Institutional Investors, Political Uncertainty and Stock Prices

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Abstract of Chapter One

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Using a characteristic-based demand asset pricing system, I investigate the role of institutional investors in the stock market under political uncertainty. Using China as an economic setting, in 2012, a year with high political uncertainty, I find that except for foreign institutions, Chinese institutional investors tilt away from politically connected stocks in their portfolios, leading to a decline in aggregate demand. Therefore, this finding could serve as a plausible explanation for decreased stock prices. Interestingly, among all institutions, trusts and non-financial institutions (e.g., large state-owned enterprises) tend to have higher price elasticity of demand, prefer smaller-size stocks and allocate their investment portfolios towards unobserved stock characteristics over time. Meanwhile, profitability serves as a vital characteristic for optimal allocation problems of institutions while dividend and investment are less important. Additionally, consistent with the US evidence, institutions' demand for market beta is procyclical. These results are robust after controlling for other well-recognized stock characteristics in the Chinese stock market, such as leverage ratio and liquidity.

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Introduction

Past studies have confirmed the importance of financial intermediaries. On the one hand, households generally lack the necessary knowledge to invest in complex assets or have limited participation in all financial markets, making financial intermediaries a vital channel for households to allocate assets and invest in financial markets (Allen, 2001; Staikouras, 2003; Allen & Gale, 2004; Duffie, 2010; He & Krishnamurthy, 2013). On the other, even in less sophisticated asset markets, the participation of households cannot preclude financial intermediaries from becoming marginal, making the intermediary kernel a valid proxy for asset pricing in these markets (He et al., 2017). Accordingly, investigating the role of institutional investors in stock markets contributes to a better understanding of asset pricing anomalies that were unsolved by previous pricing models. Allowing for flexible heterogeneity for different institutions and matching holdings data that include indexing and zero holdings, the characteristics-based demand system provides a simplified solution for optimal portfolio allocation problem, improving the quantitive understanding of cross-sectional changes on expected returns and valuations (Koijen & Yogo, 2019). More specifically, stock characteristics, including market equity, book equity, profitability, investment, market beta and dividend, are sufficient to determine the optimal portfolio allocation. Importantly, the latent demand, which refers to the unobserved stock characteristics, explains the major part of the cross-sectional stock returns variance.

As a major source of latent demand, political related demand is a significant factor to explain stock market activities. In general, past studies have shown a negative relationship between policy uncertainty and stock prices (Pastor & Veronesi, 2012). Also, the risk premium commanded by such political uncertainty would be larger if the economic condition is weaker (Kelly et al., 2016). Employing a political uncertainty index, Pástor & Veronesi (2013) have confirmed a significantly positive relationship between stock volatility and political uncertainty.

To my best understanding, this paper is among the very first to include politically related stock characteristics to estimate cross-sectional demand of institutions over time. As the second largest economy internationally, China serves as an ideal scenario to investigate politically related research questions. Firstly, owing to different anti-corruption efforts, education and openness level, relative wages of government employees, the corruption index varies across different provinces in China, allowing for cross-sectional political uncertainty over time (B. Dong & Torgler, 2013). Moreover, as a major source of political uncertainty in recent years, the top-down and large-scale Chinese anti-corruption campaign has led to different market reactions, excess financial market volatilities and decreased stock prices (C. Lin et al., 2016; L. X. Liu et al., 2017; Griffin et al., 2021). Therefore, research on politically related stock characteristics provides valuable insights into the behaviours of institutions under a demand-based system for both developing and developed markets.

This paper investigates the role of institutional investors in the Chinese stock market under political uncertainty, using a characteristic-based demand asset pricing system. Firstly, I want to test when the political uncertainty is higher, will institutional investors demand less from stocks with higher political connections. Following L. X. Liu et al. (2017), I treat a firm's board member who has previous government or military work experience as a person with political connection, and the number of the politically connected board serves as a measure of political connection of the firm. Using 2012 as a sample period, which has witnessed the leadership transition of China, Bo Xilai's political scandal, and the announcement of anti-corruption campaign, I find that except for foreign institutions, Chinese institutional investors tilt away from politically connected stocks in their portfolios, leading to a decline in aggregate demand. I propose two possible explanations for this decreasing trend among Chinese institutions. On the one hand, Chinese institutions tilt their portfolio away from stocks with political connections because they believe the political risk is higher during this period. Thus, reducing holdings of politically connected stocks may protect institutions from higher political risk. On the other, Chinese institutions may feel that they are facing higher political uncertainty, and temporarily reducing their politically connected holdings becomes their best option at the time. Therefore, from the perspective of institutional investors, this finding has provided an alternative explanation for decreased stock prices during 2012, a year with higher political uncertainty.

Secondly, I want to see how the demand for different characteristics of institutions changes over time. Among all institutions, trusts and non-financial institutions (e.g., large state-owned enterprises) tend to have a higher price elasticity of demand and more extreme portfolio weights tilted towards unobserved characteristics over time. For example, the most negative price elasticity of demand is -6.6, suggesting that non-financial institutions will decrease their RMB holdings by 7.6% if the corresponding stock price increases by 1%. Therefore, the elasticity of demand for trusts and non-financial institutions appears to be very sensitive to price changes over time, regardless of transaction costs. Accordingly, exploring the annual largest trusts, non-financial institutions and their stock holdings helps to understand their asset allocations over time. Interestingly, all the annual largest trusts and non-financial institutions are large state-owned enterprises, which have long-lasting connections with the government. After looking into the detailed holdings of such institutions, I believe trusts may serve as an alternative financing source for small and medium enterprises while non-financial institutions may trade for other purposes, for example, as a tool of government intervention.

While most institutions prefer large stocks, trusts and non-financial institutions prefer small stocks over time. This finding provides additional support for my previous explanations that trusts and non-financial institutions may adjust their optimal portfolio for other purposes.

Additionally, the demand on market beta for institutions is generally lower in recessions, suggesting that institutions' demand is procyclical. Among other characteristics, profitability attracts institutions' demand in large magnitude. However, investment and dividend are less important. Specifically, the facts of dividend are unique in China because conflicts exist in dividend payment: managers prefer to pay few or no dividends, controlling shareholders with nonnegotiable shares prefer cash dividends, while negotiable shareholders want capital gain rather than dividends (Huang et al., 2011).

The future directions of my research include variance decomposition during high political periods, stock returns predictability and cross-sectional political uncertainty analysis over the full sample period using the natural province-level variation in the corruption index. The robustness checks considered in this paper include weak instrument tests, estimation systems with more characteristics, such as liquidity and leverage ratio, alternative measures of political characteristics, including fiscal policy sensitiveness and proportion of politically-connected board, alternative measures of instrumental variable, estimation results for non-SOEs, and estimation results for non-SMEs.

The rest of this paper is organized as follows. Section 2 reviews the literature in the field. Section 3 summarizes the motivation. Section 4 develops the main hypotheses tested. Section 5 introduces stock trading, institutional holding data and political data. Section 6 explains the characteristics-based demand system and empirical methodology. Section 7 and section 8 present the empirical results and robustness checks. Section 9 concludes.

Literature Review

Introduction

Over the past decades, there has been extensive academic interest in examining the stochastic behaviours of equilibrium asset prices in an exchange economy (Dumas, 1989; Detemple & Murthy, 1994, 1997; Basak & Cuoco, 1998). The "equity premium puzzle", which is a typical phenomenon among those stochastic behaviours, documents the inability in frictionless equilibrium models (Mehra & Prescott, 1985). To resolve such inability, studies highlight not only that agents with heterogeneous preferences are important in equilibriums (Dumas, 1989; Detemple & Murthy, 1994) but also that limited participation in the stock market subjects to asset portfolio constraints (Detemple & Murthy, 1997; Basak & Cuoco, 1998), lead to the research of representative agent model. However, the average household, which is typically used as a representative agent, lacks the necessary knowledge to invest in sophisticated assets or has limited participation in all financial markets (Adrian et al., 2014). Thus, despite the moral hazard friction, households usually invest through financial intermediaries, which play a significant role in asset allocation and capital flow (Allen, 2001; Staikouras, 2003; Allen & Gale, 2004; Duffie, 2010; He & Krishnamurthy, 2018).

Past well-established papers have typically featured CARA investors and partial equilibrium with rigorous assumptions and restrictions on investors' preferences, including the study for bonds (Greenwood & Hanson, 2013) and mortgage-backed securities (Gabaix et al., 2007) to confirm that the prices and risk premia could be influenced by both supply and demand side changes. Differently, demand-based asset pricing, which allows heterogeneity across different types of institutional investors, has become an innovative area of research in finance. As an accurate measure of investors' beliefs, the slopes of asset demand curves become a valid proxy of the optimal portfolio allocation in the equilibrium of the aggregate stock market, relaxing the strict assumptions of standard finance theory (Koijen & Yogo, 2019). Additionally, different sectors applied by the pricing model play a vital role in the demand-based asset pricing system, where the behaviours of institutional investors are inconsistent (Koijen & Yogo, 2019). Under the demand-based asset pricing system, the dynamics of prices and capital flows, the role of various types of institutions and the effects of demand shocks have become easier to cross-sectionally analyze over time. More importantly, though extensive studies have evolved around models of the stochastic discount factor, such as empirical models with traded factors (Fama & French, 1993; Hou et al., 2015) and non-traded factors (Chen et al., 1986), the demand-based model matches investor holding data with asset prices and factors, shedding lights on portfolio choice applications (Koijen & Yogo, 2019).

Owing to its unique features and large market size, the Chinese stock market has attracted abundant attention from both investors and researchers. On the one hand, the centrally controlled and bank-dominated financial systems have been improved by introducing alternative financing sources and efficient financial reforms. On the other, as one major source of political uncertainty, the Chinese anticorruption campaign results in different market reactions, excess financial market volatilities and abnormal stock prices. Despite that the Chinese stock market is dominated by unsophisticated retail investors, the investigation for the role of various types of institutional investors would lead to a better understanding of the market dynamics over time, especially with the foundation of a demand-based asset pricing system.

This review summarizes previous studies into equilibrium asset pricing in an exchange economy, with a particular focus on demand-based asset pricing under political uncertainty. In section 1.2.2, the topic of asset pricing in an exchange economy is introduced, including the background of a well-recognized asset pricing framework, studies of the equity premium puzzle, and the importance of the representative agent model and related research. The major focus of this review is section 1.2.3, which presents background information on demand-based asset pricing, workhorse models in the area, and the inelastic demand hypothesis. Lastly, section 1.2.4 provides the background of the Chinese market and a summary of studies on political uncertainty.

Asset Pricing in An Exchange Economy

Background

Under the assumption that asset prices fully reflect all available information and that the rational expectation equilibriums are possessed by unspecified adapting outcomes, scholars examine the stochastic behaviour of equilibrium asset prices in an exchange economy, establishing the foundation for both theoretical and empirical asset pricing over the past decades (Lucas, 1978; Breeden, 1979). According to this foundation, a representative "stand-in" exists in the pure exchange economy with identical customers, indicating that all empirical tests are interpreted from the aggregate level (Lucas, 1978). Additionally, asset betas could be derived in terms of the changes in aggregate real consumption, simultaneously permitting stochastic consumption prices and portfolio opportunities (Breeden, 1979). Since the last century, the aggregate view in equilibrium models for asset pricing has become the main trend, laying the foundation for following work associated with asset pricing in an exchange economy.

Equity Premium Puzzle

Equilibrium models for asset pricing, it must be noted, have their issues. For example, when it is assumed that the representative agent has time-varying and state-separable utility, researchers cannot find a plausible subjective discount rate and the proper relative risk aversion for the representative agent to explain the mean equity premium over the sample period. Also, with a surprisingly large margin, stocks have outperformed bonds over the last century, indicating a puzzle in the equity premium (Mehra & Prescott, 1985).

This puzzle, cited as the "equity premium puzzle", states the inability of frictionless equilibrium models. Accordingly, past studies have tried to interpret such inability from the perspective of traditional behavioural economics theory, providing some plausible theoretical explanations. For example, researchers believe that habit formation preference and persistence should be embedded in economic models for empirical tests (Constantinides, 1990). Similarly, with the support of prospect theory, myopic loss aversion emphasises that investors demand a large premium to accept potential return variability, providing a possible solution to the equity premium puzzle (Benartzi & Thaler, 1995). However, although traditional behavioural economics theory could explain some issues related to the inability in the equity premium puzzle, it is extremely hard to apply such theory into practice.

Representative Agent Model

To practically resolve the inability of frictionless equilibrium models in the equity premium puzzle, extensive studies have invoked the representative agent model in financial empirical analysis, allowing for dynamic equilibriums in a pure exchange economy (Dumas, 1989; Detemple & Murthy, 1994, 1997; Basak & Cuoco, 1998). In general, agents, whose investment preferences and beliefs are heterogenous in the financial market, are faced with investment constraints, leading to limited participation and bounds on trades. Following the basic idea of the representative agent model, the allocation of wealth in the capital market could be analysed in terms of the dynamic interactions between two investors with heterogeneous utility functions (Dumas, 1989). Thus, the realization of interest rate in equilibriums of the capital market is a stochastic process, showing the dynamic interactions in wealth allocation.

An effective way to measure the equilibrium interest rate is to use the weighted average interest rate of each respective agent in the heterogeneous model, especially for intertemporal asset pricing with heterogeneous agents (Detemple & Murthy, 1994). Based on the estimated equilibrium rate, the price of an asset could be decomposed into three investor-specific components, including the consumption value of dividends, a speculative premium, and a collateral premium (Detemple & Murthy, 1997). Consistent with

Detemple and Murthy's finding that the dynamic equilibrium rate and prices are calculated under several constraints in investment portfolios, Basak & Cuoco (1998) set up an equilibrium model with limited agent participation in the stock market, documenting that the participation of representative agents is restricted owing to information costs and other types of frictions.

Importance of Financial Intermediaries

As an important stochastic factor invoked by past studies, the average household used as the representative agent has failed to meet some rigorous assumptions, such as perfect market participation. Though equity markets have seen great direct participation by some households, they generally lack the necessary knowledge to invest in sophisticated assets, such as derivatives and commodities, or have limited participation in all financial markets (He & Krishnamurthy, 2013). Considering the information costs and their financial knowledge limitation, households usually invest through financial intermediaries, which play a significant role in asset allocation and capital flow (Allen, 2001; Staikouras, 2003; Allen & Gale, 2004; Duffie, 2010). Even in less sophisticated asset markets, the participation of households cannot preclude financial intermediaries from becoming marginal, making the intermediary kernel a valid proxy for asset pricing in these markets as well (He et al., 2017).

Moreover, the financial intermediary is the conduit of monetary changes to the asset market and the other parts of the economy, introducing meaningful applications for the policymaker. This conduit could be further interpreted via related budgeting decisions as well as inside money allocations, confirming that the expected strategy invoked by financial intermediaries is controlling investment risk rather than predicting the movement of interest rates (Staikouras, 2003). Thus, as is proposed by Staikouras (2003), with a stochastic risk-free rate, the inherent nature of financial institutions that are subject to regulatory constraints leads them more susceptibly covary with the change of interest rate, documenting that investors are also exposed to the risk caused by unfavourable shifts in the investment opportunity set.

Also, with the support of sophisticated models, financial intermediaries trade frequently in many markets, providing a more informative stochastic discount factor (Adrian et al., 2014). Past studies have shown direct evidence linking asset prices in such more specialized asset markets to the behaviours of intermediary capital. Using evidence from the catastrophe insurance market, Froot & O'Connell (2008) emphasise the impacts of slow-moving intermediary capital on asset pricing. Other evidence comes from the mortgage-backed assets market, showing that the marginal investor is a specialized intermediary rather than the average household (Gabaix et al., 2007). Similar evidence from a wide range of asset classes, including index options (Bates, 2003; Garleanu et al., 2008), convertible bonds (Mitchell et al., 2007), certificate of deposits (Mitchell & Pulvino, 2012; Siriwardane, 2015), and foreign exchange (Adrian et al., 2011; Hong & Yogo, 2012), strengthens the significance of financial intermediaries in asset pricing.

In other empirical areas, valid results for the theories of intermediary asset pricing are provided by connecting capital shocks to asset pricing, supported by the evidence from the deviation of covered interest parity (Avdjiev et al., 2019) and the insurance market (Koijen & Yogo, 2015). According to Avdjiev et al. (2019), understanding the triangular relationship among the dollar, covered interest parity (CIP) and a cross-border bank is a key to understanding the capacity of international capital markets in terms of trading frequency and risk-taking ability, strengthening the importance of financial intermediaries in modelling asset returns. Employing empirical evidence from the insurance market, Koijen & Yogo (2015) document some extraordinary pricing behaviours caused by financial frictions and confirm the significant role of insurance institutions as intermediaries across different types of policies.

Consequently, based on both theoretical and empirical foundations of past work, recent studies have strengthened the importance of financial intermediaries with robust empirical tests (Muir, 2013; He & Krishnamurthy, 2013; Adrian et al., 2014; He et al., 2017; He & Krishnamurthy, 2018; Cho, 2020; Baron & Muir, 2022).

Demand-Based Asset Pricing

Background

Past literature has shown that investors derive their optimal portfolio solution with heterogeneous beliefs and face short-sale constraints, emphasising the use of the constrained Euler equation to estimate asset returns with the intertemporal marginal rate of substitution (Lucas, 1978). Meanwhile, to find the optimal solution for the equilibrium in an exchange economy, researchers have generated valuable insights from the mean-variance portfolio despite the portfolio variations across investors, strengthening the importance of the portfolio-based asset pricing procedure (Markowitz, 1952). Nevertheless, based on existing empirical asset pricing literature (Fama & French, 1993; Carhart, 1997), returns are assumed have follow factor loading and the expected returns are determined by the characteristics of different assets. Thus, the assets characteristics should be identified before the construction of investment portfolios. It is also well-recognized in research that using demand pressure in asset pricing has been common practice. For example, Garleanu et al. (2008) state that demand-pressure effects help to interpret some abnormal issues of the option-pricing puzzles. Confirmed by both additional time-series tests and cross-sectional tests, the demand for options not only generally explains the skewness of index options, but also effectively affects the expensiveness of single-stock options. Therefore, the combination of asset characteristics factors and asset demand could help to estimate and explain returns more efficiently.

Further, if using a characteristics-based model to solve for the optimal portfolio allocation, the observed characteristics, including book equity, market equity, profitability, dividends, investment, and market beta, should be identified before the demand estimation (Koijen et al., 2017). In addition, based on asset demand, along with the optimal portfolio solution and the market clearing condition, asset prices could be calculated from asset pricing models. Under this procedure, joint moments of returns or portfolio returns should be used with the support of aggregate consumption, which is the key component in various pricing models (Breeden, 1979). However, although the institutional and household shareholding data used in the equilibrium model can be directly observed from the asset demand, due to simplified assumptions by scholars, the differences between the datasets are usually ignored. In particular, despite the use of institutional holdings data by some empirical asset pricing literature in the equilibrium models, an equilibrium model that could impose market clearing and match asset demand with institutional holdings data both accurately and simultaneously is absent in past literature (Koijen et al., 2017).

Assumptions drawn in previous studies lack explanatory power due to their limitations. These include assumptions about investors' preferences, beliefs, and constraints that indicate no price impact from investors and that allow little heterogeneity across different investors (Garleanu et al., 2008; Koijen & Yogo, 2019). Nevertheless, such assumptions have failed to model institutional investors' asset demand because such demand could be extremely powerful in the price equilibrium (Koijen & Yogo, 2019). Consequently, studies on demand-based asset pricing could not only reconcile the existing limitations in previous pricing models but also help to explain the behaviours of different financial institutions.

Workhorse Demand-based Asset Pricing Research

Findings from Koijen & Yogo (2019) are based on the use of a demand system, which is prevailing in macroeconomic models but innovative in intermediary asset pricing equilibrium studies. Since the pioneering research of Brainard & Tobin (1968) and Friedman (1977), whose study is subject to the challenges of the availability of asset holding data, there have been works on demand systems and flows, leading to the interest of more advanced methods to measure the slopes of demand curves across assets. By using characteristics-based demand, which allows for flexible heterogeneity for different institutions and matches holdings data that include indexing and zero holdings, the behaviours of different institutional investors could be identified separately. In general, institutional investors from different sectors including index fund, actively managed mutual fund, investment advisors, hedge funds, pensions, banks, insurers, and households, tend to present inconsistent behaviours. Thus, examining the behaviours of institutional investors could help to investigate the behaviours of institutional investors about asset market activities (Koijen & Yogo, 2019).

Additionally, this innovative framework of asset pricing, supported by the portfolio investment allocation of different sectors, helps to quantitively understand the cross-sectional changes of expected returns and valuations. More specifically, the influence on investors' welfare and assets valuations could be explored by such a framework, following the latest trends in financial markets, such as passive management, climate-related risks, and financial crisis (Koijen et al., 2020).

Similar modelling strategies have been invoked to internationally understand foreign exchange rates, equity prices, and bond prices in a global demand system (Koijen & Yogo, 2020). Different from traditional papers on international finance, which assume that the financial market do not directly determine the foreign exchange rate, the demand-based model entirely relies on the financial market when it determines the exchange rate. Importantly, based on a demand system with global holdings, the demand elasticities of all asset classes and countries could be quantitively estimated, allowing for all substitution effects (Koijen & Yogo, 2020). Other studies in the field include estimation of demand elasticities on US Treasury debt (Krishnamurthy & Vissing-Jorgensen, 2012), the relation between portfolio balancing and yield changes in the euro area for estimation of demand elasticities on sovereign debt (Koijen et al., 2020), and effects of demand shocks created by the frozen and unfrozen investor funds during Chinese IPOs in the Chinese stock market (Li et al., 2021).

Following the framework of Koijen & Yogo (2019), a key improvement of Haddad et al. (2021), who find more inelastic stock demand curves, is to provide a framework to quantify the competition of different investors and its implications for asset price, proving that the stock market is far from the competitive ideal level. Besides, other researchers have examined the relationship between risk premia and intermediary constraints in asset markets using the demand for crash insurance, providing political implications for policymakers (Chen et al., 2019). More specifically, driven by shocks to the constraints of the financial intermediary, the difference in the net trading between public investors and financial intermediaries is correlated to higher risk premia, broker-dealer deleveraging, increasing option expensiveness, and deteriorating funding liquidity.

Consequently, understanding the relationship among time-varying intermediary constraints, the demand for crash insurance by financial intermediaries, and the risk premia contributes to the existing literature in the field, confirming the important role of demand-based asset pricing system in financial markets. In particular, such a system helps to explain a wide range of problems that are associated with the behaviours of institutions in asset markets, which have been big challenges in past research that invokes event studies or reduced-form regressions.

The Inelastic Market Hypothesis

Motivated by the phenomenon that the stock market has exhibited high volatility over the past decades, the inelastic market hypothesis, which refers to the quantitatively important effects on prices and expected returns from the flows and demand shocks in financial markets, provides both theoretical and empirical evidence in the field. Owing to the foundations of demand-based asset pricing system that allows for different investors to have different elasticities, researchers of the inelastic market hypothesis have established a quantification of the aggregate sensitivity of the market to demand shocks (Gabaix & Koijen, 2020; Ben-David et al., 2021; Gabaix & Koijen, 2021).

Origin from the insights of De Long et al. (1990), extensive studies have invoked similar qualitative ideas to investigate the cross-sectional effects of mutual fund and ETF flows on stock prices (Warther, 1995; Ben-David et al., 2021; X. Dong et al., 2022). However, apart from the mutual fund sector, the remaining financial sectors could be estimated at the aggregate level by a simple economic framework, including the "granular instrumental variables" (GIV) approach (Gabaix & Koijen, 2020). While some papers have demonstrated the importance of fund flows (Gabaix & Maggiori, 2015; Greenwood et al., 2020), slow rebalancing mechanisms in both stock investment and currencies (Chien et al., 2012; Bacchetta & Van Wincoop, 2010), such economic model built on the inelastic market hypothesis is the very first to link the data on flows and total holdings of all financial sectors to fluctuations (Gabaix & Koijen, 2021). Moreover, with a central role in the estimation of demand inelasticity, investment mandates and flow dynamics, the research on the inelastic market hypothesis also contribute to the model of intermediary asset pricing, helping to understand the impact of flows and demand shocks on creating prices fluctuations and excess volatilities.

Political Uncertainty in the Chinese Stock Market

Background

The Chinese stock market, which is launched in December 1990, has become the second largest in the world. Not only the market size but also the unique features of the Chinese market have attracted extensive academic research to explore questions in the Chinese financial environment, leading to a better understanding of institutional settings and financial systems of emerging markets. Even though the Chinese stock market is dominated by retail investors in terms of trading volumes and market participation, small retail investors are less sophisticated with about one-third of all Chinese retail investors lacking a high school degree or education (Titman et al., 2022). Moreover, China's financial system is centrally controlled and bank-dominated, with both highly political IPOs and seasonal stock offerings and extremely high government interventions, especially for the state-owned enterprises (SOEs) (Allen et al., 2005). More specifically, owing to their political objectives and uniqueness, the existence of the SOEs has been criticized for both the departure of value maximization and the lack of information transparency (Bai et al., 2006). Additionally, though the inefficiency remains in the Chinese banking sector, the dominance of the Big Four banks has been declining over the past decades, with smaller banks, non-bank institutions, and foreign banks entering the credit market (Allen et al., 2019).

Growing Literature in the Chinese Stock Market

While most western evidence suggests that place-based policies to boost local economies through explicitly targeted transfers are largely ineffective, the results in the Chinese context provide a positive tone for prominent place-based policies. Specifically, the national high-tech zone boosts local innovation and entrepreneurial activities (Tian & Xu, 2022).

Similarly, Beijing's introduction of specialized courts in the reform process aims to increase professional training in the bankruptcy process, helping to shorten the bankruptcy period and improve judicial independence (B. Li & Ponticelli, 2022). Therefore, considering its unique features, the prevalence of state ownership, and the intricate interactions between government intervention and market mechanisms, the Chinese financial market requires China-specific research with clear connections to western studies (He & Wang, 2022). For example, Du et al. (2022) demonstrate strong language and domain specificity in dictionary-based sentiment analysis. In details, based on 3.1 million Chinese-language financial news article, the financial sentiment dictionary developed by the authors outperforms the direct translation from western countries. Also, a list of politically positive words is more applicable to China, emphasising linguistic and cultural specificities in the economic and financial fields. Accordingly, understanding the sentiment of investors' attention may also contribute to the study of asset pricing anomalies. For example, anomaly returns are confirmed to be higher following higher investors' attention, and large traders tend to trade on anomaly signals more aggressively after observing such attention (Jiang et al., 2022).

Differently, other studies have shown China's unique institutional characteristics at a broader level. In contrast to the US market, China invokes adjustable-rate mortgages in debt-service, which remains as the key channel of monetary policy transmission (Agarwal et al., 2022). When the central bank cuts interest rates, households symmetrically increase their disposable income as they face lower mortgage payments. In addition, Chang et al. (2022) find that bank-affiliated institutions play strategic roles in relationship banking, providing credit to clients to circumvent the credit tightening policy of the government. Interestingly, bank-affiliated leasing firms have more efficient pricing. Thus, the shadow banking in China act as a remedy for the current inefficient banking system.

Political Uncertainty in the Chinese Stock Market

As a major source of political uncertainty in recent years, the top-down and large-scale Chinese anticorruption campaign has led to different market reactions, excess financial market volatilities and more uncertainties on stock prices, attracting extensive research about this (C. Lin et al., 2016; L. X. Liu et al., 2017; Griffin et al., 2021).

Such activities in the financial market are not unique to China; rather, both well-established theoretical models and empirical evidence have demonstrated the relationship of political uncertainty, stock prices, volatilities, and risk premia. For example, based on a general equilibrium model, scholars have proved a negative relation between policy uncertainty and stock prices, or policy uncertainty and equity options, and the risk premium commanded by such political uncertainty would be larger if the economic condition is weaker (Pastor & Veronesi, 2012; Pástor & Veronesi, 2013; Kelly et al., 2016). Also, invoking a political uncertainty index by Baker et al. (2016), Pástor & Veronesi (2013) have confirmed that stock volatility is higher during times of higher political uncertainty.

Further, political uncertainties in the Chinese stock market also attract abundant interest in Corporate Finance related issues from researchers. When they are faced with the trade-off between the benefits of political connections and the efficiency costs of government shareholding, investors have different reactions to unexpected share sales or cancellations of share sales of SOEs (Calomiris et al., 2010). Inconsistent with previous studies, which have shown that political connected CEOs tend to underperform (Fan et al., 2007), Calomiris et al. (2010) prove that positive abnormal returns exist when the firms are managed by former government officials. Other papers include the investigation of channels of political incentives (M. Li et al., 2008), government control, capitalism and IPOs (Piotroski & Zhang, 2014), and agency problems between central and local governments (Allen et al., 2019).

A more recent work by Piotroski et al. (2022) shows the comovement of stock price is affected by the political networks, which are generally adversarial rather than cooperative. Additionally, such effects become weaker after Xi's anti-corruption campaign and SOE reforms. From the perspective of individual politicians, Ru & Zou (2022) argue that local politicians with political ties to top political leaders are more likely to sell SOEs at discounted prices to corrupt buyers, demonstrating the importance of political issues in Chinese economic activities.

Motivation

Given its uniqueness of institutional features, the Chinese financial market, which may soon become the largest economy internationally, requires more academic research. On the one hand, the insights from papers that are based on USA and European data may not applicable to China. On the other, the study of China-specific social and economic issues could be shared by both developing and developed countries (He & Wang, 2022).

Recently, there has been growing high-quality literature in the Chinese financial market, including the study of place-based policies, bankruptcy, innovations and entrepreneurial activities (B. Li & Ponticelli, 2022; Tian & Xu, 2022), shadow banking in China (Chang et al., 2022), investor sentiment (Du et al., 2022; Jiang et al., 2022), China's unique institutional features in monetary policy transmission (Agarwal et al., 2022), and political ties in economy (Piotroski et al., 2022; Ru & Zou, 2022), highlighting contemporary issues in the Chinese market with clear connections to western countries.

While there exists comprehensive research about political uncertainties and asset pricing in the Chinese stock market, especially for the evaluations of stock returns, risk premium, and volatilities, to my best understanding, all the previous research remains at the stock level and analyses from the perspective of unsophisticated retail investors. Also, with the increasing number of institutional investors and innovative reforms in the financial system, institutional investors are playing a more significant role in the Chinese stock market. Meanwhile, equilibrium models invoked by previous papers are subject to rigorous assumptions and ignore the heterogeneity in asset demand across different types of investors (Koijen & Yogo, 2019). More importantly, as a major source of latent demand, which refers to the demand unrelated to observed firm characteristics and explains 81 percent of the cross-sectional stock returns variance in the paper of Koijen & Yogo (2019), the political related demand is a significant factor to explain stock market activities, especially for a stock market with high government intervention. Accordingly, unexpected political events, such as the large-scale Chinese anticorruption campaign directed by President Xi Jinping, serve as an ideal exogenous demand shock in this case.

Consequently, with the help of a characteristic-based demand system that allows for flexible heterogeneity among investors and the availability of institutional holding data in the Chinese market, the investigation of Chinese institutional investors could not only lead to a better understanding of the Chinese stock market but also provide valuable evidence to explain stock returns, risk premium, and volatilities with political uncertainty, contributing to the study in emerging markets.

Hypothesis Development

This section illustrates testable hypotheses about the role of institutional investors in the Chinese stock market under political uncertainty, using a characteristic-based demand asset pricing system. More specifically, I want to see how institutional investors change their demand for stocks of different political sensitiveness when they are faced with unexpected political demand shocks (anticorruption campaign). Under the demand-based asset pricing system, the coefficients of characteristic-based demand for different types of investors could be estimated (Koijen & Yogo, 2019).

According to the inelastic market hypothesis, the aggregate stock market price elasticity of demand is small, indicating that the unexpected demand shocks should have a large impact on stock prices (Gabaix & Koijen, 2021). Although comprehensive studies about political uncertainties and asset pricing in the Chinese stock market have been implemented, especially for the evaluations of stock returns, risk premium, and volatilities, to my best understanding, all the previous research remains at the stock-level and analyses from the perspective of unsophisticated retail investors, there lack explanations from the institutional investors' side. Therefore, I form the first hypothesis:

Hypothesis 1: *In China, using a characteristic-based demand asset pricing system, different institutional investors have different demand for stock characteristics over time.*

According to (Koijen & Yogo, 2019), investors' optimal portfolio weights could be determined by asset characteristics and latent demand by a logit function, and the demand elasticity could be observed by the corresponding coefficients. Therefore, in the first hypothesis, I want to test if different investors behave differently over time by comparing their coefficients of demand. In other words, if this system also works for the Chinese setting, I should be able to see different estimates of demand for different institutions in terms of various stock characteristics.

To estimate the demand system, the instrumental analysis will be introduced because the asset prices, characteristics, and latent demand are jointly endogenous. Meanwhile, through market clearing condition, the demand for an asset depends on characteristics of its own and other assets. Accordingly, using all asset characteristics as an instrument, a nonlinear function has been defined by the market clearing condition (Koijen & Yogo, 2020).

If the results support ***Hypothesis 1***, I intend to add political uncertainty into my analysis. In detail, I will assign stocks with different political connection levels following the methodology of (L. X. Liu et al., 2017). Then the corresponding hypothesis could be proposed:

Hypothesis 2: *All else equal, when the political uncertainty is higher, the institutional investors will demand less from stocks with higher political connections.*

The political uncertainty, in my thesis, is the exogenous demand shocks of the Chinese anticorruption campaign that begins in 2012. Therefore, the demand of institutional investors for stocks with different degrees of political connections should be different for the pre-and post-anticorruption campaign period. Considering that this large-scale campaign is unforeseen before 2012, there should be a clear drop in institutional investors' demand around 2012. I believe such evidence will provide more explanations for the price impacts on stocks.

After the announcement of the anticorruption campaign, can we observe increased stock volatilities, especially for the political sensitive stocks? Then it will lead to the third hypothesis:

Hypothesis 3: *All else equal, after the announcement of the anti-corruption campaign, the stock volatilities should be higher because the political uncertainty is higher.*

If evidence support ***Hypothesis 3***, I propose the following hypothesis:

Hypothesis 4: *All else equal, after the announcement of the anti-corruption campaign, the effect should be stronger for stocks with higher political connections.*

Additionally, it would be very clear to see the volatility decomposition of asset prices. Does the market volatility come from the supply side or the demand side? The supply side factors include share outstanding, stock characteristics, and dividend yield while the demand side factors include total asset under management, coefficients on characteristics, and latent demand. Consequently, I could investigate where the volatility comes from:

Hypothesis 5: *Subject to political uncertainty, the excess stock volatilities come from the demand side.*

Lastly, using the demand system, which implies mean reversion in stock prices if latent demand is mean reverting, cross-sectional variation in stock returns could be predicted (Koijen & Yogo, 2019). Under the assumption that the latent demand is mean reverting, I could regress the monthly excess returns onto lagged characteristics. The last hypothesis could be proposed:

Hypothesis 6: *All else equal, there should be a significant relationship between expected monthly returns and cross-sectional variation in stock returns in the long run.*

Data

Institutional Holding data

I collect the institutional holding data from Institutional Investor - the China Stock Market and Accounting Research Database (CSMAR). Details on institutional shareholding, including names of institutional investors, codes of institutional investors, types of institutional investors, values of shareholding of institutional investors, volumes of institutional investors and percentages of institutional investors, are used for the main analysis. However, only long-position stock holdings are available in this dataset, there lacks such information for bonds and cash.

Based on the user manual of CSMAR, there are nine types of institutions. However, this official classification of investor categories is subject to errors because a significant proportion of institutional investors is unclassified. Therefore, similar to (Liu et al., 2020), who manually classify institutional investors by key words of their names, I create eight types of institutional investors, presented in Table 1.

Stock Characteristics

The data sample includes all the publicly-listed firms in the A-share market of mainland China from June 1998 to March 2022. The monthly stock trading data, which includes price, share outstanding and dividend payment, is collected from China Stock Market Series - CSMAR. I exclude firms with missing share prices and share outstanding.

The quarterly accounting data, including operating working capital, operating profit, shareholder's equity, total asset and total liability comes from China Listed Firms Research Series - Financial Statement of CSMAR. Before merging the stock trading data and the accounting data, I lag the accounting data for six months to ensure that it is publicly accessible for investors on the trading date. Following Koijen & Yogo (2019), I create stock characteristics shown in Table 1. Meanwhile, I treat the political connection, leverage ratio, and liquidity as additional stock characteristics[1].

In addition, I keep only non-financial stocks for my empirical analysis while exclude financial firms due to their different accounting standards. However, the financial stocks are used for constructing outside assets, which will be illustrated in Section 1.6 Empirical Methodology.

Measures of Political Characteristics

Following L. X. Liu et al. (2017), I consider the following proxies of shares' political characteristics. Specifically, I use political connection as the main measure of firms'

[1] Following L. X. Liu et al. (2017), the leverage ratio refers to the total liabilities to total assets; the liquidity refers to the shares turnover ratio, which is the ratio of traded shares to total shares outstanding (Pan et al., 2016).

political characteristics, while I use fiscal policy sensitivity and alternative measure of political connection as robustness checks.

Political Connection

Past studies state that a person is considered as politically-connected if he or she currently is or was working in the central government, local government, or the military (Fan et al., 2007; L. X. Liu et al., 2017). With manually collected curriculum vitae (CV) of the board directors in Chinese publicly-listed firms from firms' financial reports, which are accessible via CSMAR and Sina Finance[2], I count the number of politically-connected directors on the board for each firm over time. Accordingly, the political sensitiveness measured by political connections is defined[3].

However, one might argue that larger boards may have more political connections, suggesting that board size should also be considered when constructing proxies for political connections (C. J. Chen et al., 2011). Therefore, I also employ the proportion of politically-connected board as robustness tests.

Fiscal Policy Sensitiveness

The firms' headquarters information is collected from China Listed Firms Research Series - CSMAR. To construct a measure of fiscal policy sensitiveness, I get the data of total investment in fixed assets and the proportion of such investment in SOEs for every province from 1999 to 2020 China Statistical Year-books[4]. According to L. X. Liu et al. (2017), a province with a higher proportion of SOEs expenditures is more politically sensitive. Thus, a firm headquartered in such a province is more politically sensitive to policy changes.

Different from L. X. Liu et al. (2017), who use the average proportion of SOEs in fixed investment for the whole sample period, I choose to use the average ratio in six

[2]https://finance.sina.com.cn/

[3]Following L. X. Liu et al. (2017), the measure of political connection equals to log (1 + number of politically connected board directors).

[4]http://www.stats.gov.cn/english/Statisticaldata/AnnualData/

periods[5] from 1998 to 2022 because I believe the political sensitivities should change over time.

Investment Universe

The final sample includes the merged institutional holding data, stock trading data, accounting data, and measures of political sensitiveness. Following Koijen & Yogo (2019), for each stock, I compute the holding value of an institution using stock price times number of stocks held. Accordingly, I could define the asset under management (AUM) of an institution as the sum of holding values, and the portfolio weight will be the ratio of holding value to AUM. Though I do not have the holding data from the household sector, the market clearing condition requires that the total share outstanding of a stock should equal to the sum of stock held by all the investors, indicating that the stock held by the household sector is the difference of total shares outstanding and the sum of stock held by all the institutional investors. Thus, I could get the corresponding holding value of the household investors. Also, I treat institutions with AUM less than ten million RMB as the household investors.

In reality, each type of institutional investors should have an investment mandate, which refers to a predetermined set of investable assets. Due to the limitation of non-publicly disclosed investment mandate, one has to use observed holdings to measure the investment universe (Koijen & Yogo, 2019). Following this, for every institution on each date, I create an investment universe that includes shares are currently held or ever held in the previous 11 quarters. Specifically, for a stock that is currently held in an institution's portfolio, the holding value in the investment universe is the observed holding value of the stock; for a stock that is not currently held by the institution but were ever held in the previous quarters, the holding value in the current investment universe should be zero.

Table 2 confirms the persistence of the investment universe by showing the percentage of stocks held in the current investment universe that were ever held in the previous

[5] The time period construction is consistent with that in Table 3.

1 to 11 quarters. Based on the pooled mean of all the institutional investors at each date, over 90 percent of stocks in the current quarter were also held in the previous 1 to 11 quarters for all the institutions with different AUMs. Therefore, this time-invariant investment universe serves as an ideal support for arguing the exogeneity of the predetermined investment universe to current demand shocks.

Empirical Methodology

This section shows the empirical methodology invoked in this paper. The key assumptions are introduced in the first subsection. With a characteristic-based demand system, the coefficients on regression can be estimated by generalized method of moments (GMM). An instrumental variable will be employed for log market equity. Based on the coefficients from the main regression, I can further analyze stock return decomposition and volatility decomposition, especially in the presence of exogenous political shocks.

Key Assumptions

Following Koijen & Yogo (2019), the key assumptions for the empirical methodology are:

Assumption 1: Investors have heterogeneous beliefs about optimal portfolio choice and face short-sale constraints.

Under Assumption 1, different types of investors can have different optimal portfolio choices due to heterogeneous beliefs. With short-sale constraints, the optimal portfolio weight of each asset is nonnegative, consistent with the fact that short selling is very limited in China.

Assumption 2: Assets have factor structures on their returns; factor loadings and expected returns depend on assets' characteristics.

More specifically, when an investor is constructing her optimal investment portfolio, assets' characteristics are sufficient for her to determine the expected returns and covariance matrix, and the covariance matrix is a valid proxy for risk. Thus, with a trade-off between risk and returns, an investor will form an optimal portfolio that depends on assets' observed characteristics and unobserved characteristics.

Assumption 3: Stock characteristics and shares outstanding other than stock prices are exogenous.

Assumption 4: In the main regression, the coefficient on log market equity is smaller than 1 for all the investors.

Assumption 5: Investor's wealth and investment universe are exogenous to current demand shocks.

Consistent with my results in Table 2, investors have time-invariant investment universes, supporting the idea that the investment universe is predetermined and exogenous.

Assumption 6: The latent demand is mean reverting and has a normalized mean of one; other characteristics follow random walks.

Assumptions 3-6 are the key to establishing a characteristic-based demand system. I will explain them in the next session.

Characteristics-Based Asset Demand System

According to Koijen & Yogo (2019), on each date, investors $i \subset \{1, ..., I\}$ can allocate wealth $A_{i,t}$ at date t in an investment universe $N_{i,t} \subset \{1, ..., N\}$ and an outside asset. Recall that in Section 1.5.4 Investment Universe, I define an investment universe as the stocks an investor can choose - a set of stocks that are currently held or ever held in the previous 1 to 11 quarters.

I denote w_i as the portfolio weights that investor i chooses at date t to maximize expected log utility over terminal wealth:

$$\max_{w_{i,t}} \mathbb{E}_{i,t}[logA_{i,T}] \tag{1}$$

where $\mathbb{E}_{i,t}$ denotes investor i's expectation at date t. With the intertemporal budget constraint and short-sale constraints:

$$A_{i,t+1} = A_{i,t}(R_{t+1}(0) + w'_{i,t}(R_{t+1} - R_{t+1}(0)1)) \tag{2}$$

$$w_{i,t} \geq 0 \tag{3}$$

$$1' w_{i,t} < 1 \tag{4}$$

where $R_{t+1}(0)$ refers to the gross return on the outside asset, the first-order condition for the portfolio choice problem is the constrained Euler equation:

$$\mathbb{E}_{i,t}[(\frac{A_{i,t+1}}{A_{i,t}})^{-1} R_{t+1}] = 1 - (I - 1w'_{i,t}(\Lambda_{i,t} - \lambda_{i,t}1)) \tag{5}$$

where $\Lambda_{i,t} \geq 0$ and $\lambda_{i,t} \geq 0$ are the Lagrange multipliers on the short-sale constraints at date t. As is shown by Koijen & Yogo (2019), an approximation to the portfolio choice problem is:

$$w_{i,t} \approx \Sigma_{i,t}^{-1}[\mu_{i,t} - \lambda_{i,t}1] \tag{6}$$

where $\mu_{i,t}$ and $\Sigma_{i,t}$ are the conditional mean and covariance of log excess returns, respectively.

Therefore, one can conclude that an investor ultimately cares about the trade-off between the covariance matrix and expected returns. Also, proved by Koijen & Yogo (2019), the scalar $\lambda_{i,t}$ ultimately depends on the characteristics of all assets. Consequently, under Assumption 2, the characteristics are sufficient for the covariance matrix and expected returns, investors construct their optimal portfolio based on the stocks' characteristics, then the portfolio weight on stock n is (for simplification, I drop time subscripts):

$$w_i(n) = \frac{\delta_i(n)}{1 + \sum_{m \in N_i} \delta_i(m)} \tag{7}$$

where

$$\delta_i(n) = exp(b_{0,i} + \beta_{0,i} me(n) + \beta_{1,i}^{'} x(n))\epsilon_i(n). \tag{8}$$

and

- $b_{0,i}$: the intercept, refers to the investment in the outside asset. In the real world, the outside investment should include bonds and cash, which are unavailable in my case. The investments in financial stocks are the only source of outside investment.
- $\beta_{0,i}$: the price elasticity of demand, according to Assumption 4, should be smaller than 1. Therefore, $\beta_{0,i} < 1$ is sufficient for downward sloping demand curves in both individual and aggregate level, consistent with most asset pricing models.
- $me(n)$: the log market equity of stock n. Since shares outstanding is not economically meaningful, only stock prices enter the estimation of demand through market equity.
- $x(n)$: the stock characteristics, include log book equity, profitability, investment, dividend to book equity ratio, and market beta. Recall under Assumption 3, these characteristics are exogenous.
- $\beta_{1,i}$: the demand for stock characteristics.
- $\epsilon_i(n)$: the latent demand, refers to the unobserved characteristics by econometricians. Under Assumption 1, no short selling is allowed. Thus, $\epsilon_i(n) \geqslant 0$ is required for the nonnegative portfolio weights.

Consequently, consistent with Assumption 2, the optimal portfolio weights are jointly determined by the information of other assets, log market equity, other observed and unobserved stock characteristics. Meanwhile, the relative demand across stocks in each investment universe can be inferred by the cross-sectional variation in $\epsilon_i(n)$. Consequently, one can construct a proxy of institutional investors' sentiment for a stock: the averaged latent demand across investors weighted by AUM. Intuitively, the dispersion in such proxy represents the asset-level measure of investors' disagreement.

In addition, under Assumption 4, Koijen & Yogo (2019) has shown that a unique equilibrium exists. With the following market clearing condition:

$$ME(n) = \sum_{i=1}^{I} A_i w_i(n, me, x, \epsilon). \tag{9}$$

where A refers to the wealth distribution of investor i. One can solve for asset prices by imposing the characteristics-based demand system.

Instrumental Variable

The characteristics-based demand system, however, is subject to endogenous issues. Specifically, the latent demand $\epsilon_i(n)$, is jointly endogenous with asset prices. For example, the unobserved characteristics could be correlated across investors. Therefore, an instrumental variable for the market equity is needed.

Empirical Specification

Based on Equation 7, the fraction invested in the outside asset equals:

$$w_i(0) = 1 - \sum_{n \in N_i} w_i(n) = \frac{1}{1 + \sum_{m \in N_i} \delta_i(m)} \tag{10}$$

And one can get Equation 8 by Equation 7 and Equation 10 using $\frac{w_i(n)}{w_i(0)} = \delta_i(n)$. According to Koijen & Yogo (2019), there are two situations that an investor does not hold an asset:

$$\frac{w_i(n)}{w_i(0)} = \delta_i(n) = \begin{cases} \mathbb{1}_i(n)\ exp\{b_{0,i} + \beta_{0,i} me(n) + \beta_{1,i}^{'} x(n)\}\epsilon_i(n), \text{if } n \in N_i \\ \mathbb{1}_i(n) = 0, \text{if } n \notin N_i \end{cases} \tag{11}$$

- When $\epsilon_i(n) = 0$, an investor chooses not to hold an asset. For example, the investor believes that such asset is overvalued.

- When $\mathbb{1}_i(n) = 0$, an investor cannot hold an asset that is outside her investment universe, which is exogenous and predetermined.

Instrumental Variable

Under Assumption 5, all the investors' wealth and investment universe are predetermined and exogenous to current demand shocks. The instrumental variable for log market equity is:

$$\hat{me}_i(n) = log(\sum_{j \neq i} A_j \frac{\mathbb{1}_j(n)}{1 + \sum_{m=1}^{N} \mathbb{1}_j(m)}) \tag{12}$$

which depends only on the wealth distribution and investment universe of other investors. Alternatively, one can regard this instrument as other investors' wealth distributed with equally-weighted portfolios. An alternative instrument is also used for robustness check:

$$\hat{me}_i(n) = log(\sum_{j \neq i} A_j \frac{\mathbb{1}_j(n) BE(n)}{1 + \sum_{m=1}^{N} \mathbb{1}_j(m) BE(m)}) \tag{13}$$

BE refers to the book equity of a stock.

By the definition of the instrumental variable, when a stock is included in the investment universe of more institutions, the exogenous component in demand is larger. With Assumption 5, Assumption 6 and the instrumental variable, I have the following moment condition for the regression estimation:

$$\mathbb{E}[\epsilon_i(n) | \hat{me}_i(n), x(n)] = 1 \tag{14}$$

Regression Estimation

The non-linear regression of Equation 8 can be estimated based on the conditional moment condition (Equation 14) using GMM. Considering the fact that most institutions have very concentrated portfolio allocations, as is shown in Table 2, I run the estimation at the institutional level for institutions with more than 1,000 cross-sectional holdings. For institutions with less than 1,000 cross sectional holdings, I group institutions by their type and lagged AUM in the last quarter, making an average of 2,000 cross-sectional holdings for each group.

Political Uncertainty in the Chinese Market

Estimation of Institutions' Demand

As is shown in the study of L. X. Liu et al. (2017), increased political uncertainty leads to decreased stock prices, especially for more politically sensitive firms. Also, the authors have confirmed that such a price drop results from a change in the discount rate instead of a change in cash flows. Alternatively, in a characteristics-based demand model with heterogeneous investors' beliefs, one can analyze such price drops from institutional investors' side using the market clearing condition (see Equation 9). As is shown in Table 3, there are more than 5,000 institutions since 2010, composing over 50 percent of the Chinese stock market in terms of market capitalization. Therefore, investigating the role of institutional investors with heterogeneous beliefs to stock political sensitivity is important to understand dropped stock prices with higher political uncertainty.

If I include stock political sensitivity as an additional exogenous stock characteristic, which will enter the regression through $x(n)$ in Equation 8, then I could interpret different institutions' demand over time by the coefficient $\beta_{1,i}$. Further, given the estimated coefficients, I can examine if decreased stock prices result from lower institutional investors' demand.

Variance Decomposition

Another key finding in the paper of L. X. Liu et al. (2017) is the increased stock volatility of political sensitive firms following unexpected political events. Innovatively, the characteristics-based demand system provides a way to decompose stock volatilities. Taking the logarithm of the market clearing condition (Equation 9):

$$p = f(p) = log(\sum_{i=1}^{I} A_i w_i(p)) - s \tag{15}$$

Then the market clearing condition defines an implicit function for log price:

$$p_t = g(s_t, x_t, A_t, \beta_t, \epsilon_t) \tag{16}$$

where s_t is the shares outstanding at time t. It is clear that asset prices are fully jointly determined by shares outstanding, observed and unobserved characteristics, investor's wealth, and the coefficients (demand) on characteristics.

And the definition of log return for stock n:

$$r_{t+1}(n) = p_{t+1} - p_t + v_{t+1} \tag{17}$$

where $v_{t+1} = log(1 + \frac{D_{t+1}(n)}{P_{t+1}(n)})$ refers to the dividend yield. By decomposing the capital gain $p_{t+1} - p_t$ as:

$$\Delta_{p_{t+1}}(s) + \Delta_{p_{t+1}}(x) + \Delta_{p_{t+1}}(A) + \Delta_{p_{t+1}}(\beta) + \Delta_{p_{t+1}}(\epsilon) \tag{18}$$

Then the cross-sectional variance of log returns becomes:

$$\begin{aligned} Var(r_{t+1}) = Cov(\Delta_{p_{t+1}}(s), r_{t+1}) + Cov(\Delta_{p_{t+1}}(x), r_{t+1}) + \\ Cov(\Delta_{p_{t+1}}(A), r_{t+1}) + Cov(\Delta_{p_{t+1}}(\beta), r_{t+1}) + \\ Cov(\Delta_{p_{t+1}}(\epsilon), r_{t+1}) + Cov(v_{t+1}, r_{t+1}) \end{aligned} \tag{19}$$

where changes in shares outstanding, changes in characteristics and dividend yield represent the supply-side effects; changes in AUM, changes in coefficients on characteristics and changes in latent demand refer to the demand-side effects.

Additionally, if the demand-side effects dominate, I could further use this variance decomposition to investigate the contribution to the total variance of different types of institutions in November 2012 - the beginning of the anti-corruption campaign.

Stock Returns Predictability

Under Assumption 6, the latent demand is mean reverting while other variables follow random walks, by Equation 16, the first-order approximation of expected capital gain in the long run is:

$$\begin{aligned}\mathbb{E}[p_T - p_t] &\approx g(\mathbb{E}[s_T], \mathbb{E}[x_T], \mathbb{E}[A_T], \mathbb{E}[\beta_T], \mathbb{E}[\epsilon_T]) - p_t \\ &= g(s_t, x_t, A_t, \beta_t, 1) - p_t\end{aligned} \tag{20}$$

Thus, for each stock, the long-run expected return can be estimated by this mean-reverting latent demand. As I have discussed in Section 3, the average latent demand shows investors' sentiment at the asset level: a higher latent demand leads to higher asset prices, resulting in lower expected returns in the long run.

Empirical Results

Estimation Results

Following Koijen & Yogo (2019), I summarize the coefficients for characteristics-based demand (Equation 14) by GMM under moment condition (Equation 20). The cross-sectional mean of estimated coefficients for log market to book equity, log book equity, profitability, investment, dividends to book equity, market beta, and political connection are shown by institution type, weighted by the corresponding AUM. Moreover, because there are only limited observations on holdings of bank for the whole sample period, and on holdings of all institutions before 2005:2, I further adjust my sample from 2005:2 to 2022:1, in which institutional investors have higher stock market proportion. Consequently, the following sections show the cross-sectional mean of estimated coefficients for stock characteristics by eight institutions from 2005:2 to 2022:1, weighted by AUM.

Estimated Price Elasticity of Demand

According to Koijen & Yogo (2019), a lower coefficient on log market to book equity indicates a higher demand elasticity. In general, based on Figure 1, fund company, foreign institutions, financial investment, insurance company, social and government institutions tend to have stable demand elasticity over time. Thus, benchmarking trading may exists in those institutions, making them cannot derive too far from market weights. Nevertheless, among all the institutions, trust and non-financial institutions have both lower and volatile estimated coefficients over time, suggesting that they are having higher demand elasticity for log market to book equity over time. Considering that there is no economic meaning for shares outstanding, the demand elasticity for market equity refers to their demand elasticity for stock price. For example, a -5 mean coefficient suggests that the institution will reduce its holding by 6% if the price increases by 1%[6]. Therefore, the elasticity of demand for trusts and non-financial institutions appears to be very sensitive to price changes over time, regardless of transaction costs. Consequently, it might be a good idea to investigate what these institutions are and the detailed holdings of their portfolios.

Trust Companies and Non-financial Institutions

For both trusts and non-financial institutions, I summarize the largest institution by AUM, the annual mean of AUM of the largest institution, the main types of shares in their portfolio, and the type of the largest institution.

As is shown in Table 6, in each year, all the largest trust companies are SOEs. More specifically, the trusts are either directly controlled by the SOEs or held by the big five banks. Interestingly, if a trust is directly controlled by the SOEs, such as China national petroleum corporation, Huaneng Corporation, and Shanghai International Trust Co., Ltd., it tends to have a small set of stocks in its investment portfolio. In contrast, if a trust is held by the big five banks, it normally has a well-diversified investment portfolio overtime. Different from western countries, China trust industry has been growing

[6] According to Koijen & Yogo (2019), the change of holding equals -(1 - the coefficient).

rapidly with difficulties in developing continuously and healthily, owing to the lack of core competence, exclusive business, and sufficient trust professionals[7]. Consistent with my results, the demand elasticity of trusts becomes less volatile in recent years because of the more regulated law and policy system. Also, given their risky nature and low chance of survivorship, the small and medium enterprises (SMEs) in China are faced with extreme difficulties in financing, leading trust companies serve as an alternative financing resources (Tao et al., 2022). It is plausible because the bank related trusts are having well-diversified portfolios overtime. Moreover, trust company seems to be a crucial channel for shadow banking, similar to the finding that bank-affiliated institutions play strategic roles in relationship banking, providing credit to clients to circumvent the credit tightening policy of the government (Chang et al., 2022).

Similar analysis applies to non-financial institutions, which typically refer to large SOEs. As is shown in Table 7, except for the last two years, all the largest non-financial institutions are SOEs. While the private institution only holds its own company's stock in the portfolio, the large SOEs are having a larger set of stocks in the related industries in their portfolio. Owing to its SOEs-dominated nature of the non-financial institution, a possible explanation for the volatile demand elasticity over time is: the non-financial institutions may adjust their portfolios for other purposes, for example, trading as a tool for government intervention.

Estimated Demand for Political Connection

Based on Figure 2, except for trusts and non-financial institutions, the remaining intuitions generally have stable demand for politically-connected stocks over time. If I zoom in the mean coefficients from 2010:2 to 2014:1, which refers to Period 4 of Table 3, I could further analyze if there is a decreasing trend in institutions' demand for stocks with political connections. Firstly, Period 4, after which the total market proportion of institutional investors has increased beyond 50%, serves as an ideal sample because it covers a period of high political uncertainty and exogenous unexpected political shocks, such as Bo's political scandal, leadership transmission, and announcement of anti-corruption campaign.

[7] http://www.xtxh.net/xtxh/english/index.jhtml

As is shown in Figure 3, consistent with my hypothesis, institutional demand for stocks with political connections, excluding foreign institutions, shows a clear downward trend from 2012:3 to 2013:1. Moreover, the non-financial institutions and trusts contribute the most of this decreasing demand.

Considering that Figure 3 only shows the mean of estimated coefficients weighted by AUM, I further invoke a Jonckheere–Terpstra test to verify if a deceasing trend among all coefficients from 2012:3 to 2013:1 exists. Based on Table 5, the mean response score decreases as the date move forward, indicating there is a downward trend at the 1% significance level from 2012:3 to 2013:1.

I propose two possible explanations for this decreasing trend among Chinese institutions. On the one hand, Chinese institutions tilt their portfolio away from stocks with political connections because they believe the political risk is higher during this period. Thus, reducing holdings of politically connected stocks may protect institutions from higher political risk. On the other, Chinese institutions may feel that they are facing higher political uncertainty, and temporarily reducing their politically connected holdings becomes their best option at the time. Similar ideas shared by the foreign institutions. Before 2012, the foreign institutions generally has a negative demand for stocks with political connections, and they even decrease their demand from 2011:4 to 2012:3 owing to higher political uncertainty in 2012. Nevertheless, they tend to have a positive demand after the leadership transaction and announcement of anti-corruption campaign at 2012:4 while reduce their demand back to the original level after 2013:2. This adjustment might because foreign institutions initially regard the new leadership and announcement of anti-corruption campaign as a good signal to invest in politically-linked stocks, but they soon reduce their demand to the original level as the reality has failed to meet their expectations.

Therefore, except for foreign institutions, the Chinese institutional investors tilt their portfolio away from stocks with political connections, leading to lower aggregate demand and corresponding lower stock prices. This finding provides a new way to understand the share price decline in 2012, which past research has attributed to changes in discount rates and political risk in pricing (L. X. Liu et al., 2017).

Estimated Demand for Other Characteristics

In contrast to Koijen & Yogo (2019), who find positive mean coefficients of log book equity for all institutions, I observe negative mean coefficients for households, trusts and non-financial institutions while other institutions have positively stable coefficients over time in Figure 4. Specifically, the coefficient of log book equity represents investors' demand for size. Thus, on average, non-financial institutions and trusts tilt their portfolio toward smaller stocks, supporting my explanations that the non-financial institutions may adjust their portfolios for other purposes and that trusts may serve as an alternative of financing for SMEs. In addition, household demand for size is both volatile and negative, which has become positive in recent years, suggesting households have recently preferred large stocks.

Different from Koijen & Yogo (2019), who find mean coefficients of profitability range from -1 to 2, Chinese institutional investors demand for profitability in larger magnitude. Except for certain periods, most institutions have positive demand for profitability over time, suggesting that company profitability is a key factor in investing.

Though different institutions are adjusting their demand for profit over time, the investment characteristic seems to be less important for institutional investors in China. As is shown in Figure 6, the magnitude of profitability is quite high while the magnitude of investment is extremely small. Thus, I can conclude that the investment factor is not important in the Chinese market, consistent with Q. Lin (2017), who states that for describing average returns, the investment factor is redundant.

Different from western countries, only a small sample of listed firms are paying cash dividends in China. This fact is owing to the unique institutional settings in China, which lead to conflicting effects for dividend payment: managers prefer to pay few or no dividends, controlling shareholders with nonnegotiable shares prefer cash dividends, while negotiable shareholders want capital gain rather than dividends (Huang et al., 2011). Therefore, limited to the few records of dividend payments, as is shown in Figure 7, I find relatively stable demand in small magnitude for dividends among all the institutions.

Lastly, following Koijen & Yogo (2019), I use the monthly rolling beta with a 60-month moving window for my beta estimation. In general, the demand for market beta of institutions tend to fall during recessions, such as 2008 financial crisis and 2015 Chinese stock market crash[8], suggesting that the demand for market risk is procyclical.

Figure 9 presents the cross-sectional standard deviation for log latent demand of different institutions, weighted by AUM. A higher standard deviation means more extreme portfolio weights tilted towards unobserved characteristics. Except for certain quarters, social and government institutions, foreign institutions, fund, insurance company, and financial investment tend to have fewer variations in latent demand. In contrast, trusts, non-financial institutions, and households have very large variation in latent demand over time. Again, trusts and non-financial institutions may have other motives that are not observable by stock characteristics when they adjust their portfolios.

Weak Instrument

A first-stage regression of log market equity on the instrumental variables and other stock characteristics is invoked to test the weak instrument issues in Equation 12, using the critical value given by Stock & Yogo (2005). For each quarter, such first-stage regression is employed for each institutional investor. Figure 10 shows the minimum first-stage t statistic on the instrumental variable of all institutions for each quarter, indicating that after 2004, all the first-stage t statistics are above the critical value of 4.05 to reject the null hypothesis of a weak instrument at the 5 significance level. This case is acceptable because there are only limited observations before 2004, and my research will focus on periods with more institutional investors.

Also, an ideal scenario for the instrumental variable is to allow the variation of the investment universe across institutions, because the cross-sectional variation of the instrumental variable is mainly driven by such variation across institutions' investment universes. In Table 3, from 2006 to 2022, the median institution has only 1 stock in its investment universe and the 90th percentile institution has only 75 to 147 stocks, showing

[8]For example, stated by Sornette et al. (2015).

that institutions tend to have a small set of stocks in their investment universe. Thus, it is plausible to confirm the variation in the investment universe across institutions.

Conclusion

Using a characteristics-based demand system, this paper confirms the importance of politically related characteristics in explaining institutional investors' demand over time. Taking the year 2012 as a sample period with high political uncertainty, I find almost all the institutions decrease their holding for politically connected stocks, leading to lower aggregate institutional demand. Consequently, this finding provides a new way to understand decreased stock prices in times of higher political uncertainty, contributing to demand-based research for both developing and developed countries. Interestingly, compared to other institutions, trusts and non-financial institutions have higher price elasticity of demand, prefer smaller-size stocks, and tend to tilt their investment portfolio to unobserved characteristics over time. Considering their long-lasting connections with the government, they may adjust their portfolios for other purposes, for example, serve as alternative financing sources for small and medium enterprises or trade as a tool of government intervention. Possible directions for future research include using the province level corruption index as a cross-sectional measure of political uncertainty for the full sample period, stock volatility decomposition analysis, and stock return predictions.

Tables and Figures

TABLE 1: Variable Descriptions.

This table presents the definitions of variables invoked by this paper. The stock trading data, the accounting data, and the institutional holding data are collected from CSMAR in the period of 1998:6 to 2022:3. For the construction of stock characteristics, to reduce the impact of outliers, I winsorize investment, profitability, and market beta at the 2.5th and 97.5th percentiles. I winsorize dividends to book equity at the 97.5th percentile. I group institutional investors into eight types.

Category of Institutional Investors	
Type	**Institutions**
Fund	Fund Company, Security Investment Fund Fund Account Wealth Management, Public Welfare Fund
Foreign	QFII Shareholding (Qualified Foreign Institutional Investor) Other Overseas Institution
Financial Investment	Securities Brokerage Shareholding, Venture Capital Company Financial Asset Management Company, Futures Company Securities Investment Consulting Company
Insurance	Insurance Company, Insurance investment Portfolio
Social and Government	Social Security Fund Shareholding Government Institution/Public Institution
Trust	Trust Company, Trust Asset Management Plan
Bank	Bank
Other Institution	Other Non-Financial Institution
Stock Characteristics	
Variable	**Definitions**
Log market equity	The logarithm of (stock price $*$ stock shareholding)
Log book equity	The logarithm of shareholder's equity
Profitability	The ratio of operating profits to book equity
Investment	The logarithm of annual growth rate in total assets
Dividend to book equity	The ratio of annual dividends per share to book equity
Market beta	The monthly rolling beta using a 60-month moving window
Political connection	The logarithm of (1 + number of politically connected board directors)
Leverage	The ratio of total liabilities to total assets
Liquidity	The ratio of traded shares to total shares outstanding

TABLE 2: Persistence of The Investment Universe.

This table presents the percentage of stocks held in the current investment universe that were ever held in the previous 1 to 11 quarters. The pooled mean of all institutional investors over time is shown in each cell for given assets under management (AUM) percentile. The quarterly sample period ranges from 1998:2 to 2022:1.

	Previous Quarters										
AUM Decile	1	2	3	4	5	6	7	8	9	10	11
1	92	92	93	94	94	95	95	96	96	97	97
2	92	93	94	94	95	95	96	96	97	97	97
3	91	93	94	95	95	96	96	96	97	97	97
4	90	92	94	95	95	96	96	96	97	97	97
5	91	93	95	95	96	96	97	97	97	97	98
6	92	94	95	96	96	96	97	97	97	97	98
7	92	94	95	95	96	96	97	97	97	97	97
8	92	94	95	95	96	96	96	97	97	97	97
9	92	94	95	96	96	96	96	97	97	97	97
10	93	94	95	96	96	96	96	97	97	97	97

TABLE 3: Summary Statistics of Institutions

This table shows the time-series mean of the summary statistics in each period, based on the institutional holding data from CSMAR. The quarterly sample period ranges from 1998:2 to 2022:1. Period 1 refers to 1998:2-2002:1; Period 2 refers to 2002:2-2006:1; Period 3 refers to 2006:2-2010:1; Period 4 refers to 2010:2-2014:1; Period 5 refers to 2014:2-2018:1; Period 6 refers to 2018:2-2022:1

	Number of	**% of Market**	**AUM (000,000)**		**Number of Stocks Held**		**Number of Stocks in Investment Universe**	
Period	**Institutions**	**Held**	**Median**	**90th Percentile**	**Median**	**90th Percentile**	**Median**	**90th Percentile**
1	12	2	962	1,610	18	28	32	46
2	1,853	30	196	859	12	29	30	80
3	3,460	46	134	1,960	1	7	1	54
4	5,453	58	219	2,725	1	12	1	75
5	9,506	55	323	3,637	1	18	1	85
6	14,188	66	239	2,921	1	31	1	147

Table 4: Summary Statistics of Firm Characteristics

This table shows the summary statistics of the stock characteristics for all the investors. Consistent with my estimation period, the quarterly sample period ranges from 2005:2 to 2022:1.

	Obs	**Mean**	**Std dev**	**Min**	**25th**	**Median**	**75th**	**Max**
LNme	5,511,421	8.226	0.887	-1.201	7.609	8.215	8.802	18.705
LNbe	5,511,421	8.633	1.589	-2.328	7.487	8.461	9.561	14.183
Profit	5,523,657	0.073	1.189	-32.216	0.035	0.065	0.106	16.814
Investment	4,840,035	0.192	0.002	-0.134	0.057	0.142	0.262	0.645
Political	4,725,446	1.295	0.654	0.000	0.693	1.386	1.792	3.664
Beta	4,662,534	1.065	0.443	0.241	0.801	1.046	1.303	2.198
Dividend	4,528,264	0.000	0.000	0.000	0.000	0.000	0.000	0.005
Leverage	5,528,380	0.398	0.206	0.025	0.228	0.391	0.552	0.923
Liquidity	5,335,329	26.680	25.204	0.026	9.723	17.760	34.537	153.797

Table 5: Jonckheere–Terpstra Test for Trend

This table shows the results of a Jonckheere–Terpstra test. All the estimated coefficients are assigned into 3 groups: 2012:3, 2012:4 and 2013:1. The corresponding observations, mean response score, and standard errors are shown in the table. $*, **$, and $***$ denote statistical significance at the 10%, 5%, and 1% level, respectively.

Date	**Mean response score**	**Number of observations**	**Std. err.**
2012:3	0.088***	6,383	39.558
2012:4	0.033***	53,695	39.558
2013:1	0.009***	6,587	39.558

Table 6: Annual Largest Trust

This table presents the annual largest trust company in terms of AUM from 2006 to 2022. The name of the largest trust company, its mean AUM in each year, and the type of the institution (SOE or non-SOE) are shown in Panel A; In Panel B, I include main types of shares in the portfolio of the example largest trust company. Specifically, CNPC refers to China national petroleum corporation, one of the largest SOEs in China.

Panel A

Year	Name	Mean AUM (in millions)	SOE
2006	Shanghai International Trust Investment Company	6,448	Yes
2007	Shanghai International Trust Co., Ltd.	16,929	Yes
2008	Shanghai International Trust Co., Ltd.	8,191	Yes
2009	Shanghai International Trust Co., Ltd.	39,610	Yes
2010	Shanghai International Trust Co., Ltd.	13,090	Yes
2011	Shanghai International Trust Co., Ltd.	11,170	Yes
2012	Shanghai International Trust Co., Ltd.	9,840	Yes
2013	Shandong International Trust Investment Company	11,721	Yes
2014	Shandong International Trust Investment Company	13,464	Yes
2015	Shenzhen International Trust Investment Co., Ltd.	42,888	Yes
2016	Shenzhen International Trust Investment Co., Ltd.	34,088	Yes
2017	CNPC - China Securities - Special Account	30,904	Yes
2018	CNPC - China Securities - Special Account	30,302	Yes
2019	Dacheng Fund - Agricultural Bank of China	31,557	Yes
2020	Dacheng Fund - Agricultural Bank of China	28,229	Yes
2021	ChinaAMC - Agricultural Bank of China	38,476	Yes
2022	Dacheng Fund - Agricultural Bank of China	24,266	Yes

Panel B

Trust Name	Type of Stocks in Portfolio
CNPC - China Securities - Special Account	Oil and Gas Extraction
Shanghai International Trust Co., Ltd.	Automobile Manufacturing
	Real Estate Industry
	Retailing
	Textile Industry
	Coal Mining and Processing
ChinaAMC - Agricultural Bank of China	Civil Engineering Construction
	Ancillary Activities for Mining
	Railroad Transport
	Medicine Manufacturing
	Wholesale

Table 7: Annual Largest Non-financial Institutions

This table presents the annual largest non-financial institutions in terms of AUM from 2006 to 2022. The name of the largest non-financial institution, its mean AUM in each year, and the type of the institution (SOE or non-SOE) are shown in Panel A; In Panel B, I include main types of shares in the portfolio of the example largest non-financial institution. Specifically, Sinopec Group refers to China Petroleum Chemical Corporation, one of the largest SOEs in China.

Panel A

Year	Name	Mean AUM (in millions)	SOE
2006	Sinopec Group	530,364	Yes
2007	China National Petroleum Corporation	1,958,618	Yes
2008	China National Petroleum Corporation	1,063,512	Yes
2009	China National Petroleum Corporation	1,380,482	Yes
2010	China National Petroleum Corporation	972,268	Yes
2011	China National Petroleum Corporation	1,677,179	Yes
2012	China National Petroleum Corporation	1,447,711	Yes
2013	China National Petroleum Corporation	1,261,656	Yes
2014	China National Petroleum Corporation	1,311,139	Yes
2015	China National Petroleum Corporation	1,606,713	Yes
2016	China National Petroleum Corporation	1,208,468	Yes
2017	China National Petroleum Corporation	1,379,241	Yes
2018	China National Petroleum Corporation	1,266,072	Yes
2019	Jizhong Energy Group Co., Ltd.	2,722,360	Yes
2020	China National Petroleum Corporation	1,475,772	Yes
2021	China National Petroleum Corporation	1,628,837	Yes
2022	China National Petroleum Corporation	882,696	Yes

Panel B

Trust Name	Type of Stocks in Portfolio
Sinopec Group	Water Transportation
	Oil and Gas Extraction
China National Petroleum Corporation	Water Transportation
	Ferrous Metal Smelting and Extruding
	Oil and Gas Extraction

FIGURE 1: Coefficients on Log Market to Book Equity

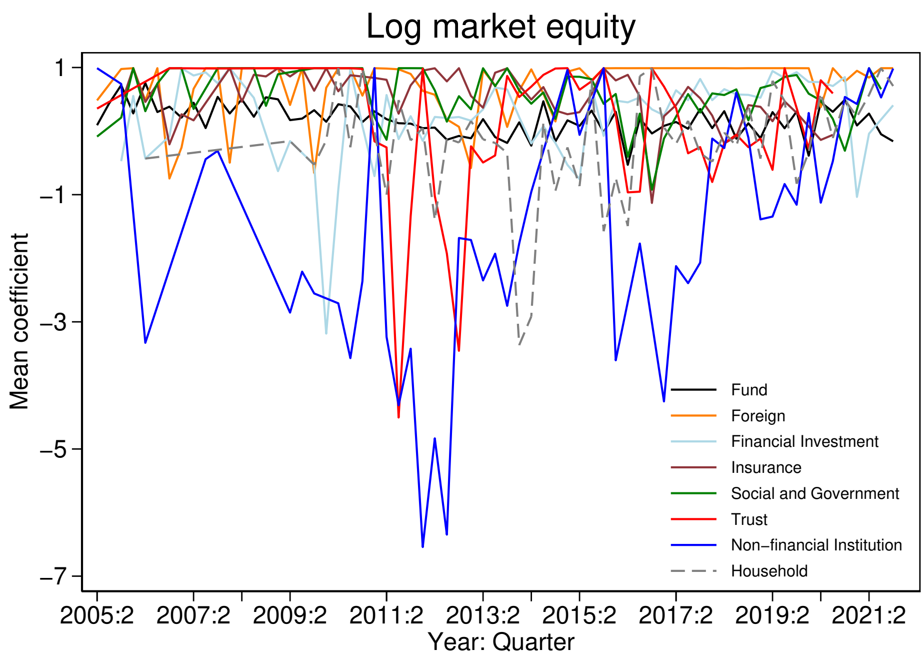

FIGURE 2: Coefficients on Political Connection

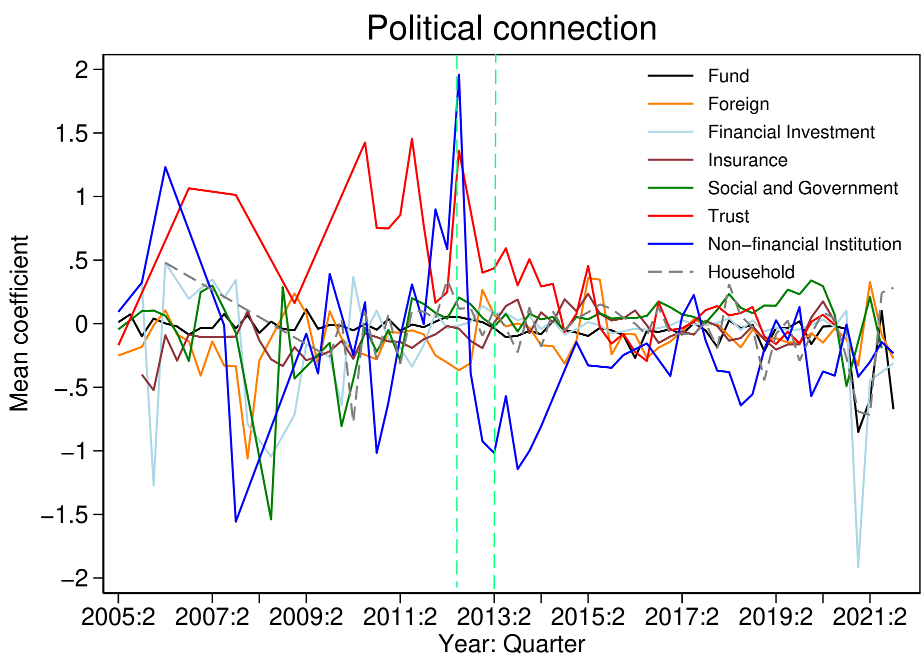

FIGURE 3: Coefficients on Political Connection - Sample

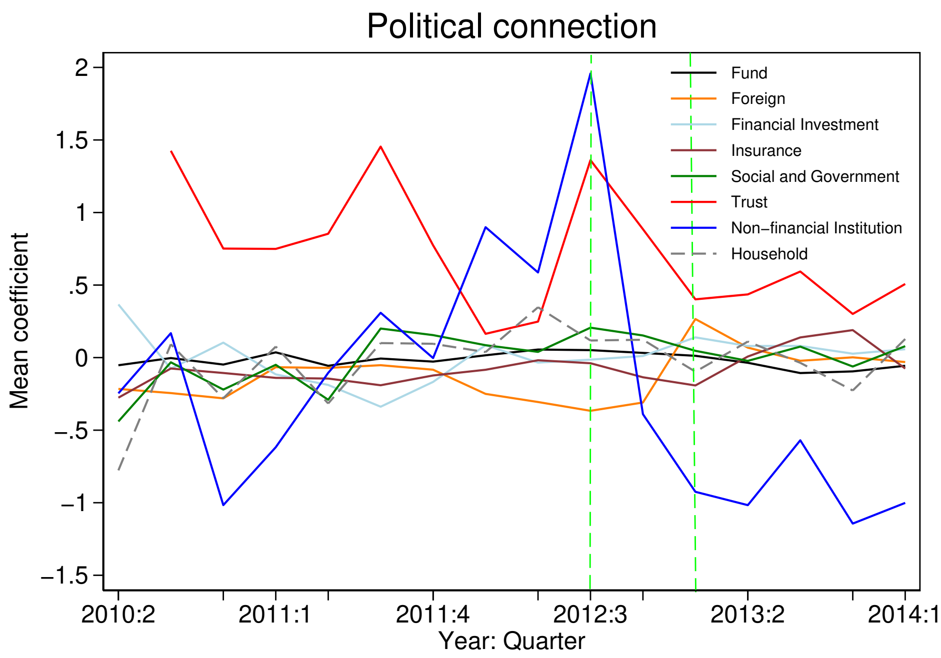

FIGURE 4: Coefficients on Log Book Equity

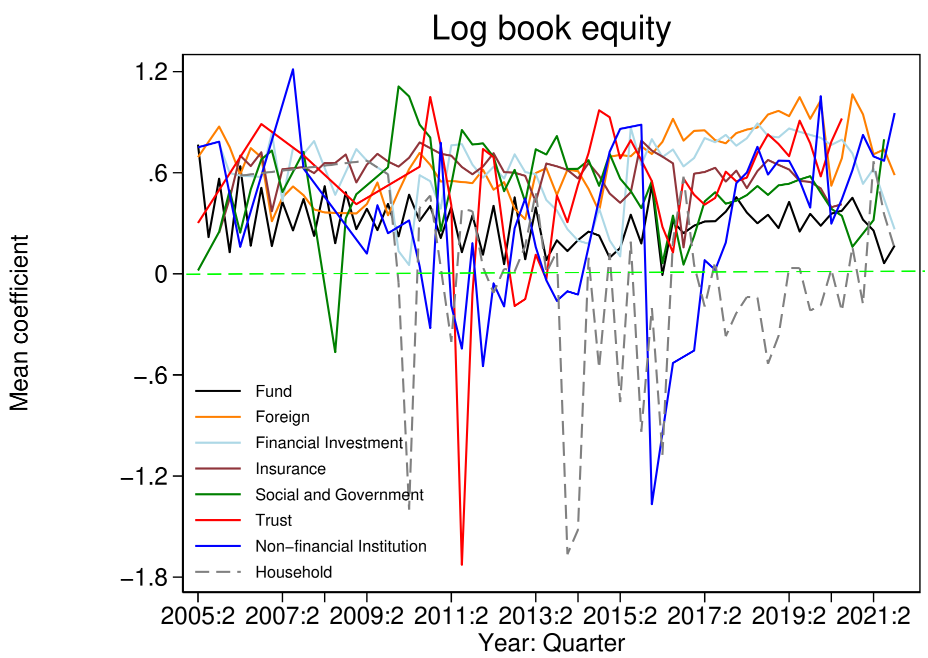

FIGURE 5: Coefficients on Profitability

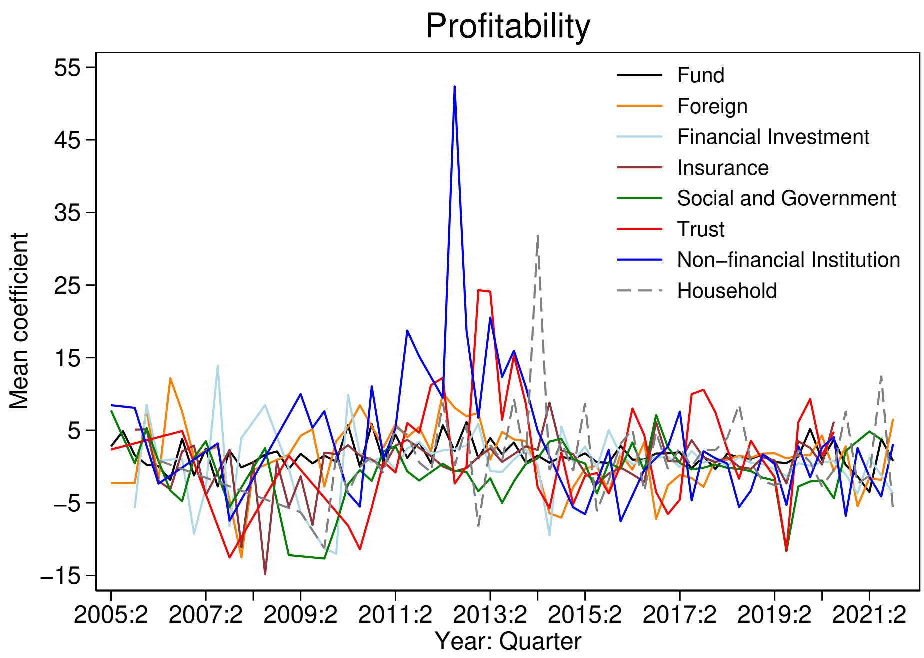

FIGURE 6: Coefficients on Investment

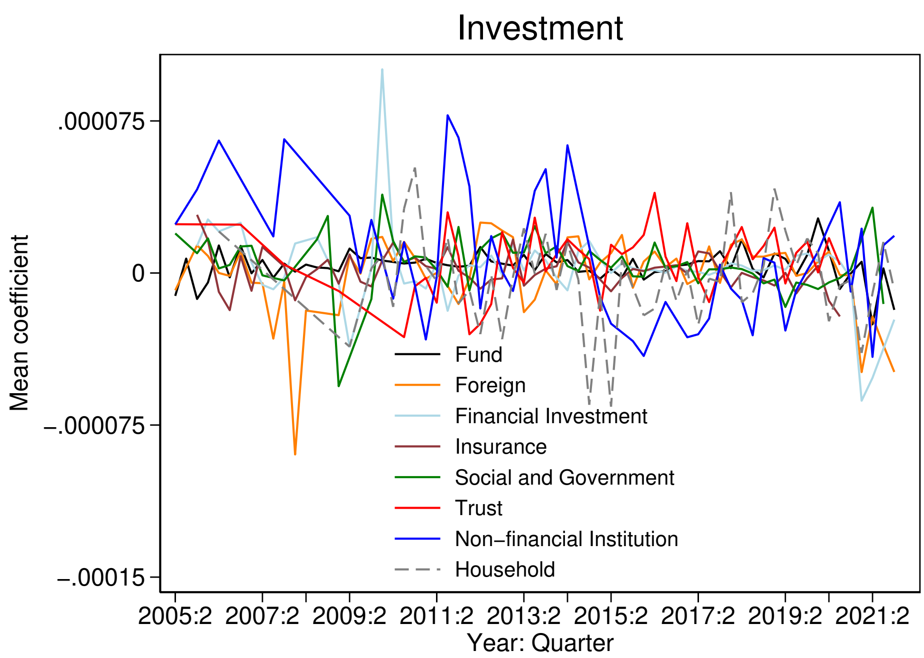

Figure 7: Coefficients on Dividend to Book Equity

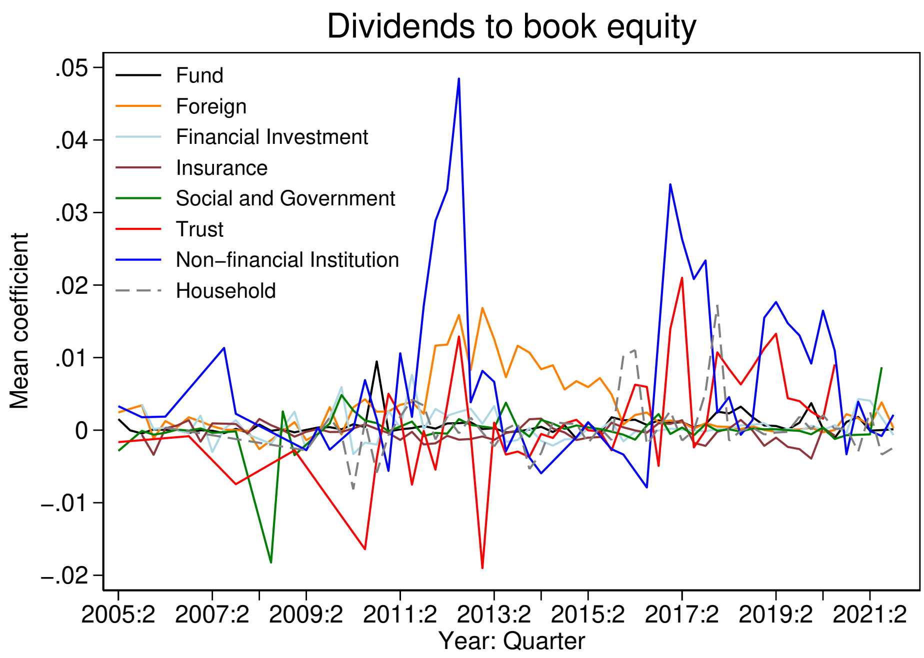

Figure 8: Coefficients on Market Beta

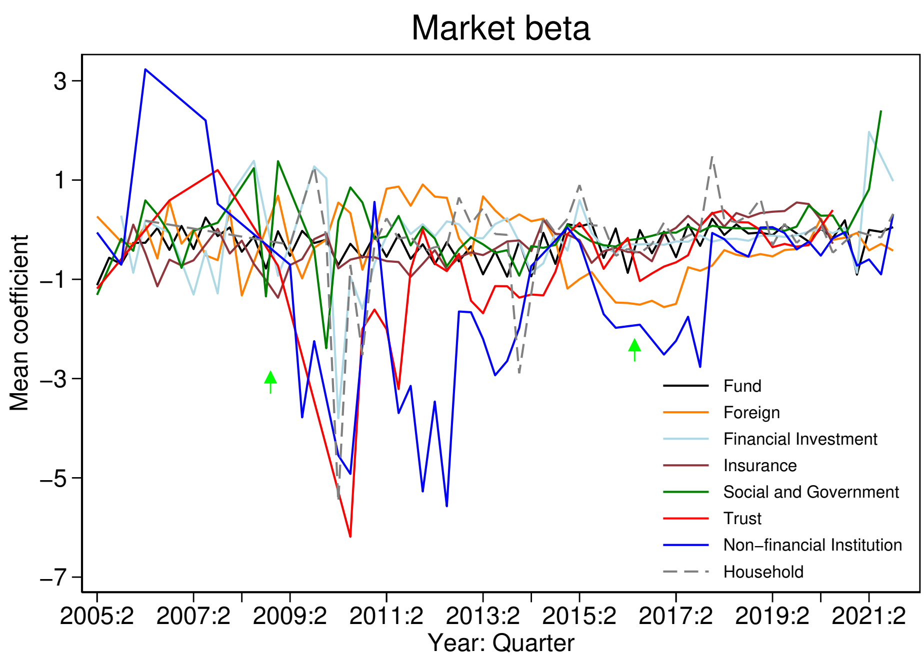

FIGURE 9: Standard Deviation of Latent Demand

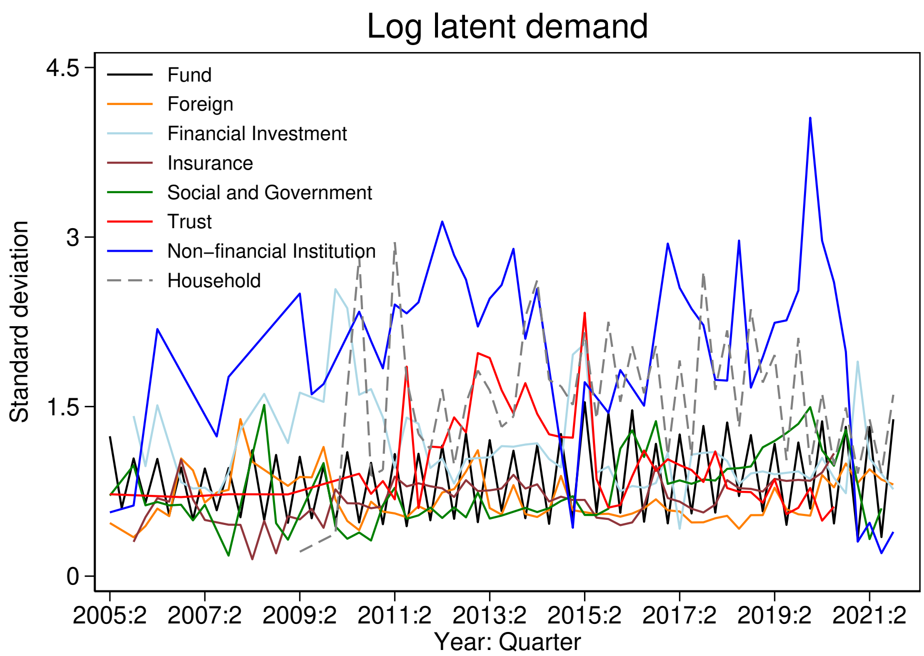

FIGURE 10: First-stage t statistic on the instrumental variable for log market equity

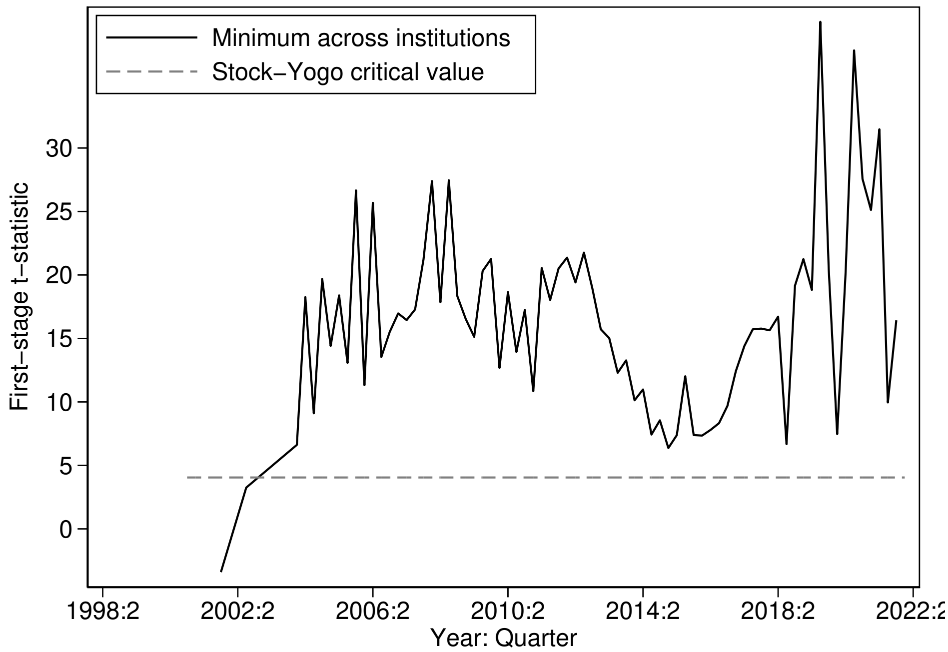

Table 8: Summary Statistics of Institutions by Type

This table shows the time-series mean of the summary statistics in each period, based on the institutional holding data by institution type from CSMAR. The quarterly sample period ranges from 1998:2 to 2022:1. Period 1 refers to 1998:2-2002:1; Period 2 refers to 2002:2-2006:1; Period 3 refers to 2006:2-2010:1; Period 4 refers to 2010:2-2014:1; Period 5 refers to 2014:2-2018:1; Period 6 refers to 2018:2-2022:1

	Number of	**% of Market**	**AUM (000,000)**		**Number of Stocks Held**		**Number of Stocks in Investment Universe**	
Period	**Institutions**	**Held**	**Median**	**90th Percentile**	**Median**	**90th Percentile**	**Median**	**90th Percentile**
				Panel A: Fund				
1	12	2	963	1,610	18	28	32	46
2	97	12	348	1,188	21	48	61	175
3	238	10	1,359	4,959	15	43	77	172
4	434	15	397	2,811	15	49	90	234
5	1,447	6	157	1,296	12	50	51	229
6	2,852	5	122	1,193	18	58	68	280
				Panel B: Foreign				
2	139	6	92	723	1	7	1	10
3	165	13	201	1,597	1	7	1	27
4	232	11	262	2,201	1	4	1	17
5	285	5	471	3,381	1	4	1	13
6	425	13	593	6,452	1	2	1	6
				Panel C: Financial Investment				
2	434	5	63	455	1	6	2	16
3	680	8	101	856	1	3	1	8
4	1,514	6	155	1,440	1	3	1	7
5	2,992	10	304	2,525	1	2	1	4
6	5,352	15	211	1,879	1	2	1	2
				Panel D: Insurance				
2	10	0	32	274	1	5	1	7
3	26	1	75	2,629	2	14	8	59
4	43	0	122	2,443	3	19	10	72
5	73	1	450	3,015	2	15	8	61
6	87	0	499	3,503	2	9	5	40
				Panel E: Social and Government				
2	94	1	243	860	5	13	10	28
3	102	4	201	1,712	1	8	2	40
4	142	2	266	3,824	1	10	1	33
5	146	3	596	4,062	1	21	1	82
6	173	0	460	4,954	1	14	2	62
				Panel F: Trust				
2	60	0	48	290	2	6	3	17
3	67	0	39	611	1	4	3	10
4	241	0	59	456	2	5	4	14
5	1,193	1	157	697	1	3	1	9
6	682	1	138	739	1	2	1	6
				Panel G: Bank				
2	20	0	58	213	1	4	1	5
3	22	0	75	657	1	4	1	9
4	24	0	79	878	1	3	1	5
5	16	0	122	752	1	2	1	4
6	58	0	201	1,222	1	2	1	2
				Panel H: Non-Financial Institution				
2	1,799	6	56	668	1	2	1	3
3	2,160	10	126	1,781	1	2	1	3
4	2,823	23	308	3,838	1	2	1	2
5	3,354	29	801	5,273	1	2	1	2
6	4,560	32	510	6,291	1	2	1	2

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