SYNERGY
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ISSN 2810-9295
02
9 772810 929246

Journal of Sustainable Business and Economics Research

Volume 7·Issue 2·April 2024 ISSN 2810-9295(Online)

Volume 7 · Issue 2 · April 2024
ISSN 2810-9295(Online)

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Journal of Sustainable Business and Economics

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Volume 7 Issue 2 • April 2024 • ISSN 2810-9295 (Online)

Journal of Sustainable Business and Economics

SYNERGY
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SYNERGY
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Volume 7 | Issue 2 | April 2024 | Page1-94
Journal of Sustainable Business and Economics

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Journal of Sustainable Business and Economics

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ARTICLE

Are Socially Responsible Banks More Risk Averse and Dividends Providers? Empirical Evidence from a Developing Economy

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ABSTRACT

Purpose: This study examines whether socially responsible firms are uninterested in risk-taking and whether socially responsible banks are more dividend providers than socially irresponsible ones. We conducted the analysis using the least-squares method for 290-panel data observations of 32 commercial banks operating in Bangladesh from 2008 to 2018. **Methodology:** We employed Ordinary Least Squares Regression for 290-panel data observations of 32 commercial banks operating in Bangladesh from 2008 to 2018 using EViews software version- 8. Moreover, we conducted descriptive analysis and correlations using SPSS software. We considered CSRI and CSRPI as the indicators of corporate social responsibility, dividend per share and stock dividend as a proxy of dividend policy, LEV (leverage), and non-performing loan to total loan as the indicators of financial risk, and lastly, Z score as the indicator of financial stability. **Findings:** Studies have shown that banks prioritizing social responsibility tend to pay dividends to their shareholders more frequently and consistently than banks that do not. In particular, banks that invest heavily in corporate social responsibility (CSR) tend to maintain a stable dividend payout, which can help address agency problems that arise from overinvestment in the CSR sector. Additionally, we found that banks that make huge expenditures on CSR also seem to have a low eagerness for risk-taking. Again, we found that the financial stability of a socially responsible bank is high and stable enough, which will help efficiently handle the bank's financial risks, reduce price fluctuations, and increase financial assets that generally influence a bank's monetary stability. **Implications:** Banks implementing fruitful CSR strategies can produce substantial shareholder advantages through high dividend payout levels. An expansion in CSR-related expenditure does not prompt a cut-down or reduce the portion of income paid out as dividends to shareholders. Therefore, the Output of our study will help provide critical information and a thorough understanding of corporate social responsibility and its association with the dividend policy, risk, and financial stability in the banking sector. This will also be useful to the researcher, students, and corporate policymakers while making a critical decision about whether a firm should make expenditures on CSR purposes, how it impacts a firm's dividend decision, and its connection with its overall risk and financial stability. According to the study, corporate social responsibility should be integrated into a firm's mission and strategy rather than appearing to be a mere act of generosity. **Originality/ Value:** This study uniquely considers CSR, dividend policy, risk, and financial stability simultaneously in a developing country. Besides, the three-dimensional measures of CSR used in the research focused on developing the economy are a precious contribution.

Keywords: Corporate Social Responsibility, Business stability, Risk, Stakeholders, Dividend policy, Bangladesh

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ARTICLE INFO

Received: 21 March 2024; Revised: 8 April 2024; Accepted: 11 April 2024; Published Online: 11 June 2024

DOI: http://doi.org/10.26549/jsbe.v7i2.16842

CITATION

Sultan, N., Sultan, W., 2024. Are Socially Responsible Banks More Risk Averse and Dividends Providers? Empirical Evidence from a Developing Economy. Journal of Sustainable Business and Economics. 7(2): 1–20. DOI: http://doi.org/10.26549/jsbe.v7i2.16842

1. Introduction

At present, CSR is considered a popular topic and a prime subject for the business world. The reasons are that CSR's amenities are now prominent, such as reducing employee transfer rate, promoting reputation, enhancing customer satisfaction, inspiring employees, and operational proficiency (Tran et al., 2019)[1]. Classical economists believe that a company's primary responsibility is to maximize shareholder value, and many private companies aim to increase their profit margin as their main objective. Classical economists believe that a company's primary responsibility is to maximize shareholder value, and many private companies aim to increase their profit margin as their main objective. Nevertheless, in reaching their ultimate goal, they should not perform their business activities in such a way that it will cause a negative side effect on the surrounding communities, environments, other stakeholders, and society at large. (Galant &Cadez,2017)[2]. Because business is for the betterment of people living in society, it is common sense that the business must rely on it to achieve its economic goals and objectives (Mc et al.,2000) [3] While striving for their objectives, companies must ensure that no adverse effects are caused to society or other stakeholders. This involves upholding social, environmental, and corporate governance standards collectively called corporate social responsibility. (Gupta & Krishnamurti, 2018)[4]. While striving for their objectives, companies must ensure that no adverse effects are caused to society or other stakeholders. This involves upholding social, environmental, and corporate governance standards collectively called corporate social responsibility. While striving for their objectives, companies must ensure that no adverse effects are caused to society or other stakeholders. This involves upholding social, environmental, and corporate governance standards collectively called corporate social responsibility. (Benlemlih M., 2019)[5]. Moreover, when CSR efficiency is attained or improved in a company, it will help to reduce the total cost allocated to the CSR sector, as claimed by (Wang, Lai et al, 2018)[6]. An ideal expenditure level of CSR can maximize the firm's profit while satisfying the needs of stakeholders, and the level should be determined by cost-benefit analysis(Mc Williams Siegel,2000) [3]. As per the financial theory, maximizing profit and the value of shareholder's wealth are the main objectives of a business. Business concerns should not be dominated not only by the shareholders but also by stakeholders who are often inspired by non-financial interests such as - the firm's impact on the environment, community, and society. Businesses can build up potent reputational capital, which means goodwill, which will further transmute into economic benefit and, thus, shareholder wealth(Fombrun, Cardberg, & Barnett, 2000)[7.] Though the rise in CSR expenditure is consistent with the value maximization of firms' insiders may deem it over-investment in CSR sectors due to their private interest (Barnea & Rubin, 2010)[8], (Benlemlih M., 2019)[5]. Due to increased pressure, companies often engage in corporate social responsibility (CSR) to fulfill their duties and responsibilities concerning economic, social, and environmental voluntary activities to their stakeholders for sustainable development(Smith, 2003)[9]. Again, several researchers argue that good CSR practices are a powerful tool because they attract talented and quality workforces and help in employment in an organization, which is a competitive advantage. In this regard, (Greening & Turban,2000)[10] found that Job seekers prefer socially responsible firms over irresponsible ones. Job seekers prefer socially responsible firms over irresponsible ones (Gatsi et al., 2016)[11]. Corporate managers often encounter the task of decision-making on the company's vital issues relating to financing decisions, investment decisions, dividend policy, and social responsibility expenditure in favor of their shareholders. There has been a long-standing debate among scholars regarding the relationship between corporate social responsibility and firm performance. On the other hand, the performance of any company is measured by how much dividends the company can earn or declare in the form of cash and stock dividends. High dividend distribution generally indicates the diminishing of the internal source of finance. However, long-term

investors usually seek capital gains and dividends(-Gusni, 2016)[12]. (Benlemlih M. (2019)[5] According to a report, high CSR (Corporate Social Responsibility)-providing firms are more likely to pay higher dividends than low CSR firms. This is based on two arguments. Firstly, the agency theory suggests that paying dividends can help minimize the inefficient use of an organization's resources. Secondly, the signaling theory proposes that a firm's dividend payout indicates strong prospects. Regarding CSR, firms are encouraged to create their resources ethically and sustainably. A high dividend payout ratio can increase the firm's reputation among potential stakeholders. According to a report, high CSR (Corporate Social Responsibility)-providing firms are more likely to pay higher dividends than low CSR firms. This is based on two arguments. Firstly, the agency theory suggests that paying dividends can help minimize the inefficient use of an organization's resources. Secondly, the signaling theory proposes that a firm's dividend payout indicates strong prospects. Regarding CSR, firms are encouraged to create their resources ethically and sustainably. A high dividend payout ratio can increase the firm's reputation among potential stakeholders.(Benlemlih M. (2019)[5]. (Brav et al. (2005)[13] claimed that managers are strongly inclined to bypass dividend cuts in most companies. Several studies have explained the reasons why a company should pay dividends. However, dividend policy remains in the puzzle because there is no clear explanation of why firms should pay dividends to their stockholders. A firm's dividend policy is vital for several reasons: It is crucial for the investors who are expecting fixed income, to the analysts as a valuable tool of evaluation, and to the managers as well as the investors as a source of reinvestment to hold the company's growth during emergencies (chai et al., 2011)[14].

Our study examines the relationship between a firm's corporate social responsibility expenditure, dividend policy, risk, and stability. Dividends are a crucial financial decision for most companies, and they are commonly used payout mechanisms, including cash and stock dividends. Our study examines the relationship between a firm's corporate social responsibility expenditure, dividend policy, risk, and stability. Dividends are a crucial financial decision for most companies, and they are commonly used payout mechanisms, including cash and stock dividends. (Benlemlih M,2019)[5]. Moreover, Financial reporting frequency is also associated with large payouts, as shown by (Eije & Magginson (2008)[15] and (Benlemliha (2019)[5]. Cash flow uncertainty can also affect a corporation's dividend payout policy. Declaration of dividends by firms causes a significant reduction of systematic risk when a firm increases dividend payments in time of their shareholders without raising their capital expenditures. However, they have to face a decrease in their profit when they incur any change in dividend payout policy. (Grullon et al., 2002)[16].

Again, the motive of reporting corporate social responsibility is to reduce risk related to a company's reputation, as this reputational risk may reduce its profit and dividends (Unerman, 2008)[17]. The article considers the relationship between a company's CSR expenses and dividend policy. Is the relationship linear or non-linear?

Does CSR positively affect the company's dividend policy?

Does CSR affect a firm's dividend policy and financial risk?

The study aims to address the gap in the existing literature about the level of corporate social responsibility exhibited by companies and how it correlates with their dividend policy and financial risk stability in Bangladesh. Very few studies have been conducted on corporate social responsibility, dividend policy, and risk stability, jointly taking into consideration. Most CSR and dividend policy studies have concentrated on the developed and other countries. So, to the best of our knowledge, this study focuses mainly on developing countries like Bangladesh's economy. As a result, our approach to considering developing countries will help to shed light on CSR, dividend policy, and risk stability.

The article is divided into several sections. The second section focuses on previous research that

explores the connection between corporate social responsibility and dividend policy. The third section describes the methodology used in the study, including data, samples, and statistical techniques. The study's main findings are presented and discussed in the fourth section. The fifth and final section provides concluding remarks and suggests directions for future research.

2. Literature Review

Companies are now using Corporate social responsibility as a strategic tool to enhance their image, gain competitive advantages, and increase firm value. (Benlemlih M). (2019)[5]. (Lulewicz-Sas (2017)[18] conducted a bibliometric analysis of scientific research on corporate social responsibility using VOS viewer software version 1.6.1. The bibliometric analysis results of scientific research on corporate social responsibility were presented in the findings. (Jensen (1986)[19] mentioned corporate managers as the agents of shareholders, but conflicting interests may exist between them, which is known as the agency problem. This usually occurs when there is free cash flow in the organization. In this regard, dividend policy and growing interest in corporate social responsibility are essential in corporate finance. Payout of dividends to shareholders will lessen the firm's resources under managers' control in one hand. As a result, managers' power in an organization will also be reduced. However, managers welcome activities related to the firm's growth because growth raises managers' power, enhancing the firm's resources under their control. Again, regarding CSR, managers may benefit from recognizing themselves as socially responsible when firms invest vast amounts in social and environmental sectors. A similar result is revealed by (Barnea & Rubin, 2010)[20], who argued that managers and other insiders always asked for over-investment in CSR sectors for personal benefit because it increases their reputation and the ''warm-glow'' effect. A recent study analyzed a unique dataset of 3,000 of the largest corporations in the U.S. to explore the relationship between firms' Corporate Social Responsibility (CSR) ratings, ownership, and capital structures. The study found that insider ownership and leverage are negatively correlated with a firm's social rating, while institutional ownership is not correlated. Insiders tend to encourage firms to invest more in CSR when it has little cost. Additionally, large, established companies with high leverage and a focus on growth are more likely to voluntarily maintain CSR and disclose socially responsible information to their stakeholders. This information was documented by (AL-Shubiri et al,2012)[21]. They developed a regression model to test the hypotheses and identify some critical determinants of CSR based on 60 companies in Jordan from 2006 to 2010. According to (Benlemliha's 2019)[5] research, firms that invest more in corporate social responsibility (CSR) tend to pay higher dividends than those that invest less in CSR. The study analyzed data from 22,839 US firms for 21 years (1991-2012). (Benlemliha)[5] found that socially irresponsible firms adjust their dividends more quickly than socially responsible firms. The study also revealed that high CSR-invested firms have a more stable dividend payout ratio. (Benlemliha)[5] used univariate and multivariate methods, including comparison tests and regression models, to arrive at these conclusions. According to (Benlemliha's 2019)[5] research, firms that invest more in corporate social responsibility (CSR) tend to pay higher dividends than those that invest less in CSR. The study analyzed data from 22,839 US firms over 21 years (1991-2012). (Benlemliha)[5] found that socially irresponsible firms adjust their dividends more quickly than socially responsible firms. The study also revealed that high CSR-invested firms have a more stable dividend payout ratio. (Benlemliha)[5] used univariate and multivariate methods, including comparison tests and regression models, to arrive at these conclusions. (Brown, Hilland, & Smith, 2006)[22] used two CSR hypotheses based on data from 500 firms. They have done descriptive statistics and Probit regressions. In agency cost theory, they revealed that managers are more inclined to use firms' resources for CSR purposes to fulfill their benefits. High donations to CSR help to recognize the insiders as good citizens and socially responsible,

increasing reputation and goodwill with Stakeholders. Whereas (GODFREY, 2005)[23] mentioned some managerial implications of three core assertions of being socially responsible, namely, CSR creates positive moral principles among communities and stakeholders, moral outlay can protect relationship-based intangible assets that will raise shareholders' wealth. On the other hand, another study was conducted to show the linkage of CSR and the cost of bank debt based on 1996 US firms' loans in which (Goss & Robberts ,2011)[24] argued that in the absence of security, lenders seem to be very sensitive to CSR concern firms. Lenders are deemed indifferent to firms generally investing a wholesome amount in CSR. They used univariate analysis, summary statistics, and correlation matrix. Besides, (Rana and Asad ,2018)[25] asserted the positive impact of CSR on the Financial Performance of pharmaceutical companies in Pakistan using Panel Least Square Fixed Effect Regression.

(Linter ,1956)[26] developed a model regarding how corporations' income can be distributed among dividends, which is generally required in dividend smoothness analysis. (Miller and Modigliani ,1961)[27] empirically examined Dividend Policy, Growth, and the Valuation of Shares. They developed the irrelevance theory of dividend policy in both perfect and imperfect markets. In (1979, Bhattacharya)[28] developed a model that explains how firms can use cash dividends to signal their expected cash flows. This is particularly relevant when external investors may not have complete information about the firm's profitability. Bhattacharya's model shows how the investors' planning horizons affect the equilibrium level of the dividend payout ratio. This provides a useful comparative static result that can help firms to determine their dividend policy.

On the contrary, some studies have also shown neutral and negative impacts. Based on econometric analysis, CSR has been found to have a neutral impact on corporations' financial performance (McWilliams & Siegel, 2000).[3]. (Qudah & Yusuf, 2015)[29] argued that the two components of dividends, D-P and DY, have a negative impact on share price volatility. They added that lower payout ratios would result in higher stock price volatility. They used most minor square regressions and correlations. Mandatorily reporting firms faced a subsequent reduction in profitability (Chen et al., 2017)[30]. (Chemmanur et al., 2010)[31] conducted a study on the corporate dividend policy by comparing the dividend policies of companies in Hong Kong and the United States. They performed a natural experiment and found that the smoothness of dividend payments of firms in Hong Kong was lesser than that of firms in the United States.

3. Methodology

3.1 Data Sources and Data Collection

In order to evaluate the interplay between corporate social responsibility, dividend policy, and risk stability in Bangladesh's banking sector, our primary objective is to conduct a comprehensive assessment. For this purpose, we have collected the balance sheets and income statements of 32 private and public banks operating in Bangladesh from 2008 to 2018. We have opted for this particular time period because CSR was first introduced in the country in 2007, and there is no available CSR data before 2008. The data collected will enable us to gain valuable insights into the dynamics of the banking industry in Bangladesh and help us understand the impact of CSR and dividend policy on risk stability.

3.2 Definition of variables

In our research, CSR measures are the independent variable, while dividend policy and risk stability are the dependent variables. Here, we have considered both cash dividend and stock dividend policy. In the study, we have shown how corporate social responsibility can affect a bank's dividend policy, dividend stability, and risk stability. We also include several control variables in the study. We have described these variables in the below subsections:

3.2.1 Corporate Social Responsibility Measures

Following the study of (Goss & Roberts, 2011)[24] (GODFREY, 2005)[23], (Barnea & Rubin, 2010)[20], (Rana & Asad, 2018)[25], and (Kiran et al., 2015)[32], use banks' participation in CSR activity in Education, health sector, community development, corporate governance, and environment protection In their study, (Goss & Robberts ,2011)[24] used community, corporate governance, diversity, employee relations, environment, human rights, and product as indicators of CSR. On the other hand, (GODFREY ,2005)[23] measured CSR based on Employees' commitment, Communities and Regulators' legitimacy, Suppliers and Partners' trust, and Customers' perception of the brand. (Barnea & Rubin ,2010)[20] considered community relations, workforce diversity, employee relations, environment, non-US operations, and product safety and use as criteria for measuring CSR. (Rana and Asad ,2018)[25] used education, healthcare, environment, donations, and workers' welfare funds as the proxy for CSR. (Shubiri et al. , 2012)[21] measured CSR by considering the training and education, research, and development sectors. (Kiran et al. , 2015)[32] measured CSR by the total amount of CSR expenditure. In the study, we used the company's total expenditure on CSR considering Education (Rana and Asad ,2018)[25],(AL- Shubiri, Al-Abdallah, & Abu, 2012),[21], health sector (Rana and Asad ,2018)[25], community development (Goss & Robberts, 2011)[24], (Barnea & Rubin, 2010)[20], corporate governance (Goss & Robberts, 2011)[24] and environment protection (Rana and Asad,2018[25]), (Barnea & Rubin,2010) [20] which is also supported by (Kiran et al., 2015)[32].

At first, we count the total expenditure by banks on all of these sectors that are supported by (Kiran et al. (2015)[32], (Shubiri et al., 2012)[21], and (Rana & Asad,2018)[25].

3.2.2 Dividend policy measures

Payout ratio of dividend policy: Following (Brockman & Unlu,2009)[33], (Gusni,2016)[12], and (Benlemliha,2019)[5], we used cash dividends and stock dividends as the proxy of the dividend payout ratio. (Brockman and Unlu ,2009)[33] analyzed the relationship between the number of dividends paid and the payout ratio. In (2016, Gusni)[12] discussed the dividend payout ratio, while (Benlemliha,2019)[5] measured cash dividends in three ways: by the ratio of cash dividends on common stocks to net sales, the ratio of cash dividends on common stocks to total assets, and by net sales and total assets. Again, he used dividend propensity and the stability of dividend payment.

Similarly, (Fenn & Liang 2001)[34] used cash and stock dividends as the dividend payout ratios. Again, payout propensity was used as the measurement variable of dividend ratio by (Shao et al. ,2010)[35] and (Benlemliha,2019)[5]. (Chay & Suh, 2009)[36] used dividend earnings ratio, dividend-sales ratio, and share repurchase as proxies for dividend policy, while (Efni,2017)[37] used dividend yield and dividend payout ratio as measurement variables. (Qudah & Yusuf, 2015) [29] used the dividend payout policy, which is measured by the ratio of dividend per share to earnings per share, and dividend yield, measured by dividend per share. (Asghar et al. (2011)[38] used two measures to proxy dividend policy: dividend yield and dividend payout ratio. The dividend yield is calculated by dividing the annual cash dividends paid to stockholders by the average stock market value in that year. The dividend payout ratio is calculated by dividing total dividends by total earnings. This study uses cash dividends (Fenn & Liang, 2001)[34]; (Benlemliha, 2019)5; (Efni, 2017)[37]; (Asghar et al., 2011)[38] and stock dividends (Fenn & Liang, 2001)[34]; (Benlemliha, 2019)[5];(Efni, 2017)[37] as proxies for the dividend payout ratio.

3.2.3 Financial Risk Measures

The leverage ratio is a useful metric to assess a bank's level of risk. It is calculated by dividing the total debt by the total assets; the higher the ratio, the more the firm depends on debt financing, leading to increased risk for the bank (Zheng et al., 2017)[39]. We calculated the non-performing loans to total loans ratio, representing the percentage of non-performing loans in the bank's total loan portfolio.

3.2.4 Stability Measure

The Z-score measures banking stability and risk. This metric determines the distance from insolvency by dividing the overall risk of dividends by the standard deviation. A higher Z-score indicates higher stability. According to studies conducted by (Klomp & Haan ,2015)[40], (Zheng et al.,2017)[39], (RAHMAN, ZHENG, & ASHRAF , 2015)[41], (Laeven & Levine ,2009)[42], (Nash & Sinkey , 1997)[43] (Demirg. u-c-Kunt & Detragiache ,2002)[44], (Lepetit & Strobel ,2013)[45], (Lepetit & Strobel ,2015)[46], and

(Beck et al. ,2013)[47], a higher Z score indicates that a bank is less likely to be fragile.

3.2.5 Control variables

Following (Chay & Suh ,2009)[36,] (Benlemliha, 2019)[5], (Galema et al. ,2008)[48], (Barnea & Rubin , 2010)[20], (Deshmukh et al. ,2013)[49] and (Shao, Kwok & Guedhami ,2010)[50], we used some control variables too Barnea and Rubin (2010) controlled for firm size, growth, and age using the book value of total assets, market-to-book ratio, and number of years, respectively. In another study, (Benlemliha ,2019)[5] used several control variables, namely Firm size (total assets), Cash holdings, Growth opportunities, Leverage (total debt to total assets ratio), and Profitability. Galema et al. (2008) used size, return, turnover, and age as control variables, while (Barnea & Rubin , 2010)[20] considered Firm size (measured by the book value of total assets), growth (the market to book ratio), and Firm's age (the number of years) as control variables. In previous studies conducted by (Shao et al. ,2010)[35] and (Deshmukh et al., 2013)[49], various control variables were considered. (Shao et al. , 2010)[35] considered Leverage, Growth, Profitability, Firm Size, and Life Cycle as control variables, while (Deshmukh et al. ,2013)[49]included Growth opportunities, cash flow, and firm size as control variables. In our study, we have also considered several control variables. These variables are firm size, measured by total assets, and asset growth, measured by the change in total asset value over time.

3.3 Empirical model development

Several literature pieces, such as (Tran et al. & Do 2019)[1], (Benlemliha 2019)[5], (AL-Shubiri et al., 2012)[21], (Gupta & Krishnamurti, 2018)[4], (Rana & Asad, 2018)[25], (Wang et al., 2018)[6], (Gusni, 2016)[12], and others, have demonstrated that banks have a relationship between corporate social responsibility and dividend policy, or performance and dividend policy, with financial risk No regression evidence was found for these three things. Thus, it is more intuitive to understand the impact of CSR on dividend policy and bank risk. In order to address the gap in existing research, we have employed a simultaneous equation model for our study. We will use 2OLS to test the relationship between CSR and bank risk and the impact of dividend policy. We will also include various bank-level control variables and some macroeconomic variables in our analysis. The study considers Corporate Social Responsibility (CSR) an endogenous variable. Banks prioritize their profitability but must also allocate funds for CSR activities that benefit society.

Main Variables	Definition and measure	Impact on Risk (Expected Sign)	Impact on Dividend (Expected Sign)	Data source
Dividend Measures:				
DPS	dividend per share	-		(Kaźmierska-Jóźwiak, 2015), [51] , (Gusni, 2017) [52], (Yusof & Ismail, 2016) [53],(Consler & Lepak, 2011) [54]
DYR	dividend yield (dividend-to-price ratio)			(Al-Malkawi, 2007) [55], (Al-Najjar, 2009) [56], , (Harada & Nguyen, 2011) [57]
Stock Dividend	Stock dividend/ dividend or 1-Cash dividend/ dividend	+		(Sah & Zhou, 2012)[58], (Khan, Burton, & Power, 2011)[59]

continued

Main Variables	Definition and measure	Impact on Risk (Expected Sign)	Impact on Dividend (Expected Sign)	Data source
Cash Dividend	Dividend payout ratio, which is measured as dividend per share/ earnings per share	-		(Kaźmierska-Jóźwiak, 2015), [51], (Gusni, 2017) [52], (Boulton, BragaAlves, & Shastri, 2012)[59], (Benlemliha, 2019),[5] , (Khan, Burton, & Power, 2011)[59]
Dividend Payout Ratio	Dividend per share/earnings per Share			(Gusni, 2017) [52], Kaźmierska-Jóźwiak, 2015), [51], (Benlemliha, 2019),[5],
Risk measures:				
Financial Leverage	the ratio of debt to equity / Ratio of debt to total assets	+	-	(Al-Twaijry, 2007)[60], (Abor & Bokpin, 2010)[61], (Duygun, Guney, & Moin, 2018)[62], (Zheng, Moudud-UlHuq)[39], (Rahman, & Ashraf, 2017)[41], (Kaźmierska-Jóźwiak,2015)[51] (Chalermchatvichien, Jumreornvong, Jiraporn, & Singh, 2013)[63], (Al-Najjar, 2009)[56], (Al-Ajmi & Hussain, 2011), (Gusni, 2016)[12], (Gusni, 2017)[52], (Abor & Fiador, 2013)[64], (Benlemliha, 2019)[5], (Harada & Nguyen, 2011)[57], (Jo & Na, 2016)[65]
Credit Risk	non-performing loans to total loans		-	(Abor & Bokpin, 2010)[61], (ECHCHABI & AZOUZI, 2016)[66], (Zheng et al., 2017)[39], (Barth et al., 2004)[67], (Al-Najjar & Hussainey,2009)[68], (Al-Najjar, 2009) [56], (Gusni, 2016)[12]
Stability (Z Score)	Overall risk / standard deviation of dividend	-		(Klomp & Haan, 2015)[40], (Zheng, Moudud-Ul-Huq, Rahman, & Ashraf, 2017)[39], (RAHMAN, ZHENG, & ASHRAF, 2015)[41], (Laeven & Levine, 2009)[42], (Nash & Sinkey, 1997)[43], (Demirg. u-c-Kunt & Detragiache, 2002)[44], (Lepetit & Strobel,2013)[45], (Lepetit & Strobel, 13 2015)[46], (Beck et al., 2013)[47]
Bank-Level Variables				
Corporate Governance	board of directors	+/-	+	(Zheng,Moudud-Ul-Huq, Rahman, & Ashraf, 2017)[39], (Al-Ajmi & Hussain, 2011)[69] , (Gusni, 2017) [52], (Abor & Fiador, 2013)[64]
Size	Natural logarithm of total assets.	+/-	+	(Hussain & Hassan, 2005)[70], (A., Kouretas, & Tsoumas, 2014)[71], (Laeven & Levine, 2009)[42], (Zribi & Boujelbène, 2011)[72], (Zheng, Moudud-Ul-Huq, Rahman, & Ashraf, 2017)[39], (Duygun, Guney, & Moin, 2018)[62], (Abor & Bokpin, 2010)[61], (Hussainey, Mgbame, & Chijoke-Mgbame, 2011)[73],(Kaźmierska-Jóźwiak, 2015)[51], (AlNajjar & Hussainey, 2009)[68], (AlMalkawi, 2007)[55], (Al-Najjar, 2009)[56], (Al-Ajmi & Hussain,2011)[69], (Gusni, 2017)[52], (Benlemliha, 2019)[5], (Harada & Nguyen,2011)[57], (Hussain & Hassan, 2006)[74]
Profitability	Return on assets (ROA): the ratio of net income to total assets / Earnings per share	-	+	(ECHCHABI & AZOUZI, 2016)[66], (Abor & Bokpin, 2010)[61] and (Duygun, Guney, & Moin, 2018)[62], (Al-Najjar & Hussainey, 2009)[68], (Al-Malkawi, 2007)[55], (Al-Najjar,2009)[56], (Al-Twaijry, 2007)[60], (Gusni, 2016)[12], (Abor & Fiador,2013)[64], (Benlemliha, 2019)[5], (Harada & Nguyen, 2011)[61]
Growth	The percentage change in the sales between 2012 and 2013.		-	(ECHCHABI & AZOUZI, 2016)[66], (Hussainey,Mgbame,& Chijoke&Mgbame,2011)[73], (Duygun, Guney, & Moin, 2018)[62], (Al-Najjar & Hussainey, 2009)[68], (Al-Malkawi, 2007)[55], (Al-Najjar, 2009)[56], (Abor & 14 Fiador, 2013)[64], (Benlemliha, 2019)[5], (Harada & Nguyen, 2011)61

continued

Main Variables	Definition and measure	Impact on Risk (Expected Sign)	Impact on Dividend (Expected Sign)	Data source
Market To Book Value	The market value of equity is divided by the book value of equity.		-	ECHCHABI & AZOUZI, 2016)[66], (Duygun, Guney, & Moin, 2018)[62], (Deshmukh, Goel, & Howe, 2013)[49], (Al-Malkawi, 2007)[55]
Retained Earnings		+/-	-	Author's estimation
Liquidity	the current ratio, measured as current assets/current liability		+	Kaźmierska-Jóźwiak,2015)[51], (Al- Najjar & Hussainey,2009)[68], (Al-Najjar,2009)[56], (Hussain & Hassan, 2006)[74]
Firm Age				
Macroeconomic Variables				
Inflation	Annual inflation rate	+/-		Chaibi & Ftiti, 2015))[75], (Hussain & Hassan,2005) [74], (Zheng et al., 2017)[39], (Abor & Bokpin, 2010)[61],
GGDP	GDP per capita	-	+	(Abor & Bokpin, 2010) [61], (Zheng, Moudud-Ul-Huq, Rahman, & Ashraf, 2017),[39] (Chaibi & Ftiti, 2015)[75], (Stolz & Wedow, 2011)[76],(Jokipii & Milne, 2008)[77]

Several kinds of literature such as(McWilliams & Siegel, 2000)[3], (He, Li, & Tang, 2012)[78], (Eije & Magginson, 2008)[79], (Linter, 1956)[26], (Desai et al., 2007)[80], (Jo & Na, 2016)[65] and among others; introduced a single equation in the model considering only dividend or only CSR or only risk factors. For example, (McWilliams & Siegel, 2000) [3], (He, Li, & Tang, 2012) [78], (Eije & Magginson, 2008) [79], (Linter, 1956) [26], and (Chemmanur et al., 2010)[31] introduced a single equation that emphasized dividend in the model, Dit = β0+ β1Dit +β2πit + εit. However, they did not consider the firm's investment in the above equation. Then, to overcome this limitation, Lintner's model was expanded by (Desai et al. (2007) [80] and Kim & Jeon (2015)[81], who developed another single equation, including a firm's investment that emphasized dividends, but they did not consider CSR, Stability, and Risk-taking. Similarly, (Kaźmierska-Jóźwiak (2015)[51] developed a single equation to identify the factors of dividend policy, including some other bank-level variables, namely leverage ratio, current ratio, return on equity, and size. Here, (Kaźmierska-Jóźwiak,2015) [51 focused] mainly on dividends and risk (risk relating to future earnings) but did not include CSR and stability. Whereas (Gusni,2016)[12] broadened the model developed by (Kaźmierska-Jóźwiak,2015)[51]to another single equation considering corporate governance mechanism and systematic risk measured by beta on the dividend payout ratio. However, it does not consider CSR and Stability in the single model. On the contrary, (Williams & Siege,2000)[3], (Jo & Na,2016) [65], and (Benlemlih M,2019)[5] developed another single equation that focused on corporate social responsibility and performance but did not consider risk-taking and stability. Moreover, (AL-Shubiri et al.,2012)[21,] and Barnea & Rubin (2010)[20] developed a single equation focused on the factors affecting corporate social responsibility only, not dividends, risk-taking, and stability. Most of the literature has shown that banks have a relationship between dividends and risk, corporate social responsibility with financial performance, and corporate social responsibility with risk. Very few studies have focused on corporate social responsibility, dividend policy, risk-taking, and stability in a regression equation.

From the above model developed, we can draw a more specific model.

$$DIVi,t = \alpha 0 + \alpha 1\ DIVi,\ t\text{-}1 + + \alpha 2\ RISKi,t + \alpha 3\ CSRi,t + \alpha 4\ PROFITABILITY + \alpha 5\ RETAINED\ EARNINGS + \alpha 6 MVE\ i,t + \alpha 7\ CGi,t + \alpha 8\ SIZEi,t + \alpha 9\ ASSET\ GROWTHi,t + \alpha 10\ ROE\ i,t + \varepsilon_{it}\ eq. \quad (1)$$

$$RISKi,t= \beta0+\beta1RISKi,\ t\text{-}1++\beta2\ DIVi,t +\beta3CSRi,t+\beta4\ LLP+\beta5\ PROFITABILITY + \beta6\ LEV + \beta8\ CGi,t + \beta9\ SIZEi,t\ + \varepsilon_{it}\ \text{eq.} \quad (2)$$

Where i indicates the banks and t refers to the time. εit means the error term. In equation (1), the dividend is a dependent variable; in the 2nd equation, bank risk is a dependent variable.

Generalized methods of moments (GMM) were applied to examine the relationships among bank size, regulatory capital ratios, and banks' risk-taking behavior (RAHMAN, ZHENG, & ASHRAF, 2015)[31], households' non-performing loans (Abid et al., 2014)[82], the dividend payout behavior under monetary policy restrictions (Pandey & Bhat, 2007) [83], bank regulation and banking risk (measured by Z-scores) depending on bank structure (Klomp & Haan, 2015)[40], non-performing loans of banks in a market-based economy (Chaibi & Ftiti, 2015)[75], and corporate social responsibility and investment (Galema et al., 2008)[48].

SEM (Structural Equation Modelling) was applied to analyze the connection between corporate disclosures and banking risk (Sharif & Lai, 2015)[84].

Ordinary least squares regression (OLS) was applied to analyze the association among bank asset structure, real-estate lending, and risk-taking behavior (Blasko & Sinkey, 2006)[85], corporate social responsibility and dividend policy (Benlemlih M., 2019)[5], corporate social responsibility and bank risk (Jo & Na, 2016)[65], CSR and dividend policy (Trihermanto & Nainggolan, 2019)[86], and factors of dividend policy (Brockman & Unlu, 2009)[87].

Two-Stage Least Square (2SLS), The Hausman test, and the Granger-causality Test were used to analyze the interrelationship among disclosure, risk, and performance (Ibrahim et al., 2011)[88], CSR activities and industry risk level (Jo & Na 2016) [65], capital regulation and risk-taking behavior and ownership structure of banks (Zheng et al., 2017)[39], corporate social responsibility and bank loans (Goss & Roberts, 2011) [89]..

Three-stage least square (3SLS) was applied to examine whether CSR activities minimize industry risk (Jo & Na, 2016) [65], agency cost and corporate social responsibility (Brown et al., 2006) [22], and institutional factors affecting corporate social responsibility (Wang et al., 2018)[6].

Multiple least square regressions were applied (Qudah & Yusuf, 2015) [29] to know the connection between dividend policy and stock price volatility, factors affecting corporate social responsibility (Fauzi & Idris, 2010) [90], determinants of Corporate Social Responsibility (Abdullahi et al., 2018), banks' risk-taking, ownership structures, and regulations (Laeven & Levine, 2009)[42], ownership concentration and risk-taking behavior (Chalermchatvichien et al., 2013) [63], corporate social responsibility and banks' performance (Okegbe & Egbunike, 2016) [91], corporate social responsibility, managerial ownership, and institutional ownership to corporate value (Rahmadianti & Asandimitra, 2017) [92].

Multivariate regression analysis was applied to analyze bank risk and diversification of product (Lepetit & Strobel, 2015) [46], the connection between audit fees and CSR reporting (Chen et al., 17 2016) [93], CSR activities and bank risk (Jo & Na, 2016)[65], and an association between CEO overconfidence and dividend payout policy (Deshmukh et al., 2013)[49]

Multiple Tobit regressions and Logit regressions were applied to analyze the relationship between dividend policy and risk (Chay & Suh, 2009)[36], CEO overconfidence and dividend payout policy (Deshmukh et al., 2013) [49], financial performance of banks and corporate social responsibility (Umobong & Agburuga, 2018) [94], dynamics of corporate dividend policy (Chemmanur et al., 2010)[31], financial constraints of firms with different CSR focus (Chan et al., 2016) [95], Chinese capital markets of disclosing information on corporate misrepresentation in a corporate social responsibility report (Hu et al., 2019) [96].

In our study, we conducted the descriptive analysis, correlation matrix of all variables using SPSS software, and Least Squares regressions using EViews software version 8 to derive the actual result of the model. While determining the effect of Corporate Social Responsibility on Dividend Policy, we have used two models showing the impact of dividend per share and stock dividend as the indicators of dividend policy. Similarly, we have applied leverage and non-performing loans to

the total asset as the risk indicators in two different models while showing the effect of Corporate Social Responsibility on Risk. Finally, we used the Z score as an indicator of financial stability while analyzing the impact of corporate social responsibility on financial stability. We have produced three models, considering the overall dividend per share, stock dividend, and cash dividends.

4. Analysis of the Results

4.1 Descriptive Statistics

Based on **Table 1**, our variable CSRPI has a mean value of 1.793 with a minimum of 0 and a maximum of 71.17, where the standard deviation is 5.43. Here, DPS and stock dividends have mean values of respectively 66.264 and 58.456, which is a positive sign with a maximum of 8150 and 8140. CG, ROA, RE, MVE, LEV, NPLTTL, LLP, and Z SCORE have a positive mean value of .987, 1.137, 1516.125, 17041.263, .920, .071, 5223.952, and 19.001, respectively with the maximum value of 1, 6.05, 13559.22, 84535.84, 1, 1, 73675.2 and 42.66, minimum value of 0.75, -4.93, -18728.09, 0, 0.85, 0, 137.58and -13.04. We have considered two control variables, namely Bank Size and AG, which have a mean value of 12.211 and 19.481, respectively.

Table 1. Descriptive Statistics of all the variables.

Variables	Minimum	Maximum	Mean	Std. Deviation
CSR	0.000	71.170	1.793	5.413
CG	.75	1.00	.987	.031
AG	-.560	332.820	19.481	23.359
MVE	0.000	84535.840	17041.263	14094.028
LLP	137.580	73675.200	5223.952	9921.423
ROA (%)	-4.930	6.050	1.137	.917
CD	0.000	40.000	7.808	8.012
STD	0.0	8140.0	58.456	533.457
DPS	0.000	8150.000	66.264	533.635
Size	10.79	14.85	12.211	.668
Z-score	-13.040	42.660	19.001	8.283
LEVERAGE	.850	1.000	.920	.0229
RE	-18728.090	13559.220	1516.125	2937.147
NPLTTL	0.0	1.0	.071	.097

4.2 Correlation matrix

All the variables in **Table 2** represent the correlation matrix among them. The result showed a positive and negative correlation between the dependent and independent variables. From the table, DPS, Stock dividend, ROA, RE, NPLTL, and LLP are statistically negatively correlated with the CSRPI (independent variable). That means if these dependent variables increase, the independent variable will decrease. Meanwhile, MVE, Size, AG, and LEV positively correlate with CSRPI, which means that if these dependent variables increase, the independent variable will also increase. Moreover, Z SCORE has significantly and positively correlated with CSRPI (independent variable) where p-value > 01. Moreover, there is no multicollinearity problem. This correlation matrix provides the relationship of dependent variables with the independent variable, but in the next section, we used the Least Squares Method to determine the effect.

Table 2. Correlation matrix.

Variables	CSR	CG	AG	MVE	LLP	ROA	CD	STD	DPS	Size	Z-score	LEV	RE	NPLTTL
CSR	1	.098	.082	.009	-.046	-.030	-.058	-.029	-.030	.017	.196**	.035	-.004	-.042
CG	.098	1	.133*	.154**	-.098	.027	.094	-.337**	-.336**	.063	.153**	-.037	.067	.008
AG	.082	.133*	1	.144*	-.104	-.043	.060	-.066	-.065	.283**	.170**	.076	.133*	-.040
MVE	.009	.154**	.144*	1	-.160**	.317**	.108	-.101	-.100	.101	.248**	-.277**	.243**	-.138*
LLP	-.046	-.098	-.104	-.160**	1	-.448**	-.199**	.076	.073	.647**	-.307**	.308**	-.350**	.451**
ROA	-.030	.027	-.043	.317**	-.448**	1	.073	.031	.032	-.494**	.381**	-.543**	.401**	-.331**
CD	-.058	.094	.060	.108	-.199**	.073	1	.015	.030	-.042	.096	-.128*	.070	-.106
STD	-.029	-.337**	-.066	-.101	.076	.031	.015	1	1.000**	.114	-.057	.055	.129*	.011
DPS	-.030	-.336**	-.065	-.100	.073	.032	.030	1.000**	1	.113	-.055	.053	.130*	.010
Size	.017	.063	.283**	.101	.647**	-.494**	-.042	.114	.113	1	-.135*	.383**	-.043	.399**
Z-score	.196**	.153**	.170**	.248**	-.307**	.381**	.096	-.057	-.055	-.135*	1	-.311**	.218**	-.184**
LEV	.035	-.037	.076	-.277**	.308**	-.543**	-.128*	.055	.053	.383**	-.311**	1	-.243**	.248**
RE	-.004	.067	.133*	.243**	-.350**	.401**	.070	.129*	.130*	-.043	.218**	-.243**	1	-.185**
NPLTTL	-.042	.008	-.040	-.138*	.451**	-.331**	-.106	.011	.010	.399**	-.184**	.248**	-.185**	1

**. Correlation is significant at the 0.01 level (2-tailed)

*. Correlation is significant at the 0.05 level (2-tailed).

4.3 Regression Analysis Using Least Squares Method

Table 3. The Effect of Corporate Social Responsibility on Dividend Policy.

Variable	Model-1	Model-2
DPSLAG	-0.130** -2.298	
STDLAG		-0.129** -2.70
CSRRI	2850.892*** 2.554	2859.91*** 2.565
CG	-5673.612*** -6.205	-5697.345*** -6.236
ROA	89.620** 2.101	89.670** 2.104
RE	0.033*** 2.962	0.0328*** 2.948
MVE	-0.006*** -2.761	-0.006*** -2.780
SIZE	231.176*** 4.167	231.723*** 4.181
AG	-2.371* -1.812	-2.389* -1.827
Adjusted R-squared	17.97%	18.07%
No. of observations	290	290
No. of banks	32	32

*** Significant level at 1%, ** Significant level at 5%, * Significant level at 10%

In the above table, the overall dividend is measured by DPS, where the dependent variable and independent variables for model-1 are DPSLAG, CSRI, CG, ROA, RE, MVE, SIZE, and AG. In contrast, the dividend is measured by stock dividend in model 2. Among the independent variables, the value of Coefficient is DPSLAG (-0.130**), CSRI (2850.892***), CG (-5673.612***), ROA (89.620**), RETAINED EARNINGS (0.033***), MARKET VALUE OF EQUITY (-0.006***) and SIZE (231.176***) respectively with a p-value less than 0.05 ($p<0.05$), which means all of these independent variables are statistically significant to define the dependent variable in model-1. CSRI, ROA, RETAINED EARNINGS, and SIZE have a positive value of correlation coefficient, that means if CSRI, ROA, RETAINED EARNINGS, and SIZE increase in one unit will increase dividend payment. In the case of CSRI, the value of t-Statistic is 2.554 ($t>2$), and the p-value is 0.01*** ($p< 0.05$); both statistically have a significant and Positive effect on the dividend policy, and this result is also supported by (Benlemlih et al. (2016)[5] and (Gatsi et al. (2016) [11]. That implies that if a company incurs more expenditure

on corporate social responsibility, it will increase the payment of dividends because to reach the goal, an organization needs to fulfill stakeholders' financial and non-financial claims. Thus, when the dividend is paid to meet the shareholders' financial commitment up to a certain level, the firm must fulfill non-financial commitment through performing CSR activities. Again, the Firm allocates dividends from its earnings to its shareholders and makes CSR expenditures out of its dividends. Therefore, When the Firm makes obsessive expenditures on CSR, its dividend-paying capacity will be narrow. However, when dividend payments to shareholders arrive at a high level, CSR cannot always be expected to be positively associated with dividend payments, and obsessive expenditures on CSR out of profit will result in mediocre dividend payments to shareholders.

On the other hand, AG has a value of 0.071* (p>0.05), which means it is statistically insignificant. T-Statistic measures the number of standard errors that the coefficient is from zero, and greater than 2 indicates that it is also statistically significant. In contrast, a value less than two means that it is insignificant. Another good indicator for OLS model estimation is Adjusted R- squared (17.97%), that means 17.97% variation of dividend per share can be explained by the variation of DPSLAG, CSRI, CG, ROA, RETAINED EARNINGS, MARKET VALUE OF EQUITY, SIZE, AND AG (independent variables). Moreover, the remaining 82.03% can be explained by the fluctuation of those variables, which is not considered in our regression model.

Similarly, in model 2, the coefficient value of CSRI is 2859.91*** (p<0.05), and the t-Statistic is 2.565 (t>2), which means an increase in one unit of CSRI will increase stock dividend payment. STDLAG, CSRI, CG, ROA, RE, MVE, size, and AG are statistically significant in defining the dependent variable in Model 2. Here, the value of Adjusted R- squared (18.07%), which means that the 18.07% variation of stock dividend per share is explained by the variation of STDLAG, CSRI, CG, ROA, RETAINED EARNINGS, MARKET VALUE OF EQUITY, SIZE, AND AG (independent variables). Furthermore, the remaining portion of 81.93% can be explained by the fluctuation of those variables, which is not considered in our regression model. Therefore, socially responsible firms are more dynamic in paying dividends to shareholders than socially irresponsible firms. The dividend payout level is stable in high-invested CSR firms because high-invested CSR firms maintain their dividend policy to handle agency problems due to overinvestment in the CSR sector.

Table 4. The Effect of Corporate Social Responsibility on Risk.

Variable	Model-1	Model-2
LEVLAG	-0.002* -0.027	
NPLTLLAG		0.010* 0.168
DPS	1.43* 0.855	-7.21* -0.68
CD		
CSR	-0.007*** -4.363	-0.0015* -0.8744
LLP	1.84* 1.623	
ROA	-0.034*** -3.151	-0.023*** -3.501
CG	-0.058* -0.205	-0.215* -1.414
SIZE	-0.074*** -4.193	0.042*** 4.439
LEV		-0.216* -1.251
Adjusted R-squared	11.30%	15.80%
No. of observations	288	290
No. of banks	32	32

*** Significant level at 1%, ** Significant level at 5%, * Significant level at10%

In the above table, the overall risk is measured by leverage in model 1 and non-performing loan to total loan in model 2. The independent variable is corporate social responsibility, measured by CSRPI in both cases. In model-1, the value of the coefficient of CSRPI is -0.007*** (p<0.05), and SIZE is -0.074***(p<0.05), which means there is a statistically negative association with corporate social responsibility. Thus, an increase in one unit of financial risk will decrease the amount of expenditure for CSR purposes. Moreover, this result is supported by the findings of (Benlemlih et al,2016)[5] and (Gatsi et al,2016) [11]. High leverage enhances the cost of transactions and fixed expenditures for raising capital

from external financial sources. As a result, firms have to pay a large amount of money from their income to use external capital sources as a fixed payment. The higher the leverage ratio, the lower the possibility of dividend since leverage has a negative relationship with dividend which is argued by Al-Twaijry (2007)[60], Abor & Bokpin (2010)[61], Duygun et al., (2018)[62], Zheng et al., (2017)[39], Kaźmierska-Jóźwiak (2015)[51] Chalermchatvichien et al., (2013) [63], Al-Najjar (2009)[56], Al-Ajmi & Hussain (2011)[69], Gusni (2016)[12], Gusni (2017)[52], Abor & Fiador (2013) [64], Benlemliha (2019)[5], Harada & Nguyen (2011)[57], Jo & Na (2016) [65]. Therefore, when a firm makes payments of an enormous amount from its income on fixed payments to raise capital from external financial sources for this purpose, it must lessen its expenditures in the CSR sector. On the contrary, in model 2, the overall risk is measured by non-performing loans to total loans. Similarly, there is a statistically negative association between corporate social responsibility and overall risk, which means an increase in one unit of financial risk will decrease the amount of expenditure for CSR purposes. Therefore, it implies that banks that make huge CSR expenditures also seem to have low intentions to take risks.

Table 5. The Effect of Corporate Social Responsibility on Financial Stability.

Variable	Model-1	Model-2
ZSCORELAG	0.641*** 16.370	0.655*** 16.824
DPS	-0.003* -0.617	
CSR	0.179*** 3.110	0.177*** 3.108
LEV	-21.375** -2.094	-28.979*** -2.773
ROA	2.518*** 6.493	2.655*** 6.866
CG	7.119* 0.782	14.374* 1.512
SIZE	1.331*** 2.445	1.276*** 2.351
STD		-0.002* -0.332
Adjusted R-squared	59.30%	59.80%
No. of observations	290	288
No. of banks	32	32

*** Significant level at 1%, ** Significant level at 5%, * Significant level at10%

In **Table 3**, financial stability is measured by the z score in three models. Here, CSRPI is considered a proxy of corporate social responsibility. In the above three models, we respectively used DPS and stock dividends. The value of coefficients of CSRPI is 0.179***, and the t value is 3.110 (t>2) for model 1, and the coefficients of CSRPI are 0.177*** (t= 3.108, t>2) for model-2 respectively, indicating that there is a statistically positive association of corporate social responsibility and financial stability. Among all of the independent variables, the values of the Coefficient are ZSCORELAG (0.641***), CSRI (0.179***), Leverage (-21.375**), ROA (2.518***), and SIZE (1.331***), respectively and have a p-value less than 0.05 (p<0.05) that means all of these independent variables are statistically significant to define the dependent variable in model-1. Another good indicator for OLS model estimation is Adjusted R- squared (59.30%), which means 59.30% variation of dividend per share is explained by the variation of DPSLAG, CSRPI, CG, ROA, RETAINED EARNINGS, MARKET VALUE OF EQUITY, SIZE, and AG (independent variables). Again, the remaining 40.70% can be explained by the fluctuation of those variables, which is not considered in our regression model. Similarly, the Adjusted R- R-squared value is 59.80% for model 2. A positive ratio of the Z score indicates that the bank's financial stability is high and stable enough. It helps in measuring and efficiently handling the risks, shunning price fluctuations of real and financial assets, which generally influence its monetary stability, and adequately allocating financial resources.

5. Conclusion

In this paper, we analyze how investment in corporate social responsibility will affect dividend policy in terms of dividend per share and stock dividend, risk, and financial stability of banks. Based on a sample of 32 banks currently operating in the economy of Bangladesh and a total of 290 bank- observations between 2008 and 2018, after controlling some factors or determinants of dividend, risk, and financial stability and finally we find that in the case of CSRI, the value of the coefficient is

2850.892*** for model 1 and 2859.91*** for model 2. Again, the value of the t-statistic is 2.554 (t>2), and the p-value is 0.01*** (p< 0.05). So, corporate social responsibility has a statistically significant and positive effect on the dividend policy. This result strongly supports the idea that a company that incurs more expenditure on corporate social responsibility will also be dynamic in the payment of dividends. An organization must fulfill stakeholders' financial and non-financial claims to reach the goal. Thus, when a dividend is paid to meet the shareholders' financial commitment up to a certain level, the firm has to fulfill non-financial commitment by performing CSR activities. Again, the Firm allocates dividends from its earnings to its shareholders, making CSR expenditures from its profit. Therefore, When the Firm makes obsessive expenditures on CSR, its dividend-paying capacity will be narrow. However, when the payment of dividends to shareholders arrives at a high level, CSR cannot always be expected to be positively associated with dividend payments longer, and obsessive expenditures on CSR out of profit will result in mediocre dividend payments to shareholders. We used leverage and non-performing loans to total loans as determinants of risk. Again, there is a statistically negative association between corporate social responsibility and overall risk, which means an increase in one unit of overall financial risk will decrease the amount of expenditure for CSR purposes. This may happen because high leverage enhances the cost of transactions and fixed expenditures for raising capital from external financial sources. As a result, firms have to pay a large amount of money from their income to use external capital sources as a fixed payment. The greater the leverage ratio, the lower the possibility of dividends, as leverage has a negative relationship with dividends. Moreover, there are statistically significant and positive associations between corporate social responsibility and financial stability. Moreover, financial stability is measured by the Z score, where we find a statistically positive association between corporate social responsibility and financial stability. A positive and good ratio of Z score indicates that the banks' financial stability is high and stable enough, which will help in measuring and efficiently handling the banks' financial risks, obviating price fluctuations of tangible and financial assets that generally influence the banks' monetary stability, and adequately allocating financial resources within the firm.

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ARTICLE

Does Financial Globalization Discipline Macroeconomic Policies

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ABSTRACT

Using the unbalanced panel data of 160 countries from 1970 to 2007, we employ inflation and the budget deficit as proxies for monetary policy and fiscal policy, respectively, and study whether financial globalization has discipline effects on these macroeconomic policies. The empirical results in our study suggest a significant discipline effect of financial globalization on monetary policy during the entire sample period, which is robust both to de jure and to de facto measures of financial openness. Our sub-sample investigations demonstrate that financial globalization reduces inflation only in higher-middle-income and high-income countries, and when financial globalization is scaled by the proportion of a country's foreign assets and liabilities to its GDP, the discipline is evident only after 1988. Nevertheless, we do not demonstrate any evidence of financial globalization's discipline effect on fiscal policy. The empirical results indicate that financial globalization even increases the budget deficit in certain countries and periods.

Keywords: Financial Globalization; Monetary Policy; Fiscal Policy; Discipline Effect

1. Introduction

Financial globalization is perceived to promote economic growth and facilitate risk-sharing all over the world. Given the strong progress toward financial integration and the fast economic growth in developing countries during the past two decades, the benefits of financial globalization seem to be partly verified. However, although there is a growing body of literature in this domain, no empirical consensus regarding the growth benefits of financial liberalization has been reached (Eichengreen, 2001; Karadam & Ocal, 2014). Moreover, due to the frequent occurrences of financial crisis since the 1980s and

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ARTICLE INFO
Received: 24 July 2024 | Revised: 30 July 2024 | Accepted: 6 August 2024 | Published Online: 16 December 2024
DOI: http://doi.org/10.26549/jsbe.v7i2.18640

CITATION
Xie, SH., Mo, T.P., 2024. Does Financial Globalization Discipline Macroeconomic Policies. Journal of Sustainable Business and Economics. 7(2): 21–37. DOI: http://doi.org/10.26549/jsbe.v7i2.18640

especially the outburst of the global financial crisis in 2008, people have begun to assess the advantages and disadvantages of financial globalization more rigorously.

Kose et al. (2009a) believe that the reason why the causal effect of financial globalization on economic growth cannot be detected despite the apparent statistical relationship between financial globalization and growth is that structural, institutional, and macroeconomic policy variables are incorporated in the regressions that explain the growth of GDP. Because these variables may capture some of the collateral benefits of financial globalization, the explanatory power left for financial globalization itself could be very little. In this case, because it is difficult to examine the direct effect of financial globalization, we can instead detect its indirect effect, namely the collateral benefits, by studying how financial globalization works through other intermediate pathways, to gain a better understanding of financial globalization's effects on the economy.

Since the mid-1980s, there has been a global trend of disinflation. Within the 1990s, the global inflation dropped from 30% to 4% (Rogoff, 2003). In addition, the global fiscal deficit level has been declining. The average government fiscal deficit in developing countries fell from 6% in the first half of the 1980s to 2% in the second half of the 1990s (Tytell & Wei, 2004). The decline of inflation and fiscal deficit level are attributed to the "Discipline Effect" of financial globalization, which works partially in the sense that favorable macroeconomic environments or investment climates will attract capital inflows whereas high fiscal deficits and serious inflation will cause market panics and serious capital flight, negatively affecting the real economy. Thus, financial globalization may induce the government to pursue better macroeconomic policies, such as tightening budget deficits and stabilizing inflation, for fear of economic deterioration. The discipline effect is just one of the aforementioned potential collateral benefits of financial globalization. If the discipline effect can be verified, which is what we attempt to do in this paper, then we can conclude that financial liberalization brings some benefits.

Unlike the rich empirical literature on the relationship between financial globalization and economic growth, studies directly analyzing whether financial globalization disciplines macroeconomic policies are notably limited. As far as we know, there are only five existing papers examining the discipline effect of financial globalization. Specifically, Kim (2003) and Furceri & Zdzienicka (2012) examine the impact of financial globalization on fiscal policy, Spiegel (2009) and Taghipour & Mousavi (2011) analyze the impact on monetary policy, whereas Tytell & Wei (2004) investigate both the fiscal policy and monetary policy. The results of these studies vary considerably. Kim (2003) and Furceri & Zdzienicka (2012) both find evidence of a discipline effect of financial globalization on fiscal policy. Spiegel (2009) confirms a negative relationship between inflation and financial globalization, although this relationship is significant only in rich countries. However, using a sample of developing countries, Taghipour & Mousavi (2011) substantiate the negative relationship. Tytell & Wei (2004) find no evidence of a discipline effect on fiscal policy, although they confirm a robust discipline effect on monetary policy.

Although the discipline effect of financial globalization is plausible in theory, it seems hard to find consistent empirical evidence. The inconformity of the results is highly attributable to the data and methodologies adopted in these studies. Therefore, in this paper, we aim to use the data of 160 countries from 1970 to 2007 to deploy a much more comprehensive analysis on financial globalization's discipline effect on both monetary and fiscal policy. Our study adds to the existing literature mainly in three aspects. First, we examine the robustness of this discipline effect to the different measures of financial globalization. Second, we assess the change of the discipline effect over time. Third, we discuss whether the discipline effect varies among different income groups of countries.

The remainder of this paper is structured as follows. Section 2 introduces the theories of financial globalization's discipline effect. Section 3 presents

the data and describes the main variables. Section 4 reports the regression results. Section 5 presents the conclusions.

2. Theoretical Background

The discipline effect was proposed in the 1990s. The earliest formal claim was made by the First Deputy Managing Director of the IMF, Stanley Fisher (1997), who said, "International capital flows tend to be highly sensitive to macroeconomic policies, to the soundness of the banking system, and to economic and political developments. Accordingly, market forces can exert a disciplining influence on macroeconomic policies. Normally, when the market's judgment is right, this discipline is valuable, rewarding good policies and penalizing bad." This perspective was also adopted by Stiglitz (2000). However, it seems that economics scholars are more concerned about practical and direct issues such as whether financial globalization can promote economic growth; thus, academic examination of the discipline effect is scarce, and studies on the mechanisms of the discipline effect are even scarcer.

In addition to a comprehensive empirical study on the discipline effect of financial globalization, Tytell & Wei (2004) also develop a theoretical model to formalize the logic behind the discipline effect. Their model illustrates that because foreign investment was one input in the production function and the investment levels of foreign investors are positively determined by the probability of the domestic government adopting good macroeconomic policies, the government tends to maximize its objective function by raising the possibility of adopting good macroeconomic policies when financial globalization deepens to increase the domestic product. Nevertheless, a caveat should be noted that their conclusion is based on the premise that higher foreign investment will increase domestic production, which is questioned by other scholars, such as Schularick and Steger (2010).

Rogoff (2003) provides a specific perspective about the effect of financial globalization on monetary policy. In his opinion, international integration including financial globalization can increase the competition in goods and labor markets, thereby reducing price levels and increasing wage and price flexibility in domestic markets. Consequently, the effectiveness of unanticipated loose monetary policies declines as the effects of these policies become smaller and more transitory. In this case, there is less incentive for central banks to use inflation as a source of government revenue. Regarding the discipline effect on fiscal policy, one plausible mechanism is that financial globalization promotes international risk-sharing by providing better opportunities for countries to smooth consumption, which simultaneously reduces the possibilities of budget deficits (Kose et al., 2009b).

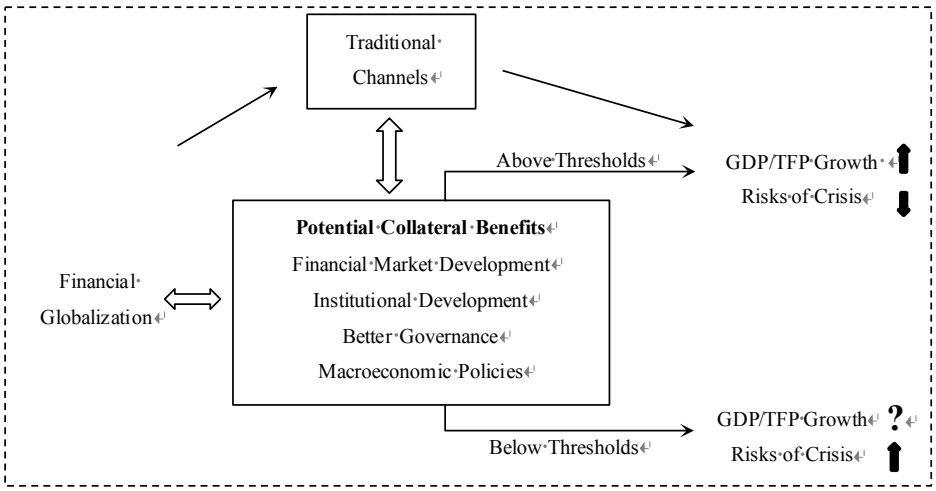

Figure 1. Growth benefits of financial globalization.

Sources: Kose et al. (2009a).

Kose et al. (2009a) propose a unified framework to describe the impact of financial globalization on economic growth. The traditional view is that financial globalization can promote economic growth through many direct channels such as improving the efficiency of international capital allocation efficiency, financing domestic investment, and increasing risk-sharing all over the world. As shown in **Figure 1**, Kose et al. (2009a) state that besides these direct effects, financial globalization can also promote the development of a country through indirect means such as developing the financial market, improving institutional arrangements, disciplining the country's macroeconomic policies, and so on. Actually, the existence of these indirect channels also accounts in two ways for the fact that present studies about financial globalization's effects on economic growth have not reached a unanimous conclusion. First, financial globalization takes a long time to show its effect on economic growth because it works more through these indirect channels than the direct means. Second, it is difficult to detect the impact of financial globalization when the proxies for these indirect channels such as institutional quality, financial development, and macroeconomic policy quality are included in the regressions. Thanks to these two reasons, the coefficient on financial globalization can be easily found to be insignificant.

Although Kose et al. (2009a) claim that financial globalization can affect economic growth through indirect channels including macroeconomic policies, they admit that these indirect mechanisms may only work when certain initial conditions are met. More importantly, the components of the indirect channels are perhaps included in the initial conditions. Specifically, only when the macroeconomic factors of an economy such as financial development, institutional quality, and macroeconomic policies reach a certain threshold can financial globalization positively influence economic growth. Many other studies have also confirmed this view. For example, Mody & Murshid (2005) find that foreign inflows have stronger impact on investment in countries that pursue better macroeconomic policies. Kose et al. (2011) also substantiate that certain "threshold" levels of financial and institutional development need to be satisfied before the indirect benefits of financial globalization are achieved. Thus, according to these arguments, it is reasonable to believe that there may also exist some conditions for the channel of macroeconomic policies to take effect, which we will discuss later.

3. Data and Variables

3.1 Data Sources and Processing

In our empirical analysis, the data utilized are mainly obtained from four databases. First, the data used to calculate the de facto measures financial globalization is from Lane & Milesi-Ferretti (2007). Second, we use the de jure measure of financial globalization calculated by Chinn & Ito (2008). Third, the data of inflation, fiscal deficit, and other macroeconomic indicators are drawn from the International Financial Statistics (IFS) of IMF. Fourth, the purchasing power parity GDP (PPPGDP) of the sample countries is from the Pen World Table.

To ensure the validity of the data, we exclude the following four categories of countries in our sample: (1) three major oil-producing countries, including Saudi Arabia, Kuwait, and Oman; (2) the four financial centers, including Singapore, Ireland, Luxembourg, and Panama; (3) four countries with outliers in the variables of financial globalization, including Libya, Nicaragua, Bulgaria, and Bahrain; and (4) Nigeria, whose value of fiscal deficit is abnormal. After dropping these countries, our sample consists of 160 countries from 1970 to 2007. We believe that the sample is large enough to identify the time change of discipline effect and the variations of discipline effect in different groups of countries. When grouping the sample countries, we classify all of the countries into four categories by the per capita income (GNI per capita) according to the standards of the World Bank: low-income countries, lower-middle-income countries, higher-middle-income countries, and high-income countries.

3.2 Macroeconomic Policy

This paper primarily focuses on monetary policy and fiscal policy. As previously explained in the theoretical background section, financial globalization can increase the price flexibility of goods and labor, and thus the impact on output of the monetary policy will decrease with the deepening of financial globalization. In this case, the monetary policy of an economy will switch from output anchored to price anchored when it becomes more financially integrated with other countries. In fact because the 1990s, countries have been more inclined to target inflation as their monetary policy goal (Spiegel, 2009). This perhaps leads to the result found by Rogoff (2003) that global inflation fell sharply in the 1990s. Considering the link between inflation and monetary policy, the paper follows previous studies to use the inflation level as the proxy variable for the quality of monetary policy. Specifically, the inflation level is defined as follows:

$$Inflation = 100 * (\frac{CPI_t}{CPI_{t-1}} - 1) \quad (1)$$

In the following analysis, as with Tytell & Wei (2004) and Spiegel (2009), we use the logarithmic value of this variable. According to the current consensus, if a country attains a low level of inflation, then we believe that the country has adopted a good monetary policy. Instead, if a country's inflation is higher, the country is perceived to pursue worse monetary policy.

Figure 2 depicts the evolution of the inflation of the four different income groups of countries from 1970 to 2007. It is apparent that despite a number of short-term fluctuations, all of the four groups of countries have experienced a decline in inflation since 1990. Among the high-income countries, the decline even began in the early 1980s. These preliminary findings are consistent with Rogoff (2003). Another interesting finding is that high-income countries always maintain a lower level of inflation than the other three groups of countries whereas the magnitude and trend of the other three groups are very close. What we are interested in this paper is whether the overall downward trend in 1990s has resulted from the deepening of financial globalization.

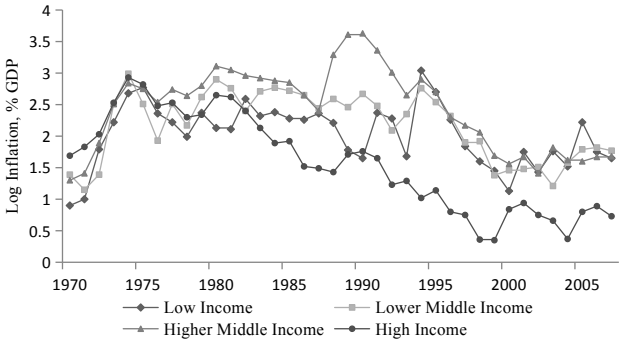

Figure 2. 1970-2007 national inflation levels in each group.

Note: Because the data of some countries in some years is not available, we only include the countries with no omission of observations from 1970 to 2007 in the sample to avoid abnormal fluctuations incurred by adding new observations to calculate the average inflation. Specifically, there are 21 low-income countries, 26 lower-middle-income countries, 21 higher-middle-income countries, and 28 high-income countries in the sample to determine the trend.

In addition to the monetary policy, the paper is also interested in the discipline effect of financial globalization on fiscal policy. Previous studies usually assessed the quality of a country's fiscal policies based on its deficit situation. This paper also follows this approach. Specifically, the budget deficit ratio is defined as follows:

$$Budget\ Deficit = 100 * \frac{Government\ Expense - Government\ Revenue}{GDP} \quad (2)$$

Because previous studies did not utilize the logarithmic value of this variable, to facilitate the comparison of results, this paper does not use the logarithmic value either. **Figure 3** depicts the changes of budget deficit of the entire sample. As shown in this figure, similar to the evolvement of inflation, the budget deficit in the sample countries has also shown a significant trend of decline since 1980. This is of course a result of multiple forces, whereas in this paper, we aim to determine whether financial openness is one of these forces.

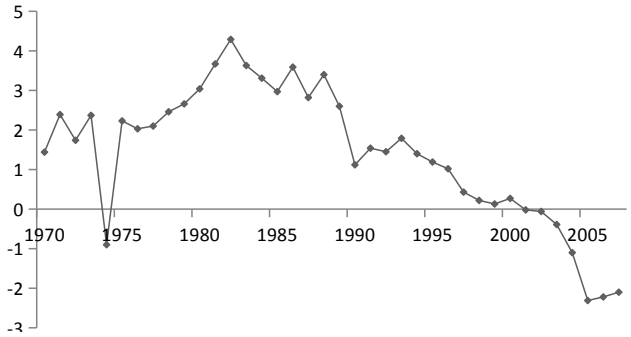

Figure 3. 1970-2007 average deficit levels.

Note: As in Figure 2, we only include the countries with full observations in the sample. We do not report the trend in different groups because the countries in different groups are too few due to the serious omission of budget deficit data.

3.3 Financial Globalization

There are two types of frequently used measures of Financial Globalization: de jure and de facto. De jure measures reflect the government's legal restrictions on all types of capital account transactions, while de facto measures reflects the actual international capital flows. Theoretically, the two types of measures should reflect the same degrees of openness. However, de jure and de facto measures may deviate from each other because the official capital account restrictions are not always effectively imposed in some countries, especially in some developing countries. Actually, it is not surprising to see that some countries with stringent capital control policies have huge capital flows whereas countries with almost no capital controls have few capital flows. In this case, the paper will use both types of measures to conduct a comprehensive analysis of financial globalization and test whether using different metrics affects the conclusions.

Most of the de jure measures of financial globalization are calculated based on the IMF's Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER). Until 1996, the summary table of the AREAER recorded IMF members' official arrangements on four groups of controls on cross-border financial transactions: the existence of multiple exchange rates; the existence of controls on current account transactions; the existence of controls on capital account transactions; and the requirement of the surrender of export proceeds. In 1996, the classification method of the restrictions changed, and these four categories of controls were disaggregated to adapt with the complexity of capital control policies. However, because the measures are all dichotomous, they cannot reflect the extent of these controls, which makes cross-country comparison difficult. Therefore, to more accurately reflect the extent of a country's capital controls, scholars such as Quinn & Toyoda (2008) and Chinn & Ito (2008) re-construct some de jure measures of financial globalization based on the information from AREAER. In this paper, we use the KAOPEN index compiled by Chinn & Ito (2008). The KAOPEN index is the first standardized principal component of four variables constructed from AREAER, and it ranges from -1.71 to 2.65. This index is higher in countries that are more open to cross-border capital transactions.

Figure 5 describes the trend of the four groups of countries' de jure measures of financial globalization from 1970 to 2007. It is obvious that the restrictions on international capital flows in high-income countries have been gradually loosened since 1975. The other three groups of countries have also gradually relaxed their restrictions on capital flows since 1990, but the trend is not as evident as in high-income countries. In particular, the de jure measure of financial globalization in low-income countries has remained unchanged in recent years. Overall, among all of the sample countries except the low-income countries, the degree of financial globalization has been increasing, corresponding to the decrease of inflation rate and budget deficit, as shown in **Figure 3** and **Figure 4**.

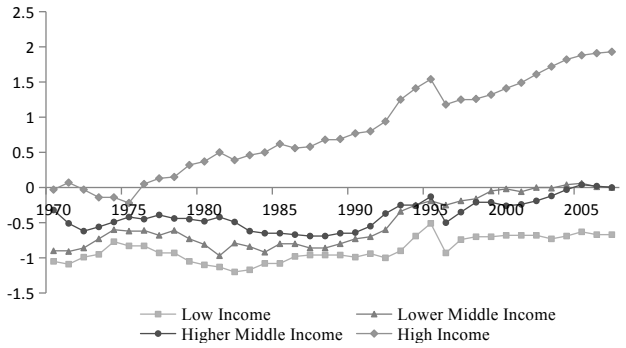

Figure 4. De jure trend of group countries in 1970-2007.

Note: As in Figure 2, we only include the countries with full observations in the sample. Specifically, there are 21 low-income countries, 26 lower-middle-income countries, 21 higher-middle-income countries, and 28 high-income countries in the sample.

According to the IMF, cross-border capital transactions can be classified into five categories, including portfolio investment (which includes portfolio equity and portfolio debt), foreign direct investment, other investments (which includes debt instruments such as loans, deposits, and trade credits), financial derivatives, and reserves. The stocks of each category's external assets and liabilities at the end of the recording period are recorded in the international investment position (IIP) data by IMF. Because other investments usually share the same features as portfolio debt, they are usually incorporated in the portfolio debt in calculation. Using the data of IIP and balance of payments (BOP), Lane & Milesi-Ferretti (2007) estimate the financial assets and liabilities of 178 countries during the period of 1970-2004 after adjusting for the valuation effect (change in financial assets and liabilities induced by the changes in exchange rates and asset prices).[①] In their work, three de facto measures of financial globalization are used:

$$IFI1 = \frac{GFA + GFL}{GDP} \tag{3}$$

$$IFI2 = \frac{EquityA + FDIA + EquityL + FDIL}{GDP} \tag{4}$$

$$IFI3 = \frac{GFA + GFL}{X + M} \tag{5}$$

GFA denoting total foreign assets is the sum of portfolio equity assets (*EquityA*), FDI assets (*FDIA*), portfolio debt assets (*DebtA*), financial derivatives assets (*FinA*), and reserves (*Res*) and *GFL* denoting total foreign liabilities is the sum of portfolio equity liabilities (*EquityL*), FDI liabilities (*FDIL*), portfolio debt liabilities (*DebtL*), financial derivatives liabilities (*FinL*). X and M are goods exports and imports, respectively. According to the above definitions, *IFI1* represents the ratio of the sum of total foreign assets and liabilities to GDP, *IFI2* represents the ratio of the sum of foreign portfolio equity and FDI assets and liabilities to GDP, and *IFI3* represents the ratio of the sum of the total foreign assets and liabilities to the sum of exports and imports. IFI1 is distinguished from IFI2 because the effectiveness of debt positions in promoting international risk sharing and enhancing growth is believed to be different from equity positions (Furceri & Zdzienicka, 2012).

The de facto measures of financial globalization used in the previous empirical studies are slightly different. For example, Tytell & Wei (2004) use IFI1 whereas Spiegel (2009) uses IFI2. In this paper, we will use all of the three measures to conduct our analysis to avoid the bias incurred by the definition of variables. Moreover, Huang (2007) claims that although the USD measured GDP as the denominator of IFI1 and IFI2 enables comparison among different countries, the results may be biased because the developing countries' GDPs are usually underestimated when the official exchange rates are used to calculate the USD GDP. Therefore, we follow Huang (2007) in using the purchasing power parity GDP (PPPGDP) as the denominator of the financial globalization measures, and we obtain the two following indicators:

$$IFI4 = \frac{GFA + GFL}{PPPGDP} \tag{6}$$

$$IFI5 = \frac{EquityA + FDIA + EquityL + FDIL}{PPPGDP} \tag{7}$$

Figure 5 shows the trend of the five de facto measures of financial globalization in four groups from 1970 to 2007. It can be observed that there is a surge of financial globalization in low-income countries before 1995, whereas since then the financial globalization has been declining. This evolution is also evidenced in the IFI1, IFI3 and IFI4 of lower-middle-income countries. However, for IFI2 and IFI5, there is only an uprising trend. In higher-middle-income countries, all of the five de facto measures evidence the deepening of financial globalization. In high-income countries, the ascending trend is even more obvious for all of the five measures. In all, we see a different pattern of evolution in the trend of the de facto measures of financial globalization from the de

① The dataset was updated several times after the publication of the paper, and the latest version can be obtained from http://www.philiplane.org/EWN.html.

jure measure. Although the ascending trend is most obvious in the high-income countries, the other three groups of countries also experience the deepening of de facto financial globalization at least from 1970 to 1995. However, when measured in the de jure method, the financial globalization in low-income countries is hardly evident. Therefore, adopting both the de jure and de facto measures of financial globalization can address the discrepancy in the two types of measures.

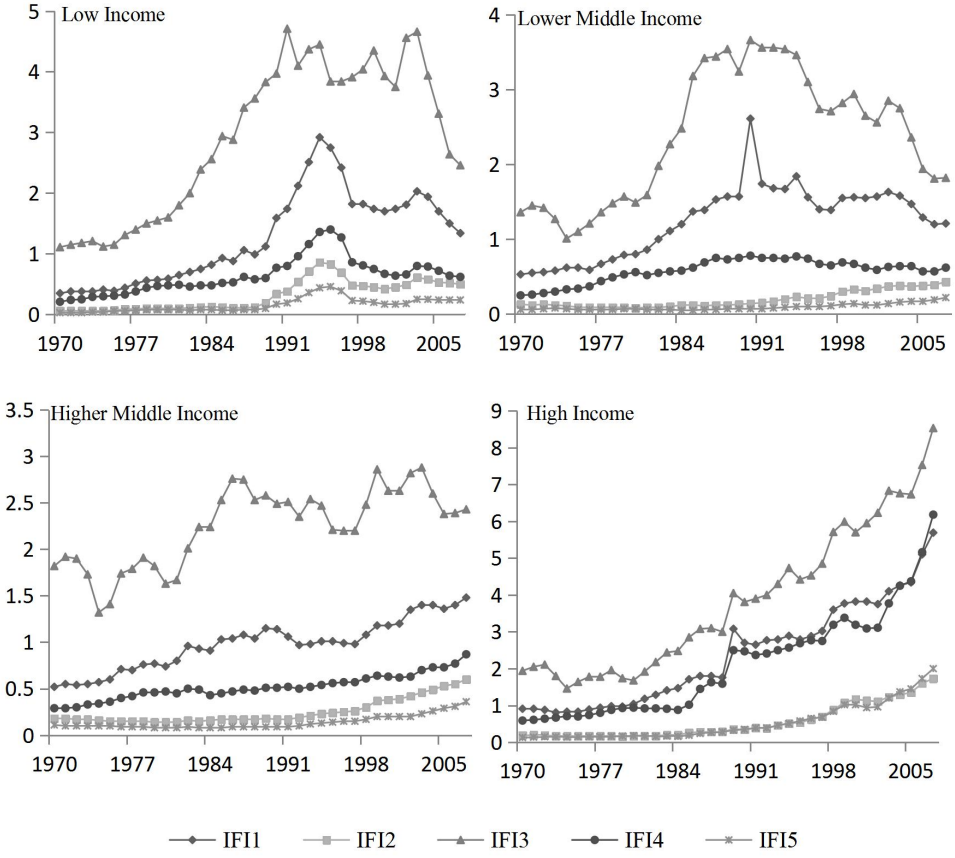

Figure 5. De facto trend of group countries in1970-2007.

Note: As in Figure 2, we only include the countries with full observations in the sample. Specifically, there are 21 low-income countries, 26 lower-middle-income countries, 21 higher-middle-income countries, and 28 high-income countries in the sample.

4. Empirical Analysis

4.1 Basic Analysis

The above analysis shows that the deepening of financial globalization is accompanied by deflation and the improvement of fiscal deficit. To more rigorously identify the relationship between financial globalization and macroeconomic policies, we employ regression analysis. According to the five existing empirical studies in this field, the regression models are specified as follows:

$$Log\ Inflation_{i,t} = \alpha_0 + \alpha_1 Financial\ Globalization_{i,t} + \alpha_2 Trade\ Openness_{i,t} + \alpha_3 Log\ Population_{i,t} + \alpha_4 GDP\ per\ capita_{i,t} + Z_t + \varepsilon_{i,t} \quad (8)$$

$$Budget\ Deficit_{i,t} = \beta_0 + \beta_1 Financial\ Globalization_{i,t} + \beta_2 Trade\ Openness_{i,t} + \beta_3 Log\ Population_{i,t} + \beta_4 GDP\ per\ capita_{i,t} + Z_t + u_{i,t} \quad (9)$$

In addition to the main explanatory variable, financial globalization, we also include Trade Openness, Log Population, and GDP per capita in the regressions to control for the effects of macro-economic factors. The Log Population is the logarithm of the population measured in ten thousands. The GDP

per capita is the logarithm of the USD PPPGDP of each country, which is obtained from the Pen World Table. According to Spiegel (2009), GDP per capita as a metric of economic development is a proxy of some domestic macro-economic factors. Because the trend of both the dependent variables and independent variables are significant, we control for the time fixed effects in some regressions to account for this trend. Moreover, other time-variant macro-economic effects can also be captured by the time fixed effects.

It should be noted that the data used for the regression in this section is not all of the data in 1970-2007 that is employed in the previous figures. To smooth out the short-term fluctuations and to reduce the effect of the correlation of time series, we average the data over 5-year non-overlapping sub-periods: 1973-1977, 1978-1982, 1983-1987, 1988-1992, 1993-1997, 1998-2002, and 2003-2007. Therefore, after this processing, there should be 7 observations for a country with no omission of data. Due to the omission of data in some countries, the ultimately used data set is unbalanced panel data.

In the empirical analysis, we first examine the influence of financial globalization on monetary policy. **Table 1** presents the preliminary regression results where time fixed effects are not controlled for. Because GDP per capita is not controlled for in the regression in most existing studies, we exclude it in Column (1) but add it back in from Column (2). It can be judged from the massive increase of R^2 that GDP per capita is essential in explaining the variations of inflation, justifying our model specification. Column (3) to Column (7) report the regression results where IFI1 to IFI5 are controlled for. It is meaningless to explain the magnitude of the coefficients on those financial globalization variables because the dependent variables are logarithms. Therefore, we primarily focus on the sign and the significance of these coefficients. Obviously, the coefficients on the 5 de facto measures of financial globalization are significantly negative, indicating that the deepening of financial globalization lowers the domestic inflation rate. In other words, financial globalization can encourages a country to adopt better monetary policies. Column (8) reports the regression results where the de jure financial globalization is incorporated. The coefficient on KAOPEN is also significantly negative, which is consistent with the previous regression results.

Table 1. The impact of financial globalization on inflation—baseline regression.

	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
			IFI1	**IFI2**	**IFI3**	**IFI4**	**IFI5**	**KAOPEN**
Financial Globalization			-0.1167***	-0.4869***	-0.0673***	-0.1404***	-0.4747***	-0.2241***
			(0.0302)	(0.0757)	(0.0180)	(0.0300)	(0.0779)	(0.0312)
Trade Openness	-0.3980***	-0.3332***	-0.1110	-0.0184	-0.4302***	-0.1312	-0.1080	-0.2714**
	(0.1006)	(0.1144)	(0.1272)	(0.1221)	(0.1165)	(0.1210)	(0.1181)	(0.1131)
Population (Log)	0.0641***	0.0627***	0.0659***	0.0711***	0.0626***	0.0715***	0.0755***	0.0724***
	(0.0212)	(0.0206)	(0.0205)	(0.0202)	(0.0204)	(0.0204)	(0.0204)	(0.0205)
GDP Growth		-0.2410***	-0.2079***	-0.1711***	-0.2109***	-0.1876***	-0.1699***	-0.1122***
		(0.0297)	(0.0306)	(0.0312)	(0.0305)	(0.0314)	(0.0316)	(0.0342)
Constant	1.6221***	3.5270***	3.2725***	2.8870***	3.5273***	3.0389***	2.8363***	2.3524***
	(0.2177)	(0.3057)	(0.3102)	(0.3159)	(0.3033)	(0.3194)	(0.3213)	(0.3453)
Observations	821	818	818	810	818	818	810	798
R^2	0.046	0.125	0.141	0.168	0.140	0.148	0.164	0.178

Notes: The dependent variable is the natural logarithm of inflation, *Log Inflation*. The cells show coefficients with robust standard errors in parentheses. *, **, and *** denote the significance levels of 10%, 5% and 1%, respectively.

Table 2 shows the results after controlling for the time fixed effects. The explanatory power of the models increase due to the more restrictive identification. The coefficients on the financial globalization remain significant at the 1% level in all of the regressions except in Column (3) and Column (5). The results suggest that the effect of financial openness on inflation is overall robust to the time fixed effects. The different significance levels of the coefficients on IFI1 and IFI2 indicates that whether the portfolio debt assets and liabilities are taken into account when computing the financial openness seems to make a difference to the results. However, the same level of significance of the coefficients on IFI4 and IFI5 shows that when PPPGDP is employed as the denominator in the calculation of financial openness index, the inclusion of portfolio debt in the numerator makes no difference to the results. Therefore, although the results in our analysis are reliable due to the comprehensive regressions, the conclusions in previous studies are very susceptible to the definitions of de facto financial globalization in their studies. The coefficient on KAOPEN is still significantly negative, showing that the effect of de jure financial globalization on monetary policy is robust.

Table 2. The impact of financial globalization on inflation—time effects controlled for.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
			IFI1	**IFI2**	**IFI3**	**IFI4**	**IFI5**	**KAOPEN**
Financial Globalization			-0.0560*	-0.3177***	-0.0169	-0.1237***	-0.3774***	-0.1982***
			(0.0294)	(0.0750)	(0.0180)	(0.0284)	(0.0749)	(0.0297)
Trade Openness	-0.2150**	-0.1559	-0.0560	0.0257	-0.1846	0.0161	0.0043	-0.1025
	(0.0940)	(0.1092)	(0.1210)	(0.1165)	(0.1134)	(0.1150)	(0.1124)	(0.1082)
Population (Log)	0.0843***	0.0827***	0.0835***	0.0864***	0.0822***	0.0898***	0.0917***	0.0872***
	(0.0196)	(0.0195)	(0.0194)	(0.0194)	(0.0195)	(0.0193)	(0.0193)	(0.0194)
GDP per capita		-0.1691***	-0.1567***	-0.1324***	-0.1641***	-0.1247***	-0.1186***	-0.0587*
		(0.0290)	(0.0296)	(0.0303)	(0.0295)	(0.0304)	(0.0306)	(0.0330)
Constant	1.9131***	3.1280***	3.0180***	2.7867***	3.1332***	2.7148***	2.6441***	2.1837***
	(0.2270)	(0.3029)	(0.3079)	(0.3127)	(0.3030)	(0.3142)	(0.3157)	(0.3351)
Observations	821	818	818	810	818	818	810	798
R^2	0.202	0.235	0.239	0.252	0.236	0.253	0.259	0.278

Notes: The dependent variable is the natural logarithm of inflation, *Log Inflation*. The cells show coefficients with robust standard errors in parentheses. Time fixed effects are controlled for in all of the columns. *, **, and *** denote the significance levels of 10%, 5% and 1%, respectively.

We then proceed to analyze the impact of financial globalization on fiscal policy. It should be noted that in the regressions, we directly use the budget deficit instead of its logarithm value because fiscal surplus is recorded as a negative value. **Table 3** presents the regression results of budget deficit. As shown in Column (3)-Column (7), the coefficients on all of the five de facto measures of financial globalization are insignificant, indicating that the impact of financial globalization on fiscal policy is not distinguishable, which accords with Tytell & Wei (2004). More interestingly, the coefficient on the de jure measure of financial globalization, KAOPEN, is significant at the 5% level and has a high positive value. The results are quite surprising. It is usually perceived that theoretically financial globalization induces an economy to pursue better fiscal, and the budget deficit level should decrease as a result. However, our regression results seems to indicate that financial globalization does not lead to better fiscal policies, and the budget position even deteriorates instead. Despite the complexity of the results, it is safe for us to conclude that we do not find any evidence of financial globalization's discipline effect on fiscal policy.

Table 3. The impact of financial globalization on budget deficit--baseline regression.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
			IFI1	IFI2	IFI3	IFI4	IFI5	KAOPEN
Financial Globalization			0.0055	0.8537	-0.1310	0.0924	0.3972	0.7259**
			(0.2250)	(0.7151)	(0.1449)	(0.1587)	(0.4256)	(0.3387)
Trade Openness	-4.1577***	-5.0576***	-5.0634***	-5.3401***	-5.3197***	-5.1011***	-5.1187***	-5.1332***
	(1.0328)	(1.6155)	(1.6347)	(1.7214)	(1.7170)	(1.6195)	(1.6291)	(1.5977)
Population (Log)	0.0509	-0.0345	-0.0344	-0.0234	-0.0415	-0.0329	-0.0330	0.0156
	(0.1931)	(0.2046)	(0.2049)	(0.2019)	(0.2045)	(0.2054)	(0.2051)	(0.1921)
GDP per capita		-0.1592	-0.1611	-0.3193	-0.0874	-0.2039	-0.2417	-0.6074**
		(0.2309)	(0.2456)	(0.2369)	(0.2610)	(0.2483)	(0.2427)	(0.2638)
Constant	2.5709	5.1267*	5.1364*	6.1703**	5.0897*	5.4176*	5.7100**	8.4109***
	(2.0935)	(2.7184)	(2.7633)	(2.9132)	(2.7389)	(2.7987)	(2.8592)	(3.2204)
Observations	298	296	296	296	296	296	296	290
R^2	0.122	0.079	0.079	0.083	0.081	0.079	0.080	0.100

Notes: The dependent variable is the budget deficit rate, *Budget Deficit*. The cells show coefficients with robust standard errors in parentheses. *, **, and *** denote the significance levels of 10%, 5% and 1%, respectively.

Similarly, we then control for the time fixed effects in all of the regressions of fiscal deficit to test the robustness of our results. **Table 4** reports the corresponding results. The significance of the coefficients on all of the financial globalization measures do not change except in Column (4). However, the coefficient on IFI2 is significantly positive, which does not challenge our previous conclusion at all. Moreover, the increase in the magnitude of the insignificant coefficients on financial globalization also does not alter our conclusions. Therefore, it can be concluded that our previous finding about the impact of financial globalization on fiscal deficit is robust to the time fixed effects.

Table 4. The impact of financial globalization on budget deficit-- the time fixed effects controlled for.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
			IFI1	IFI2	IFI3	IFI4	IFI5	KAOPEN
Financial Globalization			0.2433	1.6210**	0.0326	0.1475	0.6964	0.8754**
			(0.2127)	(0.8171)	(0.1492)	(0.1404)	(0.4306)	(0.3464)
Trade Openness	-3.7309***	-3.4116*	-3.5945**	-3.7091**	-3.3248*	-3.4636*	-3.4556**	-3.2991*
	(0.8091)	(1.7633)	(1.7742)	(1.7818)	(1.9162)	(1.7609)	(1.7535)	(1.7233)
Population (Log)	0.1273	0.1232	0.1377	0.1624	0.1272	0.1268	0.1301	0.1968
	(0.1819)	(0.2014)	(0.2018)	(0.1950)	(0.2041)	(0.2026)	(0.2016)	(0.1899)
GDP per capita		0.0449	-0.0288	-0.2360	0.0302	-0.0247	-0.0941	-0.4674*
		(0.2162)	(0.2280)	(0.2255)	(0.2415)	(0.2306)	(0.2284)	(0.2398)
Constant	2.1533	2.1623	2.5058	3.7805	2.1531	2.5972	3.0716	5.3824*
	(1.9524)	(2.6577)	(2.6938)	(2.8018)	(2.6558)	(2.7191)	(2.7695)	(3.0487)
Observations	298	296	296	296	296	296	296	290
R^2	0.176	0.129	0.131	0.142	0.129	0.130	0.133	0.162

Notes: The dependent variable is the budget deficit rate, *Budget Deficit*. The cells show coefficients with robust standard errors in parentheses. Time fixed effects are controlled for in all of the columns. *, **, and *** denote the significance levels of 10%, 5% and 1%, respectively.

According to the preliminary findings, we find that financial globalization can generally decrease the inflation whereas it contributes nothing to the decrease of budget deficit. In other words, we substantiate the discipline effect of financial globalization on monetary policy but find no evidence of the discipline effect on fiscal policy.

4.2 Regression of different phases-to judge the time point on the effect

Kose et al. (2009a) review many studies on the growth benefit of financial globalization and find that when different sample periods are used, the studies always reveal quite different findings. For example, Quinn (1997) finds that capital account liberalization can promote economic growth using the data from 1960 to 1989, whereas Rodrik (1998) finds no association between financial globalization and economic growth using the data from 1975 to 1989, although the same econometric methodologies are used in both studies. Regarding the collateral benefits of financial globalization because many fundamental macroeconomic conditions, such as the financial market development and trade integration, which are perceived to be threshold conditions by Kose et al. (2009a) have changed over time, the discipline effect of financial globalization may also evolve. In fact, Furceri & Zdzienicka (2012) find that the discipline effect of financial globalization on fiscal policy does not take effect until 1985, providing evidence of the evolution of the discipline effect. Considering this case, we conduct a further analysis on the sub-periods to test whether the discipline effect of financial globalization changes over time.

Specifically, following Furceri & Zdzienicka (2012), we divide the whole sample period into 4 overlapping sub-periods, with 20 years to each period, and run regressions separately in each sub-period. In each regression, the data used are also 5-year non-overlapping averages and the dependent variables controlled for are also the same variables as in previous regressions.

Table 5 presents the regression results of inflation, with the results of 1973-1992, 1978-1997, 1983-2002, and 1988-2007 shown in Panel A-Panel D, respectively. The results are not consistent in different measures of financial globalization, so we analyze them separately. First, in the results of IFI1 and IFI4 where total external assets and liabilities are used in the calculation of de facto measures of financial globalization, financial globalization reduces the inflation level in the period of 1988-2007. Second, in the results of IFI2 and IFI5, where debt positions are excluded in the de facto measures, the impact of financial globalization on inflation is significant during all of the four periods. Third, in the results of the de jure measure, KAOPEN, the discipline effect of financial globalization on monetary policy is found to be significant during all of the periods as well. Fourth, in the results of IFI3, where the denominator is the sum of imports and exports, the discipline effect is insignificant during all of the periods. Because the denominator IFI3 is quite different from the other four de facto measures, we believe that the result of this measure is less informative.

The complex results prove to us that when different measures of financial globalization are employed in the regressions, the results can vary greatly. Precisely, whether the debt positions are considered when calculating the de facto measures of financial globalization affects the results. Moreover, using the de jure measure and some de facto measure can also produce different results. However, despite the slightly inconformity in our results of different regressions, we can soundly conclude that when financial globalization is gauged by the ratio of the total foreign assets and liabilities to GDP, its discipline effect on monetary policy only works in the latest period of 1988-2007 in accordance with the results of Furceri and Zdzienicka (2012).

Table 6 reports the regression results of fiscal deficit in different periods. The results are almost identical to the results of the full sample period. Apparently, the coefficients on different measures of financial globalization are insignificant in almost every sub-period except for some significantly positive ones. Therefore, the regression results here provide no evidence of discipline effect of financial globalization on fiscal policies in each sub-period.

Table 5. The impact of financial globalization on inflation – sub-periods analysis.

	IFI1	IFI2	IFI3	IFI4	IFI5	KAOPEN
Panel A: 1973-1992						
Financial Globalization	0.1231**	-1.0333***	0.1754***	-0.0993	-1.7913***	-0.3099***
	(0.0558)	(0.2991)	(0.0470)	(0.0942)	(0.4195)	(0.0419)
Observations	395	388	395	395	388	377
R^2	0.114	0.133	0.148	0.110	0.159	0.200
Panel B: 1978-1997						
Financial Globalization	0.0381	-0.9257***	0.0677*	-0.1300*	-1.0832***	-0.3318***
	(0.0466)	(0.3025)	(0.0384)	(0.0692)	(0.3857)	(0.0439)
Observations	450	445	450	450	445	436
R^2	0.122	0.159	0.130	0.131	0.170	0.213
Panel C: 1983-2002						
Financial Globalization	-0.0218	-0.4417***	0.0044	-0.1393***	-0.5372***	-0.2599***
	(0.0393)	(0.1535)	(0.0275)	(0.0466)	(0.1756)	(0.0410)
Observations	499	496	499	499	496	494
R^2	0.188	0.208	0.187	0.203	0.216	0.248
Panel D: 1988-2007						
Financial Globalization	-0.0658**	-0.3509***	-0.0268	-0.1166***	-0.3757***	-0.1518***
	(0.0255)	(0.0750)	(0.0188)	(0.0260)	(0.0680)	(0.0362)
Observations	537	535	537	537	535	534
R^2	0.215	0.237	0.211	0.230	0.242	0.233

Notes: The dependent variable is the natural logarithm of inflation, *Log Inflation*. The cells show coefficients with robust standard errors in parentheses. Time fixed effects are controlled for in all of the columns. *, **, and *** denote the significance levels of 10%, 5% and 1%, respectively.

Table 6. The impact of financial globalization on budget deficit – sub-periods analysis.

	IFI1	IFI2	IFI3	IFI4	IFI5	KAOPEN
Panel A: 1973-1992						
Financial Globalization	0.2066	-2.2166	-0.0915	0.1252	-1.9259	0.3341
	(0.8491)	(2.8060)	(0.3015)	(0.5293)	(1.6844)	(0.2965)
Observations	118	118	118	118	118	112
R^2	0.089	0.094	0.089	0.089	0.094	0.101
Panel B: 1978-1997						
Financial Globalization	0.4578	2.2418	-0.1108	0.3248	0.9635	0.8464**
	(0.5519)	(1.8059)	(0.2206)	(0.3488)	(0.9725)	(0.3335)
Observations	142	142	142	142	142	137
R^2	0.134	0.140	0.132	0.134	0.133	0.174
Panel C: 1983-2002						
Financial Globalization	0.2214	1.9745	-0.0824	0.1317	0.7191	0.8621*
	(0.3483)	(1.5494)	(0.1966)	(0.2381)	(0.8178)	(0.4398)
Observations	178	178	178	178	178	175
R^2	0.125	0.136	0.124	0.124	0.126	0.152
Panel D: 1988-2007						
Financial Globalization	0.2007	1.8173**	0.0014	0.1067	0.7341	0.9266**
	(0.2235)	(0.8778)	(0.1680)	(0.1473)	(0.4608)	(0.4267)
Observations	217	217	217	217	217	216
R^2	0.087	0.104	0.086	0.086	0.090	0.117

Notes: The dependent variable is the budget deficit rate, *Budget Deficit*. The cells show coefficients with robust standard errors in parentheses. Time fixed effects are controlled for in all of the columns. *, **, and *** denote the significance levels of 10%, 5% and 1%, respectively.

4.3 Grouping Regression: Preliminary Judgment of Threshold Conditions

Kose et al. (2009a) argues only when some initial conditions such as financial development, institutional quality, and macroeconomic policies are satisfied can the collateral benefits, including the discipline effect, take effect. To verify this conjecture, we deploy our further analysis by investigating whether income level is one of the initial conditions. More specifically, we classify the sample countries into four groups according to the GDP per capita as previously introduced in the section of data and run regressions in each group. If the discipline effect is found to be distinguishable among different groups of countries, then we can conclude that the income level may act as one initial condition. However, a caveat should be noted that the conclusion is partially limited in that countries with different income levels may also differ in many other aspects such as institutional structure and financial market development and these factors are also perhaps the initial conditions themselves.

Table 7 presents the regression results of inflation in different groups, which are even more erratic than the sub-periods results. In Panel A, only the coefficient on IFI2 is significantly negative. Moreover, although the coefficients on IFI3 and IFI4 are significant, they are positive, contradicting with the discipline effect. Therefore, in the low-income countries, we find no reliable evidence of financial globalization's discipline effect on monetary policies. As for the lower-middle-income countries, the same situation goes and we will not give more detailed discussions. In Panel C, although the coefficients on IFI1 and IFI3 are not significant, the coefficients on IFI2, IFI4, IFI5, and KAOPEN are all significantly negative, substantiating the discipline effect of financial globalization on monetary policies in higher-middle-income countries. Moreover, the results in Panel 4 for the high-income countries provide more sounding evidence of discipline effect on monetary policies. The coefficients are all significantly negative except the insignificant one of IFI2. The results here thus illustrate that among the low-income and high-middle-income countries, the discipline effect of financial globalization on monetary policies is not evident, while the discipline effect exists in the higher-middle-income countries and high-income countries. These findings justify the conjecture of Kose et al. (2009a), and we may conclude that income level is one of the projected initial conditions.

Table 7. The impact of financial globalization on inflation – subgroups analysis.

	IFI1	IFI2	IFI3	IFI4	IFI5	KAOPEN
Panel A: Low Income						
Financial Globalization	0.3242	-2.2077**	0.1307**	1.1200**	-1.0707	-0.0661
	(0.1972)	(0.9239)	(0.0642)	(0.4355)	(2.9368)	(0.1060)
Observations	148	148	148	148	148	144
R^2	0.140	0.167	0.146	0.180	0.121	0.123
Panel B: Lower Middle Income						
Financial Globalization	0.3385***	-0.0192	0.2059***	-0.0740	-0.7027	-0.0340
	(0.1162)	(0.2134)	(0.0384)	(0.2226)	(0.5149)	(0.0439)
Observations	213	207	213	213	207	209
R^2	0.226	0.185	0.276	0.182	0.192	0.178
Panel C: Higher Middle Income						
Financial Globalization	-0.1713	-0.7276***	0.1844	-0.5019**	-1.2572***	-0.1251**
	(0.1474)	(0.2100)	(0.1126)	(0.2160)	(0.3345)	(0.0592)
Observations	225	225	225	225	225	219
R^2	0.439	0.457	0.451	0.449	0.461	0.461
Panel D: High Income						
Financial Globalization	-0.0514	-0.1680**	-0.0624***	-0.0780**	-0.1999***	-0.2251***
	(0.0313)	(0.0846)	(0.0195)	(0.0308)	(0.0754)	(0.0579)
Observations	232	230	232	232	230	226
R^2	0.431	0.431	0.444	0.440	0.436	0.493

Notes: The dependent variable is the natural logarithm of inflation, *Log Inflation*. The cells show coefficients with robust standard errors in parentheses. Time fixed effects are controlled for in all of the columns. *, **, and *** denote the significance levels of 10%, 5% and 1%, respectively.

Although the preceding analysis shows that financial globalization has no significant discipline effect on fiscal policy in the full sample, it is possible that the effect exists in some subsamples. Therefore, we proceed to a subsample analysis. Table 8 reports the regression results of the four subsamples. For the low-income countries in Panel A, the coefficient on KAOPEN, the de jure measure of financial globalization, is significantly negative whereas the coefficients on all of the de facto measures are all insignificant. Therefore, the discipline effect of financial globalization on fiscal policies in the low-income countries is not robust. For the other three groups of countries, although there are several significant estimates, they are all positive, which contradicts the discipline effect. Consequently, in line with the results of the full sample and the sub-periods, the subgroups results also indicate that financial globalization imposes no significant discipline effect on fiscal policy, even in groups of countries with different income levels.

Table 8. The impact of financial globalization on budget deficit – subgroups analysis.

	IFI1	**IFI2**	**IFI3**	**IFI4**	**IFI5**	**KAOPEN**
Panel A: Low Income						
Financial Openness	0.4629	-2.3775	0.2155	1.3396	-5.1193	-0.6892**
	(1.5931)	(4.8732)	(0.3682)	(2.1502)	(10.2732)	(0.3309)
Observations	55	55	55	55	55	53
R^2	0.207	0.208	0.217	0.214	0.208	0.271
Panel B: Lower Middle Income						
Financial Openness	-1.0089	23.0107	-3.0294	0.5001	47.6340**	2.6221*
	(2.8322)	(15.6414)	(3.0003)	(6.7171)	(23.4275)	(1.4452)
Observations	64	64	64	64	64	64
R^2	0.195	0.275	0.232	0.194	0.261	0.292
Panel C: Higher Middle Income						
Financial Openness	1.7611	3.7022	0.4569	3.5449**	6.5039*	0.7410**
	(1.2052)	(2.5110)	(0.7940)	(1.6856)	(3.4816)	(0.3405)
Observations	113	113	113	113	113	113
R^2	0.178	0.178	0.159	0.196	0.186	0.177
Panel D: High Income						
Financial Openness	0.2729	0.8486	0.0474	0.2258	0.6788	0.0907
	(0.3426)	(0.8533)	(0.2009)	(0.2440)	(0.6130)	(0.4843)
Observations	64	64	64	64	64	60
R^2	0.395	0.404	0.385	0.398	0.405	0.398

Notes: The dependent variable is the budget deficit rate, *Budget Deficit*. The cells show coefficients with robust standard errors in parentheses. Time fixed effects are controlled for in all of the columns. *, **, and *** denote the significance levels of 10%, 5%, and 1%, respectively.

5. Conclusions

The discipline effect of financial globalization on macroeconomic policies is perceived to be one of the collateral benefits of financial globalization on the economy. Using the data of 160 countries from 1970 to 2007, we empirically investigate this discipline effect in this paper. Specifically, we take inflation and budget deficit as the proxies for monetary policies and fiscal policies and examine whether financial globalization can reduce inflation and budget deficit as expected by the discipline effect theorem. To ensure the robustness of our results to the different measures of financial globalization, we employ five de facto measures of financial globalization as well as a de jure measure in our study. Because we believe that the effectiveness of the discipline effect may change over time due to time-variant macroeco-

nomic conditions, we conduct a subsample analysis to test this conjecture. Moreover, because it has been documented that initial conditions need to be met before the discipline effect emerges, we also classify the countries into four groups and examine whether financial globalization disciplines macroeconomic policies independently in each of the groups.

The results in our empirical analysis show that the impact of financial globalization on inflation, i.e., monetary policies, is evident overall. Nevertheless, there are some essential distinctions in the different subsamples. When financial globalization is measured by the ratio of the total foreign assets and liabilities to GDP, its discipline effect on monetary policy only works in the latest period of 1988-2007. By contrast, when debt position is excluded from the de facto measure or when financial globalization is gauged by the de jure measure, the discipline effect exists during the entire sample period. This variation shows that the discipline effect may potentially change over time. Moreover, we find that only in the high-middle-income and high-income countries is the discipline effect on monetary policy significant. This difference among the groups of countries with different income levels is actually in line with Spiegel (2009) and justifies the threshold theorem of Kose et al. (2009a). As for the discipline effect of financial globalization on fiscal policies, we find no significant evidence in this paper. The insignificance is also substantiated in the sub-periods analysis and subgroups analysis.

Overall, our empirical results are consistent with the findings of Tytell and Wei (2004); namely, financial globalization disciplines monetary policies but has no impact on fiscal policies. Beyond that, our thorough investigation also has some other interesting findings, including the changes of the discipline effect on monetary policies over time and the distinctions among different country groups, which uncover some modest evidence of the threshold theorem proposed by Kose et al. (2009a). Despite the discrepancy between the theory and empirical evidence, we can still expect low inflation to be realized with financial globalization, especially when the initial conditions are highly adequate.

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Journal of Sustainable Business and Economics
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ARTICLE

Ways to Cultivate and Develop Human Resources in the New Situation

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ABSTRACT

In the trend of globalization, digitization, and economic integration, human resources are the core competitiveness of enterprises, and cultivating and developing them is crucial for enhancing competitive advantages. This article delves into how human resource development drives enterprise innovation, promotes team collaboration, and optimizes performance management. Currently, although many enterprises are beginning to attach importance to human resource development, they still face problems such as insufficient investment, weak targeted training, and insufficient exploration of employee potential. Therefore, it is proposed that in the new situation, enterprises need to strengthen diversified training strategies, use digital tools to improve training efficiency, build a fair performance evaluation system, stimulate employee potential, and promote internal talent mobility. The implementation of these strategies will effectively enhance the efficiency of enterprise human resource management and consolidate market position.

Keywords: Human Resources; Cultivation; development; New situation; Channel

1. Introduction

In the era of knowledge economy, human resources have become one of the most important assets of enterprises. With the advancement of technology and the intensification of market competition, the demand for talent in enterprises is becoming increasingly diverse and complex. Therefore, how to effectively cultivate and develop human resources in the new situation has become an urgent problem for enterprises to solve.

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ARTICLE INFO
Received: 10 July 2024 | Revised: 18 July 2024 | Accepted: 6 August 2024 | Published Online: 16 December 2024
DOI: http://doi.org/10.26549/jsbe.v7i2.18641

CITATION
Wang, L. Yang, G.L., 2024. Ways to Cultivate and Develop Human Resources in the New Situation. Journal of Sustainable Business and Economics. 7(2): 38–43. DOI: http://doi.org/10.26549/jsbe.v7i2.18641

2. The significance of human resource cultivation and development under the new situation

In the rapidly changing market environment and increasingly fierce international competition, how to effectively cultivate and develop human resources for enterprises has become an important issue in promoting their sustainable development. This article will elaborate on the important significance of human resource cultivation and development in the new situation from three aspects: improving enterprise competitiveness, promoting employee personal development, and achieving common development between enterprises and employees.

2.1 Enhance the competitiveness of enterprises

In today's business environment, the competitiveness of a company depends not only on its hard power such as funds, technology, and equipment, but also on its soft power such as the quality and ability of its employees. The cultivation and development of human resources can significantly improve the quality of human resources in enterprises, thereby enhancing their competitiveness. Through targeted training and education, enterprises can cultivate a group of employees with professional skills and rich experience, who can better meet the business needs of the enterprise, improve production efficiency and service quality. Human resource cultivation and development can also help employees establish correct work attitudes and values, improve their work enthusiasm and sense of responsibility, form a positive corporate culture, and provide a continuous source of motivation for the development of the enterprise. The cultivation and development of human resources can also enhance the innovation capability of enterprises. Through continuous learning and exploration, employees are able to come up with new ideas and solutions, drive technological and product innovation in the enterprise, and create greater market value for the company.

2.2 Promoting personal development of employees

The cultivation and development of human resources are not only beneficial for enterprises, but also of great significance for the personal development of employees. Through training and education, employees can continuously learn and master new knowledge and skills, improve their overall quality and ability level, and lay a solid foundation for career development. Human resource cultivation and development can also help employees understand their career interests and strengths, develop more clear and scientific career plans, and achieve career development goals. Human resource cultivation and development can also enhance employees' confidence and sense of achievement. Through continuous learning and practice, employees can accumulate more experience and achievements, improve their confidence and satisfaction, and better integrate into the enterprise and society[1].

2.3 Achieving mutual development between enterprises and employees

The cultivation and development of human resources can not only enhance the competitiveness of enterprises and promote the personal development of employees, but also achieve the common development of enterprises and employees. By cultivating and developing human resources, enterprises can attract and retain more outstanding talents, providing strong talent support for the sustainable development of the enterprise. The addition and growth of outstanding employees can also bring more innovative ideas and business opportunities to the enterprise, promoting its continuous development. Employees can obtain more development opportunities and space through human resources training and development, realizing their own value and pursuit. The growth and success of employees can also bring more honor and benefits to the enterprise, achieving mutual benefit and win-win between the enterprise and employees. The cultivation and development of

human resources are of great significance in the new situation. It can not only enhance the competitiveness of enterprises and promote the personal development of employees, but also achieve the common development of enterprises and employees. Therefore, enterprises should attach great importance to the cultivation and development of human resources, increase investment and support for human resources, and lay a solid foundation for the long-term development of the enterprise.

3. Analysis of the Current Situation of Human Resource Cultivation and Development

In today's rapidly developing business environment, the cultivation and development of human resources have become the key to sustained competition for enterprises. However, despite many companies recognizing the importance of human resource cultivation and development, they still face some challenges and difficulties in practical operations. This article will analyze the current situation of human resource cultivation and development from three aspects: single training methods, lack of targeted training content, and lack of long-term planning.

3.1 Single training method

In most enterprises, training methods often remain limited to traditional classroom teaching and online courses, lacking innovation and diversity. This single training method often fails to meet the personalized needs and learning habits of different employees, resulting in poor training effectiveness. The single training method also lacks practicality and interactivity, making it difficult for employees to combine the knowledge they have learned with their actual work, further reducing the effectiveness of the training. To improve this situation, enterprises should actively explore diversified training methods. For example, employees can learn and grow through project-based learning, workshops, role-playing, and other forms of practice; New technologies such as virtual reality and augmented reality can also be introduced to enhance the fun and interactivity of training. Diversified training methods can better meet the needs of different employees and improve training effectiveness.

3.2 Lack of targeted training content

Currently, many companies often overlook the personalized needs and career development paths of their employees when developing training plans, resulting in a lack of targeted training content. Some training content is too general and lacks depth and breadth, making it difficult to meet the needs of employees in practical work. Some training content is also disconnected from the actual business and development strategy of the enterprise, making it difficult for employees to apply the knowledge learned to practical work after training. In order to improve this situation, enterprises should fully consider the personalized needs and career development paths of employees when formulating training plans. You can understand the needs and expectations of employees through face-to-face interviews, questionnaire surveys, and other methods, and develop targeted training plans based on this. Enterprises should also pay timely attention to the development dynamics and trends of the industry, ensuring that the training content is in line with the company's development strategy[2].

3.3 Lack of long-term planning

In terms of human resource cultivation and development, many enterprises often lack long-term planning, resulting in a lack of systematic and coherent training work. Some companies often only provide training when needed, without forming a complete training system. Some companies also lack follow-up and evaluation mechanisms after training, making it difficult to assess the effectiveness of the training and make corresponding adjustments and optimizations. To improve this situation, enterprises should develop long-term plans for human resource cultivation and development. The plan should cover training objectives, training content, training meth-

ods, training cycles, and form a complete training system. Enterprises should also establish a sound follow-up and evaluation mechanism to timely assess the effectiveness of training and make corresponding adjustments and optimizations. Through long-term planning, enterprises can ensure the systematic and coherent development of human resources, providing strong support for the sustainable development of the enterprise. The current cultivation and development of human resources still face some challenges and difficulties. In order to address these challenges and difficulties, enterprises should actively explore diversified training methods, develop targeted training plans, and establish long-term plans for human resource cultivation and development. Through the implementation of these measures, enterprises can improve the effectiveness and quality of human resource training and development, providing strong support for the sustainable development of the enterprise[3].

4. Ways to cultivate and develop human resources under the new situation

With the continuous advancement of technology and the globalization of the economy, enterprises are facing an increasingly fierce competitive environment. In such a new situation, the cultivation and development of human resources are particularly important. This article will explore how to effectively promote the cultivation and development of human resources through innovative training methods, precise development of training content, long-term planning, and establishment of incentive mechanisms in the new situation.

4.1 Innovative Training Methods

Traditional training methods often have problems such as single content and outdated forms, making it difficult to meet the diverse learning needs of employees. Therefore, in the new situation, we need to innovate training methods to improve training effectiveness.

4.1.1 Introduction of online learning platforms

Online learning platforms have the characteristics of high flexibility, wide coverage, and fast update speed, which can provide employees with a more convenient and efficient learning experience. By introducing online learning platforms, companies can customize personalized training plans based on the actual needs of their employees, helping them improve their skills and abilities. Online learning platforms can also provide employees with rich learning resources, helping them continuously broaden their knowledge and improve their overall quality.

4.1.2 Implement project-based learning

Project based learning is a training method that cultivates employees' skills and abilities through practical projects. In project-based learning, employees can gain a deeper understanding of the company's business processes and operational methods by participating in actual projects, and develop their teamwork and problem-solving skills. Through project-based learning, employees can combine their learned knowledge with practice to improve their work efficiency and quality.

4.1.3 Implement internal sharing mechanism

Internal sharing mechanism is a mechanism for employees within a company to share knowledge and experience. By implementing an internal sharing mechanism, companies can encourage employees to share their work experience, successful cases, and professional knowledge, promoting communication and cooperation among employees. The internal sharing mechanism can also help new employees adapt to the corporate culture and work environment more quickly, enhancing their sense of belonging and loyalty[4].

4.2 Accurately develop training content

Whether the training content meets the actual needs of employees directly affects the effectiveness of the training. Therefore, we need to accurately develop training content to ensure that it is targeted and practical.

4.2.1 Conduct demand research

Conducting demand research is a prerequisite for developing precise training content. Enterprises can gain a deeper understanding of employees' career development plans, work needs, and personal interests through methods such as questionnaire surveys and interviews, in order to accurately grasp their training needs. Enterprises should also pay attention to industry development trends and market competition situations to ensure the foresight and practicality of training content.

4.2.2 Pay attention to industry trends

Monitoring industry trends is an important basis for developing precise training content. With the continuous advancement of technology and the intensification of market competition, industry trends have a significant impact on the development of enterprises. Enterprises should pay timely attention to industry trends and cutting-edge technologies, incorporate them into training content, help employees master the latest knowledge and skills in the industry, and improve their competitiveness and adaptability.

4.2.3 Personalized customized courses

Personalized customized courses are the key to accurately developing training content. Enterprises should tailor personalized training courses based on the actual situation and career development needs of their employees. Personalized customized courses can meet the personalized needs of employees, improve their participation and learning outcomes. Personalized customized courses can also cultivate high-quality talents with professional skills and innovative abilities for enterprises, providing strong support for their development.

4.3 Develop long-term plans

The cultivation and development of human resources are not achieved overnight, and require long-term planning and investment. Therefore, we need to develop a long-term plan for human resource cultivation and development to ensure the sustainable development of human resources.

4.3.1 Clarify development goals

Clear development goals are the core of long-term planning. Enterprises need to formulate forward-looking and actionable development goals based on their actual situation and market trends. These goals should include the overall development goals of the enterprise, the development goals of each department, and the personal development goals of employees. When setting goals, enterprises should fully consider internal and external factors such as market environment, competitors, technological progress, etc., to ensure the rationality and feasibility of the goals. Enterprises should also have sufficient communication with employees to ensure their understanding and recognition of the goals.

4.3.2 Develop phased plans

Long term planning needs to be broken down into several phased plans for implementation. The phased plan should have clear time nodes and specific task arrangements, so that the enterprise can supervise and evaluate the implementation of the plan. When formulating phased plans, enterprises should fully consider the allocation and utilization efficiency of resources to ensure the feasibility and effectiveness of the plan. Enterprises should also adjust their plans in a timely manner according to changes in the market and the actual situation of the enterprise, ensuring the flexibility and adaptability of the plans.

4.4 Establishing incentive mechanisms

Incentive mechanism is a key factor in promoting employees' active participation in training and development. We need to establish a sound incentive mechanism to stimulate employees' enthusiasm and creativity.

4.4.1 Providing Promotion Opportunities

Promotion opportunities are an important driving force for employees' career development. Enterprises should establish transparent promotion channels and fair promotion standards to provide excellent employees with opportunities for promotion. Enterprises should also provide employees with diversified

career development paths to meet the career development needs of different employees. By providing promotion opportunities, companies can stimulate employees' initiative, promote their personal growth and career development[5].

4.4.2 Establishing a reward system

The reward system is an important means of motivating employees. Enterprises should establish a scientific and reasonable reward system to commend and reward outstanding employees. Rewards can include material rewards and spiritual rewards, such as bonuses, stocks, honorary titles, etc. By establishing a reward system, companies can stimulate employees' enthusiasm and creativity, improve their work efficiency and quality.

5. Conclusion

In the new situation, the cultivation and development of human resources have become the key to enhancing the competitiveness of enterprises. Enterprises should strengthen their emphasis on human resource cultivation and development, innovate training methods, enhance internal communication, establish evaluation mechanisms, and strengthen external cooperation. Only in this way can we ensure that the enterprise remains invincible in the fierce market competition. Employees should also actively participate in training and learning, continuously improve their own abilities and qualities, and contribute their own strength to the development of the enterprise.

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ARTICLE

A Review on Determinants Affecting Commercialization of Academic Institution Final Year Projects

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ABSTRACT

Final year project is an important training and assessment component incorporated in many courses of academic institution. The ability to translate ideas, research, and creativity into actual products, services, or businesses shows how successful and impactful people or institutions can be in the wider economy. However, in most of the cases, the outcomes of the final year project usually remain as academic discussion without maximizing their potential to be converted into a commercialized product or services. In this review, theory and applications are discussed to understand how entrepreneurial skills and networking abilities, components of individuals' human capital can impact the commercialisation of final year projects. Furthermore, determinants affecting commercialization of final year projects will also be explored namely: entrepreneurial skills, networking ability, access to resources, institutional support as well as creativity and innovation.

Keyword: Commercialization; Final Year Projects; Entrepreneurship; Institution Support; Network; Resources

1. Introduction

In the new era that filled with new ideas and desire to start new businesses, turning final year projects into real-world commercial products or services is now a key bridge between education institute and the commercial world (Biancone et al., 2022). The ability to translate ideas, research, and creativity into actual products, services, or businesses shows how successful and impactful people or institutions can be in the wider economy.

The contemporary educational and entrepreneur-

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ARTICLE INFO
Received: 26 July 2024 | Revised: 30 July 2024 | Accepted: 6 August 2024 | Published Online: 16 December 2024
DOI: http://doi.org/10.26549/jsbe.v7i2.19161

CITATION
Lan, X. Zainudin, Z.B., 2024. A Review on Determinants Affecting Commercialization of Academic Institution Final Year Projects. Journal of Sustainable Business and Economics. 7(2): 44–61. DOI: http://doi.org/10.26549/jsbe.v7i2.19161

ial spheres have undergone a paradigm shift, wherein the traditional academic exercise—final year projects—now holds significant potential for commercial viability. This evolution underscores the increasing acknowledgment of entrepreneurship and innovation as not merely academic concepts but as practical strategies for converting knowledge and ideas into marketable assets (Weking et al., 2018). Final year projects doesn't just confined to classroom activities, but they are treated as innovation laboratories, enabling students and researchers to integrate theoretical concepts with practical applications.

The imperative to investigate the commercialisation of final year projects emerges from a convergence of factors. Educational institutions are giving a lot of emphasis on cultivating the entrepreneurial mindsets and equipping students for the evolving demands of the contemporary workforce. Simultaneously, entrepreneurs and innovators aim to harness academic insights and research findings to propel their ventures. This convergence highlights the critical importance of comprehending the factors that facilitate or impede the commercialisation of final year projects and the potential moderating influence of socioeconomic and education-related disparities (Hicks & Ison, 2018).

2. Education systems in China to support Movies and Arts Industry

In the new era of education systems in China, academic institutions are putting efforts nurturing talent for the film and arts industry. China's dedication to fostering artistic excellence is demonstrated through its specialized educational institutions, such as the Central Academy of Fine Arts, Beijing Film Academy, and Shanghai Theatre Academy. These institutions provide comprehensive programs that span diverse artistic disciplines, including film, visual arts, theatre, music, and dance. Students admitted to these esteemed academies undergo rigorous training that integrates the development of technical skills with artistic expression, thereby equipping them with a robust foundation for careers in the creative sector (Guan, 2023).

A notable aspect of China's arts education is the integration of arts and culture into the mainstream curriculum beginning at the primary education level. This comprehensive approach introduces students to music, painting, calligraphy, and other forms of artistic expression as part of their general education. By incorporating the arts early in a student's academic journey, China seeks to foster an appreciation for creativity and cultural heritage while identifying and nurturing emerging artistic talents (Zheng, 2021). Furthermore, China has established specialized high schools dedicated to cultivating creative talents, providing intensive training in dance, music, drama, and visual arts. Admission to these schools is highly competitive, with students selected based on exceptional aptitude and talent. Once admitted, students receive advanced education and training focused on refining their artistic skills and enhancing their prospects in the film and arts industry (Zaheer et al., 2022).

The Chinese education system actively promotes arts and cultural activities through various festivals, competitions, and exhibitions across different educational levels. These events provide platforms for students to showcase their talents, gain exposure, and receive recognition for their creative endeavors. Educational institutions encourage and support participation in such activities, fostering a vibrant arts community within China (Yao et al., 2023). Financial support is another critical component of China's commitment to arts education. Both the government and private organizations offer scholarships and financial aid programs to talented students pursuing careers in the arts. These initiatives help alleviate financial barriers, making arts education accessible to a broader population and ensuring that gifted students can pursue their artistic passions (Wujarso, R., & Dameria, 2023).

In recent years, Chinese art education has integrated technological advancements, incorporating digital media, animation, and computer-generated imagery (CGI) into the curriculum. This progressive approach equips students for the evolving landscape of the film and arts industry, which increasingly

relies on technology and digital platforms for artistic expression and distribution. Additionally, many Chinese art institutions actively collaborate with industry stakeholders, such as film studios, theaters, and art galleries. These partnerships offer students real-world exposure, internships, and networking opportunities, bridging the gap between education and industry practice and facilitating a seamless transition for graduates into professional roles within the film and arts sector (Lee et al., 2021).

While emphasizing innovation and contemporary art forms, China's art education system also places great importance on preserving and promoting traditional arts and cultural heritage. This includes cultivating classical Chinese painting, calligraphy, traditional music, and Peking opera. These traditions are considered as an integral part of China's rich cultural heritage, and their preservation ensures the continuity of centuries-old artistic practices. Additionally, Chinese arts institutions have increasingly promoted international exchange programs. These programs facilitate student learning and collaboration with artists and educators worldwide. Students gain a global perspective that enhances their understanding of the broader artistic landscape by engaging with diverse artistic styles and practices (Hung et al., 2021).

Chinese culture is deeply embedded in the arts education curriculum. Students learn about the philosophical underpinnings of Chinese art, including concepts such as Confucianism, Taoism, and Zen Buddhism, which have influenced artistic expression for centuries. Incorporating cultural elements provides a profound understanding of Chinese culture and informs contemporary artists' creative work, enabling them to draw upon their cultural roots. China's art education system recognizes the importance of blending traditional and modern artistic forms. While preserving classical traditions, it encourages students to explore contemporary and innovative approaches to art. This fusion allows students to bridge the gap between tradition and modernity, fostering a dynamic and evolving artistic landscape (Hutchison & McAlister-Shields, 2020).

China actively promotes its cultural heritage through arts education. This includes disseminating traditional art forms through student performances, exhibitions, and cultural festivals. By actively engaging students in presenting and preserving their cultural heritage, China ensures these traditions remain vibrant and relevant in the contemporary world. Many arts institutions in China integrate traditional arts with modern disciplines. For example, students studying digital media or animation may incorporate conventional Chinese themes and techniques into their work. This fusion of old and new allows for the creation innovative and culturally rich art forms that appeal to a global audience (Perry, 2020).

Arts education in China follows a master-apprenticeship model, where students work closely with established artists and practitioners. This hands-on approach allows students to learn traditional arts directly from masters, ensuring the transmission of knowledge and skills from one generation to the next. Chinese language and literature are integral components of arts education (Wang, 2020). Students are encouraged to explore classical Chinese literature, poetry, and philosophy, as they provide a deep well of inspiration for artistic expression. This linguistic and literary foundation enriches students' creative work and deepens their cultural understanding. China actively promotes cultural exchange programs that allow students to engage with international artistic communities. These programs enable students to learn from and collaborate with artists worldwide, fostering cross-cultural understanding and enriching their creative perspectives (Hutchison & McAlister-Shields, 2020).

3. Underlying Theories

Human Capital Theory emphasizes that individuals' skills, knowledge, and abilities are valuable assets that contribute significantly to their success in various endeavors, including entrepreneurship. In this review, theory and applications are discussed to understand how entrepreneurial skills and networking abilities, components of individuals' human capital can impact the commercialization of final year projects. It is suggested that individuals with more

vital entrepreneurial skills and practical networking abilities are better equipped to navigate the commercialization process successfully (Werdhiastutie et al., 2020).

The Resource-Based View (RBV) Theory is particularly relevant when examining the role of access to resources in the commercialisation of final year projects. This theory explains that a project has a more competitive advantage when they have access to unique and valuable resources that are difficult for competitors to replicate (Zahra, 2021).

3.1 Human Capital Theory (HCT)

HCT is a fundamental concept in economics particularly labour economics, shedding light on the inherent value of an individual's knowledge, skills, education, experience, and competencies. It suggests that these attributes, collectively referred to as human capital, are critical determinants of an individual's economic success and the prosperity of a society. At its core, this theory emphasises that individuals are not just labour inputs but reservoirs of valuable intellectual and practical assets that can be cultivated and enhanced through education, training, and personal development (Wright, 2021).

A central premise of HCT is that investments in human capital lead to increased productivity and earning potential. Education and training are recognised as important mechanisms for augmenting human capital. Through formal education, individuals acquire theoretical knowledge and practical skills that can be directly applied in the workforce (Fix, 2018). This heightened competence renders them more productive and marketable, resulting in higher wages and greater access to desirable job opportunities. Furthermore, HCT underscores that human capital is not static but dynamic and continuously evolving. As individuals accumulate experience and adapt to the changing demands of the labour market, their human capital appreciates. This implies that lifelong learning, skill upgrading, and acquiring new competencies are paramount in a world where technology and industries are in constant flux (Wujarso & Dameria, 2023).

HCT holds significant relevance in research on the commercialization of final year projects. It helps elucidate how the possession and enhancement of specific entrepreneurial skills and networking abilities are integral components of an individual's human capital and can profoundly impact the success of commercial endeavors. Commercialization heavily relies on entrepreneurial abilities, including discovering possibilities, taking measured risks, innovating, and adapting (Jafari-Sadeghi et al., 2020). Individuals who are equipped with these skills have the advantage to navigate the complex and uncertain terrain of bringing a project to market. Additionally, networking abilities, encompassing relationship-building, information access, and resource mobilization, are facets of an individual's human capital that play a pivotal role in commercialization. Effective networking can open doors to crucial partnerships, funding opportunities, and market insights, all of which can significantly influence the outcomes of entrepreneurial projects (Mkhize, 2018).

At its core, HCT advances the notion that individuals are not passive factors of production but rather active agents who can enhance their economic well-being through strategic investments in their human capital. These investments encompass formal education, on-the-job training, skill acquisition, and experiential learning. Central to the theory's purview is that such investments culminate in heightened productivity and enhanced earning potential, substantiating an individual's economic prosperity and societal advancement (Bratton et al., 2021).

The evolution of HCT is characterized by its expanding purview, transcending the sole focus on the direct relationship between education and earnings. Contemporary interpretations acknowledge that human capital encompasses a broader spectrum of attributes, encompassing skills, competencies, health, and social capital—denoting the value accrued from an individual's social networks and interpersonal relationships. This comprehensive framework collectively informs an individual's capacity to contribute to economic growth and societal development (Sellar & Zipin, 2019).

Within the context of the research under consideration, which pertains to the commercialization of final year projects, HCT assumes an important role in elucidating the mechanisms whereby entrepreneurial skills and networking abilities can bring a favorable outcomes (Burbano et al., 2018). Entrepreneurial skills, including creativity, risk propensity, and adaptability, align closely with the construct of human capital. Individuals who proactively cultivate and augment these skills are better equipped to discern opportunities, surmount challenges, and foster innovation—all salient components underpinning the commercialization process.

Simultaneously, the theory underscores the significance of networking abilities as integral facets of human capital, encapsulating the development and mobilization of social capital (Aquino et al., 2018). Proficient networking furnishes individuals with access to valuable resources, information, and opportunities that fortify their capacity to successfully navigate the labyrinthine landscape of commercializing final year projects. By acutely recognizing the centrality of human capital in comprehending the roles of entrepreneurial skills and networking proficiencies, this research contributes cogently to exploring how investments in these domains configure the outcomes of projects marked by commercial intent (Wright et al, 2022).

3.2 Resource-Based View (RBV) Theory

RBV theory is a fundamental concept in strategic management and economics, providing a crucial framework for understanding how firms or organizations achieve and maintain competitive advantage. Central to RBV theory is the proposition that an organization's success and performance are primarily determined by its unique and valuable resources and capabilities. These resources encompass both tangible assets, such as physical infrastructure, technology, and financial capital, and intangible assets, including intellectual property, brand reputation, and organizational knowledge (Donnellan & Rutledge, 2019).

One of the fundamental tenets of RBV theory is that not all resources are created equally (Alexy et al., 2018). Some resources are more valuable and rarer than others, and they can provide a sustainable competitive advantage. VRIN resources, which include helpful, rare, difficult-to-copy, and non-substitutable resources, are widely recognized as the most strategically important assets. These resources enable organizations to differentiate themselves from competitors and create barriers to entry, making it challenging for other firms to replicate their success.

RBV theory emphasizes that firms should identify and develop unique, inimitable resources and capabilities. It suggests that competitive advantage arises when organizations leverage these resources to create superior products, services, or processes. Furthermore, the theory underscores the dynamic nature of resource development, highlighting the importance of continuous investment, learning, and adaptation to remain competitive in a changing business environment (McGahan, 2021).

RBV theory can be applied to examine the role of access to resources in the success of final year projects. Resources, such as funding, specialized equipment, research facilities, or exclusive partnerships, are crucial assets that can significantly impact commercialization. RBV theory suggests that projects or organizations with access to unique and valuable resources may enjoy a competitive advantage in bringing their projects to market. Moreover, RBV theory can help us understand how the scarcity and strategic deployment of resources can create barriers to entry for potential competitors in the commercialization landscape. For instance, if a final year project has access to cutting-edge technology or exclusive partnerships, it may be better positioned to seize market opportunities and fend off competition (Wang et al., 2020).

At its core, RBV theory asserts that an organization's success is contingent upon the distinctive nature, value, inimitability, and irreplaceability of its resources and capabilities. The theoretical origins of RBV can be traced to Wernerfelt (1984), who conceptualized firms as collections of resources, thus establishing the groundwork for subsequent scholarly

exploration of the theory's complexities. A notable advancement in RBV theory was achieved by Barney (1991), who expanded upon Wernerfelt's framework by introducing the VRIN model. This model highlights the strategic importance of resources that are Valuable, Rare, Inimitable, and Non-substitutable. Barney's contributions provided a systematic framework for both researchers and practitioners to evaluate the strategic value of resources in achieving and sustaining competitive advantage (Alexy et al., 2018).

The literature surrounding RBV theory has witnessed substantial growth, encompassing resource heterogeneity, immobility, dynamic capabilities, and competitive positioning. Scholars have also extended their exploration of resources to industry and network levels, underscoring the theory's adaptability across diverse contexts. Empirical studies rooted in RBV theory have explored various initiatives and organizational settings, investigating the role of specific resources like intellectual property, organizational knowledge, technological assets, and human capital in shaping competitive advantage (El Daly, 2020).

In the context of entrepreneurial ventures, RBV theory has offered valuable insights into how startups and small businesses can leverage their resource base to compete effectively in dynamic markets. For instance, RBV theory has been applied to understand how access to unique resources, including entrepreneurial skills, networks, and specialized knowledge, can enable startups to establish niches and disrupt established industries (Wang et al., 2020).

RBV Theory is a seminal strategic management framework. It offers a robust perspective on the critical role of resources and capabilities in driving competitive advantage. Its historical development, conceptual evolution, and empirical applications have deepened our understanding of how organizations, including entrepreneurial ventures, can strategically manage their resource base to achieve sustained success in competitive and dynamic environments (Helfat et al., 2023).

4. Project Commercialisation

Project commercialization is a multifaceted concept transforming a project, often from research, innovation, or creative endeavors, into a commercial product, service, or venture to generate economic value (Davies et al., 2018). This process represents the bridge between creativity and market realization, where the outputs of a project are strategically positioned and executed to achieve tangible financial and societal benefits.

Project commercialization involves recognizing a project's potential to meet market needs or solve specific problems (Andoni et al., 2019). It involves identifying market opportunities, targeting customer segments, and formulating a comprehensive commercialization strategy. This strategy typically addresses crucial aspects such as product development, marketing, funding acquisition, intellectual property protection, and distribution channels.

Project commercialization is not confined to the business sector alone. It is equally relevant in academic, scientific, and technological domains. In academia, for instance, it refers to translating research findings, inventions, or educational materials into tangible outcomes that can be disseminated, adopted, or monetized. In this context, it bridges the gap between academic knowledge and practical application, facilitating knowledge transfer to society (Newman et al., 2021).

Networking abilities are essential for successful project commercialization. Entrepreneurs with robust networking skills excel at cultivating relationships that grant access to financial capital, strategic partnerships, mentorship, and other critical resources. These connections serve as conduits for resource mobilization, enabling entrepreneurs to acquire the necessary assets for project advancement. Access to resources is a fundamental component of project commercialization, encompassing financial capital, technology, human resources, and social networks (De Sousa et al., 2019). Financial capital, in particular, functions as the lifeblood of commercialization efforts, facilitating investments in product develop-

ment, marketing, and scaling activities. Furthermore, access to technology and human capital accelerates innovation and product development, while social networks foster collaboration and the establishment of strategic partnerships.

Successful project commercialization depends on how well resources are managed. Entrepreneurs need to use their resources wisely to achieve the best results. This requires careful decision-making, the ability to adapt to market changes, and ongoing innovation to improve products and stay competitive. However, the commercialization process comes with challenges, such as limited resources, market uncertainties, and competition. Access to institutional support is crucial in overcoming these challenges. Support from institutions can offer mentorship, financial aid, and networking opportunities, which help reduce obstacles and make the commercialization process smoother.

5. Determinants of Project Commercialisation

5.1 Relationship between Entrepreneurial Skills and Project Commercialisation

Entrepreneurial skills, often called entrepreneurial competencies or capabilities, constitute a set of essential attributes, behaviors, and knowledge that individuals or entrepreneurs employ in identifying, creating, and capitalizing on business opportunities. These skills are pivotal in initiating, managing, and scaling entrepreneurial ventures, ranging from startups and small businesses to innovative projects within larger organizations. Entrepreneurial skills encompass many competencies that empower individuals to navigate entrepreneurship's dynamic and uncertain landscape successfully (Hanson, 2021).

At its fundamental, entrepreneurial skills are about finding and evaluating opportunities. Entrepreneurs are good at spotting market trends, unmet needs, and gaps that can be filled with innovative ideas. They use their creativity and problem-solving abilities to come up with new products, services, or business models that can change existing markets or create new ones. In addition, strong communication and networking skills are essential for entrepreneurs. They need to clearly share their vision, persuade others, and build relationships with partners, customers, investors, and other important people in the business world. These skills help them attract resources, secure funding, and form strategic partnerships to advance their ventures (Shkabatur et al., 2022).

The exploration of the interplay between entrepreneurial skills and project commercialization is a crucial area of inquiry in the field of entrepreneurship. This review delves deeper into the multifaceted relationship between these two key aspects, highlighting the nuanced ways entrepreneurial skills influence the successful transformation of innovative ideas into viable and profitable ventures. Entrepreneurial skills are widely acknowledged as catalysts for project commercialization (Jafari-Sadeghi et al., 2020). These skills encompass a range of competencies, including creativity, risk-taking, opportunity recognition, problem-solving, and effective communication. These competencies empower entrepreneurs to identify potential market opportunities, develop innovative solutions, and adeptly navigate the myriad challenges of commercialisation. Creativity, in particular, plays a central role in the ideation phase, driving the generation of novel concepts that form the basis of commercial ventures. Risk-taking and problem-solving skills enable entrepreneurs to make informed decisions, adapt to unforeseen obstacles, and pivot when necessary.

The influence of entrepreneurial skills on decision-making cannot be overstated. Entrepreneurship is inherently fraught with uncertainty, and skilled entrepreneurs possess the understanding to make calculated decisions in ambiguous and dynamic environments. A deep understanding of the market, competitive landscape, and potential outcomes temper their risk-taking propensity. This skill set empowers them to make strategic choices throughout the commercialisation journey, from market entry strategies to resource allocation and adaptation to shifting market dynamics (Chang and Chen, 2020).

Entrepreneurial skills, especially networking abil-

ities, play a big role in resource mobilization, which is key for the success of project commercialization. Skilled entrepreneurs are good at building and using professional networks to get financial support, strategic partnerships, mentorship, and other important resources. Effective networking is more than just making contacts; it involves creating relationships that offer valuable support and opportunities. Entrepreneurs with strong networking skills are better at getting the resources needed to grow and scale their projects (Densford et al., 2018).

Entrepreneurial skills also help with adaptability and innovation, which are essential for project commercialization. Entrepreneurship is a dynamic field, and skilled entrepreneurs can adapt to market changes, customer preferences, and new technologies. Their ability to innovate helps them create unique ideas and stand out in a competitive market. Being able to constantly adapt and innovate is crucial for ensuring that commercialized projects are successful and sustainable in the long term (Biancone et al., 2022).

The relationship between entrepreneurial skills and project commercialization is not static but instead dynamic and evolving. Entrepreneurial skills develop through experiential learning and are honed through entrepreneurial experiences. Entrepreneurs' skills continually adapt and mature as they progress along the commercialization pathway. This evolution influences the project's trajectory, impacting its ability to overcome challenges and seize opportunities. Therefore, developing entrepreneurial skills is an ongoing process contributing to the project's success. The relationship between entrepreneurial skills and project commercialization is indeed dynamic and evolving, characterized by continuous development and adaptation. Entrepreneurial skills are not static attributes but rather abilities that grow and refine over time, primarily through experiential learning and the challenges encountered during entrepreneurial journeys. This dynamic evolution of skills has a profound impact on the trajectory of a project, influencing its ability to navigate obstacles and capitalize on opportunities throughout the commercialization process (Ayodele et al., 2021).

5.2 Relationship between Networking Abilities and Project Commercialisation

Networking abilities, often networking skills or capabilities, are critical interpersonal and professional competencies that enable individuals to establish, cultivate, and leverage relationships with others in various personal and professional contexts. These abilities facilitate the exchange of information, resources, and opportunities and play a pivotal role in building a diverse and influential network of contacts. Networking abilities encompass various skills, behaviours, and strategies that empower individuals to connect, communicate, and collaborate effectively with others (Saikouk et al., 2021).

Networking involves the art of building and nurturing relationships. Networking abilities encompass the capacity to initiate and maintain meaningful connections with diverse individuals, including peers, colleagues, mentors, clients, partners, and industry leaders. Effective networkers possess the skills of active listening, empathy, and a genuine interest in others, which form the foundation for building trust and rapport. Effective communication is a cornerstone of networking abilities. Networking encompasses not only the ability to articulate one's own goals, ideas, and value propositions clearly but also the capacity to listen attentively to the needs, challenges, and aspirations of others. Effective communicators can engage in mutually beneficial conversations, convey their intentions persuasively, and adapt their communication style to different audiences and contexts (Arici & Uysal, 2022).

The link between networking abilities and project commercialization is an important area of study in entrepreneurship and innovation. This review explores how networking skills help turn new ideas into successful projects by looking at the many ways these skills contribute to commercialization. Networking abilities are seen as valuable resources for entrepreneurs and innovators. Effective networking means creating and maintaining professional relationships that offer access to important resources like

financial support, mentorship, market knowledge, and opportunities for collaboration. By building and managing these networks, entrepreneurs can get the resources they need to develop and commercialize their projects (Biwer et al., 2021).

Networking abilities are central to resource mobilization, a pivotal determinant of project commercialization success. Entrepreneurs with robust networking skills excel in forging connections with potential investors, strategic partners, industry experts, and mentors. These connections are conduits for accessing financial support, industry-specific knowledge, and guidance during commercialization. Resource mobilization through networking is not limited to financial capital but extends to other vital resources, including intellectual and social capital (Ullah et al., 2023).

Networking enhances entrepreneurs' access to knowledge, expertise, and industry insights, invaluable assets in project commercialization. By engaging with diverse individuals and organizations, entrepreneurs gain access to information about market trends, emerging technologies, consumer preferences, and competitive dynamics. Such insights enable entrepreneurs to make informed decisions, refine their value propositions, and adapt to changing market conditions. Networking abilities are instrumental in forging strategic alliances and partnerships that can catalyze project commercialization. Collaborative arrangements with complementary firms or organizations can provide access to distribution channels, customer bases, and shared resources (Guillory, 2020). These alliances can accelerate the commercialization process by leveraging the strengths of multiple stakeholders and mitigating risks.

Effective networking goes beyond making individual connections; it involves engaging with the wider entrepreneurial ecosystem. Entrepreneurs who actively participate in industry events, join entrepreneurial communities, and use innovation hubs are better at finding new opportunities and staying updated on industry trends. This involvement helps create a supportive environment for project commercialization (Shan and Shan, 2023).

Networking is also closely tied to building trust and a strong reputation. Entrepreneurs who develop and maintain solid professional relationships tend to earn trust from peers, investors, and other stakeholders (Zaheer et al., 2022). A good reputation enhances credibility and can help entrepreneurs access resources and form partnerships that are crucial for successful project commercialization.

5.3 Relationship between Access to Resources and Project Commercialisation

Access to resources, a central concept in various domains such as business, entrepreneurship, economics, and social development, refers to the ability of individuals, organizations, or entities to obtain and utilize the essential assets, capabilities, or means required to achieve specific goals, objectives, or outcomes. These resources can encompass a wide range of tangible and intangible assets, including but not limited to financial capital, physical infrastructure, human expertise, technology, information, and networks. The concept of access to resources is fundamental to understanding how opportunities are leveraged and challenges are addressed across diverse contexts (Werdhiastutie et al., 2020).

Financial capital is one of the primary dimensions of resource access. Adequate access to financial resources, such as funding, investment, or credit, is often critical for individuals and organizations to initiate and sustain various endeavors. Whether it involves launching a business, implementing a project, or pursuing educational goals, financial resources are the fuel to turn aspirations into reality. Moreover, equitable access to financial resources is integral to addressing socioeconomic disparities and promoting economic inclusion. Physical infrastructure and facilities constitute another aspect of access to resources. This includes access to well-maintained transportation systems, communication networks, educational institutions, healthcare facilities, and public services. Physical infrastructure plays a vital role in supporting economic development, enhancing quality of life, and facilitating the efficient movement of goods, services, and people (Peng et al., 2019).

The relationship between access to resources and project commercialization is a key topic in entrepreneurship research. This review explores how access to resources helps turn new ideas into successful and lasting businesses. Having access to resources is the foundation for successful project commercialization. Resources such as financial capital, technology, physical infrastructure, skilled people, and social connections are essential for commercializing projects. The ability to obtain and use these resources effectively is crucial for starting, developing, and growing commercial ventures (Chang and Chen, 2020).

Among these resources, financial capital is the most important for commercializing projects. Having access to different types of funding, like venture capital, angel investors, loans, and grants, is crucial for product development, marketing, operations, and entering the market. A strong financial base helps entrepreneurs deal with the uncertainties and challenges of commercialization (Densford et al., 2018). In the digital age, access to advanced technology and good infrastructure is also essential. Innovations often depend on the latest tools, equipment, and platforms for developing and delivering products. Entrepreneurs who have access to these advanced technologies and resources can speed up their project development and growth, giving them a competitive advantage (d'Armagnac et al., 2022).

Human capital, embodied in skilled talent and expertise, is a linchpin in project commercialization. Access to a skilled workforce, domain-specific knowledge, and diverse skill sets are instrumental for executing commercialization strategies effectively. A proficient team can drive innovation, adapt to market shifts, and ensure the high-quality development of projects. Social capital, comprising relationships, networks, and collaborations, forms a vital conduit for resource access. Entrepreneurs who cultivate rich social capital can leverage professional connections to secure financial support, forge strategic alliances, and glean valuable insights. These social networks facilitate resource mobilization and provide crucial support throughout the commercialization journey (d'Armagnac et al., 2022).

Access to detailed market knowledge and consumer insights is crucial for making smart decisions during commercialization. Entrepreneurs who have strong market research, customer feedback, and competitive information can adjust their strategies, improve their value propositions, and develop better market entry plans. This informed approach increases the chances of successful commercialization. The range of resources available can also affect commercialization outcomes. Having a mix of financial, technological, and human resources provides flexibility and helps entrepreneurs adapt to market changes and unexpected challenges. Interestingly, a lack of resources can sometimes boost entrepreneurial creativity. When resources are scarce, entrepreneurs often come up with creative ways to manage them, such as using limited funds wisely or forming partnerships. This scarcity can lead to innovative solutions for overcoming resource shortages (Helfat et al., 2023).

Access to comprehensive market knowledge and consumer insights indeed plays a pivotal role in informed decision-making throughout the commercialization process. Entrepreneurs armed with robust market research, feedback from customers, and competitive intelligence are well-equipped to tailor their strategies, refine value propositions, and optimize their approaches to entering the market. This informed decision-making not only mitigates risks but also elevates the prospects of successful commercialization. Comprehensive market knowledge is akin to a compass that guides entrepreneurs on their commercialization journey. Understanding market trends, customer preferences, and the competitive landscape empowers entrepreneurs to make strategic choices that are in sync with market dynamics. Armed with consumer insights, entrepreneurs can develop products or services that resonate with their target audience, fine-tune their marketing efforts, and anticipate changing consumer demands (Khanra et al., 2022).

Diversity in accessible resources is another critical factor influencing commercialization outcomes.

A well-rounded portfolio encompassing financial, technological, and human resources provides entrepreneurs with flexibility and adaptability. Such diversity allows for pivoting or adjusting strategies in response to market fluctuations or unforeseen challenges. For example, having multiple funding sources can help entrepreneurs weather financial uncertainties, while a technologically versatile team can adapt to rapidly changing technological landscapes. Paradoxically, resource scarcity can stimulate entrepreneurial creativity and innovation. When faced with limitations, entrepreneurs often employ innovative resource allocation strategies to overcome challenges. Techniques like bootstrapping, where a business starts with minimal external capital, or forming collaborative partnerships to pool resources become essential in resource-constrained environments. These strategies force entrepreneurs to think outside the box and discover unconventional solutions to resource limitations. Resource constraints also encourage entrepreneurs to adopt sustainable practices. When resources are limited, there is an incentive to maximize efficiency and minimize waste. Entrepreneurs may seek environmentally friendly solutions, explore circular economy principles, or develop lean and efficient processes, which not only address resource constraints but also resonate with environmentally conscious consumers (McGahan, 2021).

5.4 Relationship between Institutional Support and Project Commercialisation

Institutional support, a critical component of various sectors, including education, entrepreneurship, healthcare, and social services, refers to the resources, guidance, mentorship, and infrastructure organizations, institutions, or entities provide to achieve specific objectives, goals, or initiatives. This support is typically extended by established and reputable institutions, such as universities, government agencies, non-profit organizations, and industry associations, to individuals, startups, or projects seeking to leverage external assistance and expertise (Jafari-Sadeghi et al., 2020).

Mentoring and guidance are critical aspects of institutional support. Institutions often offer access to experienced individuals who can serve as mentors or advisors, providing valuable insights, advice, and direction. Mentorship can be instrumental in helping individuals navigate complex challenges, make informed decisions, and refine their skills or strategies. Institutional support also encompasses financial resources, grants, scholarships, or funding opportunities made available to individuals or organizations pursuing specific objectives. Financial aid can catalyze innovation, research, entrepreneurship, or educational attainment, enabling individuals and entities to bring their ideas to fruition, undertake projects, or invest in growth and development (Burgess et al., 2018).

The relationship between institutional support and project commercialization has been a major topic of study in entrepreneurship. This literature review explores how this support helps and speeds up the process of turning new ideas into successful projects. Institutional support is known to be a powerful driver for project commercialization. It includes various types of help, such as resources, advice, and mentorship from universities, government agencies, incubators, accelerators, and industry groups. These institutions offer essential support to entrepreneurs and innovators, giving them the tools and knowledge needed to manage the complexities of commercialization effectively (Rodríguez-Insuasti et al., 2022).

Central to institutional support is mentorship and guidance, often offered by experienced entrepreneurs and industry experts. These mentors provide invaluable insights, drawing from their own experiences to offer advice on strategy formulation, risk management, and decision-making. Entrepreneurs who benefit from mentorship gain not only access to knowledge but also access to networks, opening doors to partnerships and collaborations. Institutional support frequently includes access to vital resources like state-of-the-art facilities, research labs, and technology infrastructure. This access reduces resource-related barriers entrepreneurs might otherwise face, allowing them to expedite product development and

innovation. Institutions accelerate commercialization by providing entrepreneurs access to physical and technological resources (Hanson, 2021).

Financial support is another critical facet of institutional assistance. Through grants, scholarships, and research stipends, institutions provide entrepreneurs with the financial cushion to focus on product development and market research. This financial backing alleviates immediate financial pressures and instils confidence in entrepreneurs, empowering them to pursue their commercialization goals. Institutional affiliations often facilitate networking and the formation of strategic partnerships. Entrepreneurs embedded within institutional ecosystems gain access to an extensive network of potential collaborators, investors, and industry players. Collaborative partnerships forged through these connections can streamline market entry, provide access to additional resources, and enhance the commercialization experience (Baker & Judge, 2020).

Universities and research institutions are crucial for the success of technology-based ventures. They give entrepreneurs access to the latest research and development resources, which helps drive innovation and improve products. Collaborative research projects at these institutions can lead to major breakthroughs that boost the chances of successful commercialization. Business incubators and accelerators, often connected to these institutions, offer structured programs to support startups. These programs provide entrepreneurs with mentorship, office space, networking opportunities, and access to funding. Joining these programs can greatly speed up the commercialization process by offering a supportive environment for entrepreneurs to succeed. Overall, universities and research institutions are central to advancing technology-based ventures. They do more than just teach and conduct research—they are important centres of innovation that offer resources and support to help entrepreneurs turn their ideas into successful commercial projects (Mei & Symaco, 2021).

Universities and research institutions are often at the forefront of cutting-edge research and development in various fields. Entrepreneurs associated with these institutions can tap into this knowledge base, gaining access to state-of-the-art laboratories, specialized equipment, and expert researchers. This access enables entrepreneurs to develop and refine their technology-based products or services, leveraging the latest advancements in their respective industries. The synergy between academic research and entrepreneurial innovation is a powerful driver of technological progress (Shkabatur et al., 2022).

Collaborative research projects between entrepreneurs and academic institutions can yield breakthroughs that have the potential to transform industries. These partnerships allow entrepreneurs to combine their practical insights and market understanding with the academic institution's deep domain expertise. The outcome often includes novel solutions, innovative applications, or disruptive technologies that significantly improve the prospects of successful commercialization. These collaborations not only enhance product development but also open doors to funding opportunities and market validation. Many universities and research institutions operate or partner with business incubators and accelerators. These programs offer structured support to startups and early-stage ventures. Entrepreneurs participating in these programs gain access to invaluable resources such as mentorship from experienced business professionals, dedicated office spaces, networking opportunities with industry experts and investors, and access to various funding sources. Business incubators and accelerators provide an ecosystem that nurtures and guides startups through the complex process of commercialization. Participation in university-affiliated incubators and accelerators can substantially accelerate the commercialization journey. These programs provide a structured and supportive environment where entrepreneurs can focus on refining their business models, validating their market assumptions, and honing their strategies. The mentorship and guidance received during these programs can help entrepreneurs avoid common pitfalls and make informed decisions, significantly improving their chances of success (Wright et al., 2022).

5.5 Relationship between Creativity and Innovation and Project Commercialisation

Creativity and innovation are closely related but different ideas that drive progress and problem-solving in many areas, including business, technology, the arts, and science. Creativity is the ability to come up with new and valuable ideas, solutions, or insights. It means thinking in new ways, connecting different ideas, and approaching challenges with an open and imaginative mind. Creativity is not just for the arts; it is also important in scientific research, engineering, entrepreneurship, and everyday problem-solving. Creative people are curious, original, and can see problems from different angles. They are motivated to explore new possibilities and question the usual ways of doing things (Tamm et al., 2022).

On the other hand, innovation transforms creative ideas into practical, tangible, and valuable outcomes. It encompasses developing, adopting, and implementing new products, services, processes, or business models that improve efficiency, address unmet needs, or create a competitive advantage. Innovation requires generating creative ideas and their refinement, testing, and adaptation to real-world contexts. It often involves collaboration, risk-taking, and a commitment to continuous improvement. Innovation can occur at various scales, from incremental improvements to disruptive breakthroughs that reshape entire industries (Park et al., 2021).

In practice, creativity and innovation are deeply interconnected. Creative thinking provides the raw material for creation, serving as the wellspring of new ideas and possibilities. Without imagination, invention would be limited to incremental changes and refinements, missing out on the transformative potential of fresh insights and approaches. Conversely, innovation channels creative energy into practical applications, ensuring that innovative ideas have real-world impact and relevance (Chang and Chen, 2020).

The intricate interplay between creativity, innovation, and project commercialization is a central dimension of entrepreneurship and innovation. This literature review explores the nuanced relationship between creativity, innovation, and the successful commercialization of projects, elucidating the multifaceted ways these elements synergies to transform visionary ideas into thriving ventures. Invention refers to the generation of novel ideas, solutions, or concepts. On the other hand, innovation involves practically applying these creative ideas to bring about tangible and marketable outcomes. Together, they form the cornerstone of entrepreneurial endeavors. Creativity serves as the seed from which innovation sprouts. Entrepreneurs' creative thinking abilities allow them to identify unmet needs, recognize opportunities, and envision new product or service concepts. Creativity fuels the ideation phase of project development, enabling entrepreneurs to conceptualize innovative solutions to real-world problems (Concilio et al.. 2019).

While creativity generates ideas, innovation catalyzes their transformation into marketable products or services. Innovation involves not only the development of new products or processes but also the strategic positioning of these innovations in the market. It encompasses product development, market analysis, and adopting novel business models. The relationship between creativity, innovation, and project commercialization is underscored by their combined potential to confer competitive advantage. Creative problem-solving and innovative solutions enable entrepreneurs to differentiate their projects from competitors by offering unique value propositions or disruptive innovations. This competitive edge is a critical factor in project commercialization success (Concilio et al., 2019).

Innovation, driven by creative insights, empowers entrepreneurs to adapt to changing market conditions and consumer preferences. Creative problem-solving enables entrepreneurs to address challenges and seize emerging opportunities swiftly. This adaptability is particularly valuable in the dynamic landscape of project commercialization. Effective project commercialization necessitates a deep understanding of customer needs and preferences. Creativity and innovation play pivotal roles in customer-centric approaches. Entrepreneurs who harness ingenuity

to identify latent customer demands and innovate to fulfil them are more likely to achieve market success (Davies et al., 2018).

Creative thinking often encourages a willingness to take calculated risks. Entrepreneurs who embrace creativity are more inclined to experiment, adapt, and iterate their projects based on feedback and market dynamics. This iterative approach enhances the likelihood of successful commercialization by reducing the risk of product-market misalignment. The entrepreneurial mindset underpins the relationship between creativity, innovation, and project commercialization. Entrepreneurs who embody this mindset seek creative and innovative solutions to their challenges. They view constraints as opportunities for inventive problem-solving, driving project development and commercialization forward (Paulsen et al., 2021).

Contextual factors influence the relationship between creativity, innovation, and project commercialization. Industry dynamics, market maturity, regulatory environments, and cultural norms can shape how creativity and innovation impact commercialization outcomes. Entrepreneurs must tailor their creative and innovative approaches to align with the specific context of their projects. Contextual factors indeed wield significant influence over the interplay between creativity, innovation, and project commercialization. Various external elements, such as industry dynamics, market maturity, regulatory environments, and cultural norms, have the potential to shape how these components interact and ultimately impact commercialization outcomes. Entrepreneurs must remain cognizant of these contextual factors and tailor their creative and innovative approaches to align with the specific demands and constraints imposed by their project's environment. The industry in which a project operates greatly affects the role of creativity and innovation in commercialization. In highly competitive and rapidly evolving sectors, such as technology or biotechnology, innovation is often the key driver of success. Creative problem-solving and disruptive ideas are essential to gain a competitive edge. In contrast, in more mature and established industries, incremental innovations and cost-effective solutions may be more relevant. Entrepreneurs need to gauge the level of creative disruption that is suitable for their industry and adapt their strategies accordingly (Concilio et al., 2019).

The maturity of the target market plays a pivotal role in shaping the commercialization process. In emerging markets, where customer needs are still evolving, creative and innovative solutions can have a substantial impact. However, in mature markets, customers may have well-defined preferences and expectations. Entrepreneurs must balance creativity and innovation with meeting these established demands. Understanding the nuances of customer expectations and market maturity is essential to tailor product development and marketing strategies effectively. Regulatory frameworks vary significantly across industries and regions. Entrepreneurs must navigate these regulatory environments while maintaining creative and innovative efforts. Compliance with industry standards and regulations is non-negotiable in many sectors, such as healthcare or finance. Creative solutions that facilitate compliance, rather than circumvent it, are often required. Entrepreneurs need to work within the boundaries of the law and align their innovations with regulatory requirements, which can be a complex and resource-intensive process. Cultural norms and societal values influence market acceptance and adoption. Creative and innovative products or services must align with these norms to gain traction. Entrepreneurs should be sensitive to cultural nuances, preferences, and potential resistance to novel concepts. Adapting and tailoring innovations to align with local culture and values can significantly impact market success. Cross-cultural understanding and customization may be necessary to ensure that creativity and innovation resonate with the target audience (Gulamov et al., 2022).

6. Conclusion

This comprehensive review discusses the theoretical foundation for understanding the dynamics of project commercialisation, with a focus on critical factors and their interrelationships. The review ex-

plores various dimensions, theories, and empirical studies related to entrepreneurship, innovation, and the role of moderating variables, offering insights into the complex web of factors that influence the commercialisation of projects. It highlights the multifaceted nature of project commercialisation, encompassing aspects such as entrepreneurship skills, networking abilities, access to resources, institutional support, as well as creativity and innovation.

Author Contributions

Conflict of Interest

The authors declare no conflict of interest.

Data Availability Statement

Data sharing not applicable as this is a review article.

Acknowledgement

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Journal of Sustainable Business and Economics
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ARTICLE

Explore Regional Characteristics and Design to Enhance New Elements of Brand Packaging——Taking Moutai as an Example

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ABSTRACT

Taking ethnic minority culture as the starting point, this paper explores the possibility of artistic expression of elements in different regions, and explores how regional brands can combine regional culture to create market effects and public preferences. Through field research, literature research, and market case comparison, the aesthetic symbols of different cultural and artistic forms of the Dong ethnic group are refined and expressed, and their application in the development of local brand design is explored. Artistic expression elements such as patterns, colors, and materials are extracted from the architectural culture, ethnic art, and daily food customs of the Dong ethnic group, and used in the design of regional wine products, deeply connecting regional culture and regional brands. In the design, we should pay attention to national characteristics and brand effects, and carry out the design from a multi-dimensional design perspective, which will help to enhance brand competitiveness and achieve a win-win situation under the long-term goal of promoting national self-confidence and inheriting the essence of national culture.

Keywords: Moutai liquor; Dongsu brand; Characteristic design; Competitiveness enhancement

1. Introduction

Cultural industry is different from traditional industries. The concept was proposed in the early 20th century. It is more about satisfying people's ideological, spiritual, emotional and cultural needs. Its manifestations are diverse, but its fundamental core lies in culture. Cultural industry can polish and melt rela-

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ARTICLE INFO
Received: 26 July 2024 | Revised: 30 July 2024 | Accepted: 6 August 2024 | Published Online: 16 December 2024
DOI: http://doi.org/10.26549/jsbe.v7i2.19162

CITATION
Kang, Z.S, Ghani, D.B.A., 2024. Explore Regional Characteristics and Design to Enhance New Elements of Brand Packaging——Taking Moutai as an Example. Journal of Sustainable Business and Economics. 7(2): 62–68. DOI: http://doi.org/10.26549/jsbe.v7i2.19162

tively old, backward and popular consumer goods to form a more novel and culturally distinctive product. Cultural industry can be divided into three categories: one is cultural products presented in relatively independent physical forms of production and sales; the second is cultural service industry in the form of labor; the third is to propose cultural added value to other commodities and entertainment industries. The content studied in this article is in the third category, mainly discussing how ethnic regional culture deeply connects regional brands and creates commercial value and aesthetic standards. With the continuous and rapid development of social economy, people's spiritual and cultural needs are increasing day by day, and this industry has received unprecedented attention and development. The Dong people in Guizhou Province are one of China 's ethnic minorities, with unique customs and ethnic minority cultural characteristics. For example, Dong ethnic group's big song, Dong ethnic group's embroidery, Dong brocade, Dong ethnic group's paper-cutting, drum tower, wind and rain bridge, etc. are all symbols of Dong ethnic group's culture. Fourthly, Guizhou Province is also the province with the largest population of Dong ethnic group in China. As the national wine of China, Guizhou Moutai is also one of Guizhou's geographical indication products. It has profound cultural connotation, artistic charm and commercial development value. This graduation project takes the application of Dong ethnic group's elements in regional brand packaging design as the theme, explores the practical application of Dong ethnic group's elements in the packaging design of regional specialty Moutai, conducts innovative design, builds the emotional connection between regional culture and regional brand, and makes the characteristics of Dong ethnic group's culture actually applied in Moutai packaging design through cultural internal drive design and design external drive development, so as to activate cultural value by using the power of design.

2. Background of Cultural Support Brands

With the rise and development of the cultural and creative industry, branded and nationalized cultural and creative products stand out from the competition. Under this trend, cultural and creative packaging design products are also emerging. However, there are not many cultural and creative packaging design works that can really meet the visual and psychological needs of the general public. The combination of cultural creativity with products and brands is emerging in an endless stream. ⑤, through design expression, especially starting from the brand's information, logo, and IP image, the product is better brought to the consumer's vision; the concept of using culture and design to create a new brand has been recognized by the market.

In the development and design of ethnic cultural and creative products, combining the advantages of "regional brands" with the design of ethnic cultural and creative products will be the priority path to open up new innovation points for ethnic cultural and creative products. Dong ethnic elements are one of the more popular ethnic elements in recent years. Under the current trend of advocating the activation of cultural values through design power, the actual use of brands can inject new impetus into cultural and creative design, and through regional brand cultural and creative design, a medium for communicating ethnic culture and innovative design can be used to build an emotional link between regional culture and regional brands.

3. Kweichow Moutai Brand Research

3.1 Brand Overview

Kweichow Moutai is a regional specialty of Maotai Town, Renhuai City, Zunyi City, Guizhou Province, China, and is also one of China's national geographical indication products. Moutai is a traditional Chinese specialty wine, one of the world's three most famous distilled wines, along with Scotch whisky and French Cognac, and one of China's three most famous wines, "Mao Wu Jian". Moutai has a history of more than 800 years of accumulation and inheritance. In the Chinese liquor industry, its market value ranks first in the industry. Kweichow Moutai

has a good brand effect in terms of brand advantages, a wide audience group, and through generations of inheritance and brewing, it also has a deep consumer base in the domestic market. However, with the large demand for Moutai in the market, product innovation is no longer limited to technological progress and market expansion, and can explore innovative entry points in some brand added value, such as marketing mechanisms and brand image establishment.

The appearance and packaging design form is also a part of it. The product packaging and excellent quality are more matched to a higher degree, complementing each other, and are more conducive to brand building and long-term development. The current packaging of Moutai has undergone continuous changes and evolutions. The main features come from the overall packaging shape, color, text, pattern, and packaging material design, matching, application and display.

Second, from the initial evolution of pottery jars, glazed pottery bottles, ceramic bottles, white glass bottles to colored glazed pottery bottles, the company has continuously solved the problems of the shape, texture, packaging quality (light transmission, penetration), and recycling of liquor bottles. In the late 1990s, Moutai launched various small-batch commemorative liquors and customized liquors based on ordinary Moutai or aged Moutai, such as Guizhou Moutai (celebrating Beijing's successful bid for the Olympic Games), Guizhou Moutai (celebrating China's entry into the WTO), and Guizhou Moutai (the Year of the Pig). There are different innovations in color and material. The packaging of different eras will have changes in details, but it still retains the recognition of Moutai, seeking innovation from classics, and giving the general public a better consumer experience.

3.2 Case analysis of Moutai packaging brand

Moutai Targeted Design—Regional Culture Guizhou.

The design inspiration comes from the representative images of Guizhou's regional characteristics, such as Huangguoshu Waterfall, Zhaoxing Dong Village, and Guizhou Miao Nationality. These elements with significant ethnic characteristics are refined and combined into the Guizhou batik pattern, which is the main component of Moutai's packaging design. The bottle body uses the common color of batik cloth, azure blue, as the base color for a large area. It fully displays the regional style. The appearance design of the outer packaging box, gifts, and wine glasses is also related to the bottle design, using the same main elements for matching and combination, which highlights the integrity to a certain extent.

Case 2: Moutai Targeted Design - Gao's Wine

The packaging design of "Gao's Wine" originated from the surname creation topic in Moutai's directional design. This series of wine products is a customized wine for banquets for relatives and friends of the Gao family. The inspiration element comes from the traditional Chinese character "Gao". The main design content of the bottle is a combination of Gao's totems, characters and other elements, and finally expressed in the form of simple and abstract illustrations . The meaning of the creation is that Gao clansmen from all over the world can recall their origins and have a sense of belonging when they see this design.

4. Dong Culture and Folk Customs

4.1 Extraction of Dong ethnic customs

Folk culture can also be called traditional culture. In China, it can generally refer to the life culture of the folk people. These gathered people constantly form, create, share, and spread behaviors in the process of life, which has formed a common cognition and behavioral habits in the region. Its contents involve language, literature, music, dance, deification, etiquette, handicrafts, architectural art, etc. The Dong people are one of China's ethnic minorities, distributed in the adjacent areas of Guizhou, Hunan and Guangxi. In the formation and development of the nation, they have established their own unique material culture and spiritual culture. Taking the Dong ethnic culture as an example, the Dong customs are of various types, profound cultural connotations,

and rich ethnic characteristics. Talking about the Dong ethnic group's big song, Dong ethnic group's embroidery, Dong brocade, drum tower, wind and rain bridge, etc., they integrate the connotation of regional culture and folk customs over a long period of time. The Dong culture mainly covers the following categories: architectural culture, language culture, craft culture, ethnic art, folk culture, daily food customs, etc. In each of the six categories, there are representatives with strong regional characteristics. For example, in architectural culture, drum towers, wind and rain bridges, pavilions, Dong village gates, stilt houses, etc. are all well-known classic buildings with very distinctive regional style and characteristics.

As a profound and extensive subject, folklore takes regional characteristics as its core, and constantly excavating and developing its connotation can achieve the goal of sustainable development. In terms of design expression, it is necessary to carry out cultural refinement and creativity from all aspects and angles, and to maintain the authenticity of cultural customs, and to infiltrate the careful production of artistic creation. The extraction methods of folklore elements include semiotic design from the product perspective, that is, to sort out the basic design semantics and symbols through the user's visual impression and psychological feelings; storytelling design, that is, to tell a story or provide a scene through the product, and pay more attention to the user's experience of the story. This content includes the design of characters, prototype restoration, IP image design, etc.; emotional fit design, that is, to explore the design products that can match the user's emotions and emotional needs, such as the beautiful appeal for love, friendship, and family affection; artistic expression, including the construction of basic elements such as points, lines, and planes from an aesthetic perspective, and the rules of plane composition.

4.2 Strategies and methods for applying folklore

The traditional cultural elements of the Dong ethnic minority are rich and full of ethnic characteristics. The design can be explored from the aspects of the Dong ethnic group's architectural culture, ethnic art, daily food customs, etc. The representative architectural culture of the Dong ethnic group is the wind and rain bridge. The wind and rain bridge is a symbol of the Dong people and a traditional transportation building. This bridge is also called the "Flower Bridge" because it can connect traffic, avoid wind and rain, and is decorated with colorful paintings. In the actual packaging design of Dong ethnic elements, it can be developed from the two aspects of consumers' emotional and cultural needs and actual cultural needs, and the design can be expressed with abstract and concrete design rules to achieve the purpose of packaging design re-creativity.

4.3 Expression and promotion of folk culture

With the rapid development of science and technology, the development and inheritance of traditional folk customs cannot be separated from the young user group. How to use technology, platforms, design creativity and other methods to deeply promote the brand products supported by folk products and promote culture. First, technology is integrated into culture, giving the public more opportunities to understand, contact, learn, and delve into a relatively closed and remote culture, which can be done with the help of digital art interactive technology; for the appreciation of natural scenic spots, the visit and tour of artworks and crafts can be done through the construction of online apps, which all rely on the development of the Internet and digital media technology; second, the path of folk culture tourism. Cultural tourism can more comprehensively and truly show the characteristics of regional nature, ethnicity, culture, and economy. As the cultural region itself, it is necessary to consciously transform recreational sightseeing tourists into participating, investigating, entertaining, and living tourists. Such a transformation is more conducive to the expression and promotion of local cultural customs; third, design assistance, that is, industrial poverty alleviation and rural construction through art design.

5. Practice of Moutai packaging design with Dong ethnic elements

In the design of Moutai liquor products based on Dong folk elements, we should focus on balancing the connection between brand and culture, mainly considering the brand's cultural nature, brand image and brand positioning.

In the extraction of regional culture, the cultural connotation, development, inheritance, recognizability, affinity, and penetration of the Dong nationality should be considered. Regional culture is holistic and needs to be integrated from the details of life to the spiritual and ideological aspects. It covers the cultural methods, language habits, and values of the people in a certain area. And as time goes by, it is also necessary to take into account the development and inheritance in the process of change. The maintenance attitude and critical attitude need to coexist to maximize the brilliance of culture. Under the joint action of different regions, climates, social economy, labor, etc., the unique cultural identity that has been nurtured needs to be explored and applied. And the creation itself needs to enhance the market and users' sense of identity and belonging, and become a carrier of ethnic connection. In the specific design expression, it is mainly expressed in terms of font design, pattern design, bottle body structure design, etc.

5.1 Font design

The inspiration for the bottle font design comes from the five characters "Guizhou Moutai" written by Mr. Mai Huasan, a great calligrapher from Lingnan, Guangdong, on the regular Moutai bottle. The font of the name of Guizhou Moutai follows the font of "Guizhou Moutai" written by Mr. Mai Huasan in his 80s in 1985. It retains the characteristics of the Guizhou Moutai brand logo and highlights the brand influence. The font is calm and powerful. It is not only of great value in terms of appearance appreciation, but also contains Mr. Mai Huasan's calligraphy achievements and artistic attainments over the years, which coincides with Moutai's corporate mission of focusing on brewing high-quality life for many years. Among them, "Dongqing" is the theme of the Moutai series, which is intended to advocate "enjoying the customs of the Dong ethnic group and tasting a pot of good wine", reflecting the customs of the Guizhou Dong ethnic minority. The font design is derived from the Chinese calligraphy running script and echoes and integrates with the font style of "Guizhou Moutai". The font color is the Chinese red series, which implies a sign of festivity and auspiciousness. At the same time, red is also one of the representative colors of the Dong ethnic group.

5.2 Pattern design

The graphic design of the bottle is derived from the research and analysis of the Dong ethnic culture. Under the background of the current market packaging design trend, the application of natural and soft simple color graphic illustrations in packaging, the texture of packaging materials, the addition of creative stories and other trend points are selected. The architectural culture of the Dong culture, "wind and rain bridge, drum tower, and Dong village gate" are chosen as design elements. The wind and rain bridge structure can be divided into three parts: bridge, corridor, and pavilion. The bridge-shaped pilasters, tile eaves, carved carvings, railing sculptures, eaves corners, and pagoda-style pavilions are concretely refined to form a simple black and white line draft, which is used in the bottle body background and packaging box pattern expression.

Similarly, the drum tower and the gate of the Dong village are also presented in the form of simple black and white line drawings. The most straightforward and objective method of extraction can restore the original flavor of the characteristic buildings to the greatest extent. The line drawings and illustrations in the design expression are based on the modeling characteristics of the Dong architecture, and are designed and expressed by the design method of sketching simple drawings with lines. The purpose is to influence the first impression on the packaging design, so that the Dong culture can be intuitively presented to the users of Moutai, without causing confusion of regional culture. The black and white

lines are elegant and clean, and their texture is combined with the transparent material of the bottle. It is simple but does not lose the noble quality of Moutai, and contains the Dong people's belief in a pure and natural nation.

5.3 Bottle design

The appearance of the bottle body follows the traditional cylindrical shape, retaining the characteristics of Kweichow Moutai's packaging design, reflecting the recognition of the national liquor Moutai. The design inspiration of the bottle cap comes from design elements such as "Dong people's belief in fish", "ox horns", "drum towers", and "Dong people's embroidery". The image characteristics of the bent corners are particularly prominent in special products such as fish vines and ox horn combs, so this product incorporates the images of ox horns and fish in the bottle cap design, and users can feel the design sense of regional culture when opening the bottle cap. The material also draws on the silver ornaments of the Dong people, mainly in terms of color and pattern. The overall bottle cap design is full of strong Dong style.

The packaging design scheme is designed around the topic of "Application of Dong elements in regional brand packaging design - Taking Guizhou Moutai as an example". The theme of the Moutai series is "Dong feelings", which aims to advocate "Enjoy the Dong customs and taste a pot of good wine", drink Guizhou Moutai and enjoy the customs and customs of the Dong ethnic group. Strive to explore the innovative possibilities between ethnic minorities, regional brands and packaging design under the background of cultural and creative industries. The packaging design scheme of Moutai is innovatively designed on the basis of the previous packaging design of the regional brand Guizhou Moutai. It fully analyzes and utilizes the cultural elements of the Dong ethnic group in terms of plane graphics, bottle appearance, packaging materials, etc., and builds a packaging design bridge between the cultural and creative design of the Dong ethnic group and the regional brand Guizhou Moutai. Functionally, the packaging design scheme is a container and outer packaging of Moutai as well as a cultural derivative. Structurally, the bottle of the packaging design scheme is a cylindrical structure, and the overall structure is innovatively designed without departing from the brand recognition of Moutai. In terms of appearance, the packaging design is for liquor packaging, which is created while retaining the characteristics of Moutai. The design style is simple and rich in texture. The shape of the bottle cap is very characteristic of the Dong ethnic group and the beauty of the curve is prominent. From the perspective of CMF, the bottle body is made of transparent glass, which is simple and high-end. The bottle cap material is aluminum, and the high gloss shows high texture, which also echoes the texture of the silver ornaments commonly used by the Dong people. The bottle body graphics are printed with a wine bottle screen printer, and the red paint texture is integrated with the glass material, which is pure and high-end. In the design of the bottle body, considering the light-proof problem of liquor, the outer packaging box design uses an opaque aluminum box material, and the graphics are laser printed or corroded and carved, so that users can get a high-quality experience of perception and touch. Based on the design case process and presentation, it can be seen that the refinement of folk culture and product expression, on the basis of having the general specificity of ordinary commodities, still need to highly display special attributes different from ordinary commodities, for example, first, both culture and creativity. The concepts, emotions, tastes and other elements endowed by cultural creativity can enhance the spiritual experience and cultural value of the consumption experience of ordinary commodities. Second, practicality and beauty are equally important. The essential attribute is general commodities, and practicality is the main essence. However, the aesthetics of cultural and creative products can present new aesthetic interests under the creativity of comprehensive factors such as materials, forms, and craftsmanship in design expression. Third, it is full of warmth and emotion. The essence of design lies in how to connect the

relationship between objects and people, establish a good interactive model, and memory, so that users can have a sense of leaping while consuming, so as to experience culture and make deep associations.

Conclusion; This paper mainly discusses the thinking and future prospects of the application of Dong ethnic elements in the packaging design of the regional brand Kweichow Moutai. It hopes to use ethnic cultural and creative design to enhance the cultural confidence of the Dong ethnic group and the image of the regional brand Kweichow Moutai, and broaden the path of ethnic cultural communication. The analysis and research show that the innovation of Dong ethnic elements in regional brand packaging design focuses on the key points: first, the distinctiveness of ethnic cultural characteristics; second, the diversified application of ethnic patterns; and third, the added value of packaging design. Through the research, thinking and design practice of the relationship between Dong ethnic cultural and creative packaging design and regional brands in this paper. In the design, attention should be paid to ethnic characteristics and brand effects, and the design should be carried out from a multi-dimensional design perspective, not limited to the existing ethnic cultural materials and scope. The way to promote folk culture can be through the Internet platform, digital technology, travel and artistic creative design. The development possibility of ethnic cultural and creative products under the regional brand effect is worth exploring, which is helpful to achieve the purpose of enhancing brand competitiveness under the long-term goal of promoting national confidence and inheriting the essence of national culture, and achieve a win-win situation.

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Journal of Sustainable Business and Economics
https://journals.bilpubgroup.com/index.php/jsbe

ARTICLE

A Study on Technology Application and Performance of Small and Medium-sized Enterprises in the Context of Cloud Computing Application - A Case Study of Hotel Industry in Henan, China

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ABSTRACT

This paper examines how the adoption of cloud computing affects the relationship between the technical and environmental capabilities of small and medium-sized enterprises (SMEs) in the tourism industry in Henan Province, China, thereby promoting the stable and sustainable development of the tourism industry, combining the laws of tourism market development, vigorously constructing a smart tourism project, guiding tourism cloud service providers to strengthen the cooperation and contact with the market's tourism enterprises, introducing and utilizing cloud computing technology, optimizing and improving the functions of various tourism services of the enterprises, and enhancing the processing and analysis of enterprise-related data to provide tourism information. Strengthen the processing and analysis of enterprise-related data to provide tourism information, and further study the adoption of cloud computing and its impact on small and medium-sized enterprises (SMEs) in terms of technology and business environment knowledge, so as to make the best enterprise management decisions and realize the overall enhancement of the enterprise's tourism brand value.

Keywords: SMEs; Cloud Computing; Technology Adoption; Performance; Henan Hotels

1. Introduction

AI technology, cloud computing, so that small and medium-sized enterprises comprehensive budget management gradually towards the "intelligent"

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ARTICLE INFO
Received: 13 August 2024 | Revised: 14 August 2024 | Accepted: 21 August 2024 | Published Online: 16 December 2024
DOI: http://doi.org/10.26549/jsbe.v7i2.19486

CITATION
Hui, ZH., Mohammadi, A., 2024. A Study on Technology Application and Performance of Small and Medium-sized Enterprises in the Context of Cloud Computing Application - A Case Study of Hotel Industry in Henan, China. Journal of Sustainable Business and Economics. 7(2): 69–75. DOI: http://doi.org/10.26549/jsbe.v7i2.19486

and "informationization" direction, but also makes the comprehensive budget management of decision-making support role and value creation role more and more obvious. Based on this, in the current cloud computing background, if enterprises want to get a better comprehensive budget management informatization construction results, it must be combined with their own internal management, to develop a set of more refined comprehensive budget management system, so as to make it possible to realize the production and operation of the comprehensive budget management informatization pattern, but also can effectively promote the enterprise's operating mode of the benign cycle, and at the same time more able to ensure the gradual implementation of the enterprise's strategic planning. The gradual implementation of strategic planning.

2. Characteristics of enterprise comprehensive budget management informatization construction under cloud computing

In the process of enterprise comprehensive budget management informatization construction under the cloud computing environment, its biggest feature lies in effectively guaranteeing the enterprise's basic development needs such as "strategy landing, resource allocation, performance appraisal, clear rights and responsibilities". From the current application of cloud computing modules, "software, platform and infrastructure services" are the three most common application modes, and these are the essential elements of the combination between cloud computing and enterprise comprehensive management informationization. From the point of view of the characteristics of the cloud computing environment, enterprises in the process of building comprehensive budget management informationization, the most important practice channels mainly include "software provided by cloud computing service providers, self-research or according to their own needs to buy third-party software company products" and other three modes [2]. Among them, the cloud computing software connected to the service provider and the server, can significantly reduce the cost of software use, research and development costs and maintenance costs, to provide enterprises with the necessary infrastructure and technical platform support.

As a new business service model, the cloud computing platform's biggest technical characteristic lies in "connecting infrastructure and software before and after the service, and constructing the whole cloud computing model platform through the functions of access rights setting, module setting and data cloud storage". Enterprises in the cloud computing system, through the relevant cloud computing technology will be able to directly access a variety of data information and basic services, so as to continuously optimize their own departments, projects, products and operations of the comprehensive budget management program.

3. Cloud computing under the enterprise comprehensive budget management information construction principles

3.1 Budget target

In the cloud computing environment, the enterprise in the comprehensive budget target setting can not only integrate the original data of enterprise development, but also be able to fully competitive market environment and industry environment information fusion to the budget target setting process, so that not only to a great extent to meet the needs of the enterprise's strategic goal setting, but also more able to make its enterprises through the cloud computing terminal software to complete the comprehensive budget management information "upload and send". "Uploading", and then by the internal management of the enterprise will be the relevant information and the actual situation of the enterprise to analyze the combination, so as to clarify the future of the enterprise's comprehensive budget management development planning. This not only can gradually form a linkage between the various departments within the enterprise mode of work, and at the same time can ensure that the enterprise comprehensive

budget management objectives of the strategic planning practices and economic development, and then constantly expand the enterprise in a fully competitive market, the development of the driving force and the industry's competitive advantage.

3.2 Budgeting

In terms of comprehensive budgeting, the enterprise is not only able to analyze the enterprise's own historical data, business situation, external market information, strategic planning information, etc. through the cloud computing terminal platform to carry out all-round budget management objectives, but also able to further determine the future annual budget indicators and budget values under the support of cloud computing technology. This not only enables the internal management of the enterprise to optimize its budgeting process and budget approval process on the basis of the comprehensive budget quota standard, but also further strengthens the actual role of business departments and work plans in the comprehensive budget presentation.

In terms of budget allocation, the enterprise not only needs to combine its own organizational structure and business model to reconstruct the budget allocation of each department, but should also carry out "horizontal allocation" or "vertical extension" based on the results of the completion of the comprehensive budget in different periods, so as to make it possible for the comprehensive budget management to be compiled to the full budget of the enterprise. At the same time, "horizontal allocation" or "vertical extension" should be carried out according to the results of comprehensive budget completion in different periods, so as to enable comprehensive budget management to be compiled for each business item and production link within the enterprise.

This not only further clarifies the enterprise's job budgeting indicators, product budgeting indicators, production budgeting indicators, etc., but also enables each department to enhance the connectivity in budget data collection, so that the relevant calculation and allocation indicator data and budget allocation summary data can be submitted within a predetermined period of time with the support of cloud computing technology. This enables a more logical basis for overall budgeting data in the process of comprehensive budget management, thus ensuring the accuracy of comprehensive budgeting.

4. Enterprise comprehensive budget management informatization construction strategy under cloud computing

4.1 Improve the application effect of big data and cloud accounting means

From the current development trend of information technology, in the process of enterprise comprehensive budget management, to improve the application of big data and cloud accounting means, is bound to affect the final level of budget management informationization and refinement level. This not only enables enterprises to optimize the overall management of enterprises through information technology thinking, but also enables them to realize the real-time uploading and acquisition of information data of various aspects of comprehensive budget management under the support of cloud computing, cloud data, cloud accounting and other information technology.

In addition, the integration of big data technology and cloud accounting means, but also to promote the enterprise comprehensive budget management information data sharing, so that the data information of different departments can form a good interoperability effect. This not only can further improve the enterprise in the comprehensive budget management of information technology linkage pattern, at the same time can also make the enterprise management in the information technology means of comprehensive budget management progress for comprehensive monitoring and comprehensive supervision, so that the enterprise comprehensive budget management process management objectives can be on their own assessment and evaluation, data analysis to produce a positive effect. It can be seen that in the process of enterprise comprehensive budget management, cloud

computing and other information technology into its management practice, not only to a great extent to make up for the shortcomings of its traditional accounting data analysis, but also to further deepen the effective integration of science and technology and industry, which not only improves the enterprise in the process of comprehensive budget management of the data processing capacity, but also significantly improve its comprehensive budget management practice efficiency, thereby realizing the enterprise comprehensive budget management process management objectives can have a positive effect on their own assessment and evaluation, data analysis. Management of the practice of efficiency, so as to realize the integration of enterprise comprehensive budget management and the depth of the development of information technology.

4.2 Strengthen the dynamic supervision of budget implementation

For the enterprise comprehensive budget management, strengthen the dynamic supervision of budget implementation, the key link is to ensure that the information technology management tools and enterprise budget management objectives of the suitability and integration, so as to make the enterprise internal departments of the comprehensive budget management work can be implemented. Based on this, in the process of information-based budget management, enterprises should not only optimize the implementation of the budget, and at the same time more through the construction of information-based comprehensive budget management system, to effectively solve the problem of "budget implementation in the form of" [6]. This will not only enable the enterprise to fully discover its own problems related to budget implementation and dynamic supervision, but also be able to formulate solutions to problems in a timely manner, thus strengthening the enterprise's resilience in the process of comprehensive budget management.

In addition, under the support of cloud computing technology, the internal management of the enterprise can also build up a "budget data analysis model" for the enterprise itself through the dynamic supervision of budget execution, which can not only promote the real-time development of dynamic supervision, but also further strengthen the enterprise's own ability to analyze and process the cloud computing data. Solve the problems of budget implementation, resolve the enterprise budget risk caused by comprehensive budget management, so as to optimize the enterprise's economic internal consumption and abnormal data feedback and other work.

4.3 Improve the degree of informatization of comprehensive budget management goal-setting and preparation

Thanks to the informationization support of cloud computing technology, in the process of building a comprehensive budget management informationization framework, the enterprise can not only effectively improve its information collection level for the external environment and industry development dynamics, but also more conducive to the internal management of the enterprise on this basis to formulate a more scientific and reasonable budget development decisions, so as to avoid additional budget management objectives in the process of formulating and compiling Development risk. Based on this, in the process of improving the degree of informatization of comprehensive budget management goal-setting and preparation, enterprises should not only pay attention to the "sharing" and "integration" of the enterprise cloud platform, but also increase the use of highly sophisticated big data processing technologies such as Hadoop, Drill, HPCC, and so on. The application of high-precision big data processing technology, and its application in data analysis and evaluation of results, so that not only can make it gradually through the structured, semi-structured, unstructured data logical relationship verification to deepen the information mining power of the comprehensive budget management data and information analysis, but also on the basis of which the market competition demand and the market share of the economy to make a reasonable prediction. This not only can provide more data and information support for the enterprise comprehensive

budget management goal-setting and preparation, but also can make the enterprise in such a process to continuously improve its own data information processing capabilities, so that it can continue to highlight its own information technology comprehensive budget management advantages in the future completely competitive market.

4.4 Optimize the comprehensive budget management information assessment system

The key to optimize the informationized appraisal system of comprehensive budget management lies in that the enterprise managers should make the enterprise's general management system more effective.

5. Application of Cloud Computing in Smart Tourism

As an important development trend of the tourism industry in the future, smart tourism essentially refers to the construction and operation of the tourism industry through the scientific use of advanced technology and intelligent management means, in order to promote the orderly development of various work links, and provide more high-quality and convenient services for different levels of tourism customers. Cloud computing, as an emerging communication technology in modern society, is widely used in different industry sectors, through the organic combination of cloud computing technology and smart tourism, can give full play to their respective advantages and roles, maximize the comprehensive development of the tourism industry, and promote the informationization and intelligent development of smart tourism.

5.1 Efficient and safe data processing and analysis

Cloud computing itself, as an advanced information and communication processing technology, can assist the intelligent tourism management to process and analyze the massive data, dig out the more valuable data information, and at the same time, it can also be a safe storage of this part of the data information. In this way, the senior leaders of the enterprise can extract data for reference and analysis at any time before making management decisions, creating real value for the enterprise.

5.2 Optimization and integration of tourism data resources

Based on the application of cloud computing technology, tourism enterprises can effectively combine the real and virtual information data of the enterprise, provide consumers with better quality services, and maximize to meet the needs of different levels of users of tourism experience services. For example, tourism enterprises in the application of cloud computing technology, enterprise service objects can use different terminals to obtain tourism-related support services, convenient for users to eat, live and travel, greatly improving the service level of tourism enterprises, thus attracting more potential users.

6. Cloud computing in the wisdom of tourism in the application of innovation

6.1 Application of cloud computing in intelligent tourism operation and management

Intelligent tourism operation and management involves content mainly including resources for tourism users, travel, hotels and sightseeing attractions route planning, etc., in this management process will produce a large amount of data, requiring the relevant staff to take advanced management techniques and methods to comprehensively improve the level of wisdom of tourism management. Tourism enterprises can introduce the application of cloud computing technology to effectively build up a smart tourism management cloud platform that meets the characteristics of the enterprise's own development needs, based on the cloud platform for daily operation and management to complete the different functional services for market users to meet the different

needs of users. Cloud computing technology to build a smart tourism management platform not only has a high level of data processing and analysis capabilities, can guarantee the smooth progress of the smart tourism management business, but also can help enterprises effectively solve a large number of data security storage and protection work, to avoid the occurrence of user information data leakage and theft problems, affecting the reputation of the enterprise itself. In the construction of intelligent tourism cloud service platform, the government should strengthen the scientific guidance to the market tourism service providers, guide them to combine the law of tourism market development and tourism enterprise management needs, reasonably design the intelligent tourism cloud service platform with perfect functions, learn from the introduction of the use of more advanced informatization technology, and lay a good foundation for the development of a new situation of intelligent tourism in China.

6.2 Application of Cloud Computing in Smart Tourism Business

In the new period, the core content of smart tourism business development mainly covers smart tourism industry alliance, smart tourism marketing platform, and online promotion and marketing of tourism products. Tourism industry development process exists in the distribution of tourism resources is too dispersed, the tourism market service enterprises a huge number of characteristics, these characteristics will lead to difficulties in realizing the entire tourism market centralized wisdom management development, need to rely on the application of cloud computing technology to effectively enhance the wisdom of China's tourism business, the level of information technology development. The application process of China's intelligent tourism business innovation and development mode is to build an integrated intelligent business trading platform by the market intelligent tourism business cloud service providers, to provide online payment, security and identity identification and authentication and other business functions for the majority of tourism service enterprises in a scientific and effective manner, so that the legitimate rights and interests of the different parties involved in the tourism business services can be fully guaranteed, and to promote the construction of the tourism industry for the harmonious and stable development of the tourism industry.

7. Conclusion

In summary, under the support of cloud computing technology, enterprises can build an information-oriented comprehensive budget management system in the process of comprehensive budget management, which can provide enterprises with extremely accurate budget control data, programs and analysis results. This not only can fully reflect the many economic relationships within the enterprise, but also to optimize its own economic activities. It can be seen that cloud computing technology not only allows enterprises to comprehensive budget management work to obtain more basic services and the underlying data, but also to promote the development of enterprises in the cloud computing service platform more in line with their own strategic development, the adoption of cloud computing is the mediator of the relationship between the technical capabilities of small and medium-sized enterprises in the tourism industry and the environmental capacity for policymakers and practitioners in Henan Province, China, to provide the basis for insight, and at the same time, cloud computing technology also improves the environmental and technological capabilities of enterprises and the environment. computing technology also enhances the advantages of environmental and technological expertise.

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ARTICLE

The Effects of Infrastructure Projects on House Prices and Rents : Evidence from the HS2 Extension Cancellation in the UK

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ABSTRACT

This paper uses the HS2 extension cancellation in November 2021 as a quasi-experiment to study its impact on house prices and rents in Leeds. Using a DiD approach on repeat sales and monthly rents, I compare property values near the HS2 station and proposed construction site before and after the announcement. Results show a 3.6% decrease in house prices and a 3.9% decline in rents near the station, while properties near the construction site experienced a 2.4% increase in prices and a 2.1% rise in rents. This is the first paper to analyse the HS2 cancellation effect using panel data methods.

Keywords: HS2 extension cancellation; Externalities; House price effects; Transport infrastructure; Difference-in-Differences Model

1. Introduction

The High-Speed Two (HS2) project, a significant investment in transport infrastructure in the United Kingdom (UK), aims to stimulate economic growth, enhance connectivity and rebalance the economy. However, since its announcement in 2009, the project has faced numerous challenges and revisions by policymakers. The cancellation of the eastern leg from Birmingham to Leeds in November 2021 was part of the government's "Integrated Rail" Plan and marked a major shift in the project's scope and objectives. My main research question is to what extent this cancellation led to changes in average house prices and monthly rents in the affected Leeds area. I also study how this impact differs between properties

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ARTICLE INFO
Received: 24 July 2024 | Revised: 30 July 2024 | Accepted: 6 August 2024 | Published Online: 16 December 2024
DOI: http://doi.org/10.26549/jsbe.v7i2.19155

CITATION
Zhu, W.T., 2024. The Effects of Infrastructure Projects on House Prices and Rents : Evidence from the HS2 Extension Cancellation in the UK. Journal of Sustainable Business and Economics. 7(2): 76–94. DOI: http://doi.org/10.26549/jsbe.v7i2.19155

near the station (which would have benefited from improved accessibility) and those near the planned construction site (which would have experienced negative externalities). Despite the large body of literature on the relationship between transport accessibility and property values, there is limited empirical evidence addressing this question in the context of the UK, particularly in the case of a major infrastructure project cancellation like the HS2 extension.

The consensus in the literature suggests that transport accessibility positively affects house prices, while long-term construction activities have a negative impact. Early studies using multivariate OLS techniques suffer from omitted variable bias due to unobserved factors, leading to biased estimates. More recent work, advanced by Gibbons (2013), employs boundary discontinuity designs to control for unobservable neighbourhood characteristics, but issues may persist if these factors change discontinuously along railway track boundaries or if infrastructure projects are located in more developed neighbourhoods, leading to reverse causality. Some researchers have used instrumental variables to address such issues, but finding a valid and strong instrument remains a challenge. The most common approach to evaluate the impact of transport infrastructure changes on property prices is the quasi-experimental or difference-in-differences (DiD) methodology. For example, Brandth (2004) studied the ex-ante and ex-post effects of the introduction of the rapid Seattle transit line and found that house prices within a 2.5 km vicinity of the station increased in value by 4.3%. However, one limitation in such analyses is the difficulty in cleanly separating the positive direct effects of enhanced transport accessibility from the negative indirect effects of construction and noise pollution, especially when both effects occur within the same local area. While these studies differ in their exact approach, they generally compare property price changes in an impact area subject to transport policy changes with price changes in a 'control group' with neighbourhoods designated as mostly unaffected.

In this paper, I leverage the surprise HS2 extension policy cancellation in November 2021 as a quasi-experiment to estimate the premium for transport accessibility and the penalty for being located near a construction site. The abandonment of the HS2 line meant that transport links from Leeds to major cities like London and Birmingham were weakened, with HS2 predicted to improve travel times by 45% when fully operational. By employing a robust DiD specification with repeat sales of houses and monthly rents of properties brought onto the market during the study period, I employ 'within-variation' to more effectively control for unobserved differences in neighbourhood characteristics. This approach is less reliant on somewhat crude assumptions compared to instrumental variable or regression discontinuity designs. The novelty of my paper lies in its first-of-its-kind use of quasi-experimental methods to identify the impact of a major policy shock. To conduct my analysis, I manually constructed a dataset based on the spatial location of properties using the mapping program ArcGIS. By comparing the changes in house prices and monthly rents between affected and unaffected areas before and after the policy announcement, I find that properties near the HS2 station experienced a significant decrease in value (3.6% for house prices and 3.9% for rents) due to the loss of anticipated transport accessibility improvements. Conversely, properties near the planned construction site saw an increase in value (2.4% for house prices and 2.1% for rents), attributed to the elimination of expected negative externalities.

The rest of the paper is organised as follows: Section II offers a literature review. Section III provides information on the policy and how I constructed my dataset. Section IV contains the details of my empirical approach. Section V presents the main results and extensions while Section VI contains some robustness-control analysis. Finally, Section VII concludes.

2. Literature review

2.1 Theoretical aspects

The first strand of the literature is grounded in urban economic theory, which delves into the role

of spatial factors in determining land values. The monocentric city model, developed by Alonso (1964) and extended by Muth (1969), provides a theoretical groundwork for understanding the relationship between transport costs and land rents. In this model, households trade off accessibility to the central business district (CBD) against housing consumption, with land prices declining with distance from the CBD to compensate for higher commuting costs. After the improvement of transport infrastructure, such as the introduction of a new rail transit line, the model implies that property values will increase due to a reduction in commuting times and an increase in attractiveness of purchasing nearby properties. However Anas (1998), among others, have critiqued this model for its simplifying assumptions: the homogeneity of household preferences and there being only one employment centre. He argued that cities exhibit polycentric structures with multiple centres of employment and complex spatial patterns of economic activity. Further, spatial equilibrium patterns may diverge from the predictions of the monocentric city model due to the heterogeneous preferences of households with respect to location, property attributes and amenities.

Recent academic thought has sought to address these complexities with the bid-rent theory, originally postulated by Fujita (1989), being the main framework. It allows for heterogeneous preferences and multiple CBDs when analysing the spatial structure of cities. The theory argues that land rent at each location is determined by the highest bidder, among different types of land users such as firms, developers, or households. The bid-rent function for these agents incorporates factors like accessibility, employment opportunities, production technology or speculative upside potential. When applied to transport infrastructure, the theory is more inconclusive and suggests that the impact may vary across the different segments of the housing market and is influenced by the spatial distribution of economic activities. For example, Mathur and Ferrell (2013) highlight that the impact of a new rail line in San Jose, USA, on property values was mediated by the adoption of transit-oriented development policies and zoning changes around the stations.

Another important theoretical consideration is the potential for transport improvements to lead to wider economic benefits, beyond the direct user benefits; this motif has been captured by cost-benefit analysis. Increased labour mobility, resulting from transport improvements, can lead to better job accessibility and higher wages, which in turn can increase the demand for housing and drive-up property values. Similarly, productivity gains and agglomeration economies, stemming from improved connectivity and knowledge spill overs, can enhance the attractiveness and economic viability of living in an area. Despite the theoretical significance of wider economic benefits, empirical studies quantifying these impacts has been limited due to data constraints. For instance, Chatman et al. (2012) attempted to measure the agglomeration benefits of transit investments in San Diego, USA, but faced challenges in isolating the effects of transit from other confounding factors. Similarly, Ahlfeldt (2011) investigated the wider economic impacts of a new high-speed rail line in London, UK, but acknowledged the limitations of available data in capturing the full extent of these benefits.

2.2 Empirical evidence

With the increased availability of spatial data and advances in econometric theory, the empirical literature on the impact of transport accessibility on property values has significantly grown over the decades. The literature showcases a methodological evolution; from basic OLS regression models to advanced spatial econometrics, reflecting deeper insights into the causal impacts of transport accessibility. Most of the research has been concentrated on the effects of rail transit systems, such as light, metro or commuter rail on residential and commercial property values. A variety of econometric methods, such as hedonic pricing model, spatial econometrics or quasi-experimental designs have been employed. It is noteworthy that the evidence on the impact of transit accessibility on property values is mixed, with some studies finding significant positive effects and others report-

ing insignificant or even negative effects. This may be the case because researchers have not been able to separate the positive effect of increased transport accessibility with the negative effects of externalities on prices. A summary of the key papers is outlined in **Table 1**. Meta-analyses by Debrezion (2007) and Mohammad et al. (2013) have sought to synthesise the findings from multiple sources. The consensus is that the impact of rail transit improvement on property values is generally positive, but the size of the effect depends on factors such as the type of property, the distance to the nearest station and the methodological quality of the study.

In this strand of the literature, one of the most influential papers is by Rosen (1974) where he formulated the hedonic pricing model as a general framework for estimating the implicit price of housing attributes, including accessibility. In his model, the market price of a property is assumed to be a function of its locational, neighbourhood and structural characteristics. This stems from an optimisation problem where homebuyers choose house characteristics and access to local facilities (e.g., public transport infrastructure) based on heterogeneous budget constraints and preferences. At the optimum, the agent equalises the marginal benefit and cost of improving any attribute. The coefficient on each variable thus captures the marginal willingness to pay (MWTP) for that attribute.

To quantitatively estimate the MWTP for transportation accessibility, early research utilised multivariate cross-sectional regressions, adjusting for house and neighbourhood attributes that affect property values. For instance, an increase of up to 6.5% in house prices was found by Norman (1987), who used a dataset of over 1500 sales of residential homes in Germany in the 1970s, attributed to the improved interconnectedness of the Berlin-Hamburg highway. Several studies have also extended Rosen's basic framework by controlling for other relevant factors such as Brockman (2013) who uses pricing data for over 600,000 properties and concludes that the construction of the Mumbai high speed rail network increased prices by 3.2% for homes within a 2 km vicinity.

However, to interpret the hedonic price model estimates as causal effects in this context is problematic due to the potential for omitted variable bias and endogeneity. Neighbourhood quality or local economic conditions (both variables which are unobserved) may be correlated with both property values and transport infrastructure projects, leading to biased and inconsistent estimation of the premiums. Cervero and Landis (1997) further argue that the location of stations may be endogenous, as they may be more likely to be constructed in areas with greater development potential. To address such issues, researchers have used instrumental variables or fixed effects approaches to control for the unobserved heterogeneity. For example, Smith and Johnson (2019) employ a fixed effects model to investigate the impact of a new rapid bus system on residential property prices in New Mexico, USA, accounting for both direct and indirect (spillover) effects of transport accessibility. They conclude that a 10% increase in proximity to bus stations leads to a 2.5% increase in property values, with significant positive spillover effects extending up to 1.5 km from the bus stops.

The temporal variation in transportation accessibility allows for the application of panel data methods to control for unobserved heterogeneity between houses and neighbourhoods. These approaches exploit exogenous changes arising from policy shocks or quasi-experiments. By linking changes in housing markets to the change in transport infrastructure, researchers have identified the associated premium while accounting for any unobserved differences across properties. For example, Machin (2005) uses a DiD approach to estimate the impact of the Jubilee Line Extension in London on property values, comparing the changes in prices between affected and unaffected areas before and after the opening of the new line. He concludes that the extension led to a significant increase in property values, with a 1 km reduction in distance to the nearest station associated with a 2.1% increase in prices. This strand of the quasi-experimental literature also highlights the importance of considering the potential for heterogeneous effects and the role of complementary policies

in shaping the impact of transport accessibility on property values. For example, Bowes and Ihlanfeldt (2001) find that the effect of rail transit proximity on property values in Atlanta varied depending on the neighbourhood income level and the distance to the CBD, with higher-income neighbourhoods and those farther from the CBD experiencing greater accessibility premiums of approximately 5.8%.

2.3 Research gaps and contribution

Despite the growing body of empirical research on the impact of transport accessibility on property values, several gaps and limitations remain. First, most studies have focused on the effects of rail transit in North America. This means results cannot be generalised to other countries, like the United Kingdom, as the institutional, economic and social contexts differ significantly. Second, only a few studies have analysed the effect on both residential house prices as well as monthly rent rates. This is important to investigate for welfare reasons because most people in the UK, about 60%, rent their homes. Finally, most studies focus on quantifying the positive effects of increased transport accessibility but have not been able to isolate the indirect effect of negative externalities, such as noise pollution and inconvenience caused by construction, on house and rent prices.

To date, limited research has explored the impact of transport policy on housing market dynamics in the UK using panel-data methodologies. Employing a quasi-experimental research design to identify causal effects, my paper contributes to the literature by providing evidence on the impact of cancelling high-speed rail access in an UK context, analysing both house prices and monthly rents. Following the second strand of the literature, I also investigate heterogeneous effects by property type to qualify my results. With my classification of two treated areas ("Near station" and "Near track"), I attempt to quantify the positive direct effect of better transport accessibility as well as the negative indirect effect of externalities, associated with large public infrastructure projects. Because of the spatial pattern of construction sites and railway line, my paper leverages a more robust identification strategy. My paper introduces a novel contribution by adopting a quasi-experimental design to examine the repercussions of a significant UK policy shift without relying on stringent assumptions about unobserved household attributes or neighbourhood qualities. Notably, I am the first to analyse the implications of the HS2 extension cancellation on property values, meaning I had to manually construct the dataset.

3. Context and Data

The HS2 project is a proposed high-speed railway network in the United Kingdom, aimed at enhancing connectivity between London and major cities in the Midlands and North of England. The project was first announced in 2009 by then Prime Minister Gordon Brown, who pledged a £20bn investment in a North-South High-Speed Rail Network. Developed by HS2 Ltd, a non-departmental public body wholly funded by the Secretary of State for Transport and sponsored by the Department for Transport, the project aimed to address capacity constraints on existing rail lines, reduce travel times and stimulate economic growth in regions outside of the capital. Due to the large scale of this investment, the network was originally supposed to be built in several phases, with Phase 1 connecting London to the West Midlands, Phase 2a extending to Crewe and Phase 2b completing the network to Manchester and Leeds.

The timeline of key HS2 decisions and developments from 2009-2023 has been marked by several milestones, controversies and revisions. In 2010, the Cameron-Clegg coalition approved the development of the high-speed rail network policy. In 2012, Transport Secretary Justine Greening gave the green light to HS2, despite predicted costs rising to £32.7bn in his annual statement. The following year, the government announced that HS2 would cost almost £50bn, with the line expected to become operational in 2026 and be completed in 2033. However, costs continued to escalate, with estimates reaching £55.7bn by 2015 and £98bn by 2020 (in 2019 prices). The proposed route has been shown in **Figure 1** for a visual understanding.

Table 1: Summary of Literature on the Impact of Transit on Property Values

Authors	Year	Property Type	Transit Type	Study Area	Model	Main Finding
Insignificant Effects						
Gatzlaff and Smith	1993	Single-family detached house sales	Metrorail	Miami, US	DID	The announcement of new rail transit had a weak impact on residential property values.
Mulley	2014	Residential	Bus rapid transit	Sydney, Australia	Hedonic regression in the log transformed form	Property values are primarily influenced by individual property features and the neighborhood.
Forrest et al.	1996	Residential	Light rail transit	Manchester, UK	DID	The provision of rail transit has a weak impact on residential property values.
Hess and Almeida	2007	Residential	Light rail transit	Buffalo, US	OSL Box Cox and a spatial econometric model	For every 0.3km closer to stations, average property values rose by 0.99% (network distance), although rail proximity was less influential than property location and characteristics in predicting housing prices.
Positive Effects						
Mulley et al.	2016	Residential	Light rail transit and Bus rapid transit	Brisbane, Australia	DID	Proximity to stations increased property values by 0.14% for every 100m and by 0.36% for every 250m.
Benjamin and Sirmans	1996	Apartment rent	Metrorail	Washington DC, USA	Hedonic pricing model with fixed effects OLS	Rent decreases by 2.5% with every 0.1 mile increase in distance from stations.
Voith	1993	Single-family detached house sales	Rail	Philadelphia, US	Hedonic pricing model	Proximity to stations results in an 8.1% increase in average sales price and a 7.5% increase in average median price across all housing types.
Banister and Goodwin	2011	Residential	Metrorail	London, UK	DID	Housing prices increase with proximity to stations; Southwark experiences a residential value uplift of £59 million, and Canary Wharf sees an uplift of £5.7 million.
Debrezion et al.	2007	Commercial and residential	Meta-analysis of rail, bus rapid transit, light rail transit and metrorail	15 cities in USA	Hedonic model using generalized spatial two-stage least-squares estimation; DID and fixed effects OLS	Commercial properties within station zones were pricier than residential houses. The average prices of commercial and residential properties within station catchments were 16.4% and 4.2% higher, respectively, than those outside. Moreover, CRT stations had a more significant impact on raising housing prices compared to LRT, HRT, and Metro stations.
Al-Mosaind et al.	1993	Residential	Light rail transit	Portland, USA	Hedonic pricing model	Prices increased by 10.6% within 500m of stations.
Mathur, S., & Ferrell, C.	2013	Residential	Light rail transit with suburban development	San Jose, USA	Spatial econometric model	The price effect of transport-oriented development dissipates beyond 1/8 mile. In the post-transport oriented development period, housing prices within 1/8 mile were 18.5% higher than those more than 1/8 mile away; during the construction period, the prices were 7.3% higher; and in the pre-transport oriented development period, the difference was statistically significant.
Negative Effects						
Laakso	1992	Residential with focus on detached homes	Metrorail	Helsinki, Finland	Hedonic pricing model	Land values peak between 250-500m from railway stations and 500-750m from metro stations.
Bowes and Ihlanfeldt	2001	Residential	Bus	Atlanta, US	DID	Transport effects have a greater influence on prices than retail effects. Additionally, prices are lower by 3.4% within a 0.25-mile station buffer due to negative externalities.
Brandt and Maennig	2012	Office, commercial, light industrial properties	Rail	Hamburg, Germany	DID	Rail transit improvements can lead to up to a 4.6% uplift in prices. However, prices are lower within a 250m station buffer due to negative externalities.

Figure 1i: Map showing the original HS2 route

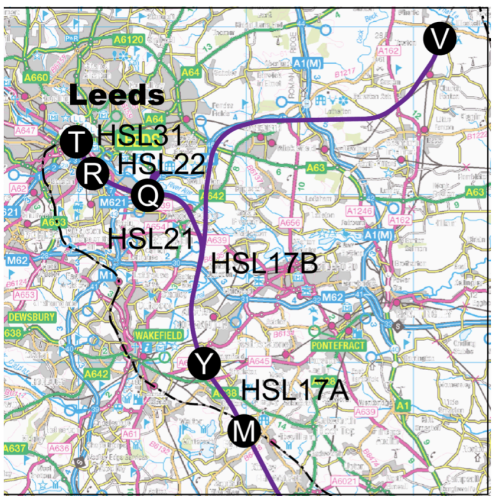

Figure 1ii: Map of the Leeds route

The proponents of the policy argue that HS2 will deliver significant economic benefits, such as increased connectivity, regeneration opportunities and reduced carbon emissions due to more advanced train technology. However, critics have raised concerns about the high estimated costs, potential cost

overruns and the need for substantial taxpayer subsidies. There is general consensus in the academic literature that the economic case for HS2 is based on overly optimistic demand forecasts and that the project represents an example of government central planning, with taxpayers bearing a high proportion of the financial risk (DoT, 2018). Unfortunately, I have not been able to supplement my empirical work with a cost-benefit analysis, as outlined by the UK Government Green Book, due to data limitations.

As HS2 progressed, it faced increased criticism and scrutiny, with the House of Lords Economic Affairs Committee questioning the sufficiency of evidence to justify its construction in 2019. Concerns were raised about the accuracy of passenger demand forecasts, the project's ability to reduce inequality between the North and South and the potential environmental consequences due to difficulties in delivering the carbon reduction targets in time. On 18th November 2021, Transport Secretary Grant Shapps scrapped the eastern leg from Birmingham to Leeds, providing the foundation for my quasi-experimental approach. More recently, in 2023, the Sunak government announced that construction of HS2's Birmingham-Crewe leg would be delayed by a further two years and the Birmingham-Manchester leg would be scrapped. Given the unfolding events and recent policy shifts, my work is not only contemporarily relevant but also important in shaping future infrastructure policy and economic debate in the UK.

To quantitatively study the effects of HS2 policy cancellation, my use of house prices and monthly rent rates is justified on two grounds. Firstly, the market price for a property is indicative of its discounted future expected utility to buyers. Even if the current buyer may not directly benefit from improved transport links (e.g., due to a short work commute), the property can be readily sold or rented to someone who values this feature. This transferability of benefits ensures that the accessibility premium persists in the housing market, as the price reflects the aggregate willingness to pay of all potential buyers, not just the current owner. Even though the benefits of the station would not have been realised until completion (projected to be 2033) house buyers will have included this in their decision, albeit slightly discounted. Second, houses are primarily transacted through estate agents, who are responsible for communicating all relevant information about the property to potential buyers, including details on nearby transport stations and future infrastructure projects. This is also done by landlords who rent their properties to renters and this information disclosure ensures that buyers are well-informed about the property's attributes, which is subsequently reflected in the market price. Assuming an efficient market, changes in the housing attributes will be reflected in the prices quickly, especially in the era of online marketplaces where nominal price rigidities are minimal (Suchindler, 2010).

To construct my dataset, I collected and merged several ones together. The primary data source on house prices was obtained from HM's Land Registry. This contained over 135,000 transactions across the Leeds area, covering commercial and residential property sales from 2010 to 2023. The dataset contained valuable information such as the date of each transaction and various characteristics of the properties being bought or sold. To ensure the accuracy and comparability of the data, I refined the dataset by focusing on houses that were sold at least twice in the time period, while maintaining the same features throughout. For houses with sales both before and after the reform, I selected only the transactions that occurred closest to the policy announcement date from either side. This refinement process helped to minimise the potential impact of time-varying factors and ensure that the observed changes in property values could be more confidently attributed to the reform itself. The houses were mapped geographically using ArcGIS to attribute the effects of HS2 construction and improved connectivity to specific spatial locations.

With regards to rent data, it was scraped using a Python script from Zoopla, a large online marketplace and data provider, between January 2010 to December 2023, covering a predicted 65% of the Leeds rental market. This dataset included details

on net rent, the time it first appeared on the market, postcode of the property and a range of housing characteristics. In this context, posted rents are particularly valuable because they tend to be more accurate than surveyed rents. Surveyed rents can be less precise, as households often struggle to separate net rent from total shelter costs, which include heating and additional services. Once again, the rented properties were geocoded with ArcGIS, a tool that transforms traditional written addresses into longitudinal and latitudinal coordinates which are then plotted on a map (**Figure 2ii** shows some of the rented properties in the "Near station" area).

For the radii defining the "Near track" and "Near station" areas, I selected a 1 km distance based on the prevailing norms in relevant literature (Kim, 2014). The "Near station" area was centred around New Lane station, designated as the primary hub for the HS2 scheme. Conversely, the "Near track" zone was oriented around Rothwell interchange, one of the six main sites for HS2 railway construction in the Leeds area. For my robustness tests, I increased the radii to 1.2 km and the areas can be seen by the dashed line circles in **Figure 2iii**. The control group included properties situated at least 1.2 km from the main HS2 station and 3 km from the Rothwell construction site. This group, located within Leeds, shares similar macroeconomic characteristics with the treatment groups, which is critical for isolating the causal impacts of HS2. **Table 2** provides summary statistics for the house sales and rented properties as well as a brief description of the control and treated areas.

```
import pandas as pd
import logging
from datetime import datetime
import matplotlib.pyplot as plt

# Set up logging
logging.basicConfig(level=logging.INFO, format='%(asctime)s - %(levelname)s
    - %(message)s')

def fetch_rent_data(sdfahasdfz, Leeds, Jan_2010, Dec_2023):
    base_url = "https://api.zoopla.co.uk/api/v1/property_listings.js"
    headers = {"Accept": "application/json"}
    all_data = [sdfahasdfz]

    while current_date <= end_date:
        params = {
            'area': Leeds,
            'listing_status': 'rent',
            'include_rented': '1',
            'api_key': sdfahasdfz,
            'page_size': '100',
            'order_by': 'price',
            'ordering': 'descending',
            'listed_from': current_date.strftime('2010Y-1m-1d'),
            'listed_to': (current_date.replace(day=28) + pd.DateOffset(days
                =4)).current_date.endtime('2023Y-12m-31d')
```

Figure 2i: Scraping for rent data

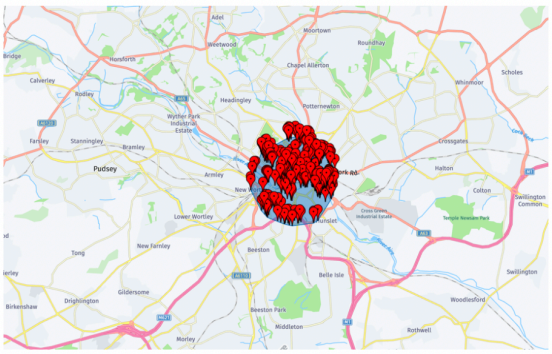

Figure 2ii: Geolocating the properties

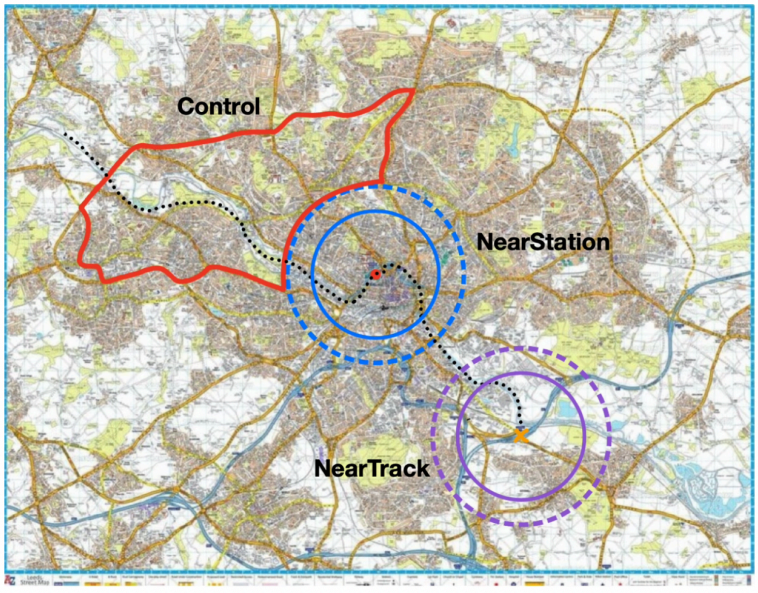

Figure 2iii: Visual representation of the groups

Table 2: Summary statistics for control and treatment groups

Group	Control	Near station	Near track
Description	The control group consists of houses located at least 1.2km from the main HS2 station and 3km from the proposed construction site on Rothwell interchange. By selecting properties within Leeds, the control group shares similar macro-level characteristics with the treatment groups, essential for isolating the causal effect of the HS2 project. The most common postcodes within this group are LS21 and LS29.	Treatment group 1 consists of properties within 1km of New Lane station, chosen to examine the benefits of increased transport access from the HS2 project, such as better connectivity and shorter travel times, without the downsides of construction. These properties will also retain access to current railway services alongside the new HS2 line. The most common postcodes within this group are LS1, LS2 and LS3.	Treatment group 2 includes properties within a 1km radius of the planned railway construction near Rothwell interchange, chosen to examine the impact of negative externalities like noise pollution and construction inconveniences. The construction is set to begin in 2026 and is expected to finish within three years. The most common postcodes within this group are LS25 and LS26.
Mean (house price)	£214,200	£225,800	£188,200
SD (house price)	£127,000	£133,300	£114,280
Transaction date range	1/1/2010 - 30/12/2023	1/1/2010 - 31/12/2023	3/1/2010 - 30/12/2023
Mean (rents)	£850	£935	£815
SD (rents)	£90	£105	£85
Transaction date range	2/1/2010 - 30/12/2023	1/1/2010 - 31/12/2023	3/1/2010 - 30/12/2023
Characteristics for house sales (%)			
New build	3.1	3.2	0.6
Semi-detached or detached	51.9	5.3	42.1
Terraced	8	30.5	48.3
Flats	37	61	9
Number of observations	3971	1682	855
Characteristics for rented properties (%)			
New build	4.5	4	1.6
Semi-detached or detached	38	12	45.1
Terraced	12.5	18	38.3
Flats	45	66	15
Number of observations	1372	1564	538

4. Empirical specification

I estimate benchmark DiD models to compare the impact of the policy cancellation on house prices (HP_{it}) and monthly rent prices (RP_{jt}) between treatment and control groups, before and after the announcement. The two equations are:

$$\ln(HP_{it}) = \beta_0 + \beta_1(TreatStation_i \times Post_t) + \beta_2(TreatTrack_i \times Post_t) + \beta_3 TreatStation_i \quad (1)$$

$$\ln(RP_{jt}) = r_0 + r_1(TreatStation_j \times Post_t) + r_2(TreatTrack_j \times Post_t) + r_3 TreatStation_j + r_4 TreatTrack_j + r_5 Post_t + v_{jt} \quad (2)$$

where $TreatStation_i$ and $TreatTrack_i$ are dummy variables indicating whether property i or j is near the station or track and $Post_t$ is a dummy variable that denotes the time period after the treatment (post November 2021). This econometric approach is consistent with the recent literature on DiD estimation and is based on comparing prices (before and after the policy announcement of cancelling HS2) for a treatment and control group. Specifically, we follow Kuminoff (2010) which showed that the "DiD estimator is the most suited to hedonic estimation for panel data." The parallel-trend assumption is of great importance in ensuring the internal validity of DiD models, yet it is the most challenging assumption to satisfy. This assumption asserts that, in the absence of the treatment, the price differential between the treatment and control groups remains constant over time. To assess the validity of this assumption, two sets of time-series data were analysed. **Figure 3** illustrates the average house price for the houses "Near track" and "Near station" in treated areas compared to the non-treated control area for 11 years preceding the announcement of the extension cancellation. Similarly, **Figure 4** depicts the average rent rates for the houses "Near track" and "Near station" in treated areas juxtaposed with the rent rates of houses in non-treated control area for the same pre-treatment period. Upon visual examination of both figures, it is evident that the price series exhibit a approximately parallel trajectory, strongly suggesting that the parallel-trend assumption holds. This finding lends credibility to the validity of my DiD model in the study, as it implies that any observed post-treatment differences in prices between the treatment and control groups can be attributed to the intervention itself, rather than confounding factors or pre-existing disparities.

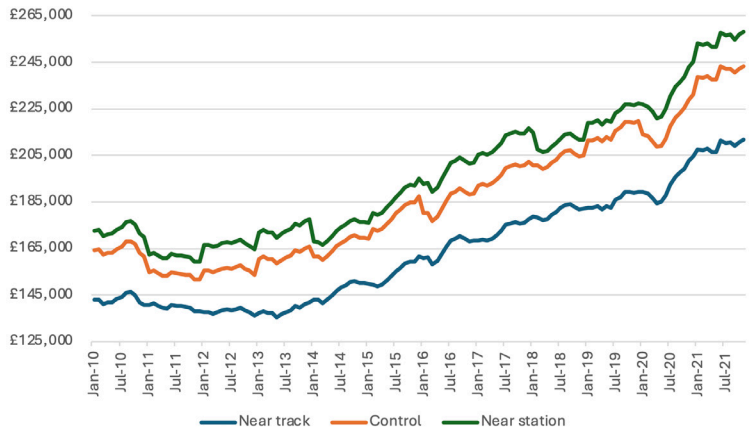

Figure 3: testing parallel trends assumption – house prices.

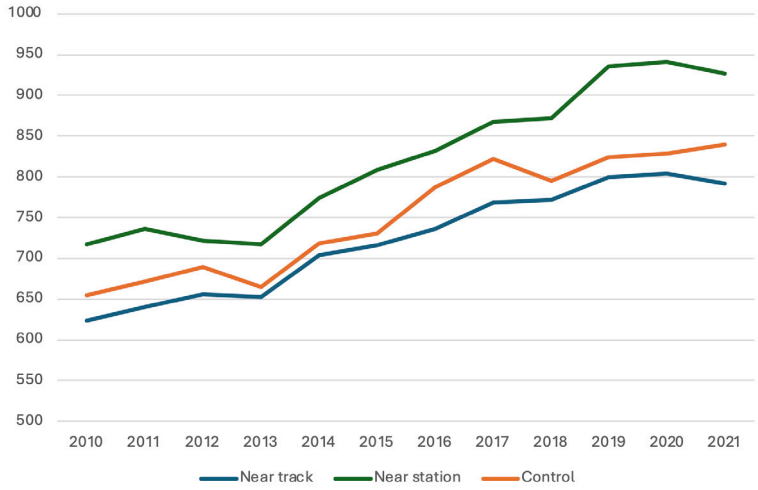

Figure 4: testing parallel trends assumption – rent prices.

To formally test this assumption, I estimate these OLS equations following Rambachan (2020).

$$\ln(HP_{it}) = \alpha + \pi_1 TreatStation_{it} + \pi_2 TreatTrack_{it} + \sum_{t=2011}^{2021} \lambda_t D_{t+} \sum_{t=2011}^{2021} \delta_{1t}(D_t \times TreatStation_{it}) + \sum_{t=2011}^{2021} \delta_{2t}(D_t \times TreatTrack_{it}) + \mu_i + e_i \quad (3)$$

$$\ln(RP_{jt}) = \upsilon + \eta_1 TreatStation_{it} + \eta_2 TreatTrack_{it} + \sum_{t=2011}^{2021} \lambda_t D_t + \sum_{t=2011}^{2021} \delta_{1t}(D_t \times TreatStation_{it}) + \sum_{t=2011}^{2021} \delta_{2t}(D_t \times TreatTrack_{it}) + \mu_i + \mu_{it} \quad (4)$$

In this regression, D_t are yearly dummies and the coefficients δ_t are of interest. The results in **Table 3** (shown in the appendix) provide support for the parallel trends assumption in both the "Near track" and "Near station" treatment groups, for both house prices and rents. The majority of the lead coefficients are statistically insignificant at conventional levels, suggesting that the treatment and control groups followed similar trends in the outcome variables prior to the treatment in 2021. For the "Near station" group, the coefficients for house prices and rents are consistently positive but insignificant throughout the pre-treatment period. This indicates that while the "Near station" group had slightly higher house prices and rents compared to the control group, the difference was not statistically significant and remained stable over time. Similarly, for the "Near track" group, most of the lead coefficients are insignificant for both house prices and rents. The co-

efficients alternate between positive and negative values, but the magnitudes are small and not statistically different from zero, suggesting no systematic differences in the trends between the "Near track" group and the control group. The lack of significant lead coefficients in the pre-treatment period supports the validity of the DiD approach in this context. It suggests that the treatment and control groups were comparable before the treatment, and any differences in the outcome variables after the treatment can be attributed to the causal effect of the treatment, rather than pre-existing differences in trends. However, it is important to note that the parallel trends assumption is fundamentally untestable, as it relies on the counterfactual scenario of what would have happened in the absence of the treatment. While the insignificant lead coefficients provide supporting evidence, they do not guarantee that the assumption holds perfectly.

5. Main results with extensions

My main findings from the DiD estimation for the period 2010 to 2023 are detailed in columns (1) and (2) of **Table 4**. Following Hansen's (2007) recommendations, I have clustered standard errors at the group level to mitigate the issue of intragroup correlation thus enhancing the robustness of my estimates. This approach is particularly suited for my panel data structure, where the non-independence of observations within groups can bias standard error estimates.

The results reveal that the announcement of the HS2 extension cancellation led to a decrease in house prices by approximately 3.6%, significant at the 5% level, near the station. This reduction in price, which translates to a £9,800 decrease in property value based on the average house price of £255,800 in the "Near station" group, highlights the diminished attractiveness of these properties due to reduced transport accessibility. Conversely, properties near the construction site witnessed a 2.4% increase in value, also significant at the 5% level, suggesting an increase in property attractiveness likely due to the elimination of negative externalities like noise pollution and congestion, equating to an increase of £4,500 based on the average house price of £188,200 in the "Near track" group.

Regarding rental prices, it is assuring that a similar trend is observed. Properties near the proposed station experienced a 3.9% decrease in monthly rent, averaging a reduction of £37 based on the average rent of £955 in the "Near station" group. This decline is significant at the 5% level and may reflect the high value placed on transport accessibility by renters, possibly driven by a higher proportion of young working professionals in this demographic. Conversely, rent prices near the construction site saw a 2.1% increase, adding a monthly premium of £17 based on the average rent of £815 in the "Near track" group, significant at the 5% level. My results show that rental prices are slightly more responsive to changes in local amenities and economic conditions than house prices, as renters are generally more mobile than homeowners as reiterated by Glaeser (2007).

These results, while significant, show a smaller magnitude of change compared to existing literature on transport infrastructure impacts on property values. For instance, studies such as Smith and Gihring (2006) report larger impacts, potentially due to their immediate operational timelines compared to the HS2 station's expected operational date in 2033 for the Leeds area, with construction expected to begin only in 2026. This suggests that the estimated effects in this study are discounted for the future, reflecting a delayed realisation of benefits and costs.

5.1 Extension 1: controlling for dates

In my DiD estimation, spanning an extensive pre- and post-reform period, there is a risk of bias if the control and treatment groups have properties sold at different times. It also might be the case that rented properties appear again on the market at systematically different times. This concern persists even if the average transaction dates are similar across groups, as the distribution of sales might vary, introducing bias during specific economic cycles, such as those influenced by the COVID-19 pandemic. For example, a concentration of sales in one group

during a boom year like 2022 could skew the results. To mitigate this, the results in columns (3) and (4) of **Table 4** use the UK house price index and the UK private housing rental index to normalise all sales prices to the 2015 baseline. This normalisation aligns the prices to a common reference year, controlling for potential discrepancies in timing between groups. This method not only preserves our full sample size, enhancing the statistical power and precision of our estimates, but also ensures that our findings are not distorted by temporal fluctuations in the market. This approach provides further robustness for my results in evaluating the true impact of the reform, free from the biases associated with varying sales dates. With normalised prices, the coefficients are slightly larger in magnitude but in the same expected direction and significant. This suggests the effect of policy cancellation is more pronounced on house and rent prices after I control for time-confounding factors like inflation or general market trends.

It's also worth noting that my paper only considers repeat sales of houses sold or rented multiple times between 2010-2023. Houses sold or rented more often, which are more likely to be included, may fundamentally differ from other houses. For example, families with a low MWTP for transport accessibility and short commutes might keep their homes for longer and be indifferent to transport improvements, potentially leading to their exclusion from the dataset and an overestimation of the true MWTP for the entire population. However, it can be argued that the extensive window period of approximately 13 years mitigates the impact of such bias, rendering it relatively minimal.

5.2 Extension 2: heterogenous effects by property type

An interesting question to test is whether the transport accessibility premium is more prominent for property owners who are more likely utilise public transport, such as for commuting. My dataset includes various residential properties, including flats and houses (detached, semi-detached, terraced). Flat owners, often younger professionals, may rely more on nearby transport accessibility compared to higher-income homeowners (Femenias, 2020). To test this hypothesis, I'll examine heterogeneous effects of transport accessibility on prices based on property type. Houses in the full sample may attenuate the estimated premium, as their owners are less reliant on public transport. To isolate the premium for the hypothesised target demographic, I re-estimated models (1) and (2) using only flats as a subsample. This removes the influence of other property types, allowing me to estimate the transport accessibility premium for the group hypothesised to value it most. It is reasonable to assume that the impact of being located near the construction site ("Near track" area) and the corresponding coefficient estimate will be similar across property types, as the negative externalities from the construction activities are likely to affect all properties in proximity with minimal heterogeneity in resident preferences. My work extends the existing literature by investigating heterogeneous effects of transport accessibility on residential property prices based on property type, an area that has received minimal attention thus far. My results are reported in **Table 5** and are broadly in line with the hypothesis. It is important to note that standard errors are noticeably larger due to a smaller sample size, rendering some of the leading DiD coefficients not significant at the 5% level. My results show that house prices fell by 4.1% with rents falling by 4.3% in the "Near station" group whereas house prices increased by 3.2% with rents going up by 1.9% in the "Near track" group. Intuitively these results are as expected which is comforting and in line with the limited literature on this topic (Wardrip, 2011). I also report the results after normalisation in columns (3) and (4).

Table 4: Main regression results

	Without normalization		With normalization	
	(1)	(2)	(3)	(4)
	House prices	Rent prices	House prices	Rent prices
Constant	10.701***	2.234***	10.589***	2.197***
	(0.0214)	(0.0227)	(0.0198)	(0.0209)
TreatStation	0.0542*	0.1015*	0.0624*	0.1132**
	(0.0296)	(0.0604)	(0.0381)	(0.0568)
TreatTrack	-0.1214*	-0.0428***	-0.1362**	-0.0517***
	(0.0736)	(0.0129)	(0.0615)	(0.0117)
Post	0.503***	0.631***	0.521***	0.649***
	(0.0211)	(0.0294)	(0.0203)	(0.0321)
TreatStation × Post	-0.0358**	-0.0391**	-0.0427**	-0.0436**
	(0.0181)	(0.0191)	(0.0199)	(0.0197)
TreatTrack × Post	0.0236**	0.0214**	0.0285***	0.0251***
	(0.0104)	(0.0106)	(0.0097)	(0.0095)
Within R^2	0.3375	0.3606	0.3492	0.3721
Observations	6508	3474	6508	3474

Robust standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 5: Regression results with only flats

	Without normalization		With normalization	
	(1)	(2)	(3)	(4)
	House prices	Rent prices	House prices	Rent prices
Constant	8.105***	1.515***	7.895***	1.474***
	(0.0516)	(0.0924)	(0.0482)	(0.1802)
TreatStation	0.0721**	0.0925*	0.0847*	0.1023**
	(0.0371)	(0.0561)	(0.0484)	(0.0547)
TreatTrack	-0.0944*	-0.0438**	-0.1224**	-0.0531**
	(0.0555)	(0.0237)	(0.0712)	(0.0253)
Post	0.516***	0.591***	0.537***	0.617***
	(0.0351)	(0.0448)	(0.0314)	(0.0401)
TreatStation × Post	-0.0411*	-0.0437	-0.0417*	-0.0436*
	(0.0235)	(0.0273)	(0.0232)	(0.0237)
TreatTrack × Post	0.0326*	0.0195*	0.0385**	0.0231*
	(0.0184)	(0.0115)	(0.0147)	(0.0114)
Within R^2	0.3157	0.3006	0.3529	0.3512
Observations	2572	1730	2572	1730
Flats only	Yes	Yes	Yes	Yes

Robust standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

6. Robustness checks

6.1 Placebo tests

To confirm the validity of my findings and avoid the risk of spurious results, I conducted four placebo tests by changing the treatment date from November 2021 to hypothetical dates. The results, detailed in **Table 6**, show that most of the coefficients are not statistically significant at conventional levels. This lack of significance further lends support to the parallel trends assumption, which is essential for the validity of my methodology. Consistent with Orefice (2010), these placebo tests reinforce the robustness of my main results, demonstrating that the observed effects are genuinely due to the intervention and not to uncontrolled confounding variables.

6.2 Restricting the time period

Adopting a restricted timeframe enhances the likelihood that unobserved housing characteristics remain constant or do not diverge significantly between the treatment and control groups, providing robustness for my results. By narrowing the time period, I reduce potential biases that could violate the common trends assumption and increase the validity of the estimates as a reflection of the MWTP for attributes such as transport accessibility, in line with Botosaru et al (2017).

Table 6: Placebo Test Results

	House prices	Rent prices
Jan 2013		
TreatStation × Post	-0.0140	0.0138
	(0.0152)	(0.0162)
TreatTrack × Post	0.0117	-0.0158*
	(0.0109)	(0.0096)
Within R^2	0.4371	0.4103
Observations	6508	3474
Jun 2016		
TreatStation × Post	-0.0125	-0.0192
	(0.0161)	(0.0173)
TreatTrack × Post	-0.0206*	0.0199*
	(0.0117)	(0.0123)
Within R^2	0.2974	0.3108
Observations	6508	3474
Oct 2019		
TreatStation × Post	0.0238	0.0255
	(0.0156)	(0.0168)
TreatTrack × Post	-0.0225*	0.0182
	(0.0121)	(0.0119)
Within R^2	0.3373	0.3607
Observations	6508	3474
Mar 2022		
TreatStation × Post	0.0309	-0.0359
	(0.0211)	(0.0227)
TreatTrack × Post	0.0247	-0.0227
	(0.0152)	(0.0146)
Within R^2	0.2376	0.1209
Observations	6508	3474

Robust standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Furthermore, this constrained temporal focus helps avoid the influence of external shocks that could affect the groups differently and skew the results. I estimated equations (1) and (2) over a limited time period surrounding the policy shock in November 2021, mirroring the empirical method used by Chay and Greenstone (2005). In their seminal analysis on the impact of air quality regulations on housing values, they concentrated on a narrow two-year window around the policy implementation to avoid biases from unobserved, time-varying factors.

The original results use sales and rent price data from 2010-2023 whereas **Table 7** shows the additional results that restrict my timeline to 2015-2023; 2018-2023 and 2020-2022. Narrowing the time period introduces a notable bias-variance tradeoff because standard errors are greater for a smaller sample size. This issue is particularly critical given that transport accessibility may only constitute a small fraction of house values, making it challenging to distinguish this effect from random variation. My analysis indicates that while the coefficients remain relatively stable as the time period is restricted, the standard errors increase significantly. Although the consistency of the magnitudes of coefficients across different time restrictions is reassuring, the larger standard errors lead to most of the coefficients being statistically insignificant at the 10% level.

Table 7: DiD results with restricted dates

	2015-2023		2018-2023		2020-2022	
	House prices	Rent prices	House prices	Rent prices	House prices	Rent prices
Constant	10.362***	2.066***	10.53***	2.032***	10.64***	2.076***
	(0.0227)	(0.0295)	(0.0406)	(0.0527)	(0.092)	(0.119)
TreatStation	0.0825***	0.0948***	0.127**	0.1461*	0.121	0.127
	(0.0313)	(0.0359)	(0.0569)	(0.0712)	(0.1446)	(0.1845)
TreatTrack	-0.067***	-0.0536**	-0.0532	-0.0325	-0.0716	-0.0651
	(0.0204)	(0.0216)	(0.0345)	(0.0276)	(0.0878)	(0.126)
Post	0.461***	0.599***	0.248***	0.285***	0.2338	0.258
	(0.0428)	(0.0374)	(0.0845)	(0.0521)	(0.215)	(0.318)
TreatStation × Post	-0.0392**	-0.0365*	-0.0348*	-0.0357	-0.0214	-0.019
	(0.0167)	(0.0179)	(0.0153)	(0.0268)	(0.132)	(0.275)
TreatTrack × Post	0.0272*	0.0227*	0.0211	0.0251	0.0431	0.0398
	(0.0173)	(0.0163)	(0.0271)	(0.0239)	(0.176)	(0.296)
Within R^2	0.241	0.228	0.134	0.142	0.084	0.079
Observations	4002	2135	2497	1336	936	534
Normalised prices	No	No	No	No	No	No

Robust standard errors in parentheses
*** p < 0.01, ** p < 0.05, * p < 0.1

6.3 Changing the size of treated areas

I selected a 1 km radius for the "Near track" and "Near station" areas, aligning with the consensus in existing literature. I appreciate that my results might be sensitive to this choice, as the effects intuitively diminish with increased distance from the station or construction site. For instance, Benjamin (1996) employs a hedonic pricing model with fixed effects to demonstrate that rents in the Washington DC area rise by 2.5% for every 0.5 km closer to the station. Ideally, I would conduct robustness checks with varying radii; however, practical constraints, primarily time limitations, prevented this. Further, it was not feasible to employ commuting time distance, as sourced from Google Maps, as a metric for radius measurement. I note that commuting distance would serve as a superior indicator, given that actual travel distances bear greater relevance than mere linear straight line measurements. This issue is somewhat mitigated in the context of the "Near Track" group, where the impact of negative externalities such as noise and construction disruption is less reliant on travelling distance but proximity.

As depicted in **Figure 2iii**, the dashed circles represent the areas where I conducted my new benchmark regressions. My results are reported in **Table 8** and although the magnitude of the coefficients is lower than before, this is expected as the inclusion of houses further from key sites dilutes the perceived importance of transport accessibility and the disutility from expected construction. It is noteworthy that the DiD estimators are significant at the 10% level. It is encouraging that my results align with existing literature and offer new insights into the spillover effects of infrastructure projects. These findings can inform future policy decisions, such as the strategic selection of construction sites to minimise the negative impact on property values.

Table 8: DiD results with larger radii

	House prices	Rent prices
Constant	10.537***	1.983***
	(0.0198)	(0.0204)
TreatStation	0.0487**	0.093*
	(0.0234)	(0.0517)
TreatTrack	-0.0813***	-0.0532*
	(0.0473)	(0.312)
Post	0.528***	0.625**
	(0.0281)	(0.0438)
TreatStation x Post	-0.0314*	-0.0212*
	(0.0167)	(0.0115)
TreatTrack x Post	0.0208*	0.0172*
	(0.0129)	(0.0089)
Within R^2	0.2869	0.3065
Observations	7954	4215
Normalised prices	No	No

Robust standard errors in parentheses
***p<0.01, **p<0.05, *p<0.1

7. Concluding remarks

In this study, I utilised the November 2021 policy announcement regarding the cancellation of the HS2 extension as a quasi-experiment to explore the impact of transport accessibility and the associated negative externalities of large infrastructure projects. Employing a robust DiD methodology enabled cleaner comparisons of pre- and post-outcome variations between affected and unaffected areas, enhancing the validity of my results over existing literature (Meha, 2017). My empirical analysis showed that house prices in the "Near station" area decreased by an average of 3.6%, while monthly rents decreased by 3.9% due to diminished future transport accessibility. Conversely, house prices in the "Near track" area rose by 2.4%, with rents increasing by 2.1%, attributed to the reduced exposure of negative externalities. The estimates are slightly muted compared to previous studies (Banister and Goodwin, 2011) possibly due to a discounting effect given the expected operational date of the HS2 station in Leeds was set for 2033, with construction starting in 2026. I also examine heterogeneous effects by property type and find that flats experienced a more pronounced impact compared to houses, in line with expectations.

The generalisability of my findings to other cities facing similar transport infrastructure changes is an important consideration. While the specific context

of Leeds, including its housing market characteristics, economic conditions and demographic factors may differ from other areas, the underlying mechanisms through which transport accessibility and construction externalities affect housing markets are likely to be similar. My robust DiD methodology, controlling for unobserved housing characteristics, enhances the external validity of the results.

Future research could extend my static analysis in several directions. A dynamic DiD model would capture anticipatory and adjusting behaviours by households in response to policy changes. Indeed, leading up to 2021, several parts of the project were already cancelled, suggesting that some effects might have already been priced into the housing market. Furthermore, following the Prime Minister's announcement in October 2023 to redirect HS2 funds for the "levelling up" scheme, the observed changes in property values may be offset. Finally, conducting similar studies in the other cities affected by HS2 extension cancellation, such as Manchester or Crewe, would allow for a more holistic assessment of the policy's impact and generalisability of the findings.

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IX. Appendix

Table 3: Non-parametric test for parallel trends assupmtion

	House prices	Rent prices
Near station x 2011	0.0062	0.0041
	(0.0117)	(0.0100)
Near station x 2012	0.0063	0.0037
	(0.0129)	(0.0110)
Near station x 2013	0.0075	0.0042
	(0.0138)	(0.0118)
Near station x 2014	0.0041	0.0022
	(0.0122)	(0.0104)
Near station x 2015	0.0060	0.0033
	(0.0133)	(0.0114)
Near station x 2016	0.0055	0.0030
	(0.0141)	(0.0121)
Near station x 2017	0.0064	0.0035
	(0.0149)	(0.0127)
Near station x 2018	0.0047	0.0025
	(0.0155)	(0.0132)
Near station x 2019	0.0067	0.0036
	(0.0162)	(0.0138)
Near station x 2020	0.0071	0.0038
	(0.0168)	(0.0144)
Near station x 2021	0.0083	0.0045
	(0.0131)	(0.0112)
Near track x 2011	0.0019	0.0010
	(0.0103)	(0.0088)
Near track x 2012	-0.0011	-0.0006
	(0.0114)	(0.0097)
Near track x 2013	0.0017	0.0009
	(0.0121)	(0.0103)
Near track x 2014	0.0025	0.0014
	(0.0107)	(0.0091)
Near track x 2015	-0.0009	-0.0005
	(0.0118)	(0.0101)
Near track x 2016	0.0023	0.0012
	(0.0125)	(0.0107)
Near track x 2017	0.0031	0.0017
	(0.0132)	(0.0113)
Near track x 2018	0.0022	0.0012
	(0.0137)	(0.0117)
Near track x 2019	0.0034	0.0018
	(0.0143)	(0.0122)
Near track x 2020	0.0041	0.0022
	(0.0149)	(0.0127)
Near track x 2021	-0.0018	-0.0010
	(0.0116)	(0.0099)
Within R^2	0.791	0.762
Observations	6508	3474
Unit FE	Yes	Yes