

ANALYZING THE EFFECTS OF FDI, RESEARCH AND DEVELOPMENT EXPENDITURE AND INFLATION OVER EXPORTS: CASE OF CHINA

Edita Mustafa

International Balkan University, North Macedonia, edita.mustafaibu@ibu.edu.mk

Abstract: This paper analyzes several factors that enhanced export in China during the period from 2000 to 2023. Having into consideration the regulational changes and the favorable position of China towards foreign investment the study focuses on foreign investment, research and development expenditure and inflation and their effect on exports. In order to conduct the analysis annual data were taken from World Bank reports.

Using a regression model, results revealed that inward foreign investment and Research and development expenditure have a statistically significant positive effect on exports, suggesting that foreign investment and increased innovation have crucial roles in increasing export. On the other side, inflation is shown to have a negative effect on exports, likely because of higher production costs and reduced competitiveness.

The findings from this research highlight the importance of fostering foreign investment and innovation through R&D, while controlling inflation for having increased export. The results are relevant for policymakers and businesses that strive to enhance China's export competitiveness in the international markets

Keywords: export, research and development, inflation.

1. INTRODUCTION

Export in China has an important role in continuously increasing economic growth. As the world's largest exporter, export performance in China is essential not only for its own economic health but also for the stability of global trade. After joining the WTO in 2001, China obtained foreign direct investment, technological innovation, and robust R&D investments to strengthen its position in international markets. However, in the increasingly competitive global environment there is still to be determined which are key factors that influence China's export performance in the long run. This study analyzes the effects of three critical variables: Foreign Direct Investment, research and development expenditure, and inflation on China's export performance for the period from 2000 to 2023. According to research studies, FDI has an essential role to improve export, while investments speed up technological transfer, expand market access, and improve efficiency (Li et al. 2021). Additionally, R&D expenditure is often considered as a foundation of innovation, which contributes to the development of advanced products and technologies that improve a country's export competitiveness. On the other hand, inflation, leading to higher production costs and reduced competitiveness, is considered a barrier for export growth (Ogede, 2020). This paper aims to show the effects of FDI, R&D, and inflation on China's export performance, with data obtained from World Bank reports. Using a regression analysis model, this study investigates how foreign investments and innovation have influenced China's exports while also analyzing the role of inflation. The findings provide crucial insights for policymakers, highlighting the importance of fostering FDI and R&D while managing inflation to ensure the continued competitiveness of China's export sector.

2. MATERIALS AND METHODS

To analyze the effects of foreign direct investment, research and development and expenditure and inflation on exports, the study uses regression analysis. The advantage of the regression model is that it quantifies the relationship between the dependent and independent variables, allowing to determine the strength and direction.

The model for the dependent variable can be expressed as:

$$Y = \beta_0 + \beta_1 \cdot X_1 + \beta_2 \cdot X_2 + \beta_3 \cdot X_3 + \epsilon$$

$$\text{Exports} = \beta_0 + \beta_1 \times \text{FDI} + \beta_2 \times \log(\text{R\&D}) + \beta_3 \times \log(\text{Inflation}) + \epsilon$$

Exports - the dependent variable

β_0 - constant term

β_1 - coefficient for FDI (Foreign Direct Investment),

β_2 - coefficient for the logarithm of Research and development expenditure,

β_3 is the coefficient for the logarithm of inflation,

ϵ is the error term.

Research questions:

In the following paragraph are posed the research questions that the study will focus on:

- What is the relationship between FDI and export?
- What is the effect of Research and development expenditure on exports?

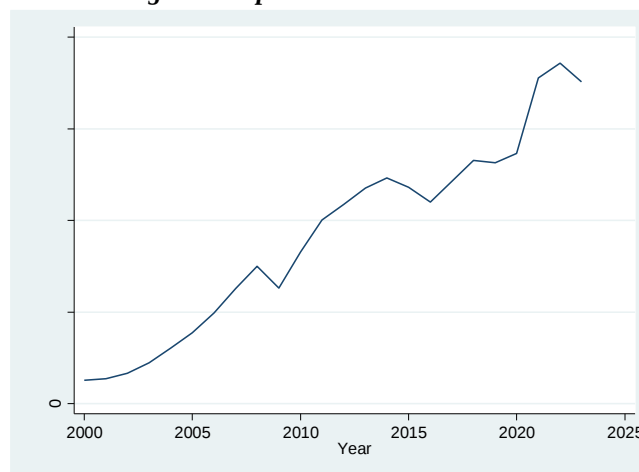
- What is the effect of Inflation on exports?

3. RESULTS

The results of this paper started with the trend analysis of the key variables under study Exports, FDI, Inflation, Research and development expenditure. This analysis provided an overview of how the variables changed during our observation period.

The presentation of these trends provided a clearer picture for the following econometric analysis and a better explanation of the statistical relationships explored.

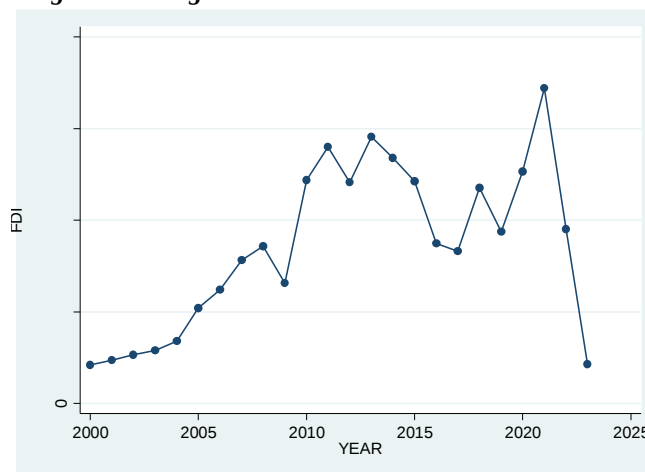
Figure 1 Exports in China 2000-2023



Source: World Bank, 2023

The trend for exports in China(figure 1) shows increase during the entire observation period ,showing the importance of exports for the country's economy, There are disruptions in the increasing trend due to global financial crises, geo political tensions and the Covid 19 pandemic.

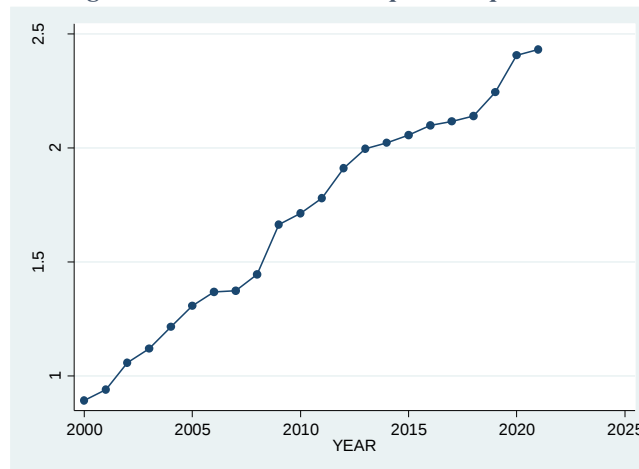
Figure 2 Foreign Direct Investment in China 2000-2023



Source: World Bank

The movement of FDI in China (figure 2) from 2000- 2023 showed periods of both growth and fluctuation. The positive FDI values gave tracks that the country presents an important investment destination for foreign countries, especially in 2021 which was the highest point of the observation period, which is followed by a decreasing trend in the last years.

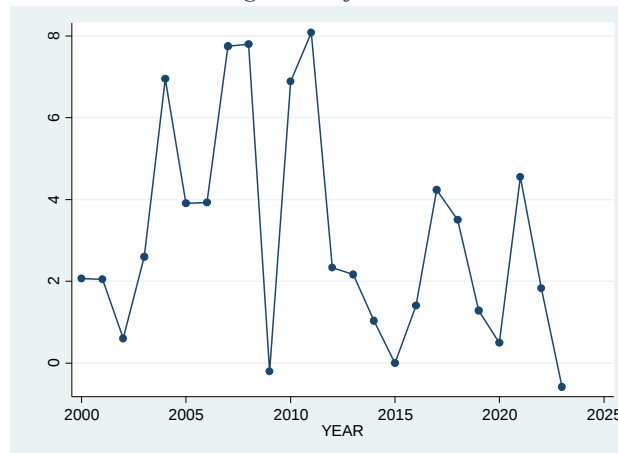
Figure 3 Research and development expenditure



Source:World Bank

The trend of research and expenditure in China (figure 3) shows continuous increase over our observation period, showing the interest and commitment of the country to continuously improve conditions for production and the quality of produced goods.

Figure 4 Inflation



Source:World Bank

Inflation in China (figure 4) shows patterns of large changes during our observation period ,respectively the highest inflation was marked in 2011,while the lowest points are presented in 2009 and by the end of 2023.

Regression results

The regression model results (table 1) show a strong and statistically significant relationship between exports and three variables: Foreign investment , research and development expenditure, and inflation.

Based on the coefficient determination the independent variables explain 97% of the variation in exports, suggesting an excellent fit.

According to the results FDI in China has a positive effect on exports, with a coefficient of 2.42, suggesting that increase in FDI may lead to increase in exports.

Similarly, R&D expenditure shows a strong positive influence on exports, indicating that higher spending on R&D may lead to an increase in exports.

On the other hand, inflation shows a negative impact on exports,suggesting that higher inflation reduces export performance.

Overall, the model is highly significant with an F-statistic of 271,71 and a low p-value of 0.0000, confirming that at least one of the variables significantly influences exports. The findings highlight the importance of foreign

investment and innovation in boosting exports, while highlighting that inflation can be a barrier to export growth in China.

Table 1 Regression analysis

Source	SS	df	MS	Number of obs = 22		
				F(3,18) = 271.71		
Model	1.8940e+25	3	6.3133e+24	Prob > F = 0.0000		
Residual	4.1823e+23	18	2.3235e+22	R-squared = 0.9784		
				Adj R-squared = 0.9748		
Total	1.9358e+25	21	9.2182e+23	Root MSE = 1.5e+11		
Exports	Coef.	Std error	t	P> t	95% CI	
FDI	2.422772	.810157	2.99	0.008	.7206957	4.124849
RND	1.58e+12	1.53e+11	10.32	0.000	1.26e+12	1.90e+12
inflation	1.67e+10	1.44e+10	1.15	0.264	-1.37e+10	4.70e+10
cons	-1.49e+12	1.77e+11	-8.42	0.000	-1.86e+12	-1.86e+12

Source: Author's calculation

4. DISCUSSION

The results from the regression analysis show a strong and statistically significant relationship between exports and Foreign direct investment , Research and Development expenditure, and inflation.

The positive coefficient for FDI suggests that higher levels of foreign investment are related with increased exports. The result is in line with the existing literature that mentions FDI as way to increase for export . In China's case, where FDI has been a driving over the past two decades, the findings align with the evidence that foreign investments can help increase the export sector by increasing productivity and expanding market access.

Similarly, the positive relationship between R&D expenditure and exports shows the importance of innovation in increasing export . The significant influence of R&D spending suggests that investments in research and development improve the quality of products, and allow diversification of exports. In China, as technological advancements and high-tech industries are a very important part of the economy, the findings highlight the role of R&D to keep a competitive position in the global market.

On the other hand, inflation ,is found as a significant barrier to export , with a negative coefficient which suggests that higher inflation reduces export performance. The finding is aligned with the economic theory that increasing inflation leads to higher production costs, which makes exports less price-competitive in international markets. As inflation lowers the purchasing power of foreign consumers, Chinese exports is expected to become less attractive,considering the importance of price sensitivity. The negative influence of inflation shows the importance of keeping stable macroeconomic conditions.

Based on the F-statistic of 271.71 and the low p-value of 0.0000, the model is statistically significant ,confirming that FDI, R&D, or inflation have a significant effect on exports. The findings of this analysis suggest that, as foreign investment and innovation are considered key drivers of export growth, inflation is a potential threat that requires control in order to maintain competitiveness in global markets.

5. CONCLUSION

The results of this study highlight the importance of foreign investment and innovation in increasing export in China. As well, they present the challenges by inflation, which can impact the competitiveness of Chinese exports. As a recommendation, policymakers need to consider the creation of an environment open to foreign investment, to encourage R&D spending as a possibility for higher quality production processes, and to maintain macroeconomic stability in order to create preconditions that to support long-term export growth.

REFERENCES

- Abeliansky, A., & Martínez-Zarzoso, I. (2019). *The relationship between the Chinese 'going out' strategy and international trade*. Economics the Open-Access Open-Assessment E-Journal, 13(1).
<https://doi.org/10.5018/economics-ejournal.ja.2019-21>

- Agezew, B. (2024). *The effect of research and development on economic growth in ethiopia: the untapped potential for prosperity*. Education Research International, 2024, 1-7. <https://doi.org/10.1155/2024/5562940>
- Calal, M. (2023). *The role of the foreign direct investment inflows on export in Azerbaijan: an ardl approach*. Economic Journal of Emerging Markets, 160-172. <https://doi.org/10.20885/ejem.vol15.iss2.art4>
- Cieřlik, A., Michałek, J., & Szczygielski, K. (2019). *What matters for firms? participation in global value chains in central and East European countries?*. Equilibrium Quarterly Journal of Economics and Economic Policy, 14(3), 481-502. <https://doi.org/10.24136/eq.2019.023>
- Gavurová, B., Halásková, M., & Koróny, S. (2019). *Research and development indicators of eu28 countries from viewpoint of super-efficiency dea analysis*. Acta Universitatis Agriculturae Et Silviculturae Mendelianae Brunensis, 67(1), 225-242. <https://doi.org/10.1118/actaun201967010225>
- Gulzar, Y. (2024). *Predicting high technology exports of countries for sustainable economic growth by using machine learning techniques: the case of turkey*. Sustainability, 16(13), 5601. <https://doi.org/10.3390/su16135601>
- Habanabakize, T. and Dickason-Koekemoer, Z. (2023). *Investment, exchange rate and exports nexus within the South African automotive industry*. International Journal of Economics and Financial Issues, 13(3), 178-184. <https://doi.org/10.32479/ijefi.14427>
- Ilmas, N., Amelia, M., & Risandi, R. (2022). *Analysis of the effect of inflation and exchange rate on exports in 5-year Asean countries (years 2010–2020)*. Jurnal Ekonomi Trisakti, 2(1), 121-132. <https://doi.org/10.25105/jet.v2i1.13561>
- Indana, Z. and Endang, M. (2021). *The effect of labor, export, and government expenditure on economic growth*. Journal of Economics and Business, 4(3). <https://doi.org/10.31014/aior.1992.04.03.368>
- Irhamna, A., Nurhayati, E., Safira, A., & Wijaya, G. (2021). *Does foreign direct investment more important than domestic direct investment for export structure? evidence from Indonesia..* <https://doi.org/10.21203/rs.3.rs-713874/v1>
- Jana, S., Sahu, T., & Pandey, K. (2020). *Growth in foreign trade in liberalized India: the relevance of fdi*. Global Business Review, 25(1), 252-267. <https://doi.org/10.1177/0972150920936988>
- Jovanka Damoska Sekuloska, (2018). "Causality between foreign direct investment in the automotive sector and export performance of Macedonian economy," *Equilibrium*. Quarterly Journal of Economics and Economic Policy, Institute of Economic Research, vol. 13(3), pages 427-443, September.
- Kirovska, Z., Gjozinska, B., & Jadrovska, L. (2022). *The impact of the efficiency of the judicial system in attracting foreign direct investments in the republic of north macedonia*. Zagreb International Review of Economics and Business, 25(1), 21-32. <https://doi.org/10.2478/zireb-2022-0002>
- Lakshani, S. (2023). *From short to long term: dynamic analysis of fdi and net export in global regions*. Plos One, 18(9), e0291301. <https://doi.org/10.1371/journal.pone.0291301>
- Li, Y., Li, J., & Zhang, X. (2021). *The Impact of Foreign Direct Investment on Export Performance: Evidence from China's Manufacturing Sector*. Journal of International Business Studies, 52(1), 97-114.
- Liu, W. (2019). *Does WTO membership has effects on the trade linkages of inward and outward FDI: evidence from China..* <https://doi.org/10.2991/feb-19.2019.14>
- Moro, A. and Tosti, E. (2020). *The determinants of service export behaviour in Italian non-financial firms*. SSRN Electronic Journal. <https://doi.org/10.2139/ssrn.3710139>
- Muthalib, D., Muthalib, A., Nuryadi, A., Arifuddin, A., Harafah, L., Kamaluddin, M., ... & Tambunan, R. (2023). *The effect of crude oil price and inflation on algae export in Indonesia*. International Journal of Energy Economics and Policy, 13(3), 507-511. <https://doi.org/10.32479/ijeep.14145>
- Nursodik, Hendi & Santoso, siswanto imam & Nurfadillah, Suryani. (2021). *Competitiveness and Determining Factors of Indonesian Tea Export Volume in the World Market*. HABITAT. 32. 163-172. 10.21776/ub.habitat.2021.032.3.18
- Nguyen, H. (2020). *Impact of foreign direct investment and international trade on economic growth: empirical study in Vietnam*. Journal of Asian Finance Economics and Business, 7(3), 323-331. <https://doi.org/10.13106/jafeb.2020.vol7.no3.323>
- Oladapo, Emmanuel & Ogede, Jimoh. (2020). *ASYMMETRIC OIL PRICE AND INFLATION: EVIDENCE FROM NET OIL EXPORTING COUNTRIES IN AFRICA*.
- Oumarou, I. and Maiga, O. (2019). *A causal relationship between trade, foreign direct investment and economic growth in Niger*. Journal of Social and Economic Statistics, 8(2), 24-38. <https://doi.org/10.2478/jses-2019-0003>
- Sahoo, M., & Sethi, N. (2018). *The Dynamic Relationship between Export, Import and Inflation: Empirical Evidence from India*. The Indian Economic Journal, 66(3-4), 294-311. <https://doi.org/10.1177/0019466220935552>

- Sekuloska, J. (2018). *Causality between foreign direct investment in the automotive sector and export performance of macedonian economy*. Equilibrium Quarterly Journal of Economics and Economic Policy, 13(3), 427-443. <https://doi.org/10.24136/eq.2018.021>
- Sultanuzzaman, Md Reza & Fan, Hongzhong & Akash, Mahamud & Wang, Banban & Shakij, Uddin. (2018). *The role of FDI inflows and export on economic growth in Sri Lanka: An ARDL approach*. Cogent Economics & Finance. 6. 10.1080/23322039.2018.1518116.
- Thomas, C. (2012) *Trade Openness and Inflation: Panel Data Evidence for the Caribbean*. International Business & Economics Research Journal, 11, 507-616. <https://doi.org/10.19030/iber.v11i5.6969>
- Vasylieva, T., Shalupayeva, N., Ohotina, A., Betlej, A., & Aļeksejeva, L. (2021). *Foreign direct investment as a factor of trade development: cases of selected countries*. Journal of Entrepreneurship and Sustainability Issues, 9(2), 384-401. [https://doi.org/10.9770/jesi.2021.9.2\(25\)](https://doi.org/10.9770/jesi.2021.9.2(25))
- Voytyuk, V. (2022). *New mechanisms for investing in the agricultural enterprise foreign trade activity development*. <https://doi.org/10.15405/epsbs.2022.02.107>