structure equation, firms take more debt hence increasing its value as markup on the debt is tax free, providing a tax shield benefit. Leverage and firm investment are also vital as worth of a company is calculated by its future inflow of cash gained in return for its investments.

1.5.3 Real Options Theory

This theory extrapolates the discounted cash flow approach to decision making in times of uncertainties. It says that uncertainty can provide opportunities to firms by allowing them to expand,

delay or abandon a project which potentially impact the use of leverage Chen [2006]. Such as a future investment opportunity can increase in value due to an uncertainty which gives the firms option to use leverage to secure that opportunity. When a firm has positive NPV projects, it may choose to incur more debt financing to materialize advantage of tax free cash and lower the firm's capital cost. Firms change their debt and investment policies under uncertainty Chen [2006]. When the level of uncertainty is high, firms try to make informed investment and financing decisions. High levels of uncertainty can increase the risk associated with projects, leading to lower expected returns. Uncertainty can lead to a decrease in investment and the use of less debt financing. These theories help to understand the association of leverage and investment and their connection with various uncertainties, providing a foundational basis for further study. investment.

1.6 Significance of Research

1.6.1 Theoretical Significance

The influence of uncertainty on leverage and investment in the context of Pakistan has not been studied in depth. This paper aims examine the topic further and add to the existing knowledge. The study will specifically analyze firm-specific, market-based, CAPM-based, and economic policy uncertainty, and their association with leverage-investment relation. It will further study the topic on firm level by comparing the impact of uncertainties between state owned and non-state owned firms in Pakistan. It will help students studying this relationship understand the topic deeply, assist academics in research and policy maker in making policy decisions.

1.6.2 Analytical Significance

This study examines the relations of different kinds of uncertainties on leverage and investment. It correlates how these uncertainties are effecting a firms investment decisions in different times. So, the results of this study are huge significance for investment decision makers, investor and policy makers. The result will help the stakeholders understand the impact of each type of uncertainty on the investment of a particular type of firm. It will help bridge the gap between policy makers and individuals firms and investors needs.

1.6.3 Policy Significance

Studies conducted on firm's investment data in UK, US, China and many other countries reveal that economic policy uncertainty of a country significantly impacts the investment decision of a firm particularly if the firm is not state owned. So, by studying this particular aspect of investment decisions in the context of Pakistan will help understand the stakeholder whether the findings in foreign jurisdiction hold true for Pakistani market as well. By revealing the impact of economic policy uncertainty on firms investment decision making it will assist policy maker adjust their policies accordingly and help them develop a healthy investment environment.

1.7 Ministries/Departments: That Could Benefit from this Study are as follows

1.7.1 Ministry of Finance

This study can inform the Ministry of Finance about the interrelation of leverage and investment for firms in Pakistan and the impact of uncertainty on this relationship, which can inform their policy-making decision.

1.7.2 State Bank of Pakistan

This study can inform the State Bank of Pakistan about the influence of uncertainty on the financial behavior of firms in Pakistan, which can inform their monetary policy decisions.

1.8 Organization of Study

This paper is divided into six chapters containing multiple sub headings. Chapter 1 of the paper introduces the paper and provides the background to the study. In Chapter 2 literature review is provided which analyses the theoretical literature on the topic. The policies effecting leverage and investment are discussed in Chapter 3 and Chapter 4 describes the research methodology employed in this paper. Chapter 5 discusses the result of the study and chapter 6 concludes the paper and provides policy recommendations.

CHAPTER 2

2 Literature Review

2.1 Empirical Literature Review

Modigliani and Miller [1958] made a groundbreaking contribution by deriving a theoretical result stating that, assuming utopian capital markets, the firm debt to growth relation has no impact on its value in the industry or its capital investment plans. This seminal study supports the notion that macroeconomic uncertainty is vital for firms' decision-making processes. The findings of their study indicated an inverse but major effect of uncertainty measures on leverage for non-financial companies in the United States from 1993 to 2003. Interestingly, cash intensive and low debt taking firms demonstrated a higher degree of sensitiveness to macroeconomic uncertainty, as reflected in the markets, compared to their less cash intensive or high-debt counterparts. The research suggested that macroeconomic uncertainty impacts the capital structure of non-financial firms, subsequently influencing their investment dynamics. Therefore, when considering more interventionist monetary policies, it is important to take into account firms' sensitivity to macroeconomic uncertainty.

Cleary [1999] investigated the relationship of investment and financial status of a company using US firms listed on stock market. The study observed that the sensitivity of the relationship between leverage and financial status of the firm was high for high creditworthy firms compared to low credit firms.

Corporate debt has come to lime light in the aftermath of financial crisis of 2008. According to Marsh et al. [2020] firm were cautious right after the crisis and were not willing to or the financial institution were not providing them credits. However, in the recent years corporate debt is on a rising trend. The firms borrowing money usually invest them in new projects. Most of the time when firms borrows they usually make payments to bondholders, who can claim the firm's assets under bankruptcy laws. This ultimately requires firm to make prudent investments decisions. On the other hand debt reduced the firms funds and increased the chances of default, thereby increasing the cost of future borrowing.

Sajid et al. [2016] studied Pakistani companies listed on the Krachi Stock Exchange for the period 2009 to 2013. The study concluded that leverage of a company is inversely and significantly related to the net financing of the company listed on stock exchange. As the financial leverage ration increase the investment of the firms decreased. The study also finds that the relations of liquidity and

return have positive and major effect on the company's investment.

The examination of how financial leverage impacts investment decisions of a firm is an essential subject when it comes to raising money for the development of a business. Aivazian [2005] made significant advancements in the existing literature by addressing various important aspects related to empirical methodology, particularly related to addressing the endogeneity issues in leverage and investment relation. The primary aim of the study conducted by Aivazian [2005] was on Canadian publicly traded companies, utilizing panel data methodology to address for variations between different companies, and they tested the reliability of the outcomes separate model for the empirical study. Research found that when pooling regression was used it underrated the influence of debt of a firm on its investment. Thus, the fixed effect model being the appropriate model for the specific study. Additionally, the study found an antagonistic association between leverage and investment levels, with a more obvious adverse effect seen for businesses with little potential for growth than for those with abundant potential for expansion. He discovered negative effect was considerable and remained consistent across numerous leverage assessments, different data sets, and alternative statistical methods. These findings are consistent with those of Aivazian [2005] and support agency theories of corporate leverage, particularly the notion that leverage acts as a check on companies with less promising growth prospects. The elements of a company's capital structure have consistently garnered significant attention in the academic discourse.

Lestari and Nuzula [2017] noted that despite the country's lack of robust banking systems and financial systems, China has shown exceptional growth in its economy over the previous three decades. The researchers looked at how political unpredictability, particularly the changing of government officials, affected business investment. While information on changes to mayors and city leaders was gathered from a variety of public sources, including print media, websites, press statements and data on changes to government officials in particular Chinese cities was sourced through the China Economic Information Network. To analyze the data, the authors employed empirical tests, using uni-variate and regression analysis. Their findings revealed a significant reduction in corporate investment follwoing knowing about a change in local government officials. In particular, capital-intensive firms exhibited a higher degree of investment reduction in response to political turnover, as these firms often have close involvement with local government officials due to their substantial investments and significance to the local economy. These findings align with the evidence presented by Julio and Yook [2012] in a cross-country context, where they discovered a decline in corporate investment during election years. Specifically, investment decreased by 5% prior to all elections and by up to 15% for certain groups of firms that were particularly vulnerable to political uncertainty.

Baum and Talavera [2009] analyzed the impact of debt taking and uncertainty, specifically short term debt taking, economic uncertainty and idiosyncratic uncertainty to examine the association of state and non state owned enterprises' leverage. Lastly, Baum and Talavera [2008] specifically studied the association of debt taking behaviour of a firm and its financing decisions as a variable against three types of uncertainties; firm-specific, CAPM based and market based uncertainty.

Building upon this foundation, Baum and Talavera [2010] aimed to expand the existing work on business debt by examining the influence of macroeconomic and idiosyncratic uncertainty on the best debt option available for non-financial firms, especially manufacturing companies in the United States. Their analysis revealed that idiosyncratic uncertainty negatively and significantly affects firms' utilization of leverage. The authors employed A statistical framework that incorporates adjustment costs and is based on the conventional model of capital accumulation's Euler equation.

Baum and Talavera [2009] studied the relations of most favorable short term leverage and idiosyncratic uncertainty. The authors only used non-banking businesses for the study. The estimation of the study showed that when one type of uncertainty increases the company decreases its short term leverage. They also found that this effect was more prominent for macroeconomic uncertainty than for idiosyncratic uncertainty.

In the study Baum and Talavera [2008] the authors aim was to find the impact of uncertainty on the firms financing decision behavior. The sample data was only from manufacturing companies. It was revealed from the results of the study that investment was inversely related to firm specific and CAPM based uncertainty while it showed direct relations with market based uncertainty. SI [2015] conducted research regarding the impact of firm's debt taking behavior while keeping an eye on various uncertainties for companies based in Indonesia. The authors used cashflow, leverage, investment and company size as variables to study the effect. They observed that the effect of the uncertainty was negative moving from leverage towards investment, while it had positive impact on cash flow and firm size. The sample selection for this study was based on the research of Baum and Talavera [2010], the conceptual framework and selection of independent variable was based on work of Arif and Jebran [2019]. Lestari and Nuzula [2017], defines leverage as the usage of funds generated from outside of the firm that eventually burdens the firm with fixed costs in exchange for using the assets in future. It is a common feature of higher leveraged firms that they hold their investment decisions and are unwilling to invest.

Earlier studies on debt taking and financing decisions show that the more a firms holds liquid assets the more it opts for investment options. Myers [1977] observed that firms with high level of leverage and financial issues tend to forgo project with high returns as a result of debt problems. These

findings portray a grim picture of firms where leverage strangles the company's investment options. Jones [2007] defines investment as a company's willingness to hold on to one or more assets which have the potential to make profit. The impact of various uncertainties on investment has been studied by various scholars. According to Beckman et al. [2004] firm specific uncertainty is caused by different internal and external factors. Most of the firms use variance of daily stock return as proxy to firm specific uncertainty. Bloom and Van Reenen [2007], who concluded that firm-specific time-varying uncertainty impacts the businesses investment decision while economic uncertainty does not. The present study suggests that both "firm-specific and market-level uncertainty" can either enhance or hinder fixed financing, either individually or in combination with the business' leverage levels. As a result, the association between "investment and uncertainty" becomes complex and less clear-cut.

Unlike firm specific uncertainty, unique to every firm, market uncertainty is caused by external firms. According to Beckman et al. [2004] market is part of systematic risk and GARCH is used a proxy to it. This uncertainty cannot be avoided by a company and it is controlled by the force of market, and this is partly caused by economic policy uncertainty. It is observed by various economist that the influence of firm-specific uncertainty is more then market based uncertainty when it comes to investment decisions of a firm Baum and Talavera [2008]. When this was compared with that of leverage it was observed that the holistic impact on leverage was less for businesses with cash holdings.

Understanding the links between uncertainty and investment behavior, both at the business-specific and overall levels, has been the focus of considerable research. In their research, Baum and Talavera [2009] looked at the influence of three different types of uncertainty on businesses' financing decisions: own uncertainty, which was influenced by return on equity data; market uncertainty, which was affected by S&P 500 index return data; and the interaction between both internal and external uncertainty. They added a covariance factor to the equation to represent the latter effect, which allowed the data to show the varied effects of each component on firms' investment. Sales growth, cash flow, company size and Tobin's Q also effect leverage investment relationship. Sales growth can be influenced by taking high level of debt. It was observed by Cai and Zheng [2004] that the more the size of sales growth the more the firm can have assets in the long run. Firth et al. [2008] conducted a study on the association between leverage and investment in Chinese firms, and their findings corroborated those of Aivazian [2005]. They observed that investment levels decreased as leverage increased in Chinese firms. Additionally, other factors such as firm growth and state control were found to influence both leverage and investment. Companies with lower growth exhibited a

weaker link between firm's debt taking and its financing decision, and the same applied to firms under state control as opposed to privately operated firms. Umutlu [2010] conducted a study to examine the influence of firm debt taking and financing decision making behavior using panel data techniques for Turkish non-banking firms listed on the İstanbul Stock Exchange. The findings indicate that in one-way error component models, leverage-investment are inversely related, but only for firms with low Tobin's Q. However, when the model is expanded to incorporate the influence of time on the relation using a two-way error component model, the leverage-investment association becomes insignificant. These outcomes align with previous research and support the agency theories of corporate finance, which suggest that debt taking plays a disciplinary criteria in companies with limited growth access. 1986 [1986] studied the relation of cash flow with that of investment. It was observed firms with large cash flow make investment decision compared to firms with low cash flows. Kropp and Power [2016] asserted that a company's potential investment makers and creditors look at the company's growth opportunities by looking at the Tobin's Q value of the company. Phan [2018] found that Tobin's Q was positively influencing the company's expansion decisions, showing that expectation of higher equity can lead a company to take higher investment decisions. According to earlier studies when Tobin's Q is included in the empirical model, the impacts of uncertainty on financial decisions tend to decrease. The study in this paper uses a basic investment approach that accounts for firm-specific financial features while incorporating numerous uncertainty measures. The imbalanced panel of manufacturing companies in the estimation sample spans the years 1984 to 2003 and was sourced from the normal and Poor's Industrial Annual COMPUSTAT database. The dataset contains 9,895 firms for which the Salinger and Summers [1983] approach can be used to impute a replacement for the worth of capital stock. The paper focuses particularly on companies whose composition did not significantly alter during the sample period.

In their empirical model, Baum and Talavera [2008] drew inspiration from Bo and Zhang [2002], who developed an scientific model to elucidate the influence of debt and uncertainty, both independently and in combination, on firms' project investment behavior. Bo and Sterken's model was based on Nickell [1978] work and assumed that firm's management aims to increase expected cash flow while decreasing its volatility. The findings of the current study reveal that the effect of debt taking on firms' project financing varies depending on changes in uncertainty. Unlike Bo and Sterken's approach, Baum and Talavera [2009] considered firms' cash flow as a control variable in their empirical investigation. They utilized firms' stock returns as a proxy for intrinsic uncertainty and the S&P 500 as a proxy for market uncertainty.The dataset used in the study comprised manufacturing firms from the Standard and Poor's Industrial Annual COMPUSTAT database, covering the period from

1988 to 2005. The average investment rate for the sample stood at approximately 11%, with a corresponding Tobin's Q value of around 2.95.

The study uses daily returns on stocks and market-related index returns to calculate both internal and external uncertainty, using a method based on Merton [1980] that takes into account changes within a year in profits over shares and overall market volatility series. This method offers a more accurate way to quantify perceptual volatility. Previous studies have demonstrated that where there is Q, firm related or macro-based uncertainty measures become unimportant, while CAPM-based uncertainty gauges have no discernible influence on investment behavior. Contrarily, the results of this study show that under a model containing Tobin's Q, own uncertainty is significant and has an adverse effect on investment, whereas CAPM-based uncertainty has beneficial effects and market uncertainty has a negative one.

Mihai et al. [2015] described CAPM as a tool to describe the relation between rate of return of a firm and the level of uncertainty in earnings. It determines how the ordinary shares value is set according to the rate of return. However, it was observed by Brainard et al. [1980] that CAPM provides multiple results when it comes to investment decisions. Moreover, Baum and Talavera [2009] states that it has significant impact on fixed investment of a firm.

This study makes it clear that the framework's assumptions, sample selection, and uncertainty proxy design can all have an impact on how uncertainty affects investment. The simplicity of the present framework and its uncertainty proxy may be appealing given that managers making capital investment choices may use many techniques to anticipate uncertainty.

In their research, Wang and Huang [2014] examined the influence of economic policy uncertainty on business financing among Chinese business listed on stock exchange. Their findings indicate that firms that user internal sources are able to alleviate the downward effects of policy unpredictability. This evidence highlights the importance of maintaining clarity and stability in the enforcement of economic policies, as it can enhance productivity of company's financing. Additionally, the study reveals that non-state-owned firms are better able to alleviate the adverse effects of policy uncertainty. Specifically, non-state-owned firms which earn higher profits on their projects greatly rely on internal finance, and a reduced negative impact of policy uncertainty on business financing in projects. Moreover, companies located in competitive markets display a higher sensitivity to EPU. Arif and Jebran [2019] describes that economic policy uncertainty negatively impacts investment decision of a firm, which eventually leads to slow down of economy of a country.

Farooq et al. [2022] researched on the impact of economic policy uncertainty on the investment of firms. Farooq used the data for ten years of listed companies from 6 Asian markets. They used the

Generalized Least Square analytics method to analyze their data. They concluded that EPU and firm's project financing are at odds with each other while a direct relation between the quality of governance and investment. It was also observed that better governance can mitigate the effect of economic policy uncertainty and protect the investors rights.

An empirical study by Xie et al. [2021] show that there is an opposite relations between EPU and the investment decision of a company. This study used the five year plan of Chinese government to analyze the relation of investment and economic policy uncertainty. The study concluded that non state owned enterprises were most influenced by the economic policy uncertainty and take decisions which resulted in underinvestment.

On the other hand He et al. [2020] finds a positive relation between investment and EPU. The paper explored the influence of economic policy uncertainty on the financing of firms listed on EPU index in China from 2000 to 2017. It was found that generally EPU boosts corporate innovation which means that lower EPU leads to more investment and innovation and higher EPU leads to decreased investment. The EPU's effect on corporate spending was mainly through cash holdings and hampering corporate growth.

Ilyas et al. [2021] used a worldwide sample of 4017 businesses from the oil industry for the period of 1991 to 2017 to study the effect of EPU on the company's financing decisions. The study used GLM regression to examine the data and find the nature of relationships of firm's project financing with economic policy uncertainty. The study concluded that the EPU induced by the oil price uncertainty negatively impacted the future financing of the selected firms.

Jackson and Orr [2019] looked at the relationship of economic policy uncertainty and investing options of firms through the lense of property investment market. The study employed a news based measure of EPU in the United Kingdom to study its effect on corporate investment decisions. The results of the study suggest that economic policy uncertainty directly impacts the investment decisions in this sector. A micro-level examination starts to uncover some of the asset-pricing decisions driving national outcomes, showing that investors' concerns about income streams remain consistently high, regardless of fluctuations in Economic Policy Uncertainty (EPU). Pricing itself can influence EPU, especially in sectors like retail and industrial markets, which are increasingly interconnected through logistics and reflect the concerns of specific stakeholder groups and prominent issues. This evidence underscores the importance for policymakers to grasp the complex, two-way relationship, as indecision can erode investment confidence and lead to market volatility, subsequently increasing EPU.

A recent study conducted by Baker et al. [2016] examined the impact of EPU on the recession of

2007-2009 and the subsequent recovery. Similarly, Bloom and Van Reenen [2007] proposed a model that suggests uncertainty hinders firms' irreversible investment when faced with sales shocks. According to their argument, businesses tend to exercise caution in times of heightened volatility in their daily stock returns throughout the year. Kang and Ratti [2014] conducted a research to explore the influence of economic policy uncertainty on the financing decisions of 2,700 U.S. manufacturing firms between 1985 and 2010. To analyze the effect, they utilized an error correction model (ECM) based on the framework developed by Bloom and Van Reenen [2007]. The model incorporated firm-level uncertainty and EPU shocks, as well as their interaction, enabling a direct comparison with existing studies on the impact of firm share price volatility on financing decisions and the assessment of economic policy uncertainty effects. The findings indicate that uncertainty due to government policies does not appear to affect the investing options of the largest manufacturing firms or the very largest firms.

Bae [2009] conducted an empirical investigation to explore the connection between financing options available to firms and investment opportunities specifically for Chinese industrial firms. These firms operate in an environment that differs greatly from that of American and Japanese firms. The study employed multivariate regression analysis and utilized four different scenarios of the debt-equity ratio as the dependent variable, drawing on considerable firm-level data spanning the period of 2000-2004. The findings indicate that the relationship between financing and investment is influenced by the chosen method of measuring financial leverage. Furthermore, the results suggest that there is no significant association between the long-term debt-equity ratios of Chinese firms and their investment opportunities. This suggests that corporate debt held for long time plays a minimal role in the relationship between leverage and investment for firms list on Hong Kong Stock exchange. Bae's research provides valuable insights for further investigation into the factors that contribute to the adverse correlation between financial leverage and investment options for firms in other economies.

CHAPTER 3

3 Policies Effecting Leverage and Investment

Leverage and investment policies in Pakistan encompasses various factors. Economic policy uncertainty is being influenced by various government and non-government factors like international funding agencies. This influence on the economic policy uncertainty ultimately effects Pakistan's investment market Wen et al. [2022]. Since its birth Pakistan is constantly challenged with economic instability resulting in high fiscal deficits, increasing debt, and fluctuating foreign reserves. International bodies like the International Monetary Fund and World Bank have time and again interfered and through programs like extended fund facility and stand by agreements tried to fix the economy. These targeted interventions attempt to fix the exchange rate issue, boost export and mange deficits to attract external investors Jensen [2004]. Even after more than twenty cycles of these targeted programs they have been failed to achieve their target, hampering foreign investment and strangling the local investment market as well Jensen [2004].

The available avenues for Pakistani companies to secure credit is through corporate loan, borrowing through capital market and external private debt. The amount of loans availed through each sources differs, however, banks are the major source of corporate credit.

3.1 Fiscal Policy

Leverage and investment decision of a firm is also affected by government borrowings to fill the gap of budget deficit. When government failed to achieve their budget targets and borrow from the market to cover the gap it create a crowing out effect leaving little credit for the private firms. The government induces private lender by increasing the interest rate on government lending which ultimately makes private borrowing expensive State Bank of Pakistan. This government behavior leave firms no choice but to rely on equity financing altering their capital structure.

3.2 Monetary Policy

Another government policy affecting leverage investment is monetary policy, which in Pakistan is governed by the State Bank of Pakistan. The State Bank through interest rate adjustment and liquidity management impacts the corporate borrowing hence investment decision. When the state bank reduces interest rate it encourages firms to more leverage their investment, on the contrary when the interest rate is increased it discourages firms to borrow, hence dampens investment. In

case of the later either firms opt for other financing options are delay their projects.

Policy uncertainties not only impacts the firm ability to borrow and invest in new projects it also effect the firm's ability to meet their working capital requirement. Because firms prefer to borrow and meet their capital requirements instead of consuming their own capital. It is true that monetary bodies used interest rate to control inflation and provide a stable and healthy business environment to corporates in the long run State Bank of Pakistan. Lower interest rate and a stable inflation can reduce the monetary policy uncertainty which provides firms opportunity to trust the economy and make long term investment decisions Khan et al. [2019]. Moreover, lower inflation reduces the interest rate in the long run, reducing the debt burden on businesses Donaldson [1978]. It has been studied at length that the influence of increased policy rate on corporate credit is adverse, as it increases the cost of taking debt. It is the reason that the number of debts taken by companies have reduced from 294,020 in September 2022 to 96,090 in December 2023, a reduction of 67% Saeed [2024]. Moreover, it has been observed that matter related with corporate debt also show negative trends, as the ratio of bad debt also seen an up tick, from 874,727 in December 2021 to 1,009,961 in December 2023 Saeed [2024]. This indicates that the asset quality and the ability of debt takers has reduced. There has also been a significant decrease in the average loan taken from PKR 40.53 billion in September 2023 to PKR 29.91 billion in December 2023 Saeed [2024].

According to State Bank of Pakistan's half yearly report the private sector credit experience as reduced growth in first half of financial year 2024 compared to previous year State Bank of Pakistan. It has slightly increased in December 2023, even that borrowing was to fund their working capital. Whereas the demand for investment borrowing did not increase a little bit throughout the first half. This stagnation was primarily caused by the up tick in the cost of borrowing and also the political and market instability in the country.

3.3 Investment Policies

To boost foreign investment in Pakistan the interim government in 2023 formed Special Investment Facilitation Council and approved the Investment Policy 2023. The policy aims to create a stable and conducive economic environment of Pakistan [2023]. This will be done by reducing bureaucratic hurdles, improve regulatory coordination, and provide incentives for foreign and domestic investments. The country after facing default multiple times is trying to improve the investment environment. The policy guarantees the protection of foreign investment on multiple levels, it guarantees stable policy, protection of economic rights and implementation of law and order of Pakistan [2023]. By

doing so, the policy will encourage firms to leverage their investment on a fix rates. The domestic firms will partner with foreign firms and take benefit of the government guarantees. Further, to lure foreign investors the policy allows them to extract the profits from Pakistan in their own currency.

3.4 Taxation Policies

Corporate taxation policies, including tax incentives and reliefs, significantly impact investment decisions. Tax deductions on interest payments encourage firms to finance through debt Lodhi [2017]. However, changes in tax policies, such as increased corporate tax rates or reduced tax incentives, can discourage borrowing and leverage, prompting firms to reconsider their investment strategies. For instance, the 2023-2024 budget outlines several methods to increase the tax base ultimately aimed to increase increasing revenue. This discourages small firms to take debts and make investment decisions. Furthermore, through mini budgets the government unpredictably bring change to fiscal policies which negatively effects the financing decisions of companies Lodhi [2017]. The uncertainty in the economy and uncertainty in taxation policy of the government makes it difficult for companies to make investment in the country. The country every now and then seeks IMF relief which further imposes conditions which makes it difficult for companies to make long-term investments decisions.

3.5 Regulatory Policies

Robust and airtight collateral laws enable firms to use their assets to generate capital Hussain et al. [2023]. These laws let the business put their assets especially movable assets as a security against credits. At the same time a sound collateral laws will help creditors recover their lending. According to the report of Bank access to finance was a major problem for small and medium sized enterprises. The reason behind this lack of access is the requirement of financial institution to provide real property as collateral with a high preference for commercial property. In the case of SMEs they have concentrated assets in moveable property. This creates a hindrance in availing credit for businesses.

The passage of Financial Institution (Secure Transaction) Act, 2016, provided a mechanism to create, perfect and enforce the security interest over moveable property. Under the act a registry is also created to register security interest which provides a centralized system to assess the security over an asset. However, this novel laws only cover entities not incorporated or individuals. To overcome the challenge of this law, another law, the Companies Act, 2017 was passed to cover the shortcoming

of the 2016 Act. Further, to strengthen the credit regulations, Financial Institutions (Recovery of Finances) Rules, 2018 were enacted. This simply the debt recovery mechanism and providing a process for out of court settlements.

Regulatory frameworks governing financial markets and corporate governance also influence leverage and investment decisions. Policies aimed at enhancing transparency, protecting investor rights, and ensuring fair competition create a stable environment for firms to operate. For instance, strict regulations on capital adequacy and risk management can limit excessive leveraging, promoting more sustainable investment practices. The minimum capital requirement provided under the Companies Act, 2017 requires different calls of companies to maintain a minimum capital which should not be leveraged for investment. Moreover, regulations that affect firm's investment decisions, such as capital requirements for companies, influence the availability of credit to firms. Stricter regulations can lead to tighter borrowing standards, reducing the amount of debt firms can access. In contrast, deregulation can increase the availability of credit, allowing firms to take on more leverage and invest in growth opportunities. The borrowing standards in Pakistan are primarily governed by the State Bank of Pakistan (SBP), the central bank responsible for regulating the country's monetary and credit system. The SBP formulates policies and guidelines to regulate lending practices, ensuring the stability and soundness of the financial sector. Chapter 19 "Loans, Overdraft and Guarantees" of FE Manual 2002 sets the standard for firms to take loans.

However, easier regulatory conditions over the last decade has enabled businesses, specifically the emerging market economies, to enhance their leverage. Nishat [2010] has observed that before 1987 the financial regulatory landscape in Pakistan was very rigid leading to low borrowing rate among corporate sectors. However, the restrained market forces and the increasing competition in the market has forced the government to change reforms in the financial sector. These reforms targeted developing institutions, financial sector particularly banking industry, equity and bond market. This deregulation of the financial sector has also led to the change in eh strategy of corporate financing which reduced the debt-to-equity ratio from 80:20 and 60:40 to 50:50 over time. The quotas in the initial offering for institutional investors have been rescinded and currently the share price is left to the market to determine Nishat [2010]. The main objective behind this policy change was to increase non-public investment and increase the competition and decrease the leverage for businesses in Pakistan. In order to boost the local investment environment and incentives the partnership of private investors including foreign investors, the National Deregulation Commission was formed. Various incentives and remissions were provided to lenders under the Foreign Investment Act, 1976. Additionally, legal protections were also provided to foreign investors to boost their confidence in

the local legal system. They were also given the relief form double taxation and remit their profits. These investment policies were seen with more incentive over the last decade and more liberal policies. According to Donaldson [1978] instead of regulating the debt policy of a firm from external sources it should be left to the firm's internal management to decide on the debt capacity of the firm. It cannot be prescribed by outsider or by generalized standards; rather, it should be a decision of the management of the firm depending on the circumstances and objectives of the firm.

3.6 Sector-Specific Policies

Government policies targeting specific sectors, such as energy, technology, and manufacturing, can have sector-specific impacts on leverage and investment. For example, subsidies and incentives for renewable energy projects encourage firms in the energy sector to leverage and invest in new technologies. Likewise, under the Punjab Power Policy, 2009, companies working in the power sector are provided incentive which gave them leverage to invest in this sector. Similarly, support for technological innovation through grants and tax reliefs can drive investment in the tech sector.

CHAPTER 4

4 Research Methodology

This paper will conduct a through empirical analysis of the influence of uncertainties on the leverage-investment link in companies in Pakistan. This section presents the theoretical framework and details the methodology employed in the present research. It also provides information on key elements such as the study's target population, sample size, data collection sources, estimation method, variables under investigation, and the econometric model utilized in this research endeavor.

4.1 Data Description

This research uses secondary data extracted from the company's annual statements, as well as balance sheet analysis and the Pakistan Stock Exchange website. The data for this paper covers the time period from 2011 to 2022.

4.2 Population and Sample Size

We have selected non-financial companies that are listed on the Pakistan Stock Exchange. The sample size consists of 100 non-financial firms registered PSX. The current study considers all companies that were listed on the Pakistan Stock Exchange (PSX) between 2012 and 2021. After that, the sample was further divided by making two groups i.e. state-owned enterprises (SOEs) and non-state-owned enterprises (non-SOEs). For SOEs we set the criteria as companies in which govt is having more than 50% shares and companies in which govt is having less than 50% shares is considered as non-SOEs. After thoroughly studying company's annual reports we came to know about the distribution of shares or the pattern of shareholdings. Through this criterion we had 15 SOEs and remaining 75 companies were non-SOEs. Several elimination standards were used to increase the sample's pliability. First, to focus on companies with a more important and stable position in the market, those that had been listed for less than ten years were excluded. To maintain data integrity, all companies with missing data for any variable were also excluded. Wide range of industries are represented in the sample. These industries include the following: the Textile Sector, the Sugar Sector, the Food Sector, the Chemical and pharm Sector, the Cement Sector, the Motor Vehicles, Trailers & Auto Parts, the Information and Communication Services, and the Petroleum Sector.
The reason behind using only non-financial firms is that financial firms financial year ends in December and July so we cannot mix them. Further, the two sectors have different regulatory framework

under different regulatory bodies.

4.3 Variable and Measurements

4.3.1 Firm Investment

Firm investment is our dependent variable and is defined as the purchase or acquisition of long-term assets, such as buildings, machinery, equipment, and intellectual property, with the aim of generating future income and profits for the firm Jones [2007]. For proxy of investment, we have subtracted the fixed assets of current year from previous year, added current depreciation and dividing by total assets.

$$Inv = \frac{FA_t - FA_{t-1} + dep}{TA} \tag{1}$$

Where FAt is overall assets in a fiscal year, ˙t-1 is the overall assets in the preceding year, DEP represents depreciated value in the present year, TA is the total assets.

4.3.2 Leverage

The paper uses leverage as the independent variable and it is defined as the ratio of debt to equity. Leverage is calculated dividing firm's overall liabilities (short term + long term) by stock as measured in literature by **?**.

$$Lev = \frac{TL}{E} \tag{2}$$

Where TL represents total liabilities, E represents capital stock.

4.3.3 Firm-Specific Uncertainty (FSU)

Firm-specific uncertainty is independent variable in this study. According to Beckman et al. [2004] FSU is caused by different internal and external factors to a company. We use variance of daily stock returns as a substitute for FSU following Arif and Jebran [2019]. To calculate variance, we took the daily stock prices of listed companies from investing.com, then using formula, we computed returns from dialy prices. The formula for calculating stocks returns is logarithm of ration of two consecutive prices.

$$Stockreturn = ln\frac{P2}{P1} \tag{3}$$

where:

P1 is today's stock price.

P2 is yestarday's stock price.

ln is natural log.

4.3.4 CAPM Based Uncertainty

The Capital Asset Pricing Model (CAPM) is a vital concept in finance that discusses how the risk of an investment impacts its expected return. It provides understanding of market equilibrium in the presence of risk. The model has been studies under various forms of uncertainty, such as market volatility, changes in risk-free rates, unexpected events impacting asset prices, and model limitations in capturing complex market dynamics. Understanding these sources allows for a more comprehensive analysis of how uncertainty affects the accuracy and reliability of CAPM-based expected returns. Additionally, exploring the implications of CAPM -based uncertainty can shed light on risk management strategies, portfolio optimization techniques, and decision-making processes in uncertain financial environment.

CAPM-Based uncertainty is an independent variable and by Mihai et al. [2015], CAPM is defined as an association of earnings flow uncertainty for an investment and that of the return on the investment. Covariance of firm's daily stock is used as a proxy as used in previous studies by Arif and Jebran [2019]. We compute the CAPM uncertainty by taking covariance between company returns and market index which is PSX. We apply this method based on Merton [1980] from the annual changes in stock returns and aggregate financial market series to compute intrinsic uncertainty using daily stock returns and market index returns, a more representative measure of perceived volatility is offered by this method. It steers clear of possible issues like low correlation in volatility and strong shock persistence when using moving average representations.

$$CAPM - BasedUncertainty = Cov(marketindex, firmreturns) \tag{4}$$

4.3.5 Economic-Policy Uncertainty (EPU)

Economic policy uncertainty is inferred from the unpredictability of economic policies, such as changes in tax laws, regulations, or trade policies. In times of EPU, firms may be hesitant to invest in new projects and may opt for lower levels of leverage since these policy changes can significantly affect the firm's cash flows, profitability, and cost of capital. According to Baker et al. [2016], EPU is calculated using a news-based index that tracks news articles deliberating on uncertainty related to economic policy. We use EPU index in Pakistan given by Baker et al. [2016] and Bloom and Van Reenen [2007] known as BBD index. In Pakistan this index is made to calculate EPU and this index relies on based on news editorials related to Policy, Economy and Uncertainty published in renowned news papers, Express Tribune, Business Recorder, The News and Dawn. It is calculated on monthly basis. Policy makers/researchers/analysts use EPU to determine the exent of uncertainty and fluctuations in the economic system and it helps in their macroeconomic analysis, policy and decision making process. It is calculated by tracking news content comprising pre-defined keywords associated to policy forming, economy and uncertainty.

$$EPU = K \times \sum (W \times |\frac{dp}{dt}| \tag{5}$$

where: k = a scaling factor to ensure the index is interpret able W = a weight that reflects the degree of uncertainty associated with a given policy change —dP/dt— = the absolute value of the change in newspaper coverage of economic policy uncertainty

4.3.6 Cash Flows

In this study cash flows are the control variable. Which is firms annual cashflow from operations. Cash flow is measured as firms' net profit + depreciation as measured by Arif and Jebran [2019].

$$CF = \prod + Dep \tag{6}$$

$\prod$ represents firms' net profit and Dep is the depreciation.

4.3.7 Firm Size

In this study firm size is control variable and it is taken in terms of total assets. Measured as log of total assets.

$$Size = \log assets \tag{7}$$

4.3.8 Sales Growth

Cai and Zhang [2009] defined sales growth as the increase value of the company's assets in long run. The log of total sales during the last twelve months is used as a substitute to sales growth variable.
Log First Difference = log(Total Sales at Year t - Total Sales at Year t1)
where:
Total Sales at Year t represents the total sales at year t, and
Total Sales at Year t1 Total Sales at Year t1 represents the total sales at the previous year, i.e., year t1.

4.3.9 ROA

ROA is a profitability ratio and it measures how efficient a company is in generating profit from its investments It is calculated as a ratio of net Income and total assets.

$$ROA = \frac{NetIncome}{TotalAssets} \tag{8}$$

4.4 Estimation Technique

Endogeneity poses a serious obstacle to empirical corporate finance research, which aims to explain the reasons behind and consequences of investment decisions. This problem stems from the fact that it is usually difficult to find exogenous variables or natural trials to investigate these relationships. "Endogeneity leads to biassed and inconsistent parameter estimates that make reliable inference almost impossible," as Roberts and Whited [2013] pointed out. Unobservable heterogeneity and simultaneity are two possible sources of endogeneity that are acknowledged by the majority of empirical corporate finance experts. But the dependence of the values of the current variable on the values of the past is another source of endogeneity that is often disregarded Wintoki et al. [2012]. Ignoring this might result in very exaggerated assumptions about the future explanatory variables' complete independence from the values of their lagged dependent variables, which can lead to major inference mistakes. We employ a two-step system GMM to tackle endogeneity in our analysis and a dynamic panel model with lagged dependent variables.
One important finding of the panel GMM estimator is; in cases where the economic process is intrinsically dynamic, as ours is in this instance where past investment decisions influence current investment efficiency, it might be feasible to address simultaneity by combining a number of the firm's historical variables. By utilizing "internal" instruments in the panel, the GMM estimator

methodology does away with the requirement for external instruments Roodman [2009]. In order to handle different endoginity sources, we employ the two-step system GMM estimator and rely on internal instruments (such lagged values). By transmuting the data internally, or deducting a variable's previous estimate from its current estimate, the GMM estimator eliminates endogeneity Roodman [2009]. As a result, as instruments in our models, we have included the lagged values of endogenous variables (including return on assets ROA, investment, leverage, and cash flow) We use the Hansen and Singleton [1982] to verify the validity of these instruments. However, utilizing lags as instruments might occasionally become invalid due to the possibility of autocorrelation in the error term. Additionally, we check for autocorrelation post-GMM estimation and detect weak instruments using the Hansen J-statistic and AR (2) test. Furthermore, the Arellano-Bond AR (2) test will be utilized to identify the existence of second-order correlation inside the residuals. Rationale for GMM Estimator and System GMM Estimator The GMM estimate method builds on the groundbreaking work of (Chamberlain, 1984), who first suggested panel data estimation using probit algorithms. The following is a summary of the main features of GMM estimation: There must be a dynamic relationship; that is, a static model becomes a dynamic model when a lagged dependent variable is included, introducing correlation. The lag of INV transforms the static model in the current study into a dynamic model.

A greater individual dimension (N) and a brief time dimension (T) should be present in the panel dataset. For instance, N is 53 and T is 12 for Non-state owned companies N-SOE) and N is 15 and T is 12 for State owned Companies (SOE) in the current study. Endogeneity, in which causality can flow in both directions and result in a correlation between regressors and the error term, should be introduced by certain explanatory variables. The study may contain endogeneity due to variables including investment, cash flow, leverage, sales growth, return on assets, and including of firm specific, economic policy, and CAPAM-based uncertainty.

Furthermore, lagged dependent variables are not the only kind of instrumental variables that can be used for GMM estimation. Mileva [2007] state that lags of explanatory variables that may lead to endogeneity can be used as instruments in system GMM, hence removing the necessity for external instruments. The GMM technique was first presented for panel data by Hansen and Singleton [1982] Later, Holtz-Eakin et al. [1988] and Arellano and Bond [1991] upgraded this technique by introducing the idea of first difference GMM with period lag AR (1). The difference GMM was critiqued by Blundell and Bond (1998) for a number of reasons. First, infinite sample bias causes the results of the difference GMM to be significantly biassed when compared to the system GMM. It has been demonstrated that larger sample sizes produce outcomes that are comparable to system

GMM. Second, whereas system GMM is more reliable and less likely to yield inconsequential results, difference GMM has a higher likelihood of doing so. Third, econometric model estimation is sensitive to the problem of weak instruments; difference GMM is particularly vulnerable to this problem, which might produce biassed findings Staiger and Stock [1994]. Fourth, difference GMM gives very little information when the dependent variable's (i.e., coefficient of variation) lags close to 1. When data is constrained in time, the IV and difference GMM both provide poor instruments.

The lower strength of the correlation between the lag and the explanatory regressor level is the main reason for the weak instruments in difference GMM. Consequently, more advantageous and effective results are obtained in system GMM when the difference of lag dependent variables is used as an instrument. This method is thought to offer the best tools, resolving the issues that the previous GMM technique encountered. We performed our analysis in our study using the system GMM estimation technique.

4.4.1 Measures of Uncertainties

Firm-specific uncertainty, CAPM-based uncertainty, and EPU are the three categories of uncertainties used in this study. We use the variance of a firm's return form their 24 hour stock trade for each year to assess firm-specific uncertainty, building on the work of Baum and Talavera [2008], Wintoki et al. [2012], and Shaoping et al. [2008]. The core fundamentals of the company are assumed to be reflected in share prices in this manner. Stock returns provide investors a sense of the firm's general environment, therefore it is possible to measure uncertainty by looking at the volatility of these returns. We compute the covariance of 24 hour stock return and the value-weighted SSE/SZSE index for CAPM-based uncertainty Baum and Talavera [2008]. As a stand-in for EPU, we employ the BBD index created by Baker et al. [2016].

4.5 Model

We employ a Dynamic Panel Data (DPD) technique to explore the moderating effect of uncertainty on the leverage and investment coordination. To account for endogeneity, we calculated all models employing the reliable two-step system-GMM technique. We include many uncertainty indicators in our model, both separately and in combination with leverage. Several variables unique to each firm are also included in the model. We use a one-period lagged investment to account for investment persistence. Debt can either encourage or inhibit a company's investment activities, as has been demonstrated by numerous studies Aivazian [2005]; Baum and Talavera [2010]; Firth et al. [2008];

Umutlu [2010].

We want to explore the effect of different uncertainties on the leverage and investment link, since a firm's investment prospects are dependent on its financing policy and leverage level, and this relationship can be influenced by numerous uncertainties. Equation (10), depict the moderating effect of FSU on the relationship between leverage-investment, is what we use to test Researh quesion 1. Each regression equation is applied independently for SOEs and non-SOEs companies.

$$\text{Inv}_{it} = \beta_0 + \beta_1 \text{Inv}_{it-1} + \beta_2 \text{Lev}_{it-1} + \beta_3 \text{fsu}_{it-1} + \beta_4 \text{Lev}_{it-1} \times \text{fsu}_{it-1} + \beta_5 \text{Sg}_{it-1} + \beta_6 \text{Cf}_{it-1} + \beta_7 \text{Roe}_{it-1} + \epsilon_{it} \tag{9}$$

The subscripts i and t in the model stand for the company and time, respectively. The investment made by the X firm in year Y is denoted by Inv. Lev stands for leverage, U for firm-specific uncertainty, and Sg for sales growth, is the logarithm of the annual total sales difference from the beginning of the year Thoa and Uyen [2017]. The cash flow ratio, Cf, is determined by normalizing the company's net profits + depreciation by its capital stock Phan [2018].

We apply Eq. (11), which investigates the moderating effect of CAPM-based uncertainty on the leverage-investment association, to evaluate Research question 2.

$$\text{Inv}_{it} = \beta_0 + \beta_1 \text{Inv}_{it-1} + \beta_2 \text{Lev}_{it-1} + \beta_3 \text{cbu}_{it-1} + \beta_4 \text{Lev}_{it-1} \times \text{cbu}_{it-1} + \beta_5 \text{Sg}_{it-1} + \beta_6 \text{Cf}_{it-1} + \beta_7 \text{Roe}_{it-1} + \epsilon_{it} \tag{10}$$

We create Eq. (13) to investigate the influence of EPU on the link between investment and leverage in order to test Research question 3.

$$\text{Inv}_{it} = \beta_0 + \beta_1 \text{Inv}_{it-1} + \beta_2 \text{Lev}_{it-1} + \beta_3 \text{epu}_{it-1} + \beta_4 \text{Lev}_{it-1} \times \text{epu}_{it-1} + \beta_5 \text{Sg}_{it-1} + \beta_6 \text{Cf}_{it-1} + \beta_7 \text{Roe}_{it-1} + \epsilon_{it} \tag{11}$$

CHAPTER 5

5 Results and Discussion

5.1 Results

The influence of uncertainties like, economic policy uncertainty, firm specific uncertainty, CAPM based uncertainty was analyzed using two step GMM techniques. We find that the influence of uncertainties varies depending on the nature of ownership of the firms. The influence of uncertainties on leverage-investment combination is analyzed using the following statistical tools.

5.1.1 Quantitive Analyses

5.1.2 Descriptive Statistics

Descriptive statistics play a dynamic part in data analysis by summarizing and unfolding the basic description of a datasets. They specify a base for data assessment, picturing, evaluation, and quality valuation, facilitating interpretation of the data and efficiently communicating the findings. Before doing the final estimation, it is very important to calculate the descriptive statistics of the data as it helps us to check the characteristics of the data used for research.

SOEs

Table 1: Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
lninv	142	-3.04	1.243	-8.856	-0.743
lnlev	164	0.385	1.589	-1.608	7.278
fsu	180	0.003	0.003	0.001	0.020
cbu	180	0.001	0.001	-0.001	0.003
epu	180	94.791	39.133	52.725	200.841
lnsg	110	-1.918	1.118	-4.885	1.596
lncf	139	15.627	1.921	8.867	19.040
lnroa	140	1.964	1.085	-0.906	3.792
lnsize	180	2.902	0.098	2.591	3.038

Where,

Inv is firm investment

Lev is firms Leverage

Fsu is firm specific uncertainty

Cpu is CAPM based uncertainty

EPU is economic policy uncertainty

CF cash flow

Sg is sales growth

ROA is return on assets

Size id the size of firm.

Table 1 displays the calculated results of descriptive statistics for the sample period spanning from 2011 to 2022. shedding light on the characteristics of the firms under investigation. The table consists of data related to central tendency, range of data, and standard deviation that shows the range in data and size of variables. The return on assets of firms lies between -906 to 3.792 with standard deviations 1.085. Notably, the mean Return on Assets (ROA) of 1.9 indicates a positive average return, reflecting the firms' ability to generate profits from their assets. The INV is showing the firm investment, and its range is between -8.86 and -. 743.The mean INV is -3.04 which indicates the average natural logarithm of overall Investment is -3.04. A business's leverage ratio depicts variance with a standard deviation of 1.5 the optimal range of the leverage ratio is 7.27 indicating a firm with less loans. This shows that company is using less debt to finance its assets. The worth of the company is a logarithm of overall assets which stand between 2.5 and 3. The mean size is 2.9 which points that on average the natural logarithm of the overall assets of the firm is 2.9. Sales growth, with a mean of -1.9 and variability (Std. dev. of 1.11), indicates less diverse growth rates across the sample. Fsu represents firm specific uncertainty ranges between 0.001 to 0.02 with SD of 0.03 showing less diversion from mean. CAPM ranges between -.001 to 0.003 th e mean value 0.01 and SD 0.01.EPU ranges between 52.200 with mean value 94 high diversion of 39.

NON-SOEs

Table 2: Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
lninv	516	-2.974	1.386	-9.349	1.303
lnlev	622	0.085	1.04	-2.556	5.694
fsu	636	0.077	0.756	0	13.718
cbu	636	0	0.001	-0.007	0.021
epu	636	94.27	38.402	52.725	200.841
lnsg	402	-1.641	1.764	-9.302	5.143
lncf	213	13.549	2.207	8.185	17.559
lnroa	528	1.912	1.108	-2.996	4.118
lnsize	636	5.462	0.98	0	6.455

Table 2 displays the calculated results of descriptive statistics of NON-SOE for the sample period spanning from 2011 to 2022. shedding light on the characteristics of the firms under investiga-

tion.The table consists of data regarding central tendency, range of data, and standard deviation that indicate the variance in data and size of variables. The profits on firms investment lies between -2.996 to 4.118 with standard deviations 1.108. Notably, the mean Return on Assets (ROA) of 1.912 indicates a positive average return, reflecting the firms' ability to generate profits from their assets. The INV is showing the firm investment, and its range is between -9.3and 1.3. The mean INV is -2.97 which suggests on the average natural logarithm of total Investment is -2.97. The leverage ratio of a company depicts the dispersion with a standard deviation of 1.386 the maximum value of the leverage ratio is 5.6 indicating a less loan taking firm. This shows that company is using less debt to finance its assets. The overall worth of the firm is a logarithm of complete assets which lies between 0 and 6.4. The mean size is 5.4 which tells us that on average the natural logarithm of the overall assets of the firm is 5.4. Sales growth, with a mean of -1.6 and variability (Std. dev. of 1.7), indicates less diverse growth rates across the sample. Fsu represents firm specific uncertainty ranges between 0. to 13 with SD of 0.7 showing less diversion from mean. CAPM ranges between -.007 to 0.021 the mean value 0.01 and SD 0.01.EPU ranges between 52.200 with mean value 94 high diversion of 39.

5.1.3 Correlation Matrix

Correlation matrix is a statical tool used to estimate relationship between two variables meaning how strong and in which direction two variables are moving. How slight change in one variable effect the other. The relation between the two variables is determine by the sign if the sign is positive, it means two variables have strong relation and if its negative it means the relation is not strong and if its 0 than the relation is neutral.

Table 3: Matrix of Correlations SOEs

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1) lninv	1.000								
(2) lnlev	-0.018	1.000							
(3) fsu	0.042	-0.145	1.000						
(4) cbu	0.025	0.052	0.106	1.000					
(5) epu	0.210	0.148	-0.052	0.130	1.000				
(6) lnsg	-0.164	0.187	-0.061	0.090	0.314	1.000			
(7) lncf	0.051	0.307	0.016	0.051	0.089	0.356	1.000		
(8) lnroa	0.132	-0.169	-0.050	0.016	0.137	-0.126	0.022	1.000	
(9) lnsize	0.147	0.444	0.025	0.079	0.188	0.342	0.740	-0.155	1.000

Correlation is one of the statistical tools used to assess the relation among variables. Table 3 reports the Pearson correlation analysis for SOEs. The final outcomes depict that SOEs financing has a measurable inverse correlations with CAPM-based and economic policy uncertainty, on the other hand it has measurable direct correlations with firm-specific uncertainty, leverage, sales growth, cash flow, Tobin's Q, and size.

Table 4: Matrix of Correlations Non-SOEs

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1) lninv	1.000								
(2) lnlev	-0.018	1.000							
(3) fsu	0.042	-0.145	1.000						
(4) cbu	0.025	0.052	0.106	1.000					
(5) epu	0.210	0.148	-0.052	0.130	1.000				
(6) lnsg	-0.164	0.187	-0.061	0.090	0.314	1.000			
(7) lncf	0.051	0.307	0.016	0.051	0.089	0.356	1.000		
(8) lnroa	0.132	-0.169	-0.050	0.016	0.137	-0.126	0.022	1.000	
(9) lnsize	0.147	0.444	0.025	0.079	0.188	0.342	0.740	-0.155	1.000

Table 4 shows the co-relation matrix for non-SOEs, the findings of the correlation matrix tells us that investment is significantly negatively related to leverage and EPU, whereas it is significantly positively related to sales growth, cash flow, Tobin's Q, and size. These findings indicate that the correlation statistics among variables differ across SOEs and non-SOEs.

Note: ***, **, and * indicate significance at 1%, 5%, and 10%, respectively and p values are given in ().

For SOEs and Non-SOEs table 5 displays the robust two-step System-GMM calculations for the impact of FSU on the leverage-investment association, as investment is the dependent variable. Under the null hypothesis the calculation shows no correlation, AR (1) and AR (2) are tests represents the first- and second-order serial correlation in first-differenced residuals (p-values for AR (1) and AR

Table 5: Impact of firm-specific uncertainty on the association between leverage and investment (SOE).

	Model 1				Model 2			
Variables	β	s.e	t-stats	p-value	β	s.e	t-stats	p-value
constant	3.225*	1.667	1.935	0.053	1.674***	0.079	21.190	0.000
invt-1	0.353*	0.214	1.650	0.099	1.399**	0.516	2.710	0.007
levt-1	0.263	0.106	2.481	0.053	-0.251	0.195	-1.290	0.197
fsut-1					0.262	34.467	1.750	0.080
Lev * fsut-1					-46.700	14.524	-3.220	0.061
sgt-1	0.002	0.003	0.667	0.941	-0.124**	0.061	-2.030	0.043
cft-1	0.257***	0.030	8.595	0.001	0.125	0.156	0.800	0.424
roa	-0.269**	0.100	-2.690	0.007	-0.191	0.324	-0.590	0.556
sizet-1	1.388**	0.658	2.109	0.035	-0.417	0.598	-0.700	0.486
AR (1)	-0.77	(0.439)			-0.70	(0.484)		
AR (2)	0.05	(0.959)			0.37	(0.713)		
J-statistics	20.06	(0.862)			51.49	(0.045)		

(2) are provided). Under the null hypothesis that the instruments are valid, the J-statistic, which is the Sargan-Hansen test of over identifying limitations, is asymptotically spread as chi-squared (p-values for the J-statistic are provided). To investigate the influence of uncertainty on the link of leverage-investment, we evaluate leverage both alone and in combination with various types of uncertainty. The major impact of leverage is significant in all calculations for SOEs, suggesting that leverage has appreciable impact on SOEs' investment. As seen in Column (2), FSU and its working term with leverage have statistically significant influence on the financing of SOEs.

Table 6: Impact of firm-specific uncertainty on the association between leverage and investment (non-SOE)

	Non-SOE							
	Model 3				Model 4			
Variables	β	s.e	t-stats	p-value	β	s.e	t-stats	p-value
constant	0.68***	0.072	8.468	0.000	-0.240**	0.051	-4.706	0.005
invt-1	0.130**	0.033	3.939	0.004	0.539*	0.304	1.773	0.076
levt-1	-0.190***	0.012	-15.833	0.000	-0.160**	0.048	-3.333	0.038
fsut-1					0.128**	0.012	10.667	0.000
Lev * fsut-1					-0.256**	0.024	-10.667	0.002
sgt-1	-0.009	0.012	-0.750	0.459	-0.003	0.033	-0.091	0.924
cft-1	0.432***	0.025	17.005	0.001	0.209***	0.010	20.490	0.000
roa	0.066**	0.022	3.000	0.002	0.059	0.047	1.255	0.209
sizet-1	0.044	0.110	0.400	0.685	0.043	0.069	0.623	0.531
AR (1)	-0.43	(0.666)			-0.56	(0.579)		
AR (2)	-0.27	(0.784)			-1.23	(0.220)		
J-statistics	0.90	(0.811)			0.51	(0.561)		

Note: ***, **, and * indicate significance at 1%, 5%, and 10%, respectively and p values are given in ().

For non-SOEs the estimated results are presented in Table 4. With the exception of leverage, the signs and significance levels correspond to those for SOEs listed in Column (1). The primary effect of debt taking is substantially adverse in all calculated models for non-SOEs. The findings presented in above table indicate a noteworthy favorable impact of FSU (˙t-1) on the financing decisions made by non-SOEs. This suggests that non-SOEs are more inclined to take risks when investing in high levels of firm-specific uncertainty.

Moreover, the FSU adversely effects the negative influence of leverage on investment, as indicated by the significantly negative -0.256 coefficient on the connection between leverage and fsu˙t-1 FSU. These results show that highly leveraged firms underinvest under increasing firm-specific uncertainty, which is aligned with the agency theory of under-investment. Several robustness tests were carried out. First- and second-order serial correlation are identified by the AR (1) and AR (2) tests; we use the Arellano and Bond (1991) test to reject the existence of second-order serial correlation and agree to the existance of first-order serial correlation, assuming that there is no serial correlation. The correctness of the tolls employed in the calculation is indicated by the J-statistic, which is the Hansen test for overidentifying constraints.

Table 7: Impact of CPAM-Based uncertainty on the association between leverage and investment.

Variables	SOE				NON-SOE			
	Model 1		Model 2		Model 1		Model 2	
	β	s.e	t-stats	p-value	β	s.e	t-stats	p-value
constant	0.540***	0.158	3.420	0.001	1.064**	0.220	4.836	0.004
invt-1	0.074	0.264	0.280	0.778	0.295**	0.041	7.195	0.002
levt-1	-0.057	0.063	-0.900	-0.370	-0.319***	0.038	-8.395	0.000
cbut-1	-50.111	106.604	-0.470	0.638	0.522*	0.314	1.662	0.081
Lev * cbut-1	3.051	1.427	2.140	0.073	0.175*	0.097	1.804	0.057
sgt-1	0.026*	0.014	1.857	0.060	0.011	0.013	0.846	0.434
cft-1	0.206***	0.000	2.850	0.004	0.351**	0.049	7.163	0.003
roat-1	-0.026**	0.044	-0.580	0.561	0.033*	0.019	1.737	0.084
sizet-1	0.044**	0.013	3.430	0.001	-0.002	0.039	-0.051	0.969
AR (1)	-0.91	(0.363)			-0.54	(0.591)		
AR (2)	-0.13	(0.896)			0.10	(0.920)		
J-statistics	52.24	(0.244)			7.503	(0.635)		

Note: ***, **, and * indicate significance at 1%, 5%, and 10%, respectively and p values are given in ().

The estimated results of CAPM-based uncertainty are presented in Table 7. The robust two-step System-GMM estimates for SOEs and Non-SOEs about the impact of CAPM-based uncertainty

on the leverage-investment combination for both SOEs and non-SOEs is examined in this section. Column (1) shows that the financing behavior of SOEs is not considerably affected by leverage, CAPM-Based uncertainty and its interaction term. As shown in Column (2), leverage has a primarily adverse impact on non-SOEs.

Furthermore, the linkage of CAPM-based uncertainty and leverage (Lev * cbut-1) in both SOEs and non-SOEs has a positive coefficient 3.051 and 0.175 respectively, suggesting that CAPM-based uncertainty amplifies the positive effects of leverage on investment. This demonstrates that highly leveraged enterprises typically increase their financing when CAPM based uncertainty is on rise, supporting the agency explanation of under-investment. Leverage, CAPM-based uncertainty, and its interaction term have discernible influence over financing made by SOEs, as Column (1) demonstrates.

Table 8: Impact of economic policy uncertainty on the association between leverage and investment

	SOE				NON-SOE			
Variables	β	s.e	t-stats	p-value	β	s.e	t-stats	p-value
constant	-2.540***	0.158	-16.076	0.001	3.154***	0.395	7.990	0.000
invt-1	0.074*	0.064	1.156	0.078	0.321***	0.082	3.923	0.000
levt-1	-0.057	0.063	-0.905	0.370	-0.979***	0.064	-15.235	0.000
eput-1	-0.111**	0.034	-3.265	0.002	-0.017	0.319	0.052	0.605
Lev * eput-1	3.051**	1.427	2.138	0.033	0.806	0.043	18.902	0.000
sgt-1	0.026*	0.014	1.857	0.060	0.011	0.018	0.607	0.544
cft-1	-0.206**	0.062	-3.328	0.004	0.318**	0.092	3.475	0.048
roat-1	-0.026	0.044	-0.591	0.561	0.419**	0.092	4.555	0.049
sizet-1	0.044***	0.013	3.385	0.001	0.188**	0.057	3.320	0.004
AR (1)	-1.08	(0.279)			-0.49	(0.627)		
AR (2)	-1.42	(0.156)			-0.11	(0.916)		
J-statistics	55.81	(0.177)			3.61	(0.438)		

Note: ***, **, and * indicate significance at 1%, 5%, and 10%, respectively and p values are given in ().

The robust two-step System-GMM estimates for SOEs and Non-SOEs about the impact of economic policy uncertainty on the leverage-investment relationship are displayed in this table. Testing null hypothesis shows absence of serial correlation, AR (1) and AR (2) are tests for first- and second-order serial correlation in first-differenced residuals (p-values for AR (1) and AR (2) are given in parenthesis. Under the null hypothesis that the instruments are valid, the J-statistic, which is the Sargan-Hansen test of overidentifying limitations, is asymptotically distributed as chi-squared (p-values for the J-statistic are supplied). In both SOE and Non-SOEs we cannot negate the null hypothesis of no serial correlation and based on the probability values of Sargan-Hansen we cannot

negate the null hypothesis of instruments are correct.

Furthermore, as we can see from Column (1), there is a substantial negative direct impact of EPU (eput-1) on SOE financing. Similarly, there is a significant plus coefficient for the association of term Lev * eput-1 depicting that the positive association between investment and leverage is increased by economic policy uncertainty. Column (2) also shows significant positive coefficient for the interaction term Lev * eput-1 indicating that the positive association between investment and leverage is increases by economic policy uncertainty for non-SOEs.

Table 9: Impact of four forms of uncertainty on the association between leverage and investment

	SOEs				Non-SOEs			
	β	s.e	t-stats	p-value	β	s.e	t-stats	p-value
constant	0.829**	0.369	2.247	0.025	4.168***	0.372	11.204	0.000
invt-1	0.111*	0.064	1.734	0.084	0.412**	0.059	6.983	0.002
levt-1	0.254*	0.131	1.940	0.087	-0.090**	0.037	-2.432	0.031
eput-1	-0.161***	0.015	-10.798	0.000	0.001	0.003	0.333	0.579
Lev * eput-1	-0.326*	0.034	-9.588	0.002	0.098**	0.028	3.523	0.025
cbut-1	-0.549*	0.318	-1.726	0.082	0.612***	0.084	7.286	0.000
Lev * cbut-1	27.881	42.746	0.652	0.514	-0.042	58.090	-0.001	0.629
fsut-1	-0.365	2.244	-0.163	0.543	0.464	1.531	0.303	0.762
Lev * fsut-1	0.042**	0.022	1.909	0.005	-0.239	0.846	-0.283	0.778
sgt-1	0.34	0.04	0.850	0.180	0.322***	0.019	16.947	0.000
cft-1	-0.051	0.124	-0.411	0.678	0.321**	0.055	5.805	0.002
roat-1	0.022	0.049	0.449	0.653	0.431***	0.046	9.370	0.000
sizet-1	0.773***	0.124	6.234	0.000	0.015	0.052	0.288	0.779
AR (1)	-1.00	(0.316)			-1.13	(0.258)		
AR (2)	0.26	(0.797)			0.04	(0.966)		
J-statistics	0.364	(0.532)			0.365	(0.522)		

Note: ***, **, and * indicate significance at 1%, 5%, and 10%, respectively and p values are given in ().

Under the null hypothesis serial correlation is absent, AR (1) and AR (2) are tests for first- and second-order serial correlation in first-differenced residuals (p-values for AR (1) and AR (2) are given in parenthesis. Under the null hypothesis that the instruments are valid, the J-statistic, which is the Sargan-Hansen test of overidentifying limitations, is asymptotically distributed as chi-squared (p-values for the J-statistic are supplied). In both SOE and Non-SOEs we are unable to negate the null hypothesis of no serial correlation and based on the probability values of Sargan-Hansen we cannot negate the null hypothesis of instruments are valid.

The table 9 shows, how different types of uncertainty interact with one another and affect SOEs and non-SOEs when making investments. Column (1) depicts where it is clear that when merged into a single model, the indications and significant levels for leverage, all types of uncertainty, and

their interaction terms stay the same. For non-SOEs, the overall influence of all types of uncertainty and their interaction factors are shown in Column (2). The coefficients, which have a positive main impact and a negative interaction term, are important for firm specific uncertainty. The coefficients, which have a positive interaction term and a negative main impact for CAPM-based uncertainty, are significant. The coefficients, which have a positive interaction term of EPU for SOE and a negative main impact for non-SOE are significant. This suggest that given the favorable effect, SOEs are probably going to invest more while dealing with economic policy uncertainties. This might be the result of a number of things, such support from the government, which acts as a buffer against uncertainty, or long-term strategic objectives that are less susceptible to shifts in the near term in policy. The adverse effect suggests that, when faced with uncertainty about economic policy, non-SOEs are more cautious and cut back on investment. Lack of safety nets, increased sensitivity to market conditions, or the need to preserve flexibility and liquidity in unsettling situations could all be contributing factors to this behavior.

5.2 Discussion

In this chapter we will explain the empirical results concerning the correlation between leverage and uncertainty among companies that are listed on the Pakistan Stock Exchange. This will summarize the main empirical findings, compare them with the body of literature, discuss the theoretical ramifications, suggest and explain the links that have been seen, and recommend for practice and policy. The regression findings of Eq. (1) of the relationship among investment, leverage, and firm-specific uncertainty are shown in Table 3 and 4 for SOEs and non-SOEs, respectively.

Table 3 provides the standard investment model for SOEs, incorporating the lagged investment-to-capital stock ratio as well as the key variable, leverage (Lev). The model also includes firm-specific determinants of investment such as sales growth (Sg), cash flow (Cf), return on assets (ROA), and firm size (Size). The results align with prior research (Baum and Talavera [2009]; Baum and Talavera [2010] Bo and Zhang [2002]), with significant positive coefficients for the lagged dependent variable, cash flow, and the constant term, while firm size exhibits a significant negative effect.

Moreover, the analysis reveals that the coefficients for Lev and Sg are statistically insignificant, a finding that is supported by previous literature (Baum and Talavera [2008]; Bo and Zhang [2002]). Additionally, the results show that the coefficient for Tobin's Q is not statistically significant, which is in line with earlier studies (Baum and Talavera [2009]; Shaoping et al. [2008]; Umutlu [2010];

Wang and Huang [2014]). This consistency with prior research enhances the credibility of our model's findings. We examined leverage both independently and in combination with various forms of uncertainty to explore its impact on the leverage-investment dynamic. All the models applied to State-Owned Enterprises (SOEs), found no significant effect of leverage on SOE investment, aligning with previous research by Bo and Zhang [2002] and Phan [2018]. Column (2) of table 3 reveals that firm-specific uncertainty, along with its interaction with leverage has no significant influence on SOE investment patterns. Conversely, Column (4) of Table 4 shows that for non-SOEs, leverage and other control variables play a notable role in investment decisions, with firm-specific uncertainty (t-1) having a significant positive effect on investment behavior in these firms. The findings suggest that non-SOEs are more willing to make investment in conditions of high uncertainty compared to SOEs, showing a high-risk taking behavior. This high-risk taking behavior of SOEs is consistent with Chamberlain [1984] theoretical assumptions. Furthermore, our findings corroborate prior research (Baum and Talavera [2008]; Shaoping et al. [2008]). Moreover, the relationship between leverage and firm-specific uncertainty (Lev $\times$ t-1) are significantly inversely related with a negative coefficient, showing that uncertainty increases the adverse effect of leverage on investment. This supports agency theory, under which firms with higher leverage tend to reduce investments when faced with greater firm-specific uncertainty. This pattern is similar to the results for SOEs from Column (1) of Table 5, except for leverage, which is significantly negative across models for non-SOEs. This findings in table 5 are consistent with earlier studies (Aivazian [2005]; Firth et al. [2008]).

To ensure the robustness of these results, several tests were applied. The Arellano and Bond [1991] test was used to detect first-order and second-order serial correlation. The J-statistic from the Hansen test confirmed the validity of the instruments used in the estimations.

Table 6 describes the influence of CAPM-based uncertainty on the leverage-investment relationship for both SOEs and non-SOEs. In Column (1), leverage, CAPM-based uncertainty, and their interaction show no significant influence on SOE investment. However, Column (2) indicates a negative and statistically significant impact of both leverage and CAPM-based uncertainty on non-SOE investment, consistent with earlier findings (Baum and Talavera [2008]; Baum and Talavera [2009]). The interaction term (Lev $\times$ t-1) is significantly positive, suggesting that CAPM-based uncertainty mitigates the negative effect of leverage on investment.

Table 7 presents the effect of economic policy uncertainty on the leverage-investment relationship. In Column (1), economic policy uncertainty (eput-1) has a significantly negative impact on SOE investment, supporting the real options theory of irreversible investment and the option value of delaying investment Chamberlain [1984]. This finding aligns with earlier studies Kang and Ratti

[2014]; and Wang and Huang [2014];. The interaction between leverage and economic policy uncertainty (Lev × eput-1) has a positive and significant coefficient, indicating that economic policy uncertainty reduces the negative influence of leverage on investment. However, Column (2) shows that economic policy uncertainty does not have a significant effect on non-SOE investment, either directly or through its interaction with leverage. These results reinforce the idea that economic policy uncertainty has a more pronounced impact on SOEs than on non-SOEs, consistent with prior research Wang and Huang [2014].

Finally, Table 9 presents the combined results for all forms of uncertainty and their interactions on investment behavior in both SOEs and non-SOEs. In Column (1), for SOEs, the signs and significance levels for leverage and the various uncertainties remain consistent when included in a single model. Column (2) shows the combined effects of all uncertainties on non-SOE investment, where intrinsic uncertainty has a significant positive main effect and a negative interaction term, while CAPM-based uncertainty exhibits the opposite pattern. Economic policy uncertainty and its interactions do not show statistical significance.

CHAPTER 6

6 Conclusion and Policy Recommendation

This thesis examined the effect of various kind of uncertainties on the association of leverage-investment for Pakistani listed companies between 2011 and 2022. We found that uncertainty has a diminishing influence on the interrelation of leverage-investment and that impact differs depending on the type of uncertainty and the ownership of the firms. It is observed that the relation between investment and economic policy uncertainty is negative for the State Owned Enterprises and the relations between investment and FSU, leverage, sales growth, cash flow, and size is positive for State Owned Enterprises. On the other hand the relation of investment with leverage and EPU is negative for non-SOEs and its relation with sales growth, cash flow and size is positive. The consequence of FSU on leverage and investment for SOEs and Non-SOEs was calculated using robust two-step System-GMM. In null hypothesis FSU and leverage and investment are not correlated. To investigate the influence of uncertainty on the link between leverage and investment, we evaluate leverage both alone and in combination with various types of uncertainty. The major consequence of leverage is significant in all models for SOEs, indicating that leverage has appreciable impact on SOEs' financing. For NSOEs the FSU worsens the adverse impact on investment. These results show that highly leveraged firms under-invest under increasing FSU, which is consistent with the agency theory of under-investment.

Furthermore, the interaction term between CAPM-based uncertainty and leverage in both SOEs and non-SOEs has a positive value, suggesting that CAPM-based uncertainty amplifies the positive effects of debt taking and investing options. This demonstrates that highly leveraged enterprises typically increase their investment when CAPM based uncertainty is on rise, supporting the agency explanation of under-investment. Leverage, CAPM-based uncertainty, and their linkage term have discernible influence on the investment made by SOEs.

Moreover, the study concluded that there is a substantial negative direct impact of EPU on SOE investment. Similarly, there is a significant positive coefficient for the interaction term showing that the positive association between investment and leverage is increased by economic policy uncertainty. It was also observed that there is significant plus coefficient for the interaction term indicating that the positive association between investment and leverage is increases by economic policy uncertainty for non-SOEs. Finally, when the relations of all the uncertainties among each other was studied, it was observed that given the favorable effect, SOEs are probably going to invest more while dealing

with economic policy uncertainties. This might be the result of a number of things, such support from the government, which acts as a buffer against uncertainty, or long-term strategic objectives that are less susceptible to shifts in the near term in policy. The adverse effect suggests that, when faced with uncertainty about economic policy, non-SOEs are more cautious and cut back on investment. Lack of safety nets, increased sensitivity to market conditions, or the need to preserve flexibility and liquidity in unsettling situations could all be contributing factors to this behavior.

Based on the findings of this thesis, which examined the influence of different uncertainties on the association of financial leverage and investment for firms listed on the PSX, the following policy recommendations are proposed: Given the observed positive association of leverage and investment in SOEs under FSU and the significant role of leverage in driving investment, it is recommended that the government enhance financial support mechanisms for SOEs. This could include providing more favorable borrowing terms, guarantees, or direct subsidies to encourage investment even under uncertain conditions. Encourage SOEs to develop and adhere to long-term strategic investment plans that can alleviate the adverse impacts of EPU. This will help stabilize investment flows and align them with national economic goals.

Improve Access to Risk Management: To counteract the downward influence of EPU on investment in Non-SOEs, the government should facilitate better access to risk management tools, such as hedging instruments and insurance products. This would help Non-SOEs manage uncertainty more effectively and maintain their investment levels. Introduce tax incentives or investment grants for Non-SOEs that undertake significant investments during times of high EPU. This would encourage firms to continue investing despite uncertain economic conditions, promoting overall economic stability. Develop and strengthen financial markets to provide more stable and varied sources of financing. This can include enhancing the corporate bond market and promoting equity financing, which can reduce the reliance on leverage and mitigate the negative effects of firm-specific uncertainty on firm's financing.

Improve transparency and predictability in economic policies to reduce overall economic policy uncertainty. This could involve clearer communication of policy intentions, consistent regulatory frameworks, and stable macroeconomic policies.

Implement policies to regulate and monitor leverage levels in both SOEs and Non-SOEs to ensure that firms do not become over-leveraged. This can be achieved through setting leverage caps or requiring more stringent reporting and risk assessment for highly leveraged firms. Provide support for financial restructuring programs for firms that are highly leveraged and struggling under uncertain conditions. This could include facilitating debt restructuring agreements or offering temporary

financial relief to prevent under-investment.

Integrated Risk Assessment Frameworks: Encourage firms to adopt integrated risk assessment frameworks that take into account FSU, CAPM-based, and EPU. These frameworks should guide investment decisions and leverage management to ensure a balanced approach to growth and stability.

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