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Financial Market Liberalization and Total Factor Productivity: A Panel Data Analysis

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ABSTRACT

Financial market liberalization refers to the gradual termination of regulatory controls over capital movements across countries. This study explores the effect of financial market liberalization on the total factor productivity (TFP) using data on 16 major Emerging Market Economies (EMEs) over the period 1997-2022. The generalized method of moments (GMM) technique of panel data estimation is employed involving different de-facto and de-jure capital market liberalization measures. The robustness of empirical results is checked by applying fixed effect and pooled OLS methods. Our empirical findings suggest that foreign direct investment (FDI) is the only conspicuous de-facto measure affecting total factor productivity positively and significantly. However, one de-jure measure of capital market liberalization namely Schindler index is also found to be statistically significant. The core conclusion of this study is that foreign capital influx is the most advantageous when it arrives in the form of FDI. The institutions and macroeconomic governance are also imperative and play a catalytic role to harness the benefits from financial liberalization progression.

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1 Introduction

Financial market liberalization refers to the gradual termination of regulatory controls over capital movements across countries. The theoretical literature elucidates many benefits of financial liberalization for the emerging and developing economies. Financial liberalization boosts economic growth and total factor productivity through efficient allocation and optimal

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utilization of funds. It ensures the availability of capital for the lucrative investment ventures (Kose, Prasad, Rogoff, & Wei, 2009). The financial resources flow from rich to poor states alleviating credit constraints and providing opportunities for the profitable investments. The theoretical literature explains the mechanism through which financial liberalization affects output growth and total factor productivity. The favorable effects of financial globalization on GDP growth are observed through the improvement in total factor productivity. Financial liberalization reduces the capital constraints, allowing productive economic activity in the economy. Financial globalization provides many growth opportunities in emerging and developing economies as it allows capital to flow more freely across borders, seeking out the most productive and profitable opportunities. This can lead to more efficient allocation of resources globally, as funds move to where they can be used most effectively. It provides easier access to capital for both developed and developing countries. Developing countries can attract foreign investment, which can spur economic growth, create jobs, and improve infrastructure. Developed countries can also benefit by diversifying their investment opportunities. Financial globalization allows investors to diversify their portfolios across different countries and regions. This diversification can reduce overall investment risk, as losses in one market or region may be offset by gains in others. Financial globalization often accompanies advancements in technology and financial innovation. This includes the development of new financial products, improved financial services, and enhanced risk management techniques. Increased competition among financial institutions globally can lead to lower costs of financial services and products. This benefits consumers and businesses by providing more choices and potentially reducing borrowing costs. Globalization encourages countries to coordinate their economic and financial policies to promote stability and growth.

Capital market liberalization stimulates financial sector advancement improving corporate governance and financial system efficiency. Financial liberalization affects productivity by raising the allocative efficiency of capital. According to Obstfeld (1994), the openness of financial flows induces the economies to share risk efficiently and enjoy the benefits from greatly lucrative investment projects. Foreign direct investment is an imperative measure of financial liberalization which can directly affect the factor productivity (Borensztein, De Gregorio, & Lee, 1998; Hussain, Nawaz, & Ibraheem, 2021). The capital market liberalization develops a healthy competition among the financial market players leading to an increase the allocative efficiency. In the presence of capital market liberalization, the productivity may be higher. As the financial liberalization provides international risk diversification opportunities, the ability of a firm or an economy to undertake risky investment ventures rises. Obstfeld (1994) pointed out that financial globalization promotes a specialization culture just like trade liberalization. The specialization culture increases productivity which encourages output growth in turn. The financial sector development and innovative production technologies affect productivity positively. Capital account openness stimulates economic growth via its influence on factor productivity (Bekaert, Harvey, & Lundblad, 2011; Gehringer, 2015). Some scholarly views have ignored the important growth channels of capital market liberalization like factor productivity and capital accumulation. In this work, we try to explore the effect of capital market liberalization on productivity as it has the ability to capture the long-run effects of financial openness on economic growth. Our study has significance in the sense that it exclusively concentrates on the EMEs while exploring an imperious growth channel of financial liberalization namely TFP. From a theoretical perspective, FDI is an advantageous capital inflow stemming from the financial globalization. When there is an influx of FDI to the emerging world, it leads to technological advancements rapidly stimulating productive activities. Emerging and developing countries are capital-deficient destinations where the marginal product of capital is higher. These countries use financial globalization anchors to attract FDI to achieve faster economic growth (Nasim, Boukhris, Kayani, Bashir, & Haider, 2023). FDI is a prominent way to transfer knowledge and

generate productivity spillovers in the developing world. The relative sforeign pill-over effect of FDI may vary across countries depending on the available infrastructure, political stability, and policy coordination.

2 Literature Review

This section examines some significant studies exploring the effect of financial market liberalization on TFP. The diverse findings are highlighted depending on the underlying conditions of the economy. Rajan and Zingales (1998) are of the view that financial liberalization promotes growth by improving access to finance for productive investment ventures in economies with strong institutions. In a weaker institutional context, financial openness may lead to financial instability and inefficiencies. Henry (2003) finds that financial liberalization results in temporary increases in TFP due to initial boosts in investment and efficiency gains, but these gains may not be sustained without proper macroeconomic reforms. Levine (2001) finds that financial market liberalization enhances financial sector development which in turn raises total factor productivity. Better financial intermediation reduces the chances of capital miss- allocation and raises productivity. Kaminsky and Schmukler (2003) analyze the historical episodes of financial liberalization across various countries. They deduce that financial market openness may lead to economic crises, negatively impacting TFP by causing economic disruptions. Prasad, Rajan, and Subramanian (2007) conclude that the impact of financial openness on TFP is positive in economies where financial institutions are well-developed and macroeconomic policies are sound. However, the fragile institutional structure may lead to the negative effect of financial market liberalization on TFP. Aghion, Howitt, and Mayer-Foulkes (2005) explore that capital market liberalization enhances TFP growth in the East Asian economies due to robust regulatory framework and strong institutional settings. Bekaert et al. (2011), explore that there is positive influence of financial liberalization on TFP. The authors use cross-country regressions using data from 95 countries in the study. The positive effect is attributed to the better allocation of capital and increased competition. Rehman, Bashir, Rashid, and Hussain (2023) explored corruption-growth nexus in the World's most important emerging market economies. reveal that corruption has a significantly negative impact on economic growth of the EMEs under consideration, after controlling for the government spending, investment, human capital, trade openness, and population.

Bonfiglioli (2005) inspects the effect of capital market liberalization on productivity and capital accumulation using data from 93 economies. The panel data estimation techniques reveal that the financial market liberalization has no significant effect on capital accumulation, however total factor productivity is affected positively and significantly. Prasad et al. (2007) use cross-country examination to inspect the effect of capital market liberalization on TFP. They explore that this impact is positive in the states with well-developed financial infrastructure and proper economic policies, but negative in the states with weaker institutions. Eichengreen, Hausmann, and Panizza (2007) examine macroeconomic data from a wide range of countries, focusing on capital flow volatility. The study concludes that capital market openness may lead to boom-bust cycles in financial flows, causing macroeconomic volatility and reducing TFP growth. Kose, Prasad, and Terrones (2009) use data from developing and developed countries to study the effect of financial liberalization on TFP. The research concludes that the countries with better legal systems and improved governance get productivity gains in this regard. Gehringer (2015) inspects the influence of European integration of financial markets on the Eurozone economies. The impact of European integration on GDP growth and its imperious channels is empirically examined by the researcher. The channels included were TFP and capital accumulation. Empirically examining the data from 1990 to 2007, the researcher found that capital market openness affects TFP of European countries positively and significantly. Arif-Ur-Rahman and Inaba (2020) investigates the link between financial openness and TFP growth employing a dynamic panel data model.

The data sample contains a large sample of countries using data for the years 1970 to 2014. The findings from the empirical estimation reveal that financial market liberalization positively affects TFP. The estimates also propose that the banking sector development may dampen the marginal impact of financial market integration on TFP growth. Xu and Pal (2022) utilize economy-wide as well as firm-level data to inspect the connection between capital market openness and TFP in India. The data sample ranges from 1990 to 2000. The empirical estimation using dynamic panel data models shows that financial liberalization encourages manufacturing sector productivity at macro as well as micro levels (Goldar, 2024; Roy & Dubey, 2023). The findings also suggest that the financial liberalization policies should be implemented to foster economic growth.

3 Empirical Methodology

We can expressed the association between GDP and its two factors of production namely capital and labor as:

$$GDP = f(K, L)$$

In terms of the Cobb-Douglas production function;

$$GDP = AK^{\alpha} L^{1-\alpha}$$

Where, GDP is Gross domestic product or output of an economy, K is Physical capital stock, L is Labor units, A is Efficiency in the use of factors which may be termed as total factor productivity (TFP), α is Contribution of capital (K) in output, (1-α) is Contribution of labor (L) in output. Let us incorporate human capital (H) in the equation (I) given above, we can write;

$$GDP = AK^{\alpha} (HL)^{1-\alpha}$$

Hall and Jones (1999) are of the view that a significant segment of cross-country differences in growth of GDP per factor may be expressed by the differences in 'A'. After the logarithmic transformation of equation (II), we get;

$$\log(GDP) = \log(A) + \alpha \log(K) + (1-\alpha)[\log(H) + \log(L)]$$

Taking derivatives with respect to time in equation (III), we get;

$$\frac{\mathbf{d \log (GDP)}}{\boldsymbol{d\, t}} = \frac{\mathbf{d \log (A)}}{\boldsymbol{d\, t}} + \boldsymbol{\alpha} \frac{\boldsymbol{d \log (K)}}{\boldsymbol{d\, t}} + (1- \alpha) \left[\frac{d \log (H)}{d\, t} + \frac{d \log (L)}{d\, t}\right]$$

Using the fact that $\frac{\mathbf{d \log (GDP)}}{\boldsymbol{d\, t}} = \frac{\boldsymbol{GDP}^{\cdot}}{\boldsymbol{GDP}}$ and so on, the above equation may be expressed as;

$$\frac{GDP^{\cdot}}{GDP} = \frac{A^{\cdot}}{A} + \alpha \frac{K^{\cdot}}{K} + (1- \alpha) \left[\frac{H^{\cdot}}{H} + \frac{L^{\cdot}}{L}\right]$$

According to the expression given above, the cross-country growth differentials are primarily triggered by the differences in productivity ($\frac{\dot{A}}{A}$) growth. Concentrating on the TFP, panel data dynamic GMM panel estimation on non-overlapping five-years averages may be written as;

$$TFP_{it} = \lambda\, TFP_{it-5} + \theta Z_{it} + \gamma FL_{it} + \eta_i + \mu_{it}$$

Where, TFP_{it} denotes total factor productivity or A at time t in any country i. The notation Z is a vector of control variables comprising human capital, private sector credit, population growth, and trade openness. The term FL indicates financial liberalization which is

our core variable. The notation η_i represents the country-specific effects while μ denotes the stochastic error term. For the elimination of country-specific effects η_i , the differences of equation (VI) are taken as;

$$\Delta TFP_{it} = \lambda \Delta TFP_{it-5} + \theta \Delta Z_{it} + \gamma \Delta FL_{it} + \Delta \mu_{it}$$

The equation (VI) and (VII) embody system GMM.

3.1. The Variables and Data

The study includes 16 leading emerging market economies from different regions of the World. Some economies are missing due to data constraints. Firstly, we included BRIC economies as these are the World's most prominent emerging markets comprising Brazil, Russia, India, and China. The South American emerging countries namely Argentina, Chile, Mexico, and Venezuela are also included. The Southeast Asian emerging countries like Indonesia, Malaysia, Philippines, and Thailand are also considered. We also included Eastern European EME's including Hungary, Poland, Turkey, and Ukraine in the sample. The TFP growth is our dependent variable while secondary schooling, trade openness, population growth, and private sector credit are used as control variables. We used the initial level of TFP based on 1997 as a regressor to represent the autoregressive component representing convergence. The trade openness is represented by exports plus imports as percentage of GDP. The credit to private sector as percentage of GDP is used as a proxy for the banking sector development. The years of schooling at the secondary level is involved as a proxy for human capital. The labor availability factor is captured by using Population growth in the regression. The data on trade openness, secondary schooling, private sector credit,, and population growth are retrieved from the World Development Indicators (WDI) database. The TFP data comes from the Penn World Table version 8 (PWT8). It is the work of Feenstra, Inklaar, and Timmer (2015) to calculate the TFP of different countries.

3.2. Measuring Financial Liberalization

Chinn-Ito index was developed by the two economists Manzie D. Chinn and Hiro Ito in 2006. This index is also called the capital account openness (KAOPEN) index. This index reflects the strength of capital account restrictions having a value of 1 for fully liberalized and 0 for fully restricted countries. The Schindler index was developed by Martin Schindler in 2009. It uses the *AREAER* database of IMF to construct a capital account liberalization index. Schindler initially used data on 91 countries for the years 1995-2005. It is coded in a fashion that 1 represents the country with fully restricted and 0 for the fully liberalized economy.

4 Results and Discussion

In table 1, the results of panel GMM regression are reported with a data sample range from 1997 to 2022. The GMM method is advantageous as it has the ability to manage the potential endogeneity issue. The de-facto financial liberalization measured by FDI as percentage of GDP and total liabilities plus assets as percentage of GDP is considered. For the robustness checks, additional methods of estimation including pooled OLS and fixed effects are also applied. The influence of de-facto financial market liberalization measures on productivity after applying system GMM indicates that FDI has considerably favorable influence on TFP growth (Ali & Akhtar, 2023; Ashraf, Carril-Caccia, & Doytch, 2024). Using GMM estimation, the value of the FDI coefficient is .078, which is found to be statistically significant at 5% level. It suggests that TFP growth increases by 7.8 percent for every 1% rise

in FDI, or vice versa. The results are further supported by the very similar values of the FDI coefficients using pooled OLS and fixed effect regressions.

All the other measures remain statistically insignificant. FDI is found to be significant because it boosts TFP by improving efficiency through advances in production methods and the propagation of competition. FDI inflows to emerging countries promote total factor productivity growth by raising resource utilization efficiency and augmenting managerial skills. The other controls involved are the initial TFP, secondary school education years, trade openness, private sector credit, and population growth. The coefficients on initial TFP are positive and significant suggesting long-term increases in the efficiency of factors i.e. labor and capital.

Table 1: Panel Data results (TFP Growth rate: Dependent variable) – Model 1

Method	**System GMM**		**Fixed Effect**		**Panel Least Square**	
Regression	**(1)**	**(2)**	**(1)**	**(2)**	**(1)**	**(2)**
Initial TFP	.784* (.169)	.738* (.160)	.707* (.089)	.720* (.088)	.724* (.089)	.743* (.088)
Years of Schooling	.061 (.189)	.116 (.169)	.297 (.193)	.273 (.179)	.269 (.185)	.241 (.177)
Population Growth	.0199 (.075)	.052 (.069)	.067 (.051)	.081 (.048)	.055 (.049)	.066 (.048)
Private Credit	.069 (.054)	.029** (.051)	.026 (.040)	-.0001 (.042)	.047 (.044)	.028** (.045)
Trade Openess	-.172*** (.096)	-.160*** (.081)	-.142** (.056)	-.128** (.049)	-.156* (.055)	-.142* (.048)
Total Liabilities + Assets	.027 (.074)		.075 (.065)	-----	.078 (.058)	-----
FDI	-----	.078** (.031)	-----	.081** (.036)	-----	.074** (.031)
Constant	-----	-----	-.698 (.444)	-.330 (.349)	-.681 (.414)	-.312 (.343)
R^2	-----	-----	.50	.53	.48	.49
No. of observations	80	80	80	80	80	80
No. of groups	16	16	16	16	16	16
Hansen (p-value)	.606	.805	-----	-----	-----	-----
AB m2 (p-value)	.116	.070				

Note: The robust standard errors are reported in parenthesis. The significance at 1%, 5% and 10% levels is represented by * , ** and *** respectively.

Financial liberalization can boost productivity by allocating resources more efficiently and providing easier access to funds (Kumari & Tang, 2024; Liu, Cui, Jiang, & Yan, 2023). The schooling, private sector credit, and population growth mostly remained insignificant. Trade openness is generally significant but has a negative coefficient. The p-values related to the Hansen test are found to be larger than 0.10 in each case which reflects the correct specification of instruments.

In table 2, the GMM regression results are reported after involving de-jure financial market liberalization measures on TFP. There are many de-jure measures with partial availability of data. We found data on two de-jure measures conveniently namely the Chin-Ito KAOPEN Index and the Schindler index.

The GMM results display the insignificant effect of KAOPEN Index on TFP growth. For the robustness checks, fixed effect and pooled OLS regression results are also reported. The statistical insignificance of the KAOPEN index is reconfirmed by these checks. In case of the Schindler index, the GMM, fixed effect, and pooled regressions produced coefficients that are statistically significant. The coefficient values range from -0.255 to -0.268.

With respect to the construction of index, it indicates that for any one percent rise in the index leads to raise TFP growth nearly 25 to 27 percentage points. The de-jure type measures usually express short-term movements of capital that don't necessarily encourage TFP growth. These measures have been under criticism with the impression that they are incapable of reflecting the intensity of financial liberalization appropriately because these are constructed based on foreign exchange restrictions that may not essentially hinder the capital movements. Hence, these measures don't mirror the actual extent of capital market liberalization.

Table 2: Panel Data results (TFP Growth rate: Dependent variable) – Model 2

Method	**System GMM**		**Fixed Effect**		**Panel Least Square**	
Regression	**(1)**	**(2)**	**(1)**	**(2)**	**(1)**	**(2)**
Initial TFP	.746* (.198)	.650* (.170)	.713* (.099)	.618* (.103)	.735* (.097)	.644* (.103)
Years of Schooling	.090 (.179)	.082 (.163)	.269 (.189)	.258 (.182)	.233 (.182)	.225 (.175)
Population Growth	.021 (.072)	.032 (.070)	.056 (.049)	.066 (.049)	.041 (.047)	.050 (.047)
Private Credit	.069 (.052)	.065 (.051)	.039 (.041)	.034 (.041)	.0644 (.043)	.060 (.042)
Trade Openness	-.160*** (.083)	-.129 (.079)	-.124** (.050)	-.091 (.050)	-.136* (.048)	-.107** (.048)
Chin Ito (2006), KAOPEN Index	.023 (.037)	-----	.021 (.024)	-----	.019 (.024)	-----
Schindler (2009), KA index	-----	-.268*** (.149)	-----	-.266** (.109)		-.255** (.108)
Constant	-----	-----	-.415 (.357)	-.405 (.343)	-.372 (.354)	-.365 (.335)
R^2	-----	-----	.50	.52	.48	.50
No. of observations	80	80	80	80	80	80
No. of groups	16	16	16	16	16	16
Hansen (p-value)	.840	.883	-----	-----	-----	-----
AB m2 (p-value)	.123	.123	-----	-----	-----	-----

Note: The robust standard errors are reported in parenthesis. The significance at 1%, 5% and 10% levels is represented by * , ** and *** respectively.

The initial TFP coefficient is positive and significant at one percent level in all the regressions indicating the improvements in managerial efficiency and labor abilities over time. The schooling, private sector credit, and population growth generally remain insignificant. Trade openness is statistically significant with negative coefficient. The p-values pertaining to

Hansen test values are found to be larger than 0.10 in all cases indicating the correct specification of instruments.

5 Conclusion and Policy Recommendations

This study aims to discover the influence of financial market liberalization on the TFP growth of 16 major EMEs for the period 1997-2022. We employed the GMM technique of estimation to tackle the potential endogeneity issues. We used different financial openness measures categorized as de-facto and de-jure for the empirical analysis. The GMM, fixed effect, and pooled OLS regressions are employed for the estimation. The empirical findings advocate that the inward FDI puts positive and statistically significant effect on productivity. The FDI due to capital market liberalization brings long-term and stable capital flows and modern technologies to the emerging economies which enhance productivity.

The outcomes are also affected by the other factors like institutional quality and regulatory frameworks. Policymakers should ponder these factors when designing and implementing financial liberalization policies to maximize TFP and economic growth. This study suggests a positive impact of financial market liberalization on TFP through improved capital allocation and financial sector development. In the policy perspective, that financial liberalization can enhance TFP if accompanied by strong institutions, effective regulations, and better macroeconomic reforms. The economic policies should focus on the improvements of institutional quality and regulatory framework. Conversely, in the absence of these conditions, liberalization may lead to financial instability and resource misallocation, adversely affecting TFP.

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