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City digital economy development and foreign divestment: Evidence from China

Qing-Rui Yu[1]
Bo-Yu Che[2+]

[1,2]*Business College, Southwest University, Chongqing, China.*
[1]*Email: yuqr1986@swu.edu.cn*
[2]*Email: 13358382537@163.com*

(+ Corresponding author)

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ABSTRACT

This research examines the city's digital economy development and foreign investment in China. Foreign investment plays a vital role in China's economic rise. How to prevent foreign investment exiting China is critical for ensuring stability in foreign investment in China. This study focuses on the impact and mechanism of the city's digital economy development on foreign divestment. Based on Probit and Tobit regression models, using a comprehensive dataset of cities and listed companies from 2011 to 2020, we find that the China's city digital economy development has significantly reduced foreign divestment decisions and the amount of foreign divestment. China's city digital economy development positively affects foreign divestment by reducing financial constraints and financing costs. The influence of city digital economy development on foreign divestment is significant in technology-intensive enterprises and capital-intensive enterprises and not significant in labor-intensive enterprises. These findings present new practical insights for guiding the digital transformation of enterprises, along with reinforcing the development of new information technology infrastructure and enhancing internet coverage, fostering a favorable financial environment, and implementing differentiated policies for the development of digital economy across industries.

Contribution/ Originality: This study examines the impact and mechanisms of the development of China's digital economy on foreign divestment, utilizing the Probit and Tobit regression models. This study contributes to the existing literature on positive factors that influence foreign investment and offers new strategies to ensure stability in foreign investment.

1. INTRODUCTION

Foreign investment is an important way of providing technology, financial resources, knowledge, and advanced management experience, which plays a vital role in China's economic rise. China has enjoyed net foreign investment for more than four decades. Several factors are to be influencing the trend, including the trend of deglobalization, the rising labor costs, increasingly stringent environmental regulation, and the slowdown of economic growth. According to the Ministry of Commerce and the State Administration of Foreign Exchange, around $100 billion in direct investment had exited from China in the first three quarters of 2023. How to prevent foreign investment exiting China is critical for China to ensure stability in foreign investment.

Foreign divestment is the international shrinkage where multinational enterprises, subsidiaries, and shareholders reduce investment in foreign markets. There is relatively little analysis in the existing literature of the factors that

may cause foreign divestment. At the level of host country, most divestment research tends to recognize that economic and political conditions, such as minimum wage, economic growth, institutional context, financial performance, and governance quality, have been shown to affect divestment decisions [1-8]. On the firm level, exit drivers include organizational characteristics, financial performance, size, and managerial self-interest [9, 10]. To our best knowledge, none of these studies included the factors to prevent foreign investment from divesting, especially the role of regional digital economics on divestment, which remains unknown. In the context, we are interested in whether the development of digital encourages foreign investment to persist in Chinese markets rather than withdraw. The digital economy is widely recognized as a multidimensional construct covering four parts related to data value, digital industrialization, industrial digitalization, and digital government. In 14th Five-Year Plan, China declared its intention to establish a digital economy. Its digital economy has grown exponentially and become the dominant economic driver. China highlighted the digital economy as the key production factors to replace old growth drivers, such as cheap domestic labor and capital investment.

The earlier literature does not address the relationship between city digital economy development and foreign divestment. In this study, we deplore the influence of the city digital economy development on foreign divestment by using a comprehensive merged sample of cities and enterprises from 2011 to 2020. Our results show that the city digital economy development reduces foreign divestment. The results are robust. After a series of tests. Then, we examine the heterogeneity effects of enterprise types. His study proposes that the digital economy's development reduces foreign divestment by alleviating financing constraints and costs.

The main contributions offered by this study are as follows: First, we supplement the growing literature on economic effects of digital economy. The existing body of literature focuses on the role of digital economy in attracting foreign investment and improving the quality of foreign investment. We are particularly interested in understanding how the development of city's digital economy impacts foreign divestment. Second, it enriches the literature on the positive factors influencing foreign divestment. The extant literature predominantly discusses the factors leading to foreign divestment. By contrast, we investigate and clarify how digital economy ensures stability in foreign investment rather than withdrawing, thus extending research on the positive factors that influence foreign investment. The study is organized as follows: Section 2 develops theoretical analysis and hypotheses development; section 3 describes data source, variable definition, and model construction; section 4 discusses the benchmark regression, robustness check, and heterogeneity effects; section 5 concludes.

2. THEORETICAL ANALYSIS AND HYPOTHESES DEVELOPMENT

China's ability to draw in foreign investment is diminishing. China desperately needs to change the driving force. The development of the city's digital economy affects the withdrawal decisions of foreign enterprises and provides a significant entry point for ensuring stability in foreign investment. Indeed, the majority of studies indirectly reflect that the digital economy helps to solve the problem of foreign divestment. From a cost perspective, since the digital technology reduces the cost of doing business in China, digital economy is a much better alternative factor to cheap labor costs for production. One reason is that digital technology not only reduces the fixed cost of enterprises but also enhances the technology spillover effect, which strengthens China's participation in the division of labor in the global value chain [11]. Another reason is that the application of digital economy has a positive effect on adapting to environmental regulations at low environmental cost through reducing environmental pressure [12, 13] realized that the rapid development of the digital economy accelerates energy-consuming rights trading, which drives firms' green technological innovation, resolves firms' excess capacity, and cracks firms' financial mismatches for promoting green total factor of firms. From the perspective of sustainable development, the digital economy generates new opportunities for the international investment that can be disaggregated into two aspects, as follows: First, the digital economy expands domestic and international market potential consumption. China leads in evolution of digital currency and electronic payment, especially mobile payment. The convenience of digital payments improves the

shopping experience for consumers. The mobile phones reduce transaction and time costs so that they enhance the decision-making power and initiative of consumption and allow people to consume more freely [14]. At the same time, the Internet, big data, and e-commerce can sense market demand with "zero-time delay" to improve supply–demand matching efficiency and stimulate the potential consumption demand [15-17]. Second, digital economy is unique for foreign investment to create its competitive advantage. According to Dunning [18] ownership advantage is a main factor that influences foreign direct investment (FDI) location selection. The digital technology accelerates human capital accumulation [19] promotes the production efficiency of enterprises [16] and increases the efficiency of resource allocation [20] which strengthens the division of labor in the global value chain [21]. Thus, we predict:

H_1: The city digital economy development reduces foreign divestment.

Access to external finance plays a role in the choice between foreign investment and divestment Buch, et al. [22]. Torneden [23] found that lack of finance is an important factor that impacts foreign divestment decisions. China's slow financial development makes it harder for foreign capital to enter the country by making it harder to use capital and technology efficiently [24] which leads to foreign investors pulling their money out of China. As in China, information asymmetry and agency costs, which raise financial constraints and the cost of financial services, have hindered the match between financial supply and demand, thereby influencing the use of external financing. For the past few years, internet, artificial intelligence, and cloud computing in China have improved rapidly. The digital economy's development plays a significant role in alleviating information asymmetry. The development of the digital economy effectively reduces information costs and search costs by providing efficiency of information exchange and factor matching [25]. Moreover, the digital economy's development can increase information sharing between enterprises and external investors [26]. From the perspective of agency costs, the use of high-quality digital technology can improve disclosure quality, which is easily obtainable for shareholders, and it is beneficial for investors to supervise and constrain the behavior of enterprise managers, thus reducing the motivation and opportunities for managers to engage in opportunistic behavior. Thus, we predict:

H_2: The city digital economy development reduces foreign divestment by alleviating financing constraints and financing costs.

3. RESEARCH METHODOLOGY

3.1. Data Source

Given the challenges in measuring city digital economy development, this study's initial sample includes cities and enterprises listed on the Chinese A-share market from 2011 to 2020. We introduce the Digital Inclusive Finance Index, co-developed by the Digital Finance Research Center at Peking University and Ant Financial Services Group as a key variable. Since the latest data for this index is from 2020, our data sample spans from 2011 to 2020. Other city-level data are sourced from the China City Statistical Yearbook and various provincial and municipal yearbooks. Corporate-level data, such as top ten shareholders' information, are obtained from the China Stock Market & Accounting Research (CSMAR) Database. We exclude enterprises labeled as Special Treatment (ST) and ST* to avoid abnormal value interference. Enterprise information is matched with the city's digital economy development index using the city code.

3.2. Variables Definition

3.2.1. Measures of city Digital Economy Development (CDED)

The core independent variable in this article is city digital economy development (CDED). There are no standard indicators to measure city digital economy development at the moment. To assess the level of city digital economy development more accurately, referring to related literature, this study measures city digital economy development levels by constructing a comprehensive indicator from two dimensions: integrated internet development and inclusive digital finance development, with the weighting of indicators determined by the NBI index weighting method, as displayed in Table 1.

Table 1. Indicator weights for the city digital economy development.

Primary indicator	Secondary indicator	Weight	Tertiary indicator	Weight
CDED	Integrated internet development	0.5	Internet penetration rate	0.125
			Number of internet-related employees	0.125
			Internet-related economic output	0.125
	Inclusive digital finance development	0.5	Number of mobile internet users	0.125
			China digital inclusive finance	0.5

Indicators utilized include internet penetration rate, employment related to the internet, outputs related to the internet, and penetration rates of mobile phones. The corresponding tertiary indicators for these four are the count of internet broadband subscribers per hundred individuals, the percentage of personnel in computing services and software industry employment to urban workers, per capital volume of telecommunication services, and mobile phone subscribers per hundred individuals. Employing principal component analysis, the data from these five indicators are standardized and subjected to dimensional reduction, yielding a composite index of digital economy development, denoted as CDED, as depicted in Table 2.

Table 2. Indicators of the comprehensive development index of the digital economy.

Level 1 index	Level 2 index	Level 3 index	Level 4 index
Composite index of digital economic development	Aggregate internet development index	Internet penetration rate	Internet users per 100 population
		Internet-related employment figures	Computer services and software sector employment ratio
		Internet-related economic output	Per capita telecommunications volume
		Mobile internet user count	Mobile phone users per 100 population
	Inclusive digital finance index	Inclusive digital finance index	China digital inclusive finance index

We calculate CDED utilizing a linear weighting approach according to the specific formula, as follows:

$$CDED_{it} = \sum_{j=1}^{5} X_{itn} \times W_n (n = 1,2,3,4,5) \quad (1)$$

Where i corresponds to different cities, t to years, n to the normalized tertiary indicators, and Wn to the weights of the nth tertiary indicator in relation to the digital economy index.

Table 3. The descriptive data statistics.

Variable	Observations	Mean	Median	Standard deviation	Min.	Max.
FDD	5669	0.436	0	0.496	0	1
FDA	5669	-7.343e+06	0	4.437e+07	-1.975e+09	0
CDED	5669	11.47	11.791	3.162	1.773	16.647
fin	5669	1.63	1.566	0.802	0.184	16.221
CGDPPC	5669	110778.306	105231	60714.048	10318	467749
pop	5669	685.841	603	434.24	20	3416
PD	5669	0.082	0.046	0.103	0	1.633
debt	5669	0.413	0.392	0.332	0.008	13.397
roe	5669	0.014	0.074	3.902	-186.557	204.69
SC	5669	0.158	0.131	0.111	0.001	0.799
flow	5669	2.716	0.865	17.488	0	889.447
size	5669	22.194	22.077	1.323	17.641	28.257
age	5669	17.962	18	7.216	2	118
AW	5669	105530.95	17077.55	855958.072	0	4.003e+07
ki	5669	2.243e+06	271584.821	2.074e+07	0	8.708e+08

3.2.2. Measures of Foreign Divestment

We use stockholders' foreign divestment decisions (FDD) and the amount of foreign divestment (FDA) as metrics to assess the level of foreign divestment in enterprises. From the withdrawal decision perspective, FDD is a binary variable. If any shareholder from the top ten is retained in j enterprise and t year, it equals 1, otherwise, it equals 0. For (FDA), the total negative equity change is calculated for foreign shareholders; those with no divestment are marked as 0.

3.2.3. Control Variables

This study selects control variables with consideration for data availability and completeness, referencing literature on the digital economy and foreign divestment [4, 10]. The following control variables, both at city and corporate levels, are selected.

At the corporate level, product differentiation (*PD*) is gauged by the percentage of annual sales expenses to profitability, reflecting the firm's competitive edge through product diversity. Debt level (*debt)* is measured using the logarithm of the annual debt-to-asset ratio. Return on equity (roe) is utilized as a measure of company performance based on year-end values. The squared percentage of holdings by the top five shareholders assesses the shareholding concentration (*SC*). Current asset turnover rate (flow) is calculated from the ratio of annual primary business revenue to current assets. Company size (*size*) is expressed by the logarithm of total assets of the corporation, and corporate age (age) is determined by years since establishment subtracted from the reporting year. The average wage level (*AW*) is chosen as a proxy indicator, quantified by the ratio of the annual total compensation to the year-end total number of employees. The annual ratio of sales expenses to operating income measures capital intensity (*ki*). At the city level, city population (*pop*) is used as a proxy for municipal market size. City gross domestic product (GDP) per capita (*CGDPPC*) is indicative of a region's potential consumer purchasing power. Financial openness of the city (*fin*) is proxied by the year-end ratio of total financial institution loans to regional GDP. Table 3 displays descriptive statistics for these variables.

3.3. Model Construction

The Probit model was introduced to address the issue of prediction value ranges in linear probability models. This model transforms predicted values into probabilities using the cumulative normal distribution function. Considering the discrete characteristics of two dependent variables, this work employs Probit model and Tobit model to examine the effect of city digital economy development on foreign divestment. The Tobit model is used to handle situations where the dependent variable is truncated. Unlike discrete choice models and standard continuous variable models, the Tobit model is specifically designed to manage cases where the dependent variable is censored or partially observed. In contrast to previous research, the model used in our study not only reflects the effect of the city digital economy development on divestment decisions but also examines the effect of the city digital economy development on the amount of divestment. Given the binary nature of foreign divestment decisions, this research employs the Tobit model, a nonlinear estimation strategy, for the regression analysis. Here, the amount of foreign divestment (FDA) is left censored, characterized by lots of zeros, and non-negative with a zero-inflated distribution, as illustrated in Figure 1. Conventional linear probability models may yield negative estimates, thereby deviating from actual circumstances; hence, this paper adopts Tobit model with left-censoring at zero for regression analysis.

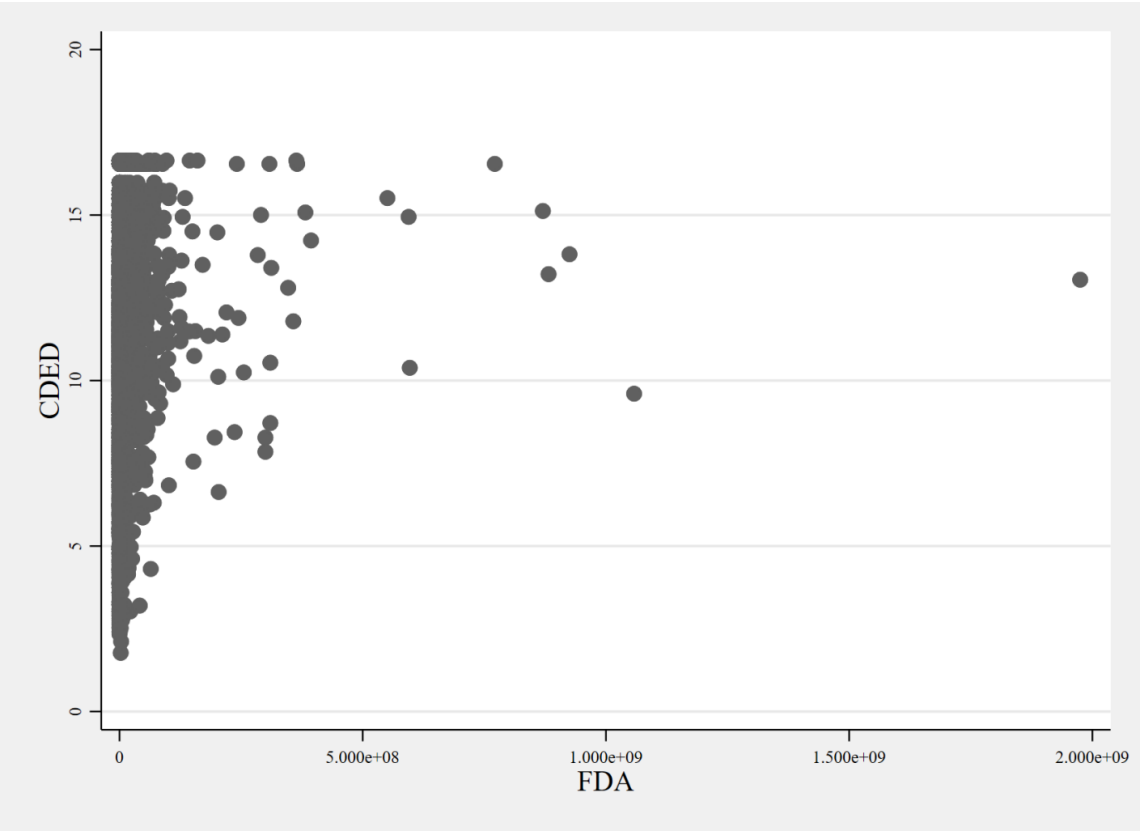

Figure 1. Distribution for amount of foreign divestment.

The Probit model and Tobit model settings are as follows,

$$Pr(FDD_{itj} = 1|X_{it}) = \alpha_0 + \alpha_1 CDED_{it} + \alpha_2 C_{it} + \sum year + \sum id + \varepsilon_{it} \quad (2)$$

$$ln\ (FDA_{itj} + 1) = \begin{cases} \beta_0 + \beta_1 CDED_{it} + \beta_2 C_{it} + \sum year + \sum id + u_{it}, FDA_{it} > 0 \\ 0, FDA_{it} = 0 \end{cases} \quad (3)$$

Where (1) represents the Probit model and (2) donates the Tobit model. FDD_{itj} and FDA_{itj} are the main dependent variables, which donate foreign divestment decisions and the amount of foreign divestment in j enterprises of i city and t year, and $CDED_{it}$ is the independent variable, which represents digital economy development. Furthermore, ∑year denotes the fixed effects, and ∑id indicates fixed effects at the firm level.

Table 4. Probit and Tobit models estimate of the effects of city digital economy development on foreign divestment.

Variable	Foreign divestment decision: Probit model		Amount of foreign divestment: Tobit model	
	(1)	(2)	(3)	(4)
	FDD	***FDD***	***FDA***	***FDA***
CDED	-0.236***	-0.070***	-1.637***	-1.637***
	(-3.31)	(-3.31)	(-3.10)	(-3.10)
fin	-0.077	-0.023	-0.601*	-0.601*
	(-1.59)	(-1.59)	(-1.67)	(-1.67)
CGDPPC	-0.000	-1.000	-0.000	-0.000
	(-0.47)	(-0.47)	(-0.90)	(-0.90)
pop	0.0000	0.0000	-0.001	-0.001
	(0.57)	(0.57)	(-0.17)	(-0.17)
PD	-0.0396	-0.012	1.040	1.040
	(-0.09)	(-0.09)	(0.29)	(0.29)
debt	-0.070	-0.021	0.458	0.457646
	(-0.37)	(-0.37)	(0.75)	(0.75)
roe	0.026	0.008	0.041	0.041
	(1.13)	(1.13)	(0.94)	(0.94)

Variable	Foreign divestment decision: Probit model		Amount of foreign divestment: Tobit model	
	(1)	(2)	(3)	(4)
	FDD	***FDD***	***FDA***	***FDA***
SC	-1.931*** (-3.32)	-0.572*** (-3.32)	-21.791*** (-5.15)	-21.791*** (-5.15)
flow	-0.001 (-0.75)	-0.000 (-0.75)	-0.003 (-0.29)	-0.003 (-0.29)
size	0.103 (1.46)	0.030 (1.46)	1.174** (2.23)	1.174** (2.23)
age	0.073 (0.51)	0.022 (0.51)	3.149*** (5.72)	3.149*** (5.72)
AW	0.000 (1.15)	0.000 (1.15)	0.000(1.64)	0.000 (1.64)
ki	-0.000* (-2.15)	-0.000* (-2.15)	-0.000** (2.50)	0.000** (2.50)
_cons	-2.298 (-1.29)		-76.720*** (-4.97)	
Year FE	Yes	Yes	Yes	Yes
Individual FE	Yes	Yes	Yes	Yes
N	4044	4044	5669	5669

Note: ***p<0.01, **p<0.05, and * p<0.1.

4. EMPIRICAL RESULTS

4.1. Benchmark Regression

The coefficients of city digital economy development are reported in Table 2. The Probit regression results are presented in columns (1) and (2), whereas the Tobit regression results are reported in columns (3) and (4). Specifically, all columns include control variables and individual and time-fixed effects; average marginal effect and marginal effect are further added in columns (2) and (4), respectively. Columns (1) and (2) report the results based on probit regressions, where negative and statistically significant coefficients of CDED variables suggest that the city digital economy development significantly reduces foreign divestment decisions. The Tobit mode examines the casual effect of city's digital economy development on the amount of foreign divestment. The coefficient of CDED variables is negative and statistically significant, suggesting that city digital economy development is more likely to reduce the amount of foreign divestment. Consistent with our model, both the probit model and Tobit model analysis indicate that the city's digital economy development significantly reduces foreign divestment. Hypothesis H1 is confirmed.

4.2. Robustness Check

In this subsection, we run three groups of robustness checks: First, robustness with revising the city digital economy development accounting approach. Secondly, the approach should be robust enough to adjust the sample size. Third, robustness regarding the city fixed effects. By taking these steps, we aim to ensure the reliability of baseline results.

4.2.1. Revising the Digital Economy Accounting Approach

We alter the accounting approach of city digital economy development variable to conduct robustness checks. We adopt the principal component analysis (PCA) method to measure the development of the city digital economy. City digital economy development is an indicator at the city-level, comprising five key aspects: inclusive financial workforce, penetration rates of mobile phones, internet broadband penetration, and telecommunications industry output. The following specific weights have been assigned: Inclusive Finance Index: 0.4403; Number of Internet-related employees: 0.1998; penetration rates of mobile phones: 0.1748; Internet broadband penetration rate: 0.1443;

Telecommunications industry output: 0.0409. Column (1) and (4) of table 6 report the regression results, confirming that the development of the digital economy significantly hinders foreign divestment.

Table 5. Revising the city digital economy development accounting approach.

Primary indicator	Secondary indicator	Definition	Weight
CDED	Digital inclusive finance index	Peking university digital inclusive finance index	0.440
	Internet-related employment figures	Employment in information transmission, computer service, and software industry	0.200
	Mobile internet penetration rate	Mobile phone users per hundred individuals	0.175
	Internet broadband penetration rate	Broadband internet users per hundred individuals	0.144
	Telecommunications industry output	Average telecommunications revenue per capita	0.041

4.2.2. Adjust the Sample Size

The "Broadband China" strategic implementation plan was launched by the State Council in 2013, significantly propelling the digital economy's development. Accordingly, we adjust the sample size to reflect the strategic plan's impact by excluding samples before 2013, and the estimation results are reported in columns (2) and (5). Regression analysis is conducted, and the findings indicate a persistently significant inhibitory effect of increased digital economy development on foreign divestment.

As shown in Table 6, all the effects of city economy development are negative and significant at the 1% level, revealing that the city digital economy development reduces both foreign divestment decisions and the amount of foreign divestment.

4.2.3. Including the City Fixed Effects

Additionally, we incorporate city fixed effects to account for unseen biases, such as local economic, regulatory, and market conditions. The estimation results, presented in columns (3) and (6) of Table 6, show that the coefficients are significantly negative at the 1% level. This indicates that city digital economy development consistently and significantly inhibits foreign divestment, confirming the robustness of the empirical conclusions.

Table 6. Robustness test results.

Variable	Foreign divestment decision: Probit model			Foreign divestment amount: Tobit model		
	(1)	(2)	(3)	(4)	(5)	(6)
	FDD	*FDD*	*FDD*	*FDA*	*FDA*	*FDA*
CDED	-0.252***	-0.195***	-0.218***	-0.969***	-0.733***	-0.878***
	(-2.96)	(-2.91)	(-2.82)	(-3.39)	(-3.18)	(-3.56)
fin	-0.0671	-0.0748	-0.0795	-0.343**	-0.380**	-0.387**
	(-1.34)	(-1.54)	(-1.62)	(-1.97)	(-2.18)	(-2.22)
CGDPPC	-0.000000211	-0.000000484	-0.000000328	-0.000000741	-0.00000220	-0.00000169
	(-0.27)	(-0.68)	(-0.45)	(-0.27)	(-0.86)	(-0.65)
pop	0.000184	0.000372	0.000331	-0.00130	0.000698	0.000848
	(0.21)	(0.51)	(0.37)	(-0.52)	(0.33)	(0.41)
PD	-0.235	-0.0153	-0.0163	0.0706	1.003	0.926
	(-0.47)	(-0.03)	(-0.03)	(0.04)	(0.57)	(0.53)
debt	-0.196	-0.0779	-0.0913	-1.022	0.0233	0.0368
	(-0.93)	(-0.41)	(-0.47)	(-1.53)	(0.07)	(0.11)
roe	0.0247	0.0261	0.0257	0.0224	0.0212	0.0213
	(1.06)	(1.12)	(1.11)	(1.12)	(1.05)	(1.06)
SC	-1.671**	-1.933***	-2.022***	-10.40***	-11.29***	-11.29***
	(-2.41)	(-3.32)	(-3.45)	(-4.54)	(-5.69)	(-5.69)
Flow	0.000735	-0.000993	-0.00103	0.00901	-0.00229	-0.00230
	(0.33)	(-0.75)	(-0.77)	(1.15)	(-0.48)	(-0.48)
Size	0.153*	0.102	0.0945	0.829***	0.724***	0.730***
	(1.86)	(1.45)	(1.33)	(3.10)	(3.12)	(3.14)
Age	0.392***	0.374***	0.419***	1.497***	1.413***	1.630***
	(5.69)	(5.83)	(5.09)	(6.50)	(6.48)	(6.39)
AW	0.000000134	4.38e-08	4.84e-08	0.000000228*	0.000000190	0.000000192
	(1.25)	(1.14)	(1.23)	(1.78)	(1.60)	(1.62)
ki	-7.10e-09**	-3.79e-09**	-4.22e-09**	-1.56e-08***	-1.56e-08***	-1.57e-08***
	(-2.00)	(-2.13)	(-2.17)	(-3.04)	(-3.11)	(-3.13)
_cons	-5.706***	-5.463***	-12.14	-32.00***	-31.09***	-35.56***
	(-2.73)	(-2.93)	(-0.04)	(-4.48)	(-4.78)	(-5.11)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Individual FE	Yes	Yes	Yes	Yes	Yes	Yes
N	3418	4044	4027	5078	5669	5669

Note: ***p<0.01, **p<0.05, and * p<0.1.

4.3. Heterogeneity Effects

Enterprises exhibit notable differences in the acquisition and application of digital technology due to varying production factor intensities, which likely contribute to significant industrial heterogeneity. To test whether city digital economy development impacts foreign divestment differently based on enterprise type, we classify the sample enterprises into technology-intensive, labor-intensive, and capital-intensive categories, following the 2012 industry classification standards of the China Securities Regulatory Commission. The estimated results show that city digital economy development significantly impacts foreign divestment in technology-intensive and capital-intensive enterprises but not in labor-intensive ones, indicating heterogeneous effects across different industry types. From the supply aspect, the technology-intensive enterprises and capital-intensive enterprises own advantage of information infrastructure and a skilled labor, which influence the effect of city digital economy development on foreign divestment. From the demand perspective, as the urban digital economy in China rapidly develops, the market demand for related products continues to rise. In such a market, technology-intensive and capital-intensive enterprises hold a greater advantage, which also discourages the withdrawal of foreign capital.

Table 7. Regression results for different enterprise type.

Variable	Foreign divestment decision: Probit model			Amount of foreign capital divestment: Tobit model		
	Technology-intensive	Labor-intensive	Capital-intensive	Technology-intensive	Labor-intensive	Capital-intensive
	FDD	*FDD*	*FDD*	*FDA*	*FDA*	*FDA*
CDED	-0.262**	-0.197	-0.378**	-1.578**	-1.270	-1.998*
	(-2.32)	(-1.41)	(-2.40)	(-2.00)	(-1.21)	(-1.82)
fin	-0.0672	0.0295	-0.217**	-0.726	0.360	-1.466*
	(-0.93)	(0.25)	(-2.01)	(-1.34)	(0.54)	(-1.95)
CGDPPC	-0.000000203	0.000000360	0.000000341	0.000000182	-0.00000381	-0.0000123
	(-0.20)	(0.23)	(0.22)	(0.02)	(-0.35)	(-1.18)
pop	0.00153	0.00171	-0.00439**	0.00688	0.00496	-0.00904
	(1.20)	(1.37)	(-2.29)	(0.83)	(0.52)	(-1.09)
PD	-0.237	-0.413	7.350***	-1.497	-1.767	13.76**
	(-0.30)	(-0.30)	(2.82)	(-0.25)	(-0.16)	(2.45)
debt	-0.177	-0.0121	-0.704	0.449	0.832	-3.755
	(-0.52)	(-0.04)	(-1.22)	(0.70)	(0.36)	(-0.94)
roe	0.0128	0.0624	0.255	0.0199	0.400	1.970
	(0.61)	(0.50)	(1.18)	(0.41)	(0.36)	(1.62)
SC	-2.495**	-2.238*	-1.590	-22.80***	-16.19	-24.06***
	(-2.39)	(-1.69)	(-1.46)	(-3.27)	(-1.59)	(-3.43)
Flow	-0.00132	-0.0185*	0.00157	-0.00780	-0.0515	0.0204
	(-0.84)	(-1.78)	(0.53)	(-0.66)	(-0.99)	(0.95)
Size	0.151	0.0720	0.141	1.305*	0.841	1.477
	(1.35)	(0.51)	(0.76)	(1.67)	(0.77)	(1.18)
Age	0.431***	0.383***	0.644***	2.846***	2.828***	3.729***
	(3.53)	(2.63)	(3.92)	(3.35)	(2.59)	(3.34)
AW	0.000000217	-0.000000117	0.000000307	0.000000626	-0.000000936	0.000000510
	(1.54)	(-0.82)	(1.04)	(1.36)	(-0.97)	(1.14)
ki	-6.54e-09	-2.71e-10	-3.76e-09*	-3.60e-08	3.46e-09	-2.46e-08*
	(-1.21)	(-0.05)	(-1.65)	(-0.98)	(0.10)	(-1.90)
_cons	-7.783***	-1.683	-11.12**	-140.9	-122.7	-87.64***
	(-2.75)	(-0.52)	(-2.56)	(-0.00)	(-0.01)	(-2.62)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Individual EFEFEFEFE	Yes	Yes	Yes	Yes	Yes	Yes
N	2088	788	1059	2984	1144	1540

Note: ***p<0.01, **p<0.05, and * p<0.1.

Table 8. Mechanism analysis results.

Variable	(1) *KZ*	(2) *EF*
CDED	-0.0164***	-0.00233**
	(-3.15)	(-2.13)
fin	0.00201	-0.000251
	(0.56)	(-0.32)
CGDPPC	-3.06e-08	-2.36e-10
	(-0.56)	(-0.02)
pop	-0.0000325	-0.0000172*
	(-0.73)	(-1.86)
PD	-0.0698*	-0.0291***
	(-1.87)	(-3.74)
debt	-0.387***	-0.987***
	(-21.09)	(-696.02)
roe	0.00202***	0.000295***
	(3.21)	(3.32)
SC	0.260***	-0.0248***
	(6.17)	(-2.82)
Flow	0.000120	0.00000386
	(0.82)	(0.18)
Size	-0.154***	-0.00823***
	(-29.01)	(-8.00)
Age	0.0209***	0.00295***
	(3.86)	(2.61)
AW	-2.00e-10	2.08e-10
	(-0.08)	(0.40)
ki	5.23e-11	1.07e-11
	(0.51)	(0.48)
_cons	3.840***	1.144***
	(33.62)	(50.88)
Year FE	YES	YES
Individual FE	YES	YES
N	5433	5669

Note: ***p<0.01, **p<0.05, and * p<0.1.

4.4. Mechanism Analysis

In the previous section, the theoretical analysis showed that the city's digital economy development reduces foreign divestment. This part mainly investigates the underlying mechanisms of city digital economy development's effect on foreign divestment from the perspective of reducing financing constraints and financing costs. Next, we use a fixed effect model to examine the mechanism of city digital economy development influencing foreign divestment from financing constraints and financing cost channels, as follows:

$$Mechanism_{it}=\gamma_0+\gamma_1 CDED_{it}+\gamma_2 C_{it}+\sum year+\sum id+\upsilon_{it} \quad (4)$$

Where Mechanism it represents financing constraints and financing costs. Following Wang, et al. [13] we use KZ Index to measure the level of financing constraints. The Kaplan-Zingales (KZ) index is constructed as a linear combination. The larger the KZ index, the more serious the financing constraints are. Additionally, following Chen [27] we use the equity financing ratio (shareholder's equity to total assets) to measure financing costs. The results of the financing constraints and financing costs mechanism test are shown in Table 8. The CDED coefficient is both negative and statistically significant, implying that the city's digital economy development alleviates financing constraints and reduces financing costs, respectively. Li, et al. [28] found that digital economy alleviates financing constraints, which supports our conclusion. Hypothesis H2 is confirmed.

5. CONCLUSION

Discussing the influence of the digital economy on foreign capital divestment in Chinese firms enhances the theoretical framework of this relationship and offers policy insights for regional economic growth, holding both

theoretical and practical significance. In this paper, we employ Probit and Tobit regression models to explore the impact of the city digital economy development on foreign divestment by analyzing a comprehensive merged sample of cities and enterprises from 2011 to 2020. The results show that the China's city digital economy development has significantly reduced foreign divestment decisions and amounts of foreign divestment. We replace city digital economy development measures, adjust the sample size, and incorporate city fixed effects to check the robustness of our conclusions. Furthermore, mechanism analysis yields that the China's digital economy's development is positive for foreign divestment by reducing financial constraints and financing costs. The detailed heterogeneity analysis conducted further highlights that the influence is significant in technology-intensive enterprises other than labor-intensive enterprises when the effect on foreign divestment decisions is significant, but the amount of foreign capital divestment is not in capital-intensive categories of enterprises.

5.1. Policy Implications

Based on the findings of this study, the following policy recommendations are made: Firstly, given the swift progress of digital economy, it is crucial to bolster the creation of new information technology infrastructure and improve internal coverage. This will significantly elevate the overall development level of China's digital economy and serve as a vital support and effective measure for increasing both the quality and quantity of foreign investment. Furthermore, there should be a continued effort to deepen and broaden financial market openness to the outside world, fostering a favorable financial environment. This approach aims to attract a larger volume of high-quality financial markets. Ultimately, differentiated policies for the digital economy development should be implemented across industries. China promotes digital economy development that favors technology-intensive and capital-intensive enterprises.

5.2. Limitations and Outlook

Nevertheless, there are several limitations. First, our data set provides a sample of Chinese listed enterprises data availability prevents us from examining small and medium-sized enterprises. Further, we could not examine the relationships prior to 2011. Second, we estimate the impact of city digital economy development on foreign divestment from the perspective of financing constraints and financing costs. However, our results may not be generalizable, there are some other mechanisms to study. Looking ahead, we first hope to further expand the sample size and research scope, for example, by extending the time span and studying a greater variety of companies. Secondly, we will continue to investigate the influencing mechanisms and explore other possible ones.

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