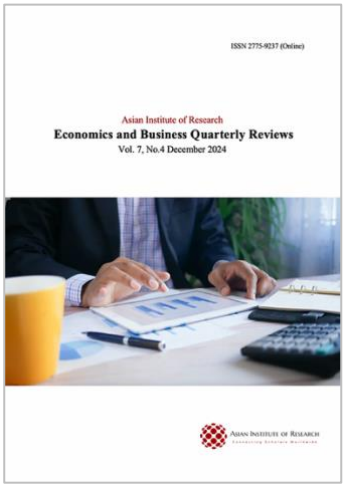

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Determinants of Regional Foreign Direct Investment Inflows in China

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Abstract
Determinants of regional foreign direct investment inflows in China from 2008 to 2019 are analysed in terms of the progress of the marketisation such as non-state-owned sectors' share of output, investment and employment, the state of price controls in commodity markets, the state of development of factor markets such as finance and labour, and the state of development of the institutional system supporting the market economy system. Additionally, human capital development, infrastructure development and industrial structure are incorporated as control variables. Key results of the analysis of China's regional FDI inflows include: 1) the progress of marketisation had a positive impact; 2) an increase in per capita GDP had a positive impact, and 3) the increase in the ratio of the secondary industry to GDP had a negative impact, while the tertiary industry had a positive impact. This result reflects the ongoing shift from vertical FDI in export-oriented labour-intensive manufacturing industries to horizontal FDI oriented toward sales to the local market.

Keywords: Foreign Direct Investment, Absorb Capacity, Marketisation

1. Introduction

China has achieved rapid economic development since the reform and opening-up policy implemented in 1978. One of the driving forces behind this has been capital investment and foreign trade. In particular, inflows of foreign direct investment (FDI) contributed to alleviating the "Two gaps," or the bottlenecks for capital investment in developing countries, namely constraints on domestic savings and constraints on foreign exchange reserves used for importing capital goods. FDI inflows also brought about the transfer of advanced technology and business management practices.

We will focus China's regional FDI inflows from 2008 to 2019 to China's 22 provinces, five ethnic autonomous regions, and four direct-administered municipalities (excluding Taiwan, Hong Kong, and Macau; hereinafter collectively referred to as "provinces" for brevity). This paper employs a panel data analysis of the determinants of FDI inflows.

In considering the determinants of FDI inflows in each province, this paper focuses on the degree of progress in each province's transition to a market economy. A characteristic of FDI into China since the 1980s is the coastal

export-oriented, labour-intensive manufacturing industry, which invests in the Pearl River Delta centred on Guangdong Province and the Yangtze River Delta around Shanghai. Due to structural diversification, since the 2000s, there has been an expansion of investment destinations, including expansion into inland areas and an expansion of industrial sectors, especially services sector. Against the backdrop of these changes in FDI inflows to China, the factors that determine the investment destination for FDI in China go beyond simple wage levels and preferential treatment provided to foreign companies by local governments. Instead, the socio-economic development level of the province and the progress of institutional reform that is more conducive to business activities will become important.

Based on these issues, in order to analyse the determinants of FDI inflows by provinces in China, Fan et al. (2019) compared the development level of the market economy in each province in China from a comprehensive and unified perspective by producing "China Marketization Index (CMI)." Each province's per capita GDP growth rate, education level, and industrial structure are employed as control variables.

As contributions of this paper, the key results of the analysis revealed that 1) the progress of the market economy as measured by the CMI has a positive impact on FDI inflows, 2) the increase in GDP per capita has a positive impact, and 3) looking at the industrial structure, the increase in the ratio of secondary industries to GDP has had a negative impact, but has had a positive impact on tertiary industries.

The rest of this paper is structured as follows: Section 2 provides a review of the existing literature covering the topics of determinants of regional FDI inflows. Section 3 presents the analysis method and data, followed by the Results of the analysis in Section 4. Section 5 concludes this paper with key findings and prospects in light of the latest development of China's external economic relations.

2. Review of existing literature

2.1 Theoretical and empirical studies on determinants of FDI location

The starting point is the Eclectic Paradigm of International Production or the OLI (Ownership, Location and Internalization) framework proposed by Dunning (Dunning, 1981). Regarding location, the critical determinant is the advantage of producing at the investment destination rather than to produce and export in one's own country. Location advantages include 1) market factors such as size, growth potential, proximity with customers and existing market structure; 2) trade factors such as trade barriers and consumer preferences for imported goods; 3) cost factors such as raw material procurement cost, labour cost, and logistics cost, and 4) investment environments such as political stability and regulatory framework of FDI in the investment destination.

Furthermore, since the 2000s, the importance of natural resources and low wages, which were considered determining factors in the selection of FDI destinations by multinational companies, has decreased in line with the growth of FDI to emerging countries due to economic globalisation. It has been pointed out that instead, emphasis has been placed on the political stability of the investment destination, the quality of the institution, and the policy settings aimed at creating a competitive environment for business (Batschauer Da Cruz et al., 2022; Dunning, 2002; Mudambi & Mudambi, 2002; Nielsen et al., 2018; Peres et al., 2018).

Institutions have the capacity to address market imperfections, thereby enhancing the efficacy of market economic structures. Institutions are the primary intangible production factor, including legal, political, and administrative systems, and institutional cost constitutes the attractiveness of an FDI location. Transaction costs in certain locations could be affected due to the presence of these institutions (Nielsen *et al.*, 2018).

On the empirical front specific to China, Belkhodja et al. (2017) conducted a study on the operations of foreign investors in China whose data was obtained in 2009. The regression analyses revealed that the likelihood of foreign investors investing was augmented by factors such as infrastructure development, intellectual property rights protection, and educational investments. Hou et al. (2021) examined the determinants of China's regional FDI inflows from 1993 to 2014. Their modelling exercise concluded that regions that had larger local markets, broader

infrastructure stock of roads and railways, lower growth rate of labour cost, a higher level of openness, larger government expenditure per regional GDP and better human capital availability measured by the stock of high school graduates attracted more FDI inflows to region.

Existing studies on determinants of regional FDI inflows in China since the 2000s include wage costs, human resources, capital formation and local government policies. Among these, the explanatory variables related to the policy framework of local governments are limited, such as the ratio of local fiscal expenditure to GDP and tax incentives for companies within the province (local corporate tax/local tax revenue). This study attempts to examine the impacts of the local government's policy framework, in particular, the progress of marketisation in each of China's provinces.

2.2 Indicators of the progress of the market economy in each province in China

In order to compare the progress of marketized economy in China's each province from a comprehensive and unified perspective, Fan et al.(2019) produced the"China Marketization Index (CMI)," a composite index by an equal-weighting method for a total of 18 regional indicators in five areas (see Table 1 for details).

Table 1: Composition of the China marketisation index

Field	Examples of constituent indicators
1. Relationship between government and market	Share of resources allocated by market mechanism, etc. ⇒ Ratio of fiscal expenditure to GDP, farmer tax burden, non-tax burden (various expenses), the ratio of government employees to the working population, *etc*.
2. Development of the non-state sector	Development level of the non-state sector ⇒ Production share of the non-state-owned sector (industrial sector), fixed asset investment share, employment-population share, *etc*.
3. Development of product market	Development of price mechanism function and degree of local industry protection by local governments, *etc*. ⇒Share of government price-controlled items in producer goods and consumer goods, awareness survey of companies regarding protection of local industries, *etc.*
4. Development of factor markets	Development level of factor markets in finance, foreign capital, labour and technology in the financial market, ratio of FDI per regional GDP, share of the employed population of migrant workers, technology market transaction value, and share of the employed population in the science and technology sector
5. Development of market intermediary organisations and legal environment	Development level of the institutional environment that allows market mechanisms to function ⇒ Share of employed population of lawyers and accountants, number of economic-related lawsuits and number of resolutions, number of patent and other intellectual property-related applications, number of consumer complaints received and case resolution, etc.

The CMI has been revised almost every year, and the latest version is for the year 2021. The CMI has been widely used to examine the impact of marketisation on regional economic growth regarding resource allocation efficiency. Chen et al. (2021) examined the relationship between economic development and the marketisation level in the western region of China whose progress was measured by the CMI. The regression analysis from 2003 to 2017 confirmed that the progress of marketisation in China's western region promoted economic development significantly. The results implied that underdeveloped areas could narrow the development gap by continuously improving the institutional framework that was conducive to promoting marketisation. Fan et al. (2019) employed CMI and assessed the impact of market-oriented reform on total factor productivity (TFP) of China's provinces. They concluded that in the period from 1997 to 2014, market-oriented reforms contributed 1.3 percentage points to China's annual GDP growth rate and accounted for 35% of the increase in TFP. Li et al. (2017) argued that foreign pharmaceutical companies' selection of investment destinations in China from 2004 to 2014 was influenced by the per capita GDP growth rate of the target province and the level of marketisation measured by

the CMI. The results implied that the progress of marketisation reduces potential transaction costs stemming from the unpredictability of the institutional system of the investment destination.

Inspired by these existing literature, we will employ the CMI and analyse the relationship between each province's progress toward market economy and FDI inflows.

3. Analysis method and data

3.1 Data for analysis

The provincial data used in this analysis is shown in Table 3 below. Regarding sources, the China Marketization Index is based on the "China Marketization Index Database" by the Beijing Institute of National Economics, and other data are based on province-specific data provided on the website of the National Bureau of Statistics of China. The time period was from 2008, after the Global Financial Crisis, to 2019 before the COVID-19 pandemic.

Table 2: List of data used in this analysis (by province)

Variable name	Explanation
FDI	Direct investment inflow amount (actual amount used; U.S. dollar-denominated amount converted at RMB rate each year)
MRK	China Marketization Index
PGDP	GDP per capita
EDU	Amount of education-related financial expenditure by the local government
SCD	Secondary industry value-added as a percentage of GDP
TRD	Tertiary industry value-added as a percentage of GDP

In addition, the descriptive statistics of each data are shown in Table 4 below. Note that *l n* indicates a natural logarithm.

Table 3: Descriptive statistics of used data

	lnFDI	*lnMRK*	*lnPGDP*	*lnEDU*	*lnSCD*	*lnTRD*
Mean	10.892	1.956	10.587	6.064	-0.884	-0.763
Median	10.854	2.028	10.584	5.995	-0.834	-0.766
Maximum	14.485	2.442	11.994	7.504	-0.479	-0.178
Minimum	6.280	-2.137	9.180	5.345	-1.833	-1.211
Std. Dev.	1.520	0.415	0.523	0.398	0.230	0.179

In addition, the correlation coefficients of each data are shown in Table 5 below.

Table 4: Correlation coefficient between data

	lnFDI	*lnMRK*	*lnPGDP*	*lnEDU*	*lnSCD*	*lnTRD*
lnFDI	1.000	0.798	0.743	-0.772	-0.006	0.259
lnMRK		1.000	0.521	-0.742	0.122	0.058
lnPGDP			1.000	-0.373	-0.278	0.617
lnEDU				1.000	-0.341	0.176
lnSCD					1.000	-0.805
lnTRD						1.000

3.2 Methodology of the analysis

In this analysis, we use the following formulation.

$$lnFDI_{it} = \alpha lnMRK_{it} + \beta lnPGDP_{it} + \gamma lnEDU_{it} + \delta lnSCD_{it} (or\ lnTRD_{it}) + \varepsilon$$

Table 3 provides an explanation of each variable. The subscript *i* is the province, *t* is the year, and ε is the error term.

For econometric analysis of the above equation, we use Panel fully modified ordinary least squares (FMOLS) by Philips and Moon (1999) and Panel dynamic ordinary least squares (DOLS) by Kao and Chiang (2000). These methods make it possible to measure long-term equilibrium relationships between variables when there is a cointegration relationship between the variables. In addition, in this analysis, it is necessary to consider the problem of endogeneity caused by reverse causality between variables (e.g. *lnFDI* → *lnPGDP*). Nevertheless, these techniques address the issue of endogeneity and serial correlation in cointegrating regressions, hence ensuring unbiased estimations of the cointegrating coefficients. FMOLS modifies the OLS estimator by adjusting for the asymptotic bias due to endogenous regressors. It uses non-parametric methods to account for the endogeneity caused by the feedback between the regressors and the error term. DOLS employs a different approach by incorporating leads and lags of the first differences of the independent variables into the regression. This inclusion of dynamic terms helps in addressing endogeneity and serial correlation.

4. Results of analysis

In conducting analysis using FMOLS and DOLS, the first prerequisite is a unit root test for panel variables and confirmation of the existence of a cointegration relationship.

4.1 Panel unit root test

To detect the problem of spurious correlations, the tests for panel unit root are conducted to examine the stationarity with the null assumption that a series has a unit root. For the variables used in the panel data analysis, the Levin, Lin & Chu (LLC) test (Levin et al., 2002), which assumes that the variables have a common unit root across regions, follows the method commonly used in previous studies. Im, Pesaran and Shin (IPS) test (Im et al., 2003), Fisher ADF test (Maddala and Wu, 1999) , and Fisher-PP test (Maddala and Wu, 1999), which assume that the carried out. The results are shown in Table 6, which shows that the data for analysis is in a steady state, *I(1)* , with a first difference.

Table 5: Results of panel unit root test

5.1: Level

Variables	LLC	IPS	Fisher-ADF	Fisher-PP
lnFDI	3.717	10.430	11.131	29.792
lnMRK	-4.517***	1.424	44.113	38.810
lnPGDP	-11.096***	-2.600***	95.530***	213.733***
lnEDU	-8.107***	-4.327***	115.991***	146.167***
lnSCD	2.008	6.032	22.424	11.302
lnTRD	-4.701	4.565	31.013	43.227

5.2: First difference

Variables	LLC	IPS	Fisher-ADF	Fisher-PP
lnFDI	-9.414***	-4.289***	127.241***	138.860***
lnMRK	-11.218***	-6.150***	149.952***	150.385***
lnPGDP	-10.485***	-4.360***	117.507***	76.603
lnEDU	-12.897***	-8.301***	175.040***	196.602***
lnSCD	-10.073***	-5.693***	133.789***	136.641***
lnTRD	-10.732***	-6.840***	154.095***	152.851***

Note 1: *** indicates that the null hypothesis that a unit root exists is rejected at the 1% significance level.
Note 2: LLC indicates the Levin, Lin & Chu test, IPS indicates the Im, Pesaran and Shin test.

4.2 Panel cointegration test

Next, we will conduct the Pedroni residual integration test to examine the cointegration relationship in the analysed data, following the method commonly used in existing studies. The Panel residual integration test, which assumes homogeneity between regions (within-dimension) in the autoregressive coefficient of the estimation residual, and the Group test, which assumes heterogeneity (between-dimension), are proposed. A total of 11 statistics are shown in Table 7, of which the null hypothesis that cointegration does not exist was rejected at the 1% significance level in six, which is the majority.

Furthermore, we also conducted a supplementary Kao test that assumes homogeneity between regions, but as shown in Table 8, the null hypothesis that there is no cointegration relationship was also significant at 1%. It was rejected at the level.

Table 6: Results of the Pedroni residual integration test

Table 6.1: Within-dimension

			Weighted	
	Statistic	p-value	Statistic	p-value
Panel v-Statistic	-1.212	0.887	-3.554	1.000
Panel rho-Statistic	4.388	1.000	5.083	1.000
Panel PP-Statistic	-8.530	0.000	-14.190	0.000
Panel ADF-Statistic	-6.190	0.000	-6.820	0.000

Table 6.2: Between-dimension

	Statistic	p-value
Group rho-Statistic	7.358	1.000
Group PP-Statistic	-19.841	0.000
Group ADF-Statistic	-7.925	0.000

Table 7: Results of Kao Residual Cointegration Test

	Statistic	p-value
ADF	-5.592	0.000

4.3 Results of FMOLS and DOLS analysis

Table 9 below shows the estimation results using FMOLS and DOLS for the econometric model presented in 3-2 above. It is obvious to note that the coefficients estimated from the two models FMOLS and DOLS models are very close except *lnMRK* and have the same signs. The coefficients obtained from both FMOLS and DOLS are statistically significant at 5% level.

Table 8: Estimation results using FMOLS and DOLS

Variables	FMOLS		DOLS	
	①	②	③	④
lnMRK	0.424***	0.400***	0.935**	1.041***
	(0.102)	(0.105)	(0.312)	(0.128)
lnPGDP	1.259***	1.240***	1.137***	1.023***
	(0.082)	(0.095)	(0.115)	(0.128)
lnEDU	-0.825***	-0.800***	-0.749**	-0.628**
	(0.224)	(0.232)	(0.259)	(0.268)
lnSCD	-1.103***		-1.292***	
	(0.238)		(0.303)	
lnTRD		0.967***		1.374***
		(0.282)		(0.363)
Adj.R ^{2}	0.974	0.972	0.974	0.973

Note: *** indicates the 1% significance level and ** indicates the 5% significance level..

The main results derived from Table 9 are as follows.

- Through models 1 to 4, the progress of the market economy in each province has a significant positive impact on the regional FDI inflows.
- Growth in per capita regional GDP has a significant positive impact on regional FDI inflows.
- Looking at the effects of changes in industrial structure, an increase in the ratio of secondary industries to GDP in each province has a negative impact on regional FDI inflows, whereas an increase in the ratio of tertiary industries to GDP has a positive impact on that.

When considering the background of these results regarding sectoral FDI inflows during the period from 2008 to 2019, as seen in Figure 1, the overall trend is that the share of the manufacturing industry has declined, and the share of the services industry has increased instead. This could be partly due to the transformation of sectoral FDI inflows to China, reflecting the ongoing shift from vertical FDI, as seen in export-oriented labour-intensive manufacturing industries to horizontal FDI oriented toward sales to local markets.

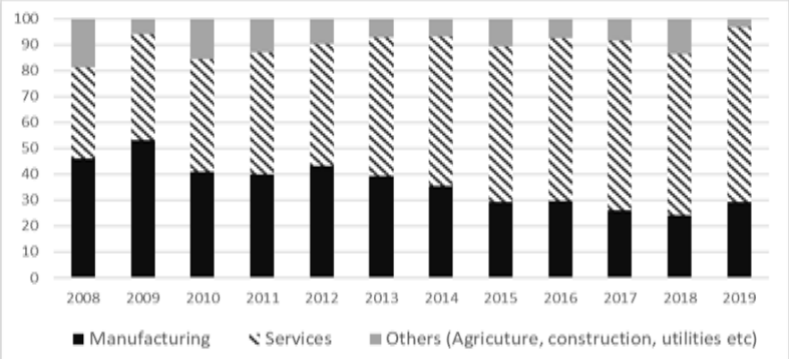

Figure: China's FDI inflow share by sector (actual usage amount), %
Source: China National Bureau of Statistics website.

Furthermore, human capital, as measured by growth in education-related fiscal expenditures in each province, has a significantly negative impact, which is inconsistent with the results of other explanatory variables, which indicate a shift in FDI inflows to horizontal FDI. One hypothesis is that the sluggish growth in spending in each province during this period may have had an impact. In any case, further consideration is needed on more appropriate variables to measure human capital formation in each province.

5. Conclusion

In order to analyse the determinants of FDI inflows by province in China, this study was created to compare the development level of the market economy in each province in China from a comprehensive and unified perspective, as proposed by Fan et al. (2019). In addition to the CMI, we used variables related to each province's per capita GDP growth rate, educational level, and industrial structure.

The main results of the analysis are that 1) the progress of the market economy as measured by the CMI has a positive impact on FDI inflows; 2) the increase in GDP per capita has a positive impact; and 3) looking at the industrial structure, the increase in the ratio of secondary industries to GDP has had a negative impact but has had a positive impact on tertiary industries. This result reflects the ongoing shift in FDI to China from vertical FDI, as seen in export-oriented labour-intensive manufacturing industries, to horizontal FDI, which is oriented toward sales to local markets.

China intends to advance the sophistication of its own industrial structure through the expansion of FDI into China by promoting institutional reforms related to the investment environment. In the government activity report of the 14th National People's Congress held in March 2023, the Chinese government stated that one of the priority mission tasks to be undertaken in 2023 was "to put even more effort into attracting and utilising foreign capital" was raised. Specifically, it aims to ease market entry regulations, further open up modern service industries such

as ICT-related, finance, real estate, and business services, and to ensure that foreign companies receive national treatment. This policy orientation was reaffirmed in the Third Plenum of the Central Committee of the Communist Party of China in July 2014.

However, the outlook for FDI to China will likely be influenced more strongly by exogenous factors such as politics and security, as seen in the recent US-China conflict, notably FDI such as those related to high-tech manufacturing. For example, a survey conducted by the American Chamber of Commerce in China (Shanghai) among American companies operating in China presented the results as follows (Data taken from the survey conducted from October to November 2023 (AmCham China, 2024).

- Nearly half of the respondents said they either plan to decrease investment in China operations, or do not intend to expand investment in China.
- Rising tensions between the US and China were cited by 61% of respondents as their top concern regarding their business activity in China.

Regarding FDI to China, which has been one of the driving forces of China's economic growth as well as industrial and technological sophistication, it will become more important to analyse it from political and security perspectives in future international relations.

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