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# A Time Series Analysis of the Determinants of Globalization in the Chinese Economy

*Çin Ekonomisinde Küreselleşmenin Belirleyicilerinin Zaman Serisi Analizi*

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**ABSTRACT**

*The Chinese economy has undergone significant structural transformations in the past decade. By opening up the economy and attracting foreign capital investments, China has gained substantial momentum in recent years. Undoubtedly, globalization has played a crucial role in this success. This study empirically analyzes the dynamics of globalization in the Chinese economy over the period of 1990-2021. It examines the impact of financial development, ICT, fiscal policy, and trade openness on globalization. The study utilizes the ADF and PP tests for unit root analysis, and the ARDL bounds test is applied to evaluate cointegration. Long-term estimates are derived using the DOLS estimator. The study identifies a cointegration relationship among the series, providing evidence that financial development, ICT, fiscal policy, and trade openness positively affect and enhance globalization. Policy recommendations can be made for Chinese policymakers to further strengthen globalization.*

***Anahtar Kelimeler:***
*Küreselleşme, Finansal Gelişme, ARDL Yaklaşımı, DOLS Tahmincisi, Çin*
***Jel Kodları:***
*F60, O16, O33*

**ÖZET**

*Çin ekonomisi son on yılda önemli yapısal dönüşümler geçirmiştir. Ekonominin dışa açılması ve yabancı sermaye yatırımlarının çekilmesi sayesinde Çin, son yıllarda kayda değer bir ivme kazanmıştır. Şüphesiz bu başarıda küreselleşme kritik bir rol oynamıştır. Bu çalışma, 1990-2021 dönemi kapsamında Çin ekonomisinde küreselleşmenin dinamiklerini ampirik olarak incelemektedir. Çalışmada finansal gelişmenin, bilgi ve iletişim teknolojilerinin (BİT), maliye politikasının ve dışa açıklığın küreselleşme üzerindeki etkileri araştırılmaktadır. Birim kök analizi için ADF ve PP testleri, eşbütünleşmenin sınanması için ise ARDL sınır testi kullanılmıştır. Uzun dönem tahminleri DOLS tahmincisi aracılığıyla elde edilmiştir. Çalışma, seriler arasında bir eşbütünleşme ilişkisi tespit ederek finansal gelişmenin, BİT'in, maliye politikasının ve dışa açıklığın küreselleşmeyi olumlu yönde etkilediğini ve güçlendirdiğini ortaya koymaktadır. Bulgular doğrultusunda Çinli politika yapıcılara küreselleşmeyi daha da güçlendirmeye yönelik politika önerilerinde bulunulabilir.*

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## 1. INTRODUCTION

Over the past few decades, China has undergone profound structural and economic transformation and has become one of the largest and most influential economies in the world. A key component of this remarkable development has been China's deepening integration into the global economy. Through gradual trade liberalization, attraction of foreign direct investment, financial sector reforms and the adoption of new technologies, China has increasingly benefited from globalization and, in turn, has become a major actor in global trade, finance and production networks.

Globalization, however, is not a one-dimensional phenomenon. It is a multidimensional process that involves economic, social and political interactions across borders, and it is shaped by a broad set of structural and policy-related factors. In empirical research, this multidimensionality has encouraged the use of composite measures rather than relying on a single proxy such as trade-to-GDP. Globalization is proxied in this study by the KOF overall globalization index (KOFGI), which provides a comprehensive measure of a country's integration into the world economy (Dreher, 2006; Gygli et al., 2019). A key advantage of this index is that it distinguishes between realized cross-border activities (de facto globalization) and the institutional and policy environment that enables or restricts international integration (de jure globalization) (Gygli et al., 2019; KOF Swiss Economic Institute, 2025). This distinction is important for determinants-based analysis because domestic conditions may influence globalization through different margins—by affecting actual flows and interactions, by shaping the policy—institutional framework, or by operating through both channels simultaneously.

In the case of China, several determinants stand out as particularly relevant for understanding the country's degree of integration with the rest of the world. Among these, financial development, Information and Communication Technologies (ICT), fiscal policy and trade openness play a central role. Financial development can facilitate globalization by improving access to credit, mobilizing savings and supporting cross-border capital flows. ICT reduces information and transaction costs, promotes the diffusion of knowledge and enables participation in global value chains. Fiscal policy, through the level and composition of government expenditure, affects infrastructure, human capital and institutional quality, which in turn shape the capacity to benefit from globalization. Trade openness directly reflects the extent to which an economy is integrated into international markets via exports and imports. Beyond their separate effects, these factors can also be viewed as interacting "capacity" channels: financial systems support internationalization by easing financing and risk management; digital capacity reduces coordination frictions and expands the set of tradable activities; public expenditure can raise the quality of hard/soft infrastructure and institutional capability; and openness can translate domestic capabilities into realized cross-border exchange.

In parallel with these developments, a growing empirical literature has examined the determinants and consequences of globalization using composite indicators such as the KOF Globalization Index. Existing studies generally report that financial development and various dimensions of globalization are closely linked, and that trade openness, institutional quality and technological factors are important in explaining cross-country differences in globalization levels. However, much of this evidence is based on multi-country panel data, and relatively few contributions analyze a single country's globalization process using a comprehensive globalization index while jointly considering financial development, ICT, fiscal policy and trade openness. This matters for China because the country's globalization trajectory has evolved alongside policy sequencing, reform episodes, and structural changes that may be difficult to capture through pooled panel averages. A country-specific time-series approach can therefore complement the panel evidence by distinguishing long-run relationships from short-run adjustments in a setting where reforms and external integration have unfolded gradually and unevenly over time.

Against this background, the present study examines whether and how financial development, ICT, government expenditure and trade openness are associated with China's globalization dynamics as measured by KOFGI. The empirical strategy combines unit root testing (ADF and PP) with cointegration analysis using the autoregressive distributed lag (ARDL) bounds-testing approach, complemented by Dynamic OLS (DOLS) estimates and Granger causality tests to assess both long-run linkages and short-run directional relationships. The conceptual framework that guides the empirical specification is presented in the methodology section (Section 3), rather than in the introduction, to ensure a clear separation between motivation and model formulation. The findings are used to inform a cautious discussion of policy-relevant implications for enhancing China's capacity to sustain and manage international integration.

The remainder of the study is organized as follows. Section 2 reviews the related literature and identifies the main research gap. Section 3 outlines the empirical model, data and econometric methods. Section 4 presents the

empirical findings. Section 5 discusses the results in relation to prior research. Section 6 concludes and develops policy implications. Section 7 outlines limitations and directions for future research.

## 2. LITERATURE REVIEW

Globalization is a complex multifaceted concept that describes the increasing interconnectedness and interdependence of countries, economies, and societies around the world. It encompasses various economic, social, political, and cultural dimensions (Dreher, 2006). The KOF Globalisation Index is a popular measure of globalization as it is a composite index that captures economic, social and political globalization (Dreher, 2006; Gygli et al., 2019). Beyond being "broad", this index is explicitly designed to separate realized cross-border integration (de facto) from the institutional-policy environment that enables or constrains it (de jure). This distinction matters for determinants-based work because the same domestic factor can operate through different margins: for instance, ICT may raise de facto integration by reducing transaction and coordination costs, while regulatory reforms and financial liberalization can shift de jure integration by altering rules governing trade, capital flows, and international activity (Gygli et al., 2019; KOF Swiss Economic Institute, 2025). In this sense, KOFGI is not only an "outcome" of openness but also a summary of the evolving capacity of an economy to sustain cross-border exchange under changing domestic and international constraints (Potrafke, 2015).

Composite measurement also creates an interpretation challenge: when globalization is proxied by an index that already aggregates trade and financial subcomponents, empirical models should avoid "definitional storytelling" and instead articulate channels—how domestic capacity and policy choices translate into broader cross-border connectedness. This is especially relevant when trade openness is included as a regressor, because trade is conceptually close to economic globalization and may be embedded in the construction of the KOF index (KOF Swiss Economic Institute, 2025). This concern is not merely conceptual: recalculations of the KOF economic globalization component using alternative openness measures suggest that the index is broadly robust, but they also reinforce the need for careful interpretation when openness enters the right-hand side of the model (Gozgor, 2018). Accordingly, recent empirical work increasingly emphasizes mechanisms and identification: the question is not whether openness correlates with globalization, but which domestic pillars (finance, digital capacity, fiscal capacity, and policy stance) help explain changes in a multidimensional globalization index over time.

Against this backdrop, the determinants literature that informs the present model can be organized into four interrelated strands aligned with our explanatory variables: financial development, ICT/digitalization, fiscal policy, and trade openness. A recurring limitation is that much of the evidence is drawn from multi country panels. While panels provide cross-sectional variation, they can mask country-specific reform sequencing, institutional discontinuities, and structural breaks issues that are particularly salient for China’s globalization experience, where integration has unfolded alongside gradual liberalization, state-guided financial reforms, and rapid technology upgrading. This motivates complementary single-country time-series evidence that can separate long-run linkages from short-run adjustments and speak more directly to China’s internal drivers of globalization dynamics. Importantly, many empirical models in this area also include institutional quality and macroeconomic stability controls (e.g., inflation, interest rates, government investment), which signals that "domestic capacity" is multidimensional and that estimates for any one channel should be interpreted as conditional associations rather than as standalone drivers (Mahalik et al., 2023).

### 2.1. Financial Development and Globalization

The relationship between financial development and globalization has been studied extensively in the literature. Earlier conceptual contributions highlighted that globalization can stimulate institutional reforms and market deepening in developing countries, thereby shaping domestic financial development as much as being shaped by it (Mishkin, 2009). The literature suggests that financial development can play a crucial role in promoting globalization by facilitating international trade and investment, improving access to credit and financial services, and enhancing economic efficiency. However, a key conceptual point is that the finance-globalization nexus is rarely purely one-way: deeper domestic finance can expand firms’ capacity to participate in international markets (trade finance, hedging, cross-border payments, external funding), while greater global integration can reshape domestic finance through competition, learning spillovers, and increased demand for sophisticated financial services. This bidirectionality raises identification concerns and helps explain why effects differ across institutional settings and stages of development. In a related vein, broader assessments of financial globalization argue that the benefits of cross-border integration tend to be indirect and conditional-working through improved discipline, risk-sharing, and institutional upgrading rather than through simple volume effects (Kose et al., 2009).

Studies indicate that financial development has a positive impact on globalization. For example, Fofack (2009) found that financial development promotes globalization by increasing trade openness and capital flows. Similarly, Kazar & Kazar (2016) found that financial development positively affects globalization and economic growth. More recent evidence also stresses heterogeneity: the "same" expansion of credit or markets can support outward integration when intermediation is efficient and stability is preserved, but can be less globalization-enhancing (or even fragile) when institutions are weak or when the financial system amplifies external shocks. One implication is that finance should be interpreted as "integration capacity" rather than a mechanical correlate of globalization. Panel-cointegration and causality approaches further underline that the direction and strength of linkages are not uniform: evidence for a multi-country sample over 1989-2012 suggests that globalization can support growth and access to external finance, yet does not necessarily translate into domestic financial deepening in a systematic way (Kandil et al., 2015). Relatedly, studies emphasizing institutional transmission mechanisms argue that globalization can operate indirectly by encouraging institutional reforms that subsequently facilitate banking-sector development (Law et al., 2015).

This point is especially relevant for China, where financial deepening has occurred alongside strong state involvement in credit allocation and gradual opening of capital-account and financial markets. Time-series evidence focusing on China and comparable emerging economies suggests that financial development can foster economic globalization in the long run, while short-run dynamics may reflect adjustment costs, policy sequencing, and episodic tightening/loosening cycles (Mahalik et al., 2023). Complementary global-panel evidence (1980-2014) also supports a positive association between financial market development and economic globalization on average, while leaving room for country-specific institutional heterogeneity in magnitudes (Katircioğlu & Zabolotnov, 2020). In applied work, the measurement of financial development also matters: multidimensional indices (e.g., combining depth, access, and efficiency of financial institutions and markets) are often preferred over single proxies such as private credit-to-GDP because they better capture the institutional and market structure through which globalization-relevant financial services are delivered (Svirydzenka, 2016). Overall, the literature supports a positive finance-globalization connection but cautions that estimates depend on institutions, stability, and identification strategy. This motivates including financial development as a core determinant while interpreting coefficients through plausible channels (capacity, cost of capital, risk-sharing) rather than through purely correlational narratives.

### 2.2. ICT, Digitalization, and Globalization

Information and Communication Technology (ICT) is another important factor that drives globalization. ICT can facilitate cross-border trade and investment, promote communication and cultural exchange, and enhance access to information and knowledge. Latif et al. (2018) found that ICT contributes to globalization by increasing economic integration and enhancing economic growth. At the mechanism level, ICT reduces information frictions and coordination costs, lowers entry barriers for firms, and expands the scope of tradable activities—particularly services and digital-enabled tasks—thereby reshaping not only the intensity but also the composition of globalization. Recent international evidence emphasizes this compositional shift by documenting how globalization is associated with faster digital technology adoption across a broad set of countries, consistent with two-way spillovers between global connectedness and digital capability (Skare & Ribeiro Soriano, 2021).

The empirical literature also suggests two-way reinforcement. Globalization can accelerate digital adoption through competitive pressure, technology transfer, and diffusion of best practices, while digital adoption expands the feasible set of cross-border interactions. For example, Skare and Ribeiro Soriano (2021) Show, using KOF globalization measures and cross-country digital adoption indicators, that globalization is associated with faster digital technology adoption, highlighting globalization’s role as a spillover channel for technology diffusion. These findings imply that ICT should not be treated as a narrow "infrastructure" control, but as part of a broader connectivity capability that can amplify the effects of openness and finance. China’s case is instructive because ICT expansion has been rapid and often policy-supported, making it plausible that digital capacity affects globalization both directly (enabling cross-border transactions and digital services) and indirectly (raising productivity, upgrading value chains, and strengthening international competitiveness). Evidence from China indicates that the digital economy can improve efficiency by optimizing resource allocation and reducing transaction costs—mechanisms consistent with stronger integration potential in global value chains (Liu et al., 2024). Complementing this micro-to-macro channel, global policy reports emphasize that cross-border data and digitally delivered services have become central components of modern international integration, reinforcing the idea that ICT capacity is increasingly a structural driver of globalization dynamics (UNCTAD, 2024). Consistent with this broader shift, recent UNCTAD statistics note the growing weight of digitally deliverable services in

global services exports, which supports treating ICT as a structural (not merely auxiliary) component of modern integration (UNCTAD, 2025).

### 2.3. Fiscal Policy and Globalization

The relationship between globalization and fiscal policy has also been examined in the literature. The literature suggests that globalization can affect fiscal policy by increasing competition for investment and trade, leading to lower tax rates and reduced government spending. Songur & Yalçınkaya Koyuncu (2023) found that economic globalization leads to a reduction in taxation and increased green investment. Yet the broader fiscal-globalization debate is typically framed around two competing hypotheses: (i) the "efficiency/discipline" view, where globalization constrains governments and pressures them toward lower taxes/spending to maintain competitiveness, and (ii) the "compensation" view, where openness raises exposure to external risk and volatility, inducing governments to expand social protection and public investment (Rodrik, 1998). Classic comparative political economy work similarly associated trade openness with larger public sectors as a form of risk insurance in open economies (Cameron, 1978), while later contributions debated the conditions under which tax and spending competition dominates compensation dynamics (Garrett, 1998).

Recent synthesis work reinforces that there is no single stylized fiscal response: results are heterogeneous and depend on how openness/globalization is conceptualized and measured, which spending categories are examined, and what institutional settings prevail. A meta-analysis focusing on openness and social spending concludes that empirical heterogeneity is systematically related to measurement and modeling choices, cautioning against one-dimensional claims about globalization's fiscal effects (Giuliani & Madama, 2025). From a determinants perspective (which is the focus of this paper), fiscal policy can also shape globalization particularly when public spending strengthens infrastructure, human capital, innovation capacity, and institutional quality. This channel is highly relevant for China, where public investment and state-led programs have played an outsized role in logistics, innovation support, and digital infrastructure. For instance, evidence on China indicates that fiscal science and technology expenditures can raise regional innovation efficiency and support convergence, suggesting a mechanism through which fiscal capacity can enable the technological and productive upgrading associated with stronger global integration potential (Hou, 2023). In KOF-based empirical work, globalization has also been linked to the composition (not only the level) of public expenditures, highlighting that fiscal policy interacts with integration in ways that can alter productive capacity and policy priorities (Dreher et al., 2008). Despite this plausibility, fewer studies directly model government expenditure as a driver of a comprehensive globalization index, especially in single-country time-series settings, leaving room for a more integrated approach.

### 2.4. Trade Openness and Globalization

Trade openness is an important measure of globalization and is often used as a proxy for economic integration. Trade openness can be measured by the ratio of exports and imports to GDP. The literature suggests that trade openness can promote globalization by increasing economic integration and facilitating the exchange of goods and services. Leitão (2014) found that trade openness has a positive impact on economic globalization. Pratiwi & Wulansari (2022) found that trade openness promotes economic globalization in ASEAN countries. At the same time, earlier reviewer concerns about directionality remain relevant in the broader literature: globalization can plausibly reinforce openness through policy learning, institutional alignment, and competitiveness pressures, which further motivates interpreting openness coefficients as part of a dynamic system rather than as strictly exogenous drivers.

However, when globalization is measured using composite indices (such as KOF), trade openness requires mechanism-based interpretation. Because trade and related restrictions can be embedded in the economic globalization component, researchers must be careful to avoid purely mechanical correlation and instead clarify what openness is capturing in the model: policy stance, market access, and the realized ability to convert domestic capabilities into cross-border exchange (KOF Swiss Economic Institute, 2025). This is one reason the literature often stresses robustness and measurement sensitivity when trade openness is paired with globalization indices (Gozgor, 2018). In this integrated view, trade openness interacts with other domestic pillars. Financial development can support exporters via credit and risk management instruments; ICT reduces trade costs and enables digitally deliverable trade; and fiscal policy can improve trade-related infrastructure and institutional capacity. Policy-oriented evidence also underscores that "opening-up" is not only about volumes but also about institutional alignment and facilitation; for example, the World Openness Report emphasizes cross-border institutional openness alongside performance, consistent with the idea that openness policies can reinforce broader globalization connectivity (Institute of World Economics and Politics [IWEP] & Research Center for Hongqiao International Economic Forum, 2024).

### 2.5. Synthesis, Research Gap, and Contribution

The literature on globalization determinants is extensive and covers various factors that drive globalization. The literature suggests that financial development, ICT, fiscal policy, and trade openness are important drivers of globalization. At the same time, the evidence is heterogeneous and context-dependent, and much of it comes from multi-country panels that can obscure country-specific policy sequencing and structural breaks. These concerns are particularly salient for China, where globalization has unfolded alongside gradual liberalization, state-guided financial reforms, and rapid technology upgrading. Moreover, several strands of the literature imply that the four channels considered here often co-move with institutional quality and macroeconomic stability, so the most policy-relevant interpretation is not "one variable causes globalization", but rather how domestic capacity bundles (finance-technology-public capacity-openness) relate to integration dynamics under different policy regimes (Kose et al., 2009; Potrafke, 2015).

This motivates the present study's contribution: rather than narrating determinants as isolated correlates, we treat financial development, ICT/digitalization, fiscal policy (government expenditure), and trade openness as interacting pillars of "global integration capacity" and evaluate how they jointly relate to the evolution of a multidimensional globalization measure (KOF overall globalization) within a single-country time-series framework. By doing so, the study addresses an underexplored angle in the literatüre, modeling globalization itself (measured comprehensively) as the outcome, and provides a China-focused account that is better suited to capturing long-run relationships and short-run adjustments than pooled panel averages.

## 3. MODEL AND METHODOLOGY

This study, which focuses on the key drivers of globalization in the Chinese economy, analyzes the relationships between globalization and the variables influencing it using the following model in Equation (1):

$$lnGLOB_t = \alpha + \gamma_1 lnFIN_t + \gamma_2 lnICT_t + \gamma_3 lnGOV_t + \gamma_4 lnTR_t + \varepsilon_t \quad (1)$$

All variables are transformed into natural logarithms to mitigate scale differences and potential heteroskedasticity, and to allow the slope coefficients to be interpreted as approximate elasticities in terms of proportional changes. The trade openness indicator is computed as $TR_t = 100 \times (X_t + M_t)/GDP_t$, where $X_t$ and $M_t$ denote exports and imports, respectively. Fiscal policy is proxied by general government final consumption expenditure as a share of GDP $(GOV_t)$, and ICT is proxied by mobile cellular subscriptions (per 100 people), consistent with the World Development Indicators definition. The KOFGI overall globalization index and the IMF financial development index are used as provided by their respective databases; therefore, the empirical strategy focuses on how movements in these series relate over time rather than on reconstructing the indices themselves.

The conceptual framework underlying Equation (1) is summarized in Figure 1, which links financial development, ICT, government expenditure, and trade openness to China's globalization (KOFGI) through complementary "capacity" channels. While the diagram is presented in terms of determinant channels, feedback effects are also plausible over time (e.g., higher globalization may influence openness and financial development), which motivates the additional use of short-run dynamics and causality evidence in the empirical section.

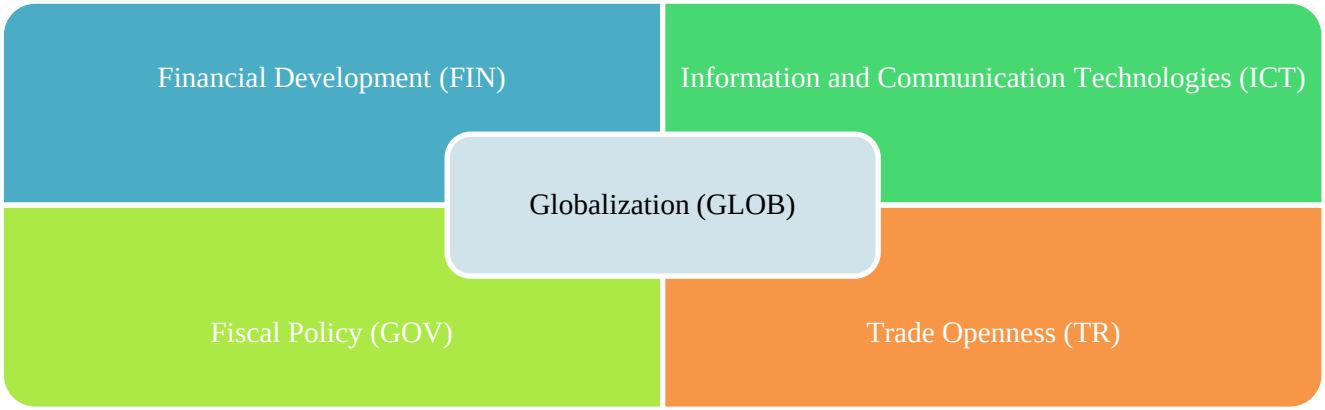


**Figure 1.** The Theoretical Model

In this model, GLOB represents the globalization index, FIN denotes the financial development index, ICT stands for information and communication technology, GOV refers to fiscal policy, and TR indicates trade openness.

GLOB is the dependent variable, while FIN, ICT, GOV, and TR are the explanatory variables. $\alpha$is the constant term, and $\gamma_1$, $\gamma_2$, $\gamma_3$, and $\gamma_4$ represent the long-run parameters. Each parameter respectively reflects the elasticity of globalization with respect to financial development, ICT, fiscal policy, and trade openness.

The data for the variables are obtained from the KOF-SEI, IMF, and WDI databases. Table 1 provides detailed information about variables, while Figure 2 illustrates the trends of the series during the 1990-2021 period.

**Table 1.** Data Descriptions

| Variables | Symbol | Measure | Source |
|---|---|---|---|
| Globalization | GLOB | Overall globalization index | KOF-SEI |
| Information and communication Technologies | ICT | Mobile cellular subscriptions | WDI |
| Financial development | FIN | Financial development index | IMF |
| Fiscal policy | GOV | General government final consumption expenditure (% of GDP) | WDI |
| Trade openness | TR | Export and Imports (% of GDP) | WDI |

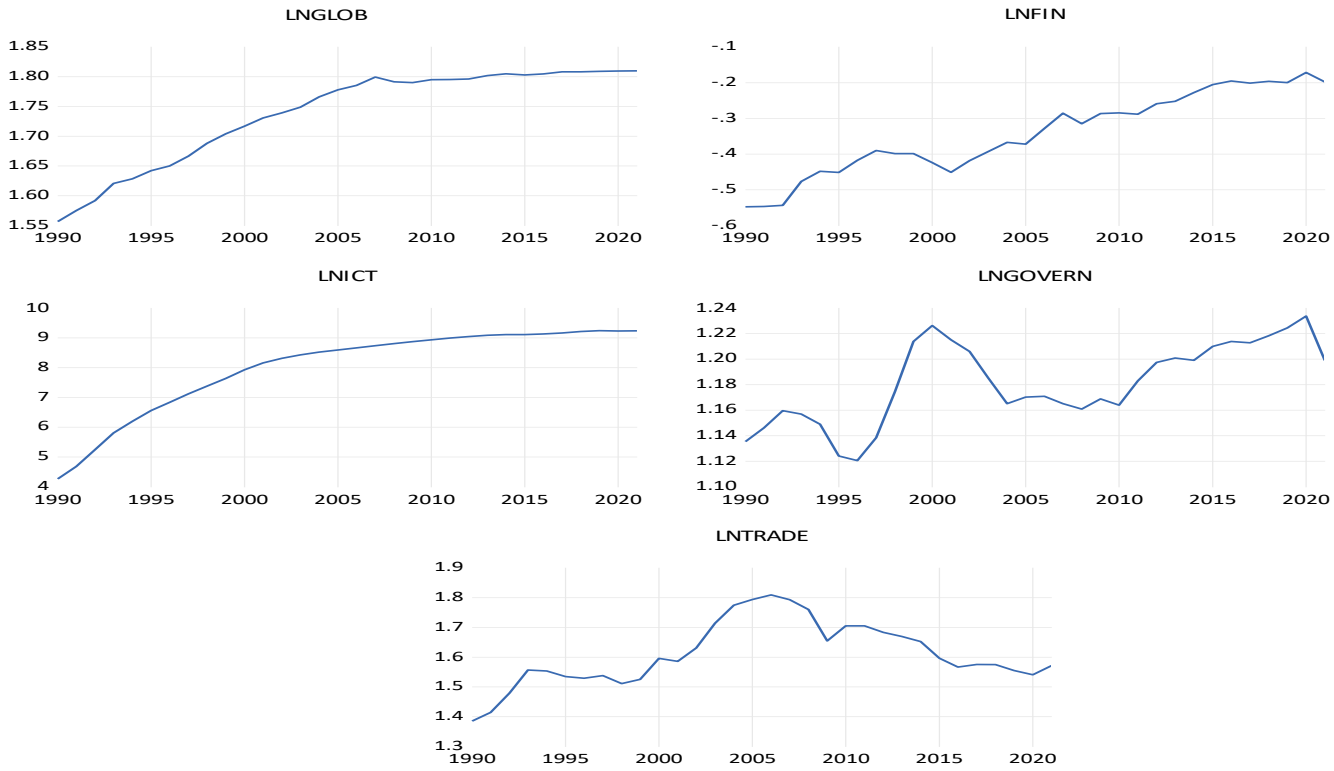


**Figure 2.** The Course of Variables in the Period 1990-2021

From an econometric methodology perspective, the study performs unit root analysis for all the series by applying the ADF and PP unit root tests. A simple form of the ADF regression can be written as in Equation (2):

$$\Delta y_t = \mu + \rho y_{t-1} + \sum_{i=1}^{k} \phi_i \Delta y_{t-i} + u_t \quad (2)$$

where $y_t$ is the series, Δ denotes the first difference and $u_t$ is the error term. These tests help determine whether the series are stationary at the level or need to be differenced to achieve stationarity, which constitutes a crucial step in time-series modelling.

In both ADF and PP tests, the null hypothesis is that the series contains a unit root (non-stationary), against the alternative of stationarity. The ADF test addresses serial correlation by augmenting the regression with lagged differences, while the PP test provides a complementary robustness check by applying a non-parametric correction

to the test statistic that is robust to general forms of serial correlation and heteroskedasticity in the error term. Given the annual frequency and limited sample size, the lag length in the ADF regression is selected parsimoniously using information criteria, and the unit-root results are cross-checked across ADF and PP to avoid relying on a single test outcome.

To detect the cointegration among the series, the ARDL bounds testing approach is applied. In general terms, the ARDL model for $InGLOB_t$ and its determinants can be written as in Equation (3):

$$ln(GLOB_t) = \delta_0 + \sum_{i=1}^{p} \delta_i \, ln(GLOB_{t-i}) + \sum_{j=0}^{q_1} \beta_j \, ln(FIN_{t-j}) + \sum_{j=0}^{q_2} \theta_j \, ln(ICT_{t-j}) + \sum_{j=0}^{q_3} \eta_j \, ln(GOV_{t-j}) + \sum_{j=0}^{q_4} \kappa_j \, ln(TR_{t-j}) + v_t \quad (3)$$

Following Pesaran et al. (2001), the ARDL bounds model is estimated with variables in levels, while short-run dynamics are captured through the Δ (first-difference) terms generated within the unrestricted error-correction form (UECM) representation. Accordingly, no manual difference calculation is applied to the level variables beyond the Δ-operator terms shown in the model specification, and they are shown as in Equation (4):

$$\begin{aligned} \Delta \, ln(GLOB_t) = c_0 &+ \sum_{i=1}^{p-1} \phi_i \, \Delta \, ln(GLOB_{t-i}) + \sum_{j=0}^{q_1-1} \beta_j \, \Delta \, ln(FIN_{t-j}) + \sum_{j=0}^{q_2-1} \theta_j \, \Delta \, ln(ICT_{t-j}) + \sum_{j=0}^{q_3-1} \eta_j \, \Delta \, ln(GOV_{t-j}) + \sum_{j=0}^{q_4-1} \kappa_j \, \Delta \, ln(TR_{t-j}) \\ &+ \lambda_1 \, ln(GLOB_{t-1}) + \lambda_2 \, ln(FIN_{t-1}) + \lambda_3 \, ln(ICT_{t-1}) + \lambda_4 \, ln(GOV_{t-1}) + \lambda_5 \, ln(TR_{t-1}) + \varepsilon_t \end{aligned} \quad (4)$$

Cointegration is tested by the bounds F-statistic for the joint null $H_0: \lambda_1 = \lambda_2 = \lambda_3 = \lambda_4 = \lambda_5 = 0$. If the computed F-statistic exceeds the upper bound critical value, the variables are interpreted as cointegrated; if it falls below the lower bound, cointegration is not supported; and if it lies between bounds, the evidence is inconclusive (Pesaran et al., 2001). This approach is particularly attractive in small samples and in settings where regressors may be a mixture of $I(0)$ and $I(1)$, provided that none of the series is $I(2)$, which is checked via unit root tests. The lagged values of the dependent and explanatory variables are included with appropriate lag lengths. This technique is particularly suitable for small samples, making it an appropriate choice for the structure of the data (Pesaran et al., 2001).

For the estimation of long-run coefficients, the study utilizes the DOLS estimator, which is widely adopted in empirical literature as a robust technique for handling potential endogeneity and serial correlation in cointegrated systems (Stock & Watson, 1993). A simple DOLS specification based on Equation (5) can be given as:

$$InGLOB_t = \beta_0 + \beta_1 \, ln \, F \, IN_t + \beta_2 \, ln \, I \, CT_t + \beta_3 \, ln \, G \, OV_t + \beta_4 \, ln \, T \, R_t + \sum_{k=-s}^{r} \omega_k \Delta X_{t+k} + e_t \quad (5)$$

where $X_t$ represents the set of explanatory variables and $\Delta X_{t+k}$ are their leads and lags in first differences. The DOLS estimator enhances the reliability and precision of long-term parameter estimates, providing more accurate insights into the elasticities of globalization with respect to its key determinants.

In DOLS, the inclusion of leads and lags of first differences of the regressors is intended to absorb potential endogeneity and serial correlation that may bias conventional OLS estimates in cointegrated systems. Accordingly, the DOLS estimates are interpreted as a robustness-oriented benchmark for the long-run parameters rather than as a substitute for the ARDL long-run solution, and the sensitivity of results to the chosen lead–lag length is assessed to ensure that inferences are not driven by an arbitrary dynamic specification.

Finally, the causality analysis of the variables is performed using the Granger (1969) causality technique. Given the stationarity requirements of Granger-type tests, the causality analysis is implemented in a stationary representation (and interpreted as short-run predictive precedence rather than structural causality) (Granger, 1969). For example, the possible causality from financial development to globalization can be tested with the following in Equation (6):

$$\Delta \, ln(GLOB_t) = \alpha_0 + \sum_{i=1}^{L} \alpha_i \, \Delta \, ln(GLOB_{t-i}) + \sum_{i=1}^{L} \gamma_i \, \Delta \, ln(FIN_{t-i}) + u_t \quad (6)$$

Given the possibility of feedback effects highlighted in the conceptual framework, Granger causality results are interpreted as evidence on short-run predictive precedence rather than as definitive structural causality. In

particular, the causality tests complement the long-run cointegration evidence by indicating whether changes in one variable tend to precede changes in another within the sample, which is useful for discussing sequencing and adjustment dynamics in the policy interpretation. Similar equations are set up for ICT, GOV and TR. If the lagged values of an explanatory variable are jointly significant, this variable is said to Granger-cause globalization. The causality analysis is of particular importance as it serves to diversify policy recommendations. Figure 3 collectively presents all the empirical methods applied in the study.

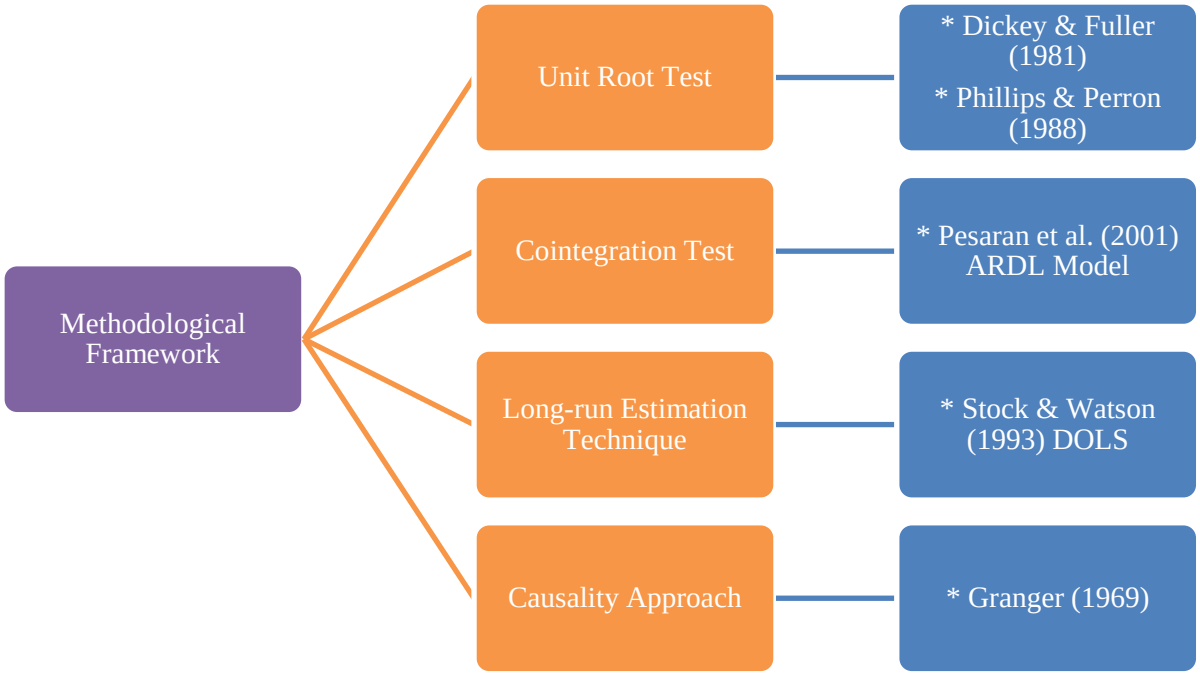


**Figure 3.** Methodological Framework

## 4. FINDINGS

The first empirical outcomes are the descriptive statistics, which are expressed in detail in Table 2. The variable lnICT has the highest values across all statistical measures, while lnFIN consistently has the lowest values among the variables. The mean values indicate that among the variables, lnICT has the highest average (8.008), while lnFIN has the lowest (-0.341). The standard deviation is also highest for lnICT (1.437), suggesting greater variability in this variable over the study period. Conversely, lnGOV shows the least variation, with a standard deviation of just 0.031. Regarding skewness, lnGLOB, lnFIN, lnICT and lnGOV are negatively skewed, indicating a longer tail on the left side of their distributions. lnTR, in contrast, is slightly positively skewed.

**Table 2.** Summary Statistics

| | lnGLOB | lnFIN | lnICT | lnGOV | lnTR |
|---|---|---|---|---|---|
| **Mean** | 1.738 | -0.341 | 8.008 | 1.181 | 1.610 |
| **Median** | 1.781 | -0.347 | 8.629 | 1.178 | 1.580 |
| **Max.** | 1.809 | -0.171 | 9.243 | 1.233 | 1.809 |
| **Min.** | 1.556 | -0.548 | 4.262 | 1.120 | 1.385 |
| **Std. dev.** | 0.080 | 0.113 | 1.437 | 0.031 | 0.107 |
| **Skewness** | -0.905 | -0.178 | -1.252 | -0.175 | 0.160 |
| **Kurtosis** | 2.441 | 1.931 | 3.437 | 1.973 | 2.480 |
| **Obs.** | 32 | 32 | 32 | 32 | 32 |

Table 3 outlines the correlation matrix, which illustrates the links between the variables. The outcomes indicate that lnFIN, lnICT, lnGOV, and lnTR are positively linked with lnGLOB. In other words, the table reveals strong and statistically meaningful relationships between globalization and its potential determinants. Notably, lnICT and lnFIN show a positive correlation with lnGLOB (0.987 and 0.909, respectively), suggesting that improvements in ICT and financial development are closely associated with increases in globalization. Similarly, lnTR and lnGOV also exhibit positive correlations with lnGLOB, at 0.663 and 0.649, respectively.

**Table 3.** Correlation Matrix

| | lnGLOB | lnFIN | lnICT | lnGOV | lnTR |
|---|---|---|---|---|---|
| **lnGLOB** | 1.000 | | | | |
| **lnFIN** | 0.909 | 1.000 | | | |
| **lnICT** | 0.987 | 0.889 | 1.000 | | |
| **lnGOV** | 0.649 | 0.614 | 0.659 | 1.000 | |
| **lnTR** | 0.663 | 0.379 | 0.650 | 0.096 | 1.000 |

Following the correlation analysis, it is crucial to examine the stationarity properties of the variables, as non-stationary time series can lead to misleading regression results. Table 4 presents the outcomes of the ADF and PP unit root tests conducted for this purpose (Dickey & Fuller, 1981; Phillips & Perron, 1988). The outcomes report that all series become stationary after first differencing. This finding confirms that the series are difference-stationary and thus appropriate for cointegration analysis in the subsequent stages of the study.

**Table 4.** Unit Root Results

| **ADF** | **Level** | **First difference** |
|---|---|---|
| lnGLOB | -1.938 | -2.778$^{*}$ |
| lnFIN | -1.367 | -5.384$^{***}$ |
| lnICT | -2.616 | -3.624$^{**}$ |
| lnGOV | -2.143 | -3.285$^{**}$ |
| lnTR | -2.219 | -3.750$^{***}$ |
| **PP** | **Level** | **First difference** |
| lnGLOB | 2.686 | -5.239$^{***}$ |
| lnFIN | -1.376 | -5.374$^{***}$ |
| lnICT | 1.830 | -2.607$^{**}$ |
| lnGOV | -1.951 | -2.788$^{*}$ |
| lnTR | -2.199 | -3.739$^{***}$ |

**Note:** $^{***}$, $^{**}$ and $^{*}$ express significance at 1%, 5% and 10% level, respectively.

**Table 5.** ARDL Cointegration Results

| **Optimal lag** | | **[1,0,0,0,0]** | |
|---|---|---|---|
| *F*-statistic | | 36.242$^{***}$ | |
| $ECT_{(t-1)}$ | | -0.367$^{***}$ | |
| **Critical values** | | | |
| **Significance level** | **Lower bounds, *I*(0)** | **Upper bounds, *I*(1)** | |
| 1% | 3.29 | 4.37 | |
| 5% | 2.56 | 3.49 | |
| 10% | 2.20 | 3.09 | |
| **Diagnostic tests** | | | |
| Breusch-Godfrey LM test | 2.874 (0.102) | $R^2$ | 0.997 |
| ARCH LM test | 0.294 (0.591) | Adjusted-$R^2$ | 0.996 |
| J-B normality test | 1.369 (0.505) | *F*-statistic | 1943.778$^{***}$ |
| Ramsey RESET test | 2.026 (0.053) | Prob. | 0.000 |

**Note:** $^{***}$ and $^{**}$ denote significance at 1% and 5% levels, respectively.

Once cointegration is supported, the short-run adjustment is captured through an error-correction specification in which the error-correction term $ECT_{t-1}$ represents the lagged deviation from the estimated long-run equilibrium. The coefficient on $ECT_{t-1}$ is expected to be negative and statistically significant, indicating that deviations from the long-run path are partially corrected over time. In addition, standard diagnostic checks—serial correlation (Breusch-Godfrey LM), conditional heteroskedasticity (ARCH LM), normality (Jarque-Bera), and functional form (Ramsey RESET)—are used to assess whether the estimated ARDL model is well-specified and empirically adequate.

The finding that all series are difference-stationary necessitates an investigation into whether a cointegration exists among the variables. Therefore, this study applies the ARDL bounds test as the cointegration technique.

According to Table 5, the outcomes report that the calculated F-statistic, with a value of 36.242, is significant at the 1% level and exceeds the upper critical bound. This points out a cointegration relationship among the variables. So, a long-run link exists among lnFIN, lnICT, lnGOV, lnTR, and lnGLOB.

**Table 6.** DOLS Results

| Variables | Coefficient | Std. Err. | Prob. |
|---|---|---|---|
| **lnFIN** | 0.326*** | 0.028 | **0.000** |
| **lnICT** | 0.023** | 0.009 | **0.028** |
| **lnGOV** | 0.485*** | 0.087 | **0.000** |
| **lnTR** | 0.280*** | 0.026 | **0.000** |
| **Constant** | 0.619*** | 0.103 | **0.000** |

**Note:** *** and ** denote significance at 1% and 5% levels, respectively.

The parameter estimates derived using the DOLS estimator are presented in Table 6. Considering the outcomes, the coefficient for lnFIN (0.326) is positive and significant, supporting the conclusion that financial development is positively associated with globalization. This result can be expressed as a 1% increase in lnFIN leading to approximately a 0.326% increase in lnGLOB. This outcome is consistent with the panel findings of Katircioğlu & Zabolotnov (2020) and with related evidence that links financial deepening to broader international integration through intermediation and risk-sharing (Mishkin, 2009; Kandil et al., 2015; Mahalik et al., 2023).

Similarly, the coefficient for lnICT (0.023) is also positive and significant, indicating that ICT enhances globalization. This finding can be interpreted as a 1% increase in lnICT leading to a 0.023% increase in lnGLOB. This outcome is in line with empirical evidence indicating that ICT investment and adoption lower information frictions and coordination costs and thereby facilitate countries' integration into global markets (Latif et al., 2018; Skare & Ribeiro Soriano, 2021).

The coefficient for lnGOV (0.485) is positive and statistically significant. In the log-log specification, this implies that a 1% increase in lnGOV is associated with approximately a 0.485% increase in lnGLOB. Government spending thus appears as an important driver of globalization in the Chinese economy, which is broadly consistent with evidence that globalization and the size/composition of the public sector often co-move, particularly where public spending supports adjustment and competitiveness in more open economies (Cameron, 1978; Garrett, 1998; Dreher et al., 2008).

Finally, the coefficient for lnTR (0.280) is found to be positive and significant. This can be interpreted as a 1% increase in lnTR leading to a 0.280% increase in lnGLOB. This result suggests that trade openness is positively associated with globalization, in line with empirical evidence linking openness to broader measures of economic globalization (Dreher, 2006; Leitão, 2014; Pratiwi & Wulansari, 2022). Overall, the findings suggest that financial development, ICT, fiscal policy, and trade openness are key drivers of globalization in the Chinese economy.

**Table 7.** Granger Causality Results

| Hypothesis | $\chi^2$ | Prob. | Causality |
|---|---|---|---|
| lnFIN ≠> lnGLOB | 0.825 | 0.661 | **No** |
| lnICT ≠> lnGLOB | 5.658* | 0.059 | **Yes** |
| lnGOV ≠> lnGLOB | 5.262* | 0.072 | **Yes** |
| lnTR ≠> lnGLOB | 3.096 | 0.212 | **No** |
| lnGLOB ≠> lnFIN | 3.027 | 0.220 | **No** |
| lnGLOB ≠> lnICT | 3.916 | 0.141 | **No** |
| lnGLOB ≠> lnGOV | 6.360** | 0.041 | **Yes** |
| lnGLOB ≠> lnTR | 8.061** | 0.017 | **Yes** |

**Note:** ** and * denote significance at 5% and 10% levels, respectively.

Finally, in order to investigate the causality among the series, the study utilizes the Granger causality approach. The outcomes obtained through the appropriate VAR model are reported in Table 7. Based on the causality outcomes, the null hypothesis that lnFIN does not Granger-cause lnGLOB cannot be rejected; hence, no causality from financial development to globalization is identified. On the other hand, since the null hypotheses that lnICT does not Granger-cause lnGLOB and lnGOV does not Granger-cause lnGLOB are rejected at the 10% significance level, it can be detected that ICT and fiscal policy do cause globalization. Moreover, the null hypothesis that lnTR does not Granger-cause lnGLOB cannot be rejected, implying that no evidence of causality from trade openness to globalization is found.

Regarding reverse causalities, the null hypotheses that lnGLOB does not Granger-cause lnFIN and lnGLOB does not Granger-cause lnICT cannot be rejected, indicating no evidence that globalization causes financial development or ICT. Finally, since the null hypotheses that lnGLOB does not Granger-cause lnGOV and lnGLOB does not Granger-cause lnTR are rejected at the 5% significance level, the existence of causality from globalization to fiscal policy and trade openness becomes evident.

## 5. DISCUSSION

This study provides evidence consistent with a long-run relationship between China's overall globalization (KOFGI) and the domestic determinants considered, as indicated by the ARDL bounds test and the negative and statistically significant adjustment parameter in the error-correction framework. In substantive terms, the sign and magnitude of the error-correction term imply that deviations from the long-run path tend to be corrected over time, suggesting that globalization dynamics evolve through gradual adjustment rather than instantaneous shifts. Within this long-run structure, the DOLS estimates point to positive elasticities for financial development, ICT, government expenditure, and trade openness, though the estimated magnitudes differ across channels and should be interpreted cautiously given the composite nature of KOFGI.

The long-run association between financial development and globalization is consistent with a "capacity" view in which deeper intermediation supports cross-border integration by easing financing constraints, facilitating trade finance, and enabling risk management and international payments (Mishkin, 2009; Kandil et al., 2015; Mahalik et al., 2023; Law et al., 2015). However, the Granger results do not indicate short-run causality from financial development to globalization, which can be read as suggesting that finance is more closely related to the long-run level of integration than to short-run fluctuations. By contrast, ICT is positive and significant in the long run and also shows short-run predictive precedence toward globalization, which aligns with arguments emphasizing that digital connectivity reduces information frictions, lowers coordination costs, and expands the feasible scope of cross-border interactions (Latif et al., 2018; Kurniawati, 2020; Skare & Ribeiro Soriano, 2021; UNCTAD, 2024).

Government expenditure exhibits a comparatively large long-run elasticity and shows bidirectional Granger linkages with globalization, pointing to an enabling-and-responsive fiscal channel. Interpreted cautiously, this pattern is compatible with the idea that public spending can support integration by strengthening infrastructure, human capital, and institutional capacity, while deeper integration may also be associated with shifts in fiscal priorities as exposure to external markets rises (Cameron, 1978; Rodrik, 1998; Garrett, 1998; Dreher et al., 2008; Giuliani & Madama, 2025). Trade openness is positively related to KOFGI in the long run, yet the short-run causality runs from globalization to trade openness rather than the reverse, which is compatible with feedback effects and reinforces the need for mechanism-based interpretation when openness is paired with a composite globalization index that is conceptually close to trade-related integration (Dreher, 2006; Gozgor, 2018; Leitão, 2014; Pratiwi & Wulansari, 2022; KOF Swiss Economic Institute, 2025).

## 6. CONCLUSION AND POLICY RECOMMENDATIONS

This study has examined the determinants of globalization in the Chinese economy over the period 1990-2021, using the KOF overall globalization index as a comprehensive measure of China's integration into the world economy. Focusing on four key explanatory variables, financial development, information and communication technologies (ICT), fiscal policy and trade openness, the analysis has employed standard time-series econometric techniques, including ADF and PP unit root tests, the ARDL bounds testing approach, the DOLS estimator and Granger causality analysis.

The empirical results indicate the existence of a long-run cointegration relationship between globalization and its determinants. The DOLS estimates show that financial development, ICT, government consumption and trade openness all exert positive and statistically significant effects on globalization. In elasticity terms, financial development and fiscal policy have comparatively larger long-run effects, while the elasticity of globalization with respect to ICT is positive but more modest in magnitude. Trade openness also strengthens globalization, confirming its role as both a component and a driver of China's integration into global markets.

The Granger causality results complement these findings by revealing important directional linkages. In the short run, ICT and fiscal policy are found to Granger-cause globalization, whereas no evidence is obtained for causality running from financial development or trade openness to globalization. At the same time, globalization is shown to Granger-cause both fiscal policy and trade openness, suggesting that as China becomes more globalized,

adjustments occur in public expenditure patterns and trade-related policies. Taken together, the long-run and short-run results underline that globalization in China is shaped by a mutually reinforcing interaction between domestic financial, technological, fiscal and trade-related conditions on the one hand, and the country's degree of integration into the world economy on the other.

From a theoretical perspective, these findings are consistent with an interpretation of globalization as a multidimensional outcome that reflects both realized cross-border activity and the domestic capacity to sustain such activity over time. In practical terms, the results suggest that policies aimed at strengthening "integration capacity" may be more effective when they are coordinated across the financial, digital, and public-investment domains rather than pursued in isolation.

In this context, continued improvements in the depth and functioning of financial markets may support globalization primarily through long-run channels, particularly if reforms enhance the efficiency of intermediation, broaden access to finance, and strengthen risk management in ways that facilitate international transactions without undermining stability. Similarly, the short-run and long-run relevance of ICT implies that sustained investment in digital infrastructure, digital skills, and the enabling regulatory environment for digitally delivered activities may contribute to globalization by lowering coordination costs and widening participation in international production and service networks. The fiscal results point to the importance of expenditure quality and composition: public spending that supports connectivity-enhancing infrastructure, human capital, and innovation capacity may strengthen the enabling environment for integration, while the feedback from globalization to fiscal policy highlights that maintaining macro-fiscal credibility can remain important as external exposure deepens. Finally, the trade openness evidence is consistent with an approach that emphasizes facilitation and resilience: policies that reduce frictions in cross-border exchange, improve logistics and customs effectiveness, and support diversification in export markets and products may help sustain integration while moderating vulnerability to external shocks.

## 7. LIMITATIONS AND FUTURE RESEARCH

Several limitations should be considered when interpreting the results. First, KOFGI is a composite index, and some of its components are conceptually close to the explanatory variables used in the model, particularly trade-related integration. Although the empirical strategy focuses on time-series relationships and distinguishes long-run from short-run dynamics, future research could further reduce concerns about definitional overlap by repeating the analysis with alternative globalization measures or by decomposing the KOF index into de facto and de jure dimensions. Second, the sample period includes major policy and global events that may imply structural breaks or regime shifts. While the error-correction framework captures adjustment toward a long-run equilibrium, additional tests that explicitly model breaks or allow for time-varying parameters could provide a richer account of reform sequencing and external shocks.

Third, the analysis relies on annual time-series data, which can limit the ability to detect higher-frequency dynamics and policy timing. Where feasible, future studies could employ higher-frequency data or alternative identification strategies that better isolate exogenous shifts in financial conditions, digital capacity, or fiscal stance. Fourth, although the present model focuses on four core determinants, China's globalization trajectory may also reflect additional drivers—such as institutional quality, exchange rate policy, foreign direct investment dynamics, or global value chain positioning—that could be integrated into extended specifications. Finally, future research could complement the aggregate approach with sectoral or regional evidence to clarify whether the globalization effects of finance, ICT, and public spending are concentrated in specific industries or provinces, which would also strengthen the policy relevance of the conclusions.

**AUTHORS' DECLARATION:**

This paper complies with Research and Publication Ethics, has no conflict of interest to declare, and has received no financial support.

**AUTHORS' CONTRIBUTIONS:**

The entire research is written by the author.

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