6-2022

Financial Openness and Economic Growth

Doo Kyun Wang
The Graduate Center, City University of New York

FINANCIAL OPENNESS AND ECONOMIC GROWTH

By

DOO KYUN WANG

A dissertation submitted to the Graduate Faculty in Economics in partial fulfillment of the requirements for the degree of Doctor of Philosophy, The City University of New York

2022

FINANCIAL OPENNESS AND ECONOMIC GROWTH

By

DOO KYUN WANG

This manuscript has been read and accepted for the Graduate Faculty in Economics in satisfaction of the dissertation requirement for the degree of Doctor of Philosophy.

	Merih Uctum
Date	**Chair of Examining Committee**
	Christos Giannikos
Date	**Executive Officer**

Supervisory Committee:

Professor Merih Uctum

Professor Thom Thurston

Professor Nadia Doytch

THE CITY UNIVERSITY OF NEW YORK

Abstract

FINANCIAL OPENNESS AND ECONOMIC GROWTH

By

DOO KYUN WANG

Advisor: Professor Merih Uctum

An ongoing controversy in economics relates to the effect of financial openness on economic growth. Despite their longstanding nature, these questions are not easily resolved. Theoretically, capital market liberalization can lower the cost of capital. Given perfect international capital mobility, this can cause factor price equalization and finally accelerate economic growth. In contrast with the strong theoretical argument, empirical studies on the effect financial openness have on growth are still inconclusive.

Given the diverse perspective, the goal of this paper is to further investigate the role and effect of financial openness on economic growth in different time periods and at different levels of accumulated wealth as well as in the presence of credit market imperfection.

In the rest of the paper, chapter 1 introduces the indices for financial openness and sees how we can choose among them.

Chapter 2 employs the dimensionality reduction technique to investigate the effect of financial openness on economic growth. Using five indices of financial openness, which are publicly available, I found that the *de jure* related component (or factor) shows the negative effect on growth, which outweighs *de facto* related component (or factor).

In chapter 3, I categorize countries into 3 income levels, low, middle, and high, by World Development Indicator categorization and track what countries transition from one level to another level. Using GMM-SYS methodology and two financial openness indices (KA, LMF), I investigated the effect of financial openness on the economic growth of countries at different levels of income.

In Chapter 4, instead of using a single index at a time, PCA and FA of five publicly available financial openness are adopted in order to identify the common pattern of financial openness indices. Using fixed effect methodology, I investigated the effect of financial openness on economic growth at the industry level.

Acknowledgments

Throughout my pursuit of a Ph.D. in economics and this dissertation's writing, I have received the love and support of my parents. This paper would not be possible without their support.

I would like to thank my dissertation supervisor, Merih Uctum. She has been my mentor and mother for a decade. This accomplishment would not be made without her wisdom and support. She consistently challenged me to progress in my research. Thank you, professor.

All professors support me, but especially thank to Dr. Kwack, who is my lifelong advisor.

Finally, I would like to thank my wife, Sun Min Park, and my son Jong Hoon Wang. Without them, I would truly be lost in life.

Contents

List of Tables

Chapter 1: Financial Openness Indices: How Can We Choose Among Them?

1 Introduction

An ongoing controversy in economics relates to the effect of financial openness on economic growth. Despite their longstanding nature, these questions are not easily resolved. Theoretically, a capital market liberalization can lower the cost of capital. Given perfect international capital mobility, this can cause factor price equalization and finally accelerate economic growth. In contrast with the strong theoretical argument, empirical studies on the effect financial openness has on growth are still inconclusive.

For example, Bekaert, Harvey and Lundblad (2005) shows that equity market liberalization allowing foreign investors to participate in the market leads to a 1% increase in real GDP per Capita. Moreover, Bekaert, Harvey and Lundblad (2011) find that financial openness has a positive effect on economic growth through capital stock accumulation and total factor productivity growth. In particular, because the effect on total factor productivity growth is larger than the one on capital stock growth, financial openness can lead to large GDP growth even with a relatively modest increase in investment.

In contrast, Rodrik (1998) showed that while some countries without restrictions on payments for capital transactions have better economic performance such as high economic growth or more investment, that is not always the case. Among 23 countries that he studied which have maintained financial openness since 1973, some achieved high economic growth, whereas some others underperformed. This implies that the correlation between openness on the capital account and economic performance is not necessarily positive. In line with this, Edison et al. (2002) showed that using new measures of international financial integration, the null hypothesis that international financial integration is unrelated to economic growth is not rejected.

Conclusions regarding the impacts of financial openness have become more controversial since the Global Finance Crisis and Great Recession of 2007-2009. This is because most developing countries were adversely affected by the financial crisis, which reignited the debate regarding the effect of financial openness. Meanwhile, some major economic institutions such as IMF (2012) have changed their view regarding financial openness in suggesting that the benefits of financial openness outweigh its risks if a country reach certain level or threshold. This implies that a developing or less-developed country needs appropriate policies and/or plan when there are either rapid capital inflows or disruptive outflows. In other words, "Capital Flow Management" may be an appropriate policy tool for some countries.

In addition to such conflicting conclusions, the indices used to measure financial openness exacerbate the divergence. In general, financial openness indices can be categorized into *de facto* or *de jure*. A *de facto* index is based on economic outcomes such as Foreign Direct Investment, Total Export/Import, and/or Foreign Financial Assets/Liabilities. In contrast, *de jure* index derives from a country's legal system as it relates to the economy such as tariff and/or other legal restrictions. Since each index has own limitation, there is no clear guidance for the choice of the indices. At the same time, Gräbner et al. (2020) estimate a standard growth regression specification with different economic openness indices and show how different categories of economic openness can have different effect on economic growth. In other words, the choice of the index matters and has critical effect on estimation results so that the effect of financial openness is not robust to the choice of indices.

2 Indices for Financial Openness

One of the reason for the ambiguous and inconclusive conclusions in the financial openness literature relates to the large variety of financial openness indices. Moreover, different econometric methodologies make it harder to choose a proper index in order to harmonize

the result. According to Quinn and Toyoda (2008) and Chinn and Ito (2008) , the various measures of financial openness can be largely grouped into three types: *de jure* (official), *de facto* (unofficial), and hybrid indicators with one main source, the IMF's Annual Report on Exchange Arrangement and Exchange Restrictions (AREAER). Most *de jure* indices modify the IMF's Annual Report on Exchange Arrangement and Exchange Restrictions (AREAER) or sub-category, "Summary Features of Exchange and Trade System in Member Countries". The IMF's Annual Report on Exchange Arrangement and Exchange Restrictions (AREAER). AREAER has binary value of 0 and 1. Epstein and Schor (1992) formed the first indicator with 16 OECD countries. Grilli and Milesi-Ferretti (1994), Garrett (1995) developed the measurement with 13 categorical indicators. After adopting a new enriched tabular format, Johnston and Tamirisa (1998) organized indicators for the 13 categories for 40 countries. Many other researchers developed and extended the Johnston and Tamirisa (1998) format for 187 countries from 1970 to 2004. Now, The IMF now publishes the data with six categories of restrictions in AREAER.

- Overall Openness Index (All asset categories)
- Openness of Capital Inflows Index
- Openness of Capital Outflows Index (1=fully liberalized)
- Financial Market Openness Index (equity, bond, money market, collective investment, derivatives, 1=fully liberalized)
- Resident Openness Index (1=fully liberalized)
- Nonresident Openness Index (1=fully liberalized)

If any restriction is in place, the standard indicator takes a value of zero suggesting that the capital account is closed. Because of its coarseness, this index has been largely discredited in the literatures. Starting from 1950, AREAER reports, in descriptive format, the rules

and regulations that countries use to govern current and capital transactions, as well as the proceeds arising from them, between residents and nonresidents.

Chinn-Ito Index (KAOPEN) Chinn and Ito created this index in order to measure the extent of financial openness in capital account transactions. This index (KAOPEN) is based on the IMF's Annual Report on Exchange Arrangements and Exchange Restriction (AREAER) and a *de jure* measure of capital account openness. This "extensive" indicator uses major components of four categories of current account restrictions which are:

- variable indicating the presence of multiple exchange rates (kao_1)
- variable indicating restrictions on current account transactions (kao_2)
- variable indicating restrictions on capital account transactions (kao_3)
- variable indicating the requirements for the surrender of proceeds from export (kao_4)

In 1996, the third category was divided into 13 subcategories to follow Johnston and Tamirisa (1998)'s modification.[1] To give all attention on the effects of financial openness, Chinn and Ito reverse the values of binary variables, such that the variables are equal to one when the capital account restrictions are non-existent. In order to control the capital transaction kao_3, they introduced $SHAREkao_t$, which is the share of a five-year window that capital controls were not in effect.

$$SHAREkao_{3,t} = \left(\frac{kao_{3,t}+kao_{3,t-1}+kao_{3,t-2}+kao_{3,t-3}+kao_{3,t-4}}{5}\right)$$

$KAOPEN_t$ is the first standardized principal component of kao_1, kao_2, $SHAREkao_{3,t}$, kao_4. Within this setting, the KAOPEN index can reflect financial openness and focuses on regulatory aspects of capital account openness. The updated version of the Chinn-Ito index (2014) is used for our model and it is normalized between zero and one. A higher (near 1) value stands for a higher level of financial openness with open cross-border capital

[1] See Johnston and Tamirisa (1998) and Miniane (2004) for details.

transactions. The data file contains the Chinn and Ito index series for the time period of 1970 through 2016 for 182 countries.

Schindler's index (KA) This is the most finely gradated of the AREAER text measures. It covers several subcategories of the "Capital Transactions" section for 91 countries from 1995 to 2005. Unlike other indices, it provides binary codes at the level of individual types of transactions, for example, "issue locally by nonresidents of debt securities". According to Quinn and Toyoda (2008), KA is especially useful for researchers interested in individual asset categories and those interested in issues related to the sequencing of capital account liberalization

Wang-Juhan Capital Account Openness Index (KANEW) Wang-Jahan capital account openness index is a *de jure* index that is constructed based on the information contained in the IMF's AREAER. This index provides information on the state of openness of the capital account based on 12 types of asset categories for 168 countries, 60 of which are low-income developing countries, over the period 1996 -2013. It not only captures the overall openness of the capital account but also shows openness across various types of subcategories: direction of flows (inflow verses outflow), residency (resident verses non-resident), and asset types (for example, equity, bonds, direct investment etc.). The specification of this index provides the mixture of *de jure* information with associated changes in *de facto* capital flows.

Heritage Economic Freedom Index (IFHeritage) The Heritage Foundation's "Investment Freedom" category in its Index of Economic Freedom is also a *de jure* measure (Heritage Foundation, 2018) (IFHeritage). The source documents for Heritage are "official country publications" and sources from the Economist and U.S. government agencies. However, how these sources are coded is not clear.

Lane and Milesi-Ferretti's index (LMF) This index is the most widely used *de facto* measure of a country's exposure to international financial markets. LMF is calculated as a country's aggregate assets plus liabilities relative to its gross domestic product, and includes the categories of portfolio equity, FDI, debt, and financial derivatives, as well as assets and liabilities for each. Ten other *de facto* indicators exploit the observable phenomena of increased capital mobility, such as the size of gross capital flows (IMF, 2001).

2.1 Comparison between Measurements

Recent empirical papers present conflicting evidence regarding the effect of financial liberalization on growth, while the theoretical literature suggests a strong relationship. What accounts for the differences? Different researchers use different proxies for financial openness and supporting data and examine different sets of countries for different time periods, using different estimation methodologies.

The aim of this section is to compare the financial openness indices, not the pros and cons of each index, but the characteristically different findings from the literatures. I compared financial openness indices which are publicly available. Specifically, the data and coding of five financial openness indices are compared.

Table 1 summarizes the basic scales and samples and shows the measures for the United States, United Kingdom and China in 2010. KAOPEN measures range from -1.80 to 2.54 for 181 countries. KAOPEN shows that United Kingdom and United States are fully opened based on IMF AREAER which includes restrictions on capital account transaction but excludes financial current account. KA ranks the United States as nearly open, while the United Kingdom is fully open because KA exclude clearly minor restrictions. IFHeritage ranks the United States as 78% open, with the United Kingdom at 76.5% and the China at 51%. IFHeritage index is complex because it treats domestic investment restriction as well as international investment. IFHeritage index is complex because it includes restrictions on domestic investment as well as on international investment. IFHeritage includes subcom-

ponents such as capital controls, foreign exchange controls, expropriation of investments, sectoral investment restrictions, land ownership, foreign investment and national treatment of foreign investment. In 2010, IFHeritage changed from a 5-point scale to a 20-point scale. LMF index ranks the United States at -0.18. It has special weight based on size of income. LMF index is divided by the sum of aggregate assets and liability of country's GDP. As aggregate income increases, the financial integration is relatively modest.

Table 1: Descriptive Statistics for Financial Openness indices

Measure	# of Country	# of obs	Period	Mean	Std. Dev.	Min.	Max	Type
KAOPEN	181	6,958	1970-2016	0.0055	1.5363	-1.9043	2.3599	*de jure*
KA	100	2,200	1995-2017	0.3757	0.3403	0	1	*de jure*
KANEW	162	2,464	1996-2013	0.5529	0.3459	0	1	*de jure*
LMF	174	6,099	1970-2011	-0.3569	1.4644	-32.97	17.207	*de facto*
IF_Heritage	166	3,300	1995-2019	59.7572	10.7934	15.6	90.5	*de jure*

Table 2: Financial Openness indices for Major Countries

Measure	U.S	China	U.K
KAOPEN	2.36	-1.202	2.36
KA	0.15	1	0
KANEW	0.8182	0	0.9545
LMF	-0.18	0.251	-0.252
IF_Heritage	78	51	76,5

Chapter 2: Impact of Financial Openness on Economic Growth Using Dimensionality Reduction

1 Dimensionality Reduction

PCA and FA are generally employed to identify common pattern among variables. The identified pattern is used to extract the underlying (latent) variables in data so that large amounts of information from many variables can be summarized by a relatively small number of variables. For example, Stock and Watson (2002) employed principal component analysis to summarize a large number of time series variables by a small number of indices and showed that 215 time series data can be explained by only six components. Therefore, this dimensionality reduction technique can be very useful in a data-rich environment in situations when there are no clear guidelines for the selection of data.

As mentioned above, there are several different measures of financial openness variables in both the *de jure* and *de facto* categories. Even though some of the indices are within the same conceptual dimension, the results vary with the selection of the index. (Gräbner et al., 2020). In this case, it seems to be reasonable to employ the reduction technique rather than choosing one specific variable if there is no theoretical foundation for the choice.

Even with similarity in dimensionality reduction, PCA is different to FA. While PCA is based on a linear combination of variables, FA is a model of a unobservable latent variable. In other words, PCA combines many variables into a single component or few components by the optimal weighted contribution of each variable so that PCA helps explain the total variance among variables. In contrast, FA constructs a latent variable from other associated variables so that FA explains the common variance among variables. Therefore, the main purpose of PCA is reducing the dimensions of a dataset, while the purpose of FA is identifying an unknown latent variable in the data. For this reason, the application of each technique is different. According to Kim (2008), FA is more appropriate to explain

the correlation among variables while PCA is better at summarizing the data with a small number of variables. However, it is not clear what technique is more appropriate to reduce the number of financial openness variables. This is because both of them are the case in financial openness. Therefore, this chapter employs PCA as well as FA to estimate the effect of financial openness on economic growth.

Table 3 shows the results of PCA. From five financial openness variables (KAOPEN, KANEW, KA, IFHeritage, and LMF), five components are extracted. Panel A in Table 3 shows how much each components can explain the total variance. Generally, eigenvalues show the amount of variability of the corresponding eigenvector. For example, component 1 can explain 63.43% of total variance, while component 2 can explain 19.92%. Therefore, 83.55% of total variance can be explained by both components. As a rule of thumb, components are acceptable only when the eigenvalue is higher than or equal to unit. (Component 2 is very close to unit.) This is because the higher eigenvalue stands for more explanatory power for the variance.

In PCA, eigenvectors determine the direction of components on the new feature space. As mentioned above, PCA provides information about the patterns in the data. From eigenvectors, it is possible to see these patterns in the data. This is because eigenvectors stand for lines which explain all observations with minimum residuals or lines that aim for maximum variance along each dimension. Therefore, it is possible to identify what a component is closer to the original variables. For example, the eigenvector of Component 2 with LMF shows 0.9372 so that LMF follows the direction of component 2. In other words, component 2 is more closely related to LMF than any other components. Table 5 also confirms that component 1 is more associated with *de jure* indices, whereas component 2 is associated more with the *de facto* index.

In contrast with PCA, Panel A in Table 4 shows that factor 1 explains 98.75% of common variance so that five indices can be merged into one factor. At the same time, all factors other than factor 1 have an eigenvalue less than unit. Therefore, it is possible to conclude

that factor 1 is the only variable for data reduction. Factor loading is known as an indicator that shows the relative importance of a variable so that values represent the strength of the relationship between the unobserved factor and variables. Panel B in Table 4 also shows that factor 1 is closely related to financial indices except LMF. Even though Factor 2 has the eigenvalue less than 1, however, it is more related to LMF. Table 5 also confirm that factor 2 is more related to LMF. Therefore, factor 1 as well as factor 2 are employed to estimate the effect of financial openness as PCA.

2 Estimation

2.1 Empirical Models

The focus of this section is to examine how financial openness affects economic growth using either principal components or factors extracted using PCA or FA. Following the standard specification used in the existing literature, the set of control variables that affect economic growth are employed in the model.

$$\Delta y_{i,t} = cons. + \Delta y_{i,t-1} + \beta_1 F_{i,t} + \beta_2 X_{i,t} + \lambda_i + \epsilon_{i,t} \tag{1}$$

where $y_{i,t}$ is the economic growth in a country i and year t, defined by the change in GDP per capita adjusted by Purchasing Power Parity (PPP). $F_{i,t}$ is either *Principal Component* or *Factor* from financial openness indices by the dimensionality reduction. $X_{i,t}$ consists of the set of control variables including (i) capital service, (ii) total factor productivity, (iii) domestic credit, and (iv) trade openness. In addition, λ is the unobserved country specific effect.

This equation is typically known as dynamic panel model so that the dynamic panel regression can provide biased results if the data has shorter time period (t), but more individuals

(n). This is known as Nickell (1981)'s bias in dynamic panel models. For this reason, Arellano and Bond (1991) suggested the Generalized Methods of Moments (GMM) to handle this issue in dynamic panel models, specifically, the, *first-differenced* GMM estimator to eliminate the bias. Due to random walk issue in the lagged level (Arellano and Bover, 1995; Blundell and Bond, 1998; Bond, Hoeffler and Temple, 2001) and amplifying missing data in an unbalanced panel (Roodman, 2009), the alternative GMM estimator, known as *System* GMM, was proposed.

The critical conditions in *System* GMM are that there be no serial correlation between instrument variables and the error term as well as the absence of second order autocorrelation in residuals. These are tested by Arellano and Bond (1991)'s AR(1) and AR(2) test and Hansen Test (or Sargan J-test). Unfortunately, *System* GMM is not employed in this chapter since the requisite conditions are not satisfied. At the same time, *first-differenced* GMM is also inapplicable. This is because the estimation results cannot satisfy the rule suggested in Bond (2002) that the differenced GMM estimator for the lagged term should lie between the pooled Ordinary Least Square (OLS) (as upper bound) and the corresponding fixed effects estimations (as lower bound). In other words, the differenced GMM estimation results falls out of the range so that the differenced GMM estimator is an improper estimator. Therefore, this chapter employs *GMM with Fixed Effect*. This is because GMM is more a general estimator than other estimators such as OLS, Instrumental Variable or 2 Stage Least-Squares.

2.2 Control Variables

Due to asymmetric information, credit rationing is an unavoidable feature in the banking industry. (Stiglitz and Weiss, 1981) The bank charges interest to avoid adverse selection effects or to affect the incentives for borrowers and to reduce the riskiness of a loan. Under conditions of asymmetric information, it is not easy for banks to identify either good or bad borrowers. Therefore, the banks employ various screening tools such as credit scores, number

of loans, history of credit, and so on. This implies that the better the screening tools that the bank uses, the more the loans that can be approved because banks can identify *lemon* borrowers. Because proper allocation of loans can increase the efficiency of the financial markets, which in turn can lead to economic growth, it is important to measure how much loans are approved to gauge how financial markets are close to perfect market. Based on this idea, this chapter employs *Domestic Credit to Private Sector* provided by World Bank.[2] Domestic credit to private sector (or credit to public) refers to financial resources provided by the private sector, such as through loans, purchases of non-equity securities, and trade credits and other accounts receivable that establish a claim for repayment.

The fundamental theoretical framework to explain long-run economic growth in economic growth literature is Solow-Swan model. (Solow, 1956; Swan, 1956). This framework how explains long-run economic growth occurs through capital accumulation, technology progress, and population growth. In spite of the property that a continuous capital accumulation encourages economic growth temporarily, the accumulation in capital is one of the key components in the framework. Due to this property of the Solow-Swan model, Mankiw, Romer and Weil (1992) modified the model by adding human capital, which helped described the cross-country data very well. This suggests that physical capital as well as human capital are important determinants in economic growth. Rather than employing capital stock, therefore, this chapter employs capital service as provided by Penn World Table (PWT).[3] Capital service helps in measuring the capital stock by estimating the user cost of capital and comparing the implicit rental price of capital and the level of capital service and normalized by relative to United States. This is because high-income countries invest more in less durable assets (e.g., computer) and less in more durable assets, while low-income countries do the opposite. These differences are based on the relatively higher cost of less durable assets and lack of complementary assets in developing or less developed countries, which causes to weigh less on less durable assets, and finally underestimates the role of physical capital. This

[2]Available at https://data.worldbank.org/indicator/FS.AST.PRVT.GD.ZS
[3]Available at https://www.rug.nl/ggdc/productivity/pwt/?lang=en

suggests that employing capital stock could adversely affect measures of the effect of capital on economic growth. Therefore, capital service would be the more appropriate variable.

In addition to the capital variable, technological progress in Solow-Swan model is one of the most important determinants of long-run economic growth. Due to its importance, Solow (1957) has separated variations in output per capital attributable to technical changes from variation due to changes in capital per capita. This is known as the *Solow Residual* or Total Factor Productivity (TFP).[4] TFP is generally calculated by dividing output by the weighted average of input factors such as labor and capital and measures the efficiency of the economy. Likewise, PWT computed TFP on the basis of average hours worked for countries and capital estimates.

One implication of endogenous growth theory is that economic policies that encourage openness, competition, and R&D will support long-run economic growth. In this point of view, trade openness is one of the important factors in promoting economic growth if trade openness encourages the diffusion of knowledge and/or innovation through the competition. In contrast with the implication, Young (1991)'s learning by doing model showed that a country under free trade with less initial technology experiences technological progress and/or economic growth less than or equal to a country under autarky with the same level of technology in a sense that the effect of trade openness could not lead to economic growth by technological progress and/or innovation. Counter-intuitively, moreover, Yanikkaya (2003) showed that the trade barriers are positively associated with economic growth. This suggests that trade openness need not be a way to promote economic growth and that that there are other characteristics of a country's economy related to trade openness which can affect economic growth. However, it is clear that trade openness has an effect on economic growth irrespective of whether that effectis positive or negative. Therefore, this chapter employs trade openness as the sum of export and imports of goods and service measured as a share of GDP which is provided by World Bank.[5]

[4] In Solow (1957), *Solow Residual* was not coined. However, it is widely used in literature.

[5] Available at https://data.worldbank.org/indicator/NE.TRD.GNFS.ZS

Table 6 shows the descriptive statistics of control variables. The data covers 181 countries from 1971 to 2016. However, some countries are not observed every period so that total number of observations of each control variables is different. In other words, the data set is an unbalanced panel data. Methodologically, due to this challenge, *listwise deletion* is adopted so that observations with missing values in any variables will be excluded from the statistical analysis.

3 Results

Table 7 shows the results of PCA and FA. One surprising result is that there is no big difference in the results. Particularly, the significance and sign of coefficients of control variables in each reduction methodology are identical between them. The only difference is that difference between component 2 and factor 2.

Among independent variables, trade openness shows a positive effect on economic growth and supports the traditional argument that trade helps a country develop the economy. While though this is consistent with the argument, the magnitude of the effect is very low. In other words, its effect is less than a percentage point so that its effect is not critical. Possibly, this could be a reason for the controversy regarding its effect on the trade. Because the most of countries in the world are less-developed or developing, these countries form the majority in the data. As we know, lower income countries depend more on agriculture-based activities such as farming, forestry, and fishing sector. In contrast, developed countries are more rely more on manufactured goods such as electronics and IT equipment. (UNCTAD, 2018) Therefore, the benefit from the trade could be less in either less-developed or developing countries due to the exposure to price volatility of agricultural products. This is the possible explanation why the effect of trade openness is only weakly positive. In other words, the positive effects dominate the negative effects due to the difference in the industrial structure, but both are almost identical so that it generates a weak positive net effect.

For domestic credit, its effect is negative on economic growth. This result is consistent with Gozgor (2015) that only seven countries among 58 countries including developed and developing countries have statistically significant Granger causality between domestic credit and economic growth. This implies that the higher domestic credit causes financial institutions to have to bear higher costs such as screening cost or processing cost so that the increase in domestic credit need not lower the cost. This can ultimately discourage economic growth. At the same time, this suggests the presence of asymmetric information exists regardless of the quantity of domestic credit.

In contrast with domestic credit, capital service shows different results that and support the argument in the Mankiw, Romer and Weil (1992) model that physical as well as human capital are critical factors that encourage economic growth. As mentioned above, capital service is a variable that shows the utilization of capital stock in each country on the basis of the relative to United States. (Note that United States has a unit value.) As predicted in Mankiw, Romer and Weil (1992), capital service is a significant and critical factor to determine economic growth. Particularly, capital service is the most critical variable for economic growth in terms of the magnitude of its effect.

In addition to capital service, the second variable critical to encouraging economic growth is TFP. In the Solow-Swan model, TFP is a critical factor for economic growth, and which is required for long-run economic growth. This point of view is consistent with theoretical argument. Even though its importance is greater than that of capital service theoretically, its magnitude is less than that of capital service. This is a counter-intuitive result since capital accumulation has temporary effect while TFP has permanent and long-run effect. According to Schefold (1976), however, technological progress can take different forms such as saving of labor, savings of raw materials, mechanization, and inventions. As known, the modern technological progress is closely related to mechanization and/or inventions rather than saving of labor and/or saving of raw material. Because less-developed or developing countries are more likely to have labor intensive industries such as agriculture, as mentioned

above, possibly it requires technological transformation cost such as reequipping, retraining, relocating and industrialization. (Solo, 1969) Because these technological transformations require capital accumulation as the prerequisite condition, capital service itself can be a more important factor than TFP. Particularly, this is the case for some developing countries such as the *Four Asian Tiger*. (or *Four Asian Dragons*) In this vein, Krugman (1994) made a specific comment on this case: *"Asian growth, like that of the Soviet Union in its high-growth era, seems to be driven by extraordinary growth in inputs like labor and capital rather than gains in efficiency"*(p.70) As mentioned above, the majority of the data consist of either developing countries or less-developed countries. Therefore, this possibly accounts for the reason why capital service has larger effect on economic growth than TFP.

According to Melo et al. (2001), there are 11 variables that characterize the initial conditions of developing or tier-changing categories to market economies, including development, resources, initial macroeconomic distortion, income level, urbanization and industrialization. They found that initial conditions are critical in terms of economic performance as is the speed of economic liberalization by constructing a linkage system model showing the linkages among initial conditions, policies, and performance. The results show that initial condition have a positive effect on current economic growth so that there is an inertia effect once an economy takes off on a path to development, as a plane takes off from the runway. This is consistent with Melo et al. (2001).

Finally, the most surprising variable is components or factors for financial openness. In the case of PCA, the first component is positive while the second component is negative. In terms of magnitude, however, first component is little larger than second component so that overall effect should be negative. In the case of FA, both are same sign, but the second factor is not statistically significant. Possibly, this is because, as shown above, the first factor can explain almost 99% of financial indices. Except for the second component in the FA, both analyses show the same sign on the first variable. As shown above, first component (or factor) is more related to *de jure* indices of financial openness, while the second component (or

factor) is more related to *de facto* indices. In this point of view, the PCA results implies that even though a country opens its doors in terms of economic outcomes, it may not experience economic growth without institutional restructuring. This is because positive economic effect is dominated by negative institutional effect. This is consistent with the general notion that a country can have positive effect as well as negative effect as long as a country is financially open. At the same time, this also justifies the dominance of negative effect since the Global Financial Crisis and Great Recession of 2007-2009 and, in particular, support the reason why some major economic institutions such as the IMF have changed their view regarding financial openness. In the case of FA, it is clearer that financial openness has negative rather than positive effects. Therefore, the most important factor in financial openness is not economic but institutional aspects. so that it is not possible for a country to enjoy the fruit of financial openness without adequate institutional readiness. Based on this point of view, for example Brazil's controls on inflows that penalized short-term capital inflow after the Global Financial Crisis were an acceptable response if the economy was not mature enough to absorb the negative effect of the crisis resulting from the country's financial openness.

4 Concluding Remarks

This chapter employs dimensionality reduction technique to investigate the effect of financial openness on economic growth. This is because there are variations in measures of financial openness between *de jure* and *de facto* indices and the selection of indices affects the results. (Gräbner et al., 2020). Using 5 indices of financial openness, which are publicly available (4 are *de jure* and 1 is *de facto*), the analysis has counter-intuitive results in that financial openness does not always encourage economic growth. Specifically, financial openness, when measured by the *de facto* indices, helps economic growth. However, in terms of the *de jure* index, it does not. This implies that on the absence of appropriate legal or institutional readiness, the negative effects of financial openness such as financial crises may outweigh the

positive ones, such as knowledge diffusion. In other words, a country that wants to enjoy the fruits of financial openness should have a mature institutional or legal system. This is because the *de jure* related component (or factor) shows the negative effect on economic growth, which outweighs *de facto* related component (or factor). Also, this is consistent with the current change in the stance of the IMF (2012) which was a strong supporter of liberalization and globalization.

Table 3: Eigenvalue and Eigenvector of Principle Component Analysis

Panel A: Eigenvalue of PCA

Component	Eigenvalue	Difference	Proportion	Cumulative
Component 1	3.1713	2.1752	0.6343	0.6343
Component 2	0.9961	0.4081	0.1992	0.8335
Component 3	0.5879	0.3915	0.1176	0.9511
Component 4	0.1964	0.1482	0.0393	0.9904
Component 5	0.0482		0.0096	1

Panel B: Eigenvector of PCA

Variables	Comp. 1	Comp. 2	Comp. 3	Comp. 4	Comp. 5	Unexplained
KAOPEN	0.5191	-0.0601	-0.0413	0.8457	-0.1004	0
KA	-0.5212	0.1870	0.2840	0.4251	0.6573	0
IF_Heritage	0.3959	0.2245	0.8709	-0.1853	-0.0064	0
KA_New	0.5303	-0.1806	-0.2447	-0.2617	0.7468	0
LMF	0.1447	0.9372	-0.3151	-0.0366	0.0079	0

Total Number of Observations: 1,387
Pearson Correlation Coefficient, $\rho = 0.9511$

Table 4: Eigenvalue of Factor Analysis & Factor Loading

Panel A: Eigenvalue of Factor Analysis

Component	Eigenvalue	Difference	Proportion	Cumulative
Factor 1	2.9507	2.1752	0.9875	0.9875
Factor 2	0.2386	0.4081	0.0798	1.0674
Factor 3	-0.0284	0.3915	-0.0095	1.0579
Factor 4	-0.0536	0.1482	-0.0179	1.0399
Factor 5	-0.1194		-0.0399	1

Total Number of Observations: 1,387
LR Test: Independent vs. Saturated (Full): $\chi^2(10) = 5594.29 (p > \chi^2 = 0.0000)$

Panel B: Factor Loading and Unique Variances

Variable	Factor 1	Factor 2	Uniqueness
KAOPEN	0.8811	0.1224	0.2087
KA	-0.9397	0.1911	0.0805
IF_Heritage	0.5799	0.2952	0.5766
KA_New	0.9602	-0.1557	0.0538
LMF	0.1820	0.2751	0.8912

Table 5: Coefficient of Correlation

Variables	KAOPEN	KA	IF_Heritage	KA_New	LMF
Component 1	0.9243	-0.9281	0.7050	0.9444	0.2576
Component 2	-0.060	0.1867	0.2241	-0.1803	0.9354
Factor 1	0.9029	-0.9629	0.5942	0.984	0.1865
Factor 2	0.1958	0.3058	0.4724	-0.2492	0.4403

Table 6: Descriptive Statistics of Control Variables

Measure	# of observation	Mean	Std. Dev.	Min.	Max
Economic Growth	7,108	3.7534	6.3437	-64.0471	149.973
Capital Service	5,347	0.0353	0.11380	0	1.3379
TFP	4,503	0.7249	0.4174	0.1054	5.7396
Domestic Credit	6,165	39.0653	37.6957	0.1859	312.019
Trade	6,631	78.2974	48.0492	0.0209	442.62

Table 7: PCA and FA Estimation Results

Variables	PCA	FA
Financial Openness		
Component 1	-0.4072***	
	(0.0815)	
Component 2	0.2889***	
	(0.091)	
Factor 1		-0.7923***
		(0.1545)
Factor 2		-0.1308
		(0.2214)
Control Variables		
Capital Service	2.68***	2.897***
	(0.7521)	(0.7769)
TFP	2.052***	2.324***
	(0.6623)	(0.6618)
Domestic Credit	-0.0183***	-0.019***
	(0.0029)	(0.0030)
Trade	0.0093***	0.0107***
	(0.0021)	(0.0021)
Constant	2.586***	2.328***
	(0.4442)	(0.4511)

Note: Standard error in parentheses.
$^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$

Chapter 3: The Growth Impact of Financial Openness Indices Controlling For Development Levels

1 Introduction

Kose, Prasad and Taylor (2011) analyzed country-specific features and initial conditions to develop empirical thresholds for identifying indirect benefits and potential risks of financial openness. Using identified thresholds such as financial depth, institutional quality, regulation, trade openness, and overall development, they found that there seems to be certain threshold levels that a country should achieve for the benefits to outweigh the risks.

In contrast with above, Gupta and Yuan (2009) created a dummy variable based on the date of stock market liberalization and investigated the effect of financial openness at the industry levels rather than at the national level. They found that increase in industry growth was attributable to an expansion in the size of existing firms, rather than the entry of new firms into the industry so that the effect of financial openness on the *within-industry* did not lead the growth in the industry.

Based on the idea of thresholds mentioned in Kose, Prasad and Taylor (2011), this chapter categorizes countries into 3 income levels, low, middle, and high, by World Development Indicator categorization and tracks what countries transition from one level to other level. This is because countries at different levels of income should have different level of institutional quality, governance and/or economic policies so that countries within same level of income are most likely to have same level of threshold as the effect on the *within-industry* (Gupta and Yuan, 2009).

2 Estimation

2.1 Transition of Countries by Development Level

According to Kose et al. (2009), the effect of financial openness is complicated by threshold conditions such as financial market development, institutional quality, governance, macroeconomic policies, and trade integration (Figure 6, p.44) In other words, without satisfying threshold conditions, the positive impact from financial openness can be mitigated by making a country more vulnerable to financial crisis so that the net effect of financial openness is ambiguous a priori. Based on this idea, Kose, Prasad and Taylor (2011) developed an empirical framework around the concept of threshold conditions. They were able to conclude from the framework that the flow of FDI and portfolio equity are safer than debt flows at low levels of financial and institutional development. This implies that the effect of financial openness can vary, depending on the maturity of an economy.

In this vein, World Development Indicator (WDI) provided by World Bank categorizes countries into 4 income groups by low income, lower middle income, upper middle income, and high based on GNI Per Capita in U.S. Dollar, converted from local currency using the Atlas Method.[6][7] Similar groupings have been introduced with the World Development Report since 1970. Before 1987, however, countries are categorized into 3 income groups by low income, middle income, and high income. Therefore, there is a discrepancy between pre-1987 and post-1987.

Based on the conclusions of Kose et al. (2009) and on the WDI, countries are categorized by the transition of each country by development level as shown in Table 14 and Table 15. Rather than employing specific thresholds mentioned above, focusing on countries' transition seems to be more robust. This is because the final impact of such thresholds can be

[6]The Atlas method is a method which smooths exchange rate fluctuation by a three year moving average using price-adjusted conversion factor. For measuring inflation, the current methodology is using the change in SDR deflator complied from inflation measures represented in the IMF's Special Drawing Rights. The thresholds are updated annually at the beginning of the World Bank's fiscal year, July 1st

[7]Available at https://datacatalog.worldbank.org/dataset/world-development-indicators

affected by changes in level of economic development such as moving into the high-income category. At the same time, measuring political or institutional aspects of a country is quite controversial since, for example, institutional quality is too broad to define clearly. To the extent that there is no clear consensus in this aspect, therefore, measuring some thresholds could be biased.

Table 14 shows countries in which there is no transition and which are staying in same income group, while Table 15 shows countries in which transition occurs. Because there a is an inconsistency in WDI categories between pre-1987 and post-1987, the ranges of both LMF and KA are adjusted according to the newer categorization of WDI so that both indices start at 1987. In other words, even though LMF has the longer range, 1970 to 2011, the new categorization of WDI is applicable to post-1987 range. Due to this reason, the number of countries in each category are different. However, a greater number of countries in LMF remain in the same income group, whereas more countries in KA are transitioning. This result is surprising because KA is a de jure index, which measures broader aspects of openness. In other words, KA is the more strict index in terms of openness because it measures more aspects of openness including underlying institutional qualities. Counterintuitively, however, there are more tier-changing categories in KA.

2.2 Empirical Model and Variables

As mentioned above, the main hypothesis of this chapter is how financial openness affects economic growth at different stages of transition. To answer the question, along with the standard specification used in existing literature, the set of control variables that affect economic growth are included in the model, where $y_{i,t}$ is the economic growth in a country i and year t, defined by the change in GDP per capita adjusted by Purchasing Power Parity (PPP). $F_{i,t}$ is financial openness index, either LMF (*de facto*) or KA (*de jure*). $X_{i,t}$ consists of the set of control variables including (i) capital service, (ii) total factor productivity, (iii) domestic credit, and (iv) trade openness. In addition, λ_i is the unobserved country specific

effect and $\epsilon_{i,t}$ is the error term.

According to Stiglitz and Weiss (1981), credit rationing is one of characteristic behaviors in financial markets, particularly in the banking industry. In order for banks to reduce the riskiness of a loan, they charge the interest rate to avoid adverse selection or affect the incentive effect of borrowers. This is because financial market itself is not subject to perfect information so that it is difficult to identify either good or bad borrowers. Therefore, the bank employs various screening tools such as credit score, number of loans outstanding etc. This implies that the better screening tools the bank uses, the more loans can be approved because banks can identify lemon borrowers. Therefore, it is important to measure the quantity of loans are approved to gauge how close financial markets are to being perfect. At the same time, economic growth can be accelerated if lemons are excluded from the financial markets by screening tools. This is because proper allocation of loans can increase the efficiency of the financial markets,eventually resulting in economic growth. Based on this idea, this chapter employs domestic credit to private sector provided by World Bank.[8] Domestic credit to private sector (or credit to public) refers to financial resources provided by the private sector, such as through loans, purchases of non-equity securities, and trade credits and other accounts receivable that establish a claim for repayment

In economic growth literature, the fundamental theoretical framework to explain long-run economic growth is the Solow-Swan model. (Solow, 1956; Swan, 1956). In their framework, long-run economic growth is attributed to capital accumulation, technological progress, and population growth. Even though the effect of a continuous accumulation in capital is to increase the growth rate temporarily, capital accumulation is one of key components in the framework. Due to this property of Solow-Swan model, Mankiw, Romer and Weil (1992) modified the model by adding human capital. Even with this modification, including human capital in addition to physical capital described the cross-country data very well. This implies that not only physical capital, but also human capital are important determinants

[8] Available at https://data.worldbank.org/indicator/FS.AST.PRVT.GD.ZS

in economic growth. Rather than employing capital stock, therefore, this chapter employs capital service provided by Penn World Table (PWT).[9] Capital service is a measure of the capital stock based on estimating the user cost of capital and comparing the implicit rental price of capital and the level of capital service and normalized by relative to United States. This is because high-income countries invest more in less durable assets (e.g., computer) and less in more durable assets, while low-income countries do the opposite. These differences are based on the relatively higher cost of less durable assets and lack of complementary assets in developing or less developed countries. This causes there to be less investment in less durable assets in those countries, which underestimates the role of physical capital. This suggests that employing capital stock could adversely affect the effect of capital on economic growth. Therefore, capital service seems to be more relevant variable.

As mentioned earlier, in the Solow-Swan model, technological progress is one of most important determinants in long-run economic growth. Due to its importance, Solow (1957) has segregated variations in output per capita attributable to technical changes from variation due to changes in capital per capita. This is known as *Solow Residual* or Total Factor Productivity (TFP).[10] In general, TFP is calculated by dividing output by the weighted average of input factors such as labor and capital and is a measure of the efficiency of an economy. Likewise, PWT computed TFP based on average hours worked for countries and capital estimates. Endogenous growth theory insists that investment in human capital and/or RD is an outcome of profit maximization and critical contributor to economic growth. Therefore, the theory implies that economic policies that encourage openness, competition and RD will support long-run economic growth. In this point of view, trade openness is one of the important factors that promotes economic growth. This is likely to happen if trade openness encourages the diffusion of knowledge and/or innovation. However, the effect of trade openness is not clear as much as theoretical intuition. For example, Grossman and Helpman (1990) found that under cross-country differences in efficiency at R&D and manufacturing,

[9] Available at https://www.rug.nl/ggdc/productivity/pwt/?lang=en

[10] In Solow (1957), *Solow Residual* was not coined. However, it is widely used in literature.

growth in world resourced or improvement in R&D efficiency through economic integration could not accelerate the speed of steady state growth if those changes occur in a country with a comparative disadvantage in R&D. In line with this, Young (1991)'s learning by doing model showed that a country under free trade with less initial technology experiences technological progress or economic growth less than or equal to a country under autarky with same level of technology. This implies that the effect of trade openness could not lead to economic growth by technological progress and/or innovation. Moreover, Yanikkaya (2003) showed that trade barriers are positively associated with economic growth. This suggests that trade openness could not be a way to promote economic growth so that there are other characteristics of a country related to trade openness which can affect economic growth. Therefore, the effect of trade openness on economic growth is quite ambiguous. Regardless of the net impact, positive or negative, however, it is clear that trade openness has an effect on economic growth. This chapter employs trade openness as the sum of exports and imports of goods and services measured as a share of GDP which is provided by World Bank.[11]

2.3 Estimation Methodology

The fixed effects method in the panel estimation is the common estimator that includes the country-specific (time invariant) effect and time-specific (individual-invariant) effect. However, OLS can provide biased results if the dynamic panel data model is estimated. Since the dynamic panel data has a shorter time period (t) but more individuals (n), the dynamic model with fixed individual effects generates inconsistent estimates.(Nickell, 1981). At the same time, Arellano and Bond (1991) mentioned that employing lags as instruments in the dynamic model under the assumption of white noise error generates inconsistent estimates if the errors were serially correlated. Due to these reason, Arellano and Bond (1991) estimated the dynamic model containing individual effects, lagged dependent variables, no strictly exogenous variable and serially correlated errors by the Generalized Method of Moments

[11] Available at https://data.worldbank.org/indicator/NE.TRD.GNFS.ZS

(GMM) and suggested the first-differenced model to eliminate *dynamic panel bias* that a lagged dependent variable in the dynamic panel model is endogenous to fixed effects in the error term. However, a potential weakness of first-difference GMM estimator was shown in Arellano and Bover (1995) and Blundell and Bond (1998). Moreover, Bond, Hoeffler and Temple (2001) showed that the estimation of cross-country growth regression by first-difference GMM can be poor. Particularly, if the lagged variables are close to random walk, the lagged levels are a poor instrument for first-difference variables. In addition, Roodman (2009) argued that first-difference transformation magnifies gaps in an unbalanced panel so that first-differences at t and t+1 are missing if the value at t is missing. Due to these reasons, alternative GMM estimator, known as System GMM, was proposed. The advantage of System GMM is that the estimator does not require any external instrument variables to address the endogeneity issue but requires the lagged dependent variable and the difference of endogenous independent variables in two time periods, as instrument variables. Moreover, System GMM requires two conditions such as no correlation between instrument variables and error terms and the absence of second order autocorrelation in residuals to generate consistent results. Therefore, this chapter employs System GMM to avoid any issue related to the dynamic panel model.

3 Results

3.1 Stable Countries

As shown in Table 10 and Table 11, the countries are divided into stable countries and tier-changing categories. Stable countries are those that have remained at the same income level since 1987 so that their income level at 1987 is equal to the level in 2011 (or 2017). In other words, even if there is fluctuation in income level during this time period, it is included into stable countries as long as the income level at the beginning equals to the end of the data. In

addition to this, some countries in which the income level declined over the time are dropped from the analysis. This is because the number of countries falls into this category is very small and most of tier-changing categories have experienced some economic development. Only 4 countries fall into this category. At the same time, some countries where there are missing independent variables are also dropped from the analysis. Thus, the total number of countries for the analysis is less than the number of them in each category in both Table 14 and Table 15. In case of upper medium and lower medium countries, they are merged into one category, medium. This is because the number of countries is relatively less than high income countries so that the estimation is inconsistent due to insufficient observations. Note that the estimation for low-income countries for KA is not available owing to same reason.

Table 10 shows the results for stable countries. First of all, as mentioned above, for the System GMM estimator to be a consistent estimator, test statistics such as validity of overidentifying restrictions and the absence of serial correlation should be reported with parameter estimates. (Arellano and Bond, 1991) According to Arellano and Bond (1991), the required condition for System GMM is that there is no serial correlation at an order higher than 1. If this condition is not satisfied, the moment conditions employed in the estimation are not valid. Therefore, Arellano and Bond (1991)'s AR(1) and AR(2) test are implemented. The test for AR(1) results in a rejection of the null hypothesis, regarding the absence of the first-order serial correlation in residuals. The test for AR(2) cannot reject the null hypothesis of the absence of the second-order serial correlation in residuals except in the case of the estimation for tier-changing categories to high-income level.[12]

Moreover, as mentioned above. it is well known that instrumental variables are required to deal with endogenous regressors that provide inconsistent parameter estimates. Because System GMM does not require any external instrument variables, this implies that internal instruments are required. Basically, overidentification implies that the model has more in-

[12]The test results shows that the null hypothesis is rejected at roughly 10% significant. This implies the possibility of misspecification. Therefore, the test for AR(3) is implemented and the null hypothesis is not rejected. This implies that the estimation could satisify the required condition.

struments than necessary for the estimation. In other words, the model does not necessarily need external instruments. Therefore, the test for overidentification is critical in System GMM. The Hansen test or Sargan's J test is the test for overidentifying restrictions implied by an overidentified model such that the null hypothesis is that the overidentifying restrictions are valid. The results show that there are no rejections of the null hypothesis of the validity of overidentification. In sum, the overall estimations satisfy the required conditions for system GMM

Among independent variables, trade openness shows a positive effect on economic growth and consistent results except low-income level countries. However, its magnitude is lower than other variables even though it is statistically significant across different income levels except at low levels of income. Generally, it is well known that the lower income countries tend to be agriculture-based, with focus on sectors such as farming, forestry, and fishing, while developed countries are more reliant on exports of manufactured goods such as electronics and IT equipment (See UNCTAD (2018)) Therefore, less-developed countries are exposed to the risk of price volatility, which is more prevalent in the agricultural industry. At the same time, these sectors are laborintensive, so that their value-added to a country's economy is smaller than that from manufactured industries. This is a possible reason that it is negative and statistically insignificant.

In line with trade openness, TFP also has a positive effect, which is consistent except at low levels of income. According to Schefold (1976), technological progress can take different forms such as saving of labor, saving of raw materials, mechanization, and inventions. Therefore, technological progress can enhance economic growth through increases in productivity of either capital or labor or both. However, modern technological progress is closely related to mechanization and/or inventions rather than saving of labor and/or saving of raw materials so that technological progress requires industrialization. Because less developed countries' production is more likely to be labor intensive, such as in agricultural industries, as mentioned above, possibly it takes technological transformation cost such as reequipping,

retraining, relocating, and reorganizing their economy, known as industrialization. (Solo, 1969) Therefore, it is possible for technological progress to have an adverse effect on growth at the beginning of the industrialization of less developed countries. This suggests that technological progress may not necessarily encourage economic growth. Keeping this in mind, the statistical insignificance of TFP for low income level countries makes sense.

In case of domestic credit, its effect on the growth is either negative or there is no effect. This result is consistent with Gozgor (2015) who found that among 58 developed and developing countries over 1970-2010, only seven countries have statistically significant Granger causality between domestic credit and economic growth. This implies that the higher domestic credit causes financial institutions to have higher screening cost rather than lowering the cost. Therefore, the negative or zero effect on the growth is indicative of the presence of asymmetric information regardless of the quantity of domestic credit.

Compared to other independent variables, the impact of capital service is less consistent. As mentioned above, capital service is a slightly different concept from capital stock and can be interpreted as the utilization of capital stock due to normalization relative to the United States. Note that capital service for the United States has unit value. The results indicate a positive effect on growth in the case of low-income level countries and then an increase in the effect for medium income level countries. Finally, the effect is diminishing (or becoming negative). This pattern suggests that there is inverted U-shaped pattern in the effect of capital service on the growth across the different income levels. This is consistent with the prediction of the Solow-Swan model because developed countries generally have lower marginal productivity of capital and support the convergence hypothesis in the Solow-Swan model that investors are able to earn the highest return by investing in the low-income countries because the magnitudes of capital service in low and medium-income countries are higher than in high-income level countries. Therefore, the results support the arguments of the Solow-Swan model.

According to Melo et al. (2001), there are 11 variables to characterize the initial conditions

of developing for countries transitioning to a market economy. They include development, resources, initial macroeconomic distortion, income level, urbanization, industrialization and so on. They constructed a linkage system among initial conditions, policies and performance and found that initial conditions are important in terms of both economic performance and the speed of economic liberalization. Therefore, initial conditions are important factors to generate different economic performance. This suggests that current economic growth relies on prior economic growth as long as the initial conditions affect the economic performance persistently. The results show that except for high income countries for LMF, in high and medium income countries there is a positive effect of prior economic growth on current economic growth. In low-income countries prior economic growth affects current economic growth negatively. Therefore, it is clear that the initial condition of low-income level countries for coming out of the poverty trap are not as favorable as they are formedium and higher-income countries, since prior economic growth can have a negative effect on current economic growth for lower income countries until they are able to escape from the trap. Given this perspective, the results seem to have reasonable signs.

Finally, the most surprising variable is financial openness. In spite of the controversy regarding financial openness, generally, it is expected that hypothetically, low-income level countries' growth is likely to be negatively affected by financial openness through appreciating real exchange rate and reducing profitability and investment opportunities in the traded goods sector. (Rodrik and Subramania, 2009) Moreover, financial crises resulting from financial openness affect the economies of low-income more severely than those of high-income countries. This could be because many low-income countries have a more vulnerable financial structure than do high-income countries.

A general notion in economics regarding openness is that the openness is the outcome of financial development. In other words, the more financially developed, the more open to the world. Therefore, this result is counter-factual or counter-intuitive to the theoretical argument in literature because it shows openness having a negative effect on high-income

countries' growth while it has positive effect on growth in medium and low income countries regardless of its statistical significance. According to Cerdeiro and Komaromi (2021), however, the equity inflows in more financially open countries' portfolios are more exposed to the external interest rate environment, while debt inflows are more sensitive to domestic business cycles. This implies that financially more developed countries are more vulnerable to foreign portfolio investment. This is because most developed countries have more foreign portfolio investment while less developed countries have more debt inflow and foreign direct investment. Therefore, the financially more open countries are more vulnerable to some financial factors. In this point of view, the negative effect of financial openness on economic growth in the case of high income level countries is empirically reasonable.

3.2 Tier-Changing Categories

As shown in Table 11, test statistics for the System GMM satisfies required conditions of no serial correlation at an order higher than 1 and of the validity of overidentifying restrictions as before. Therefore, using System GMM for the estimation of tier-changing categories results in a consistent estimator.

In contrast with the results for stable countries, for tier-changing categories, financial openness has a positive effect on economic growth, as we can see in Table 11. This is consistent with the typical arguments in the literature that financial openness encourages economic growth. However, one critical difference is while the difference in the magnitude between LMF and KA is small in stable countries, it is large among tier-changing categories. At the same time, overall magnitude of tier-changing categories is larger than stable countries. This suggests that financial openness is more impactful for tier-changing categories than for stable countries.

In line with this divergence in results, their statistical significance is also different. Particularly, LMF is statistically significant across stable countries while KA is statistically significant across tier-changing categories. As mentioned above, KA is a de jure index so

that it measures financial openness more broadly than de facto indices. This is because a de jure index is based on a country's legal system and how it relates to the economy. This suggests that the willingness to be open under regulatory circumstance is important enough to economic growth, that it is not possible to step up to another level of income without the reformation. This conclusion is based on the fact that KA is statistically significant only in tier-changing categories.

For example, according to Ianchovichina and Martin (2001), after China joining the World Trade Organization (WTO), there was an increase in the number and types of enterprises eligible to trade and a greater importance of indirect trade policy instruments that were absent or unimportant under the planning system. This implies that reformation across wide range of industries is not only quantitatively but also qualitatively different to the openness as economic outcome. Therefore, it is safe to say that systematical reformation for financial openness including the legal and regulatory environment is a more relevant factor to tier-changing categories so that all aspects of liberalization are required for transition.

In case of the growth lag, the coefficients across tier-changing categories are statistically significant and larger than for stable countries in terms of their magnitudes. This would lead to the intuitive conclusion that to exit from the poverty trap, economic growth is likely to be accelerated by inertial growth as an aircraft accelerates to take off from land. Therefore, prior growth should have a positive effect on economic growth and the magnitude of this effect is larger than for stable countries. In this point of view, the sign and the magnitude seem to be as expected.

As mentioned above, capital service shows the pattern that has an inverted U-shaped pattern in the effect of capital service on economic growth. LMF shows a slightly different pattern that is a little higher than transitioning to medium while KA follows same pattern. Note that capital service is not statistically significant in transitioning to High in LMF so that its value is not different to zero. Hence there is no difference in the pattern.

Additionally, the effect of domestic credit on economic growth among tier-changing cate-

gories is consistently negative. This indicates the presence of asymmetric information, and this is not associated with economic growth. Generally, it is known that economic growth is attributable to financial development. This is because financial development can avoid unnecessary costs related to asymmetric information among agents. As mentioned above, however, the presence of the asymmetric information exists regardless of the quantity of domestic credit. This goes against the general notion that financial development encourages economic growth as long as financial development is measured quantitatively. This is possibly another reason why only KA has greater magnitude and statistical significance in tier-changing categories. This implies that without qualitative transition, taking off from the poverty trap would require more time.

One surprising result in tier-changing categories is the negative effect of TFP on economic growth in transitioning to Low in the case of LM while there is a positive effect with KA. Since, as noted earlier, TFP has a positive effect on economic growth, this result is contrary to what we would expect. One possible explanation for this is that while transitioning, it takes time to adapt to new technological progress, as mentioned above. Therefore, the costs to switch to more industrialized level are unavoidable , which can cause the observed negative effect. In contrast, institutional change due to technological progress can be faster than economic change from technological advance so that KA can have a positive effect while LMF has a negative effect. Therefore, tier-changing categories may not enjoy the full fruits of technological progress.

Finally, as before, trade has either a positive effect but one that is smaller than for other variables or that is not different from zero so that there is no difference between stable and tier-changing categories. Therefore, trade is not a critical variable to explain the economic growth regardless of the development status of countries. These results run counter to theoretical arguments in international trade theory, but are partially consistent with Yanikkaya (2003). As mentioned in Ianchovichina and Martin (2001) and Yanikkaya (2003), trade openness can lead to systematical reformation so that it is possible to introduce new institutional

changes. A possible explanation of this is that the marginal effect of trade openness is more important than the level of trade openness itself.

Table 8: List of No Tier-Changing Categories

Income Status	Countries under LMF	# of countries	Countries under KA	# of countries
Low Income	Afghanistan, Bangladesh, Benin, Burkina Faso, Burundi, Cambodia, Central African Republic, Chad, Comoros, Congo Rep., Eritrea, Ethiopia, Gambia, Guinea, Guinea-Bissau, Haiti, Kenya, Liberia, Madagascar, Malawi, Mali, Mauritania, Mozambique, Myanmar, Nepal, Nigeria, Rwanda, Sierra Leone, Tanzania, Togo, Uganda	31	Afghanistan, Benin, Burkina Faso, Burundi, Central African Republic, Chad, Comoros, Congo Rep., Ethiopia, Eritrea, Gambia, Guinea, Guinea-Bissau, Haiti, Liberia, Madagascar, Malawi, Mali, Mozambique, Nepal, Nigeria, Rwanda, Senegal, Sierra Leone, Somalia, Tanzania, Togo, Uganda, Zimbabwe	29
Lower Middle	Albania, Armenia, Belize, Bolivia, Cameroon, Caipe Verde, Congo Rep., Cote D'Ivoire, Egypt, Fiji, Georgia, Guatemala, El Salvador, Honduras, Kiribati, Marshall Island, Morocco, Moldova, Mongolia, Nicaragua, Papua New Guinea, Paraguay, Philippines, Samoa, Senegal, Syria, Tonga, Ukraine, Uzbekistan, Vanuatu, Yemen Rep.	31	Bolivia, Cape Verde, Djibouti, El Salvador, Guatemala, Egypt, Indonesia, Kiribati, Lesotho, Micronesia, Morocco, Papua New Guinea, Philippines, Solomon Island, Syrian, Tunisia, Ukraine, Uzbekistan, Vanuatu	19
Upper Middle	Algeria, Antigua and Barbuda, Argentina, Belarus, Brazil, Cyprus, Gabon, Iran, Latvia, Libya, Lithuania, Panama, Romania, Russian Fed., Suriname, Seychelles, Uruguay, Venezuela	18	Argentina, Brazil, Gabon, Libya, Malaysia, Mauritius, Mexico, South Africa, St. Lucia	9
High	Aruba, Australia, Austria, Bahrain, Belgium, Canada, Denmark, Finland, France, Germany, Hong Kong, Iceland, Ireland, Israel, Italy, Japan, Kuwait, Netherlands, New Zealand, Norway, Qatar, Saudi Arabia, Singapore, Spain, Sweden, Switzerland, United Arab Emirates, United Kingdom, United States	29	Aruba, Australia, Austria, Bahamas, Belgium, Canada, China, Cyprus, Denmark, Finland, France, Germany, Hong Kong, Iceland, Ireland, Israel, Italy, Japan, Korea Rep., Kuwait, Netherlands, New Zealand, Norway, Portugal, Qatar, San Marino, Singapore, Spain, Sweden, Switzerland, United Arab Emirates, United Kingdom, United States	33

Table 9: List of Tier-Changing Categories

Income Status	Countries under LMF	# of countries	Countries under KA	# of countries
Low to Lower Middle	Bhutan, Ghana, Guyana, India, Indonesia, Lao Rep., Lesotho, Nigeria, Pakistan, Sao Tome and Principe, Solomon Island, Sri Lanka, Sudan, Vietnam, Zambia	15	Armenia, Bangladesh, Bhutan, Cambodia, Cameroon, Congo Rep., Cote D'Ivoire, Georgia, Ghana, Honduras, India, Kenya, Kyrgyz Rep., Lao Rep, Mauritania, Moldova, Mongolia, Myanmar, Nicaragua, Nigeria, Pakistan, Sao Tome and Principe, Sri Lanka, Sudan, Tajikistan, Vietnam, Yemen Rep., Zambia	28
Low to Upper Middle	Angola, China, Maldives	3	Albania, Angola, Azerbaijan, Bosnia and Herzegovina, China, Equatorial Guinea, Guyana	7
Low to High	Equatorial Guinea	1	None	0
Lower Middle to Upper Middle	Azerbaijan, Bosnia and Herzegovina, Botswana, Bulgaria, Chile, Colombia, Costa Rica, Dominica, Dominican Rep. Ecuador, Grenada, Jamaica, Jordan, Kazakhstan, Lebanon, Malaysia, Mauritius, Mexico, Namibia, Peru, St. Lucia, St. Vincent and the Grenadines, South Africa, Thailand, Turkmenistan, Tunisia, Turkey	27	Algeria, Belize, Belarus, Botswana, Bulgaria, Colombia, Costa Rica, Dominica, Dominican Rep., Ecuador, Fiji, Grenada, Iran, Iraq, Jamaica, Jordan, Kazakhstan, Lebanon, Maldives, Marshall Island, Namibia, Panama, Paraguay, Peru, Romania, Russian Fed., Samoa, St. Vincent and the Grenadines, Suriname, Thailand, Tonga, Turkey, Turkmenistan, Venezuela	34
Lower Middle to High	Croatia, Czech Republic, Poland, Slovak Rep.	4	Estonia, Latvia, Lithuania, Poland, Slovak Rep.	5
Upper Middle to High	Estonia, Greece, Hungary, Korea, Rep., Malta, Oman, Portugal, Slovenia, St. Kitts and Nevis, Trinidad and Tobago	10	Antigua and Barbuda, Bahrain, Barbados, Chile, Croatia, Czech Rep., Greece, Hungary, Malta, St. Kitts and Nevis, Oman, Saudi Arabia, Slovenia, Seychelles, Trinidad and Tobago, Uruguay	16
Lower Middle to Low	Kyrgyz Rep., Tajikistan, Zimbabwe	3		0
Upper Middle to Low	Iraq	1		0

Table 10: GMM-SYS Estimation for Stable Countries

Status	High		Medium		Low	
Financial Openness	LMF	KA	LMF	KA	LMF	KA
Growth Lag	0.0409	0.186***	0.1880***	0.1092***	-0.1137***	
	(0.0281)	(0.0295)	(0.0611)	(0.0644)	(0.0193)	
Openness	-2.4132***	-2.3159	0.6127***	0.5891	0.2590***	
	(0.2285)	(2.1029)	(0.1504)	(3.7260)	(1.5094)	
Capital Service	-29.4304***	1.0332	29.1735***	43.4162***	10.0514	
	(7.3325)	(1.0205)	(10.8213)	(8.9332)	(7.2989)	
TFP	8.1951***	1.6631***	15.5235 **	15.0932***	4.0872	
	(0.7200)	(0.5267)	(6.8254)	(2.0071)	(18.0589)	
Domestic Credit	-0.0415***	-0.0166***	0.0133	-0.0265**	0.4913	
	(0.0097)	(0.0047)	(0.0252)	(0.0122)	(0.1998)	
Trade	0.0231***	0.0073***	0.0867***	0.0357**	-0.0609	
	(0.0031)	(0.0017)	(0.0237)	(0.0165)	(0.0848)	
Constant	-1.2431	2.0689***	-13.2290***	-9.2134***	4.6346	
	(1.6471)	(0.6616)	(3.3444)	(2.0863)	(9.8059)	
AR(1)	-2.53**	-2.77***	-3.34***	-2.70***	-1.97**	
	[0.011]	[0.006]	[0.001]	[0.007]	[0.049]	
AR(2)	-0.21	-0.86	-0.21	-1.57	1.23	
	[0.837]	[0.391]	[0.83]	[0.117]	[0.218]	
Hansen	11.20	14.85	6.67	9.46	2.82	
	[0.262]	[0.189]	[0.573]	[0.396]	[0.945]	
# of Obs.	338	449	556	266	219	
# of Countries	23	27	28	14	11	

Note: Standard error in parentheses. p-value in square brackets.
$^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$

Table 11: GMM-SYS Estimation for Tier-Changing Categories

Status	To High		To Medium	
Financial Openness	LMF	KA	LMF	KA
Growth Lag	0.2155***	0.2739***	0.3756***	0.1705***
	(0.0816)	(0.0674)	(0.0501)	(0.0463)
Openness	0.4487	6.6859***	1.9881	5.4902**
	(2.8453)	(2.8909)	(1.4516)	(2.5419)
Capital Service	11.2063	-40.8807***	-1.2703**	13.8187***
	(8.2244)	(16.6067)	(0.6157)	(4.5174)
TFP	25.4860***	3.1103***	-2.5609**	7.4964***
	(10.7192)	(1.0964)	(1.1527)	(2.4163)
Domestic Credit	-0.0446***	-0.0334*	-0.0134	-0.0802***
	(0.0151)	(0.0189)	(0.0136)	(0.0187)
Trade	0.0217	0.0139***	-0.0080	0.0998***
	(0.0186)	(0.0042)	(0.0077)	(0.0203)
Constant	-12.9431	-1.0396	6.6895***	-7.2821***
	(7.9538)	(1.9439)	(1.2480)	(2.6325)
AR(1)	-2.51**	-2.86***	29.81***	-3.86***
	[0.012]	[0.004]	[0.001]	[0]
AR(2)	-1.71*	-1.42	1.02	-1.15
	[0.087]	[0.155]	[0.306]	[0.250]
Hansen	2.77	8.63	15.84	15.41
	[0.973]	[0.656]	[0.104]	[0.118]
# of Obs.	130	186	386	469
# of Countries	10	12	23	25

Note: Standard error in parentheses. p-value in square brackets.
$^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$

Chapter 4: Industry Analysis

Instead of using a single index at a time, PCA and FA are adopted in order to identify the common pattern of financial openness indices. In this paper, five publicly available indices are introduced, but there are many different financial openness variables including *de jure* and *de facto*. The results vary depending on what index was chosen in my previous research. Therefore, it is reasonable to use dimensionality reduction techniques rather than choosing one specific variable and comparing each one. PCA and FA adoption seems very helpful in data-abundant cases where there is no clear theoretical guideline for proper data selection. In dimensionality Reduction, PCA and FA show different aspects. PCA is based on a linear combination of variables. PCA combines many variables into a single component or a few components by selecting the optimal weighted contribution of variables and shows the total variance of variables. FA is a model of unobservable latent variable from related variables. FA explains the common variance of variables. The main purpose of the PCA is reducing the dimension of the data and that of FA is to identify unknown latent data. According to Kim (2008), FA is more appropriate to explain the correlation among variables while PCA is better to summarize the data with a small number of variables. However, it is not clear what technique is more appropriate to reduce the number of financial openness variables. Therefore, this paper employs both PCA and FA to estimate the effect of financial openness on economic growth.

1 PCA and FA Results

Table 12 shows the results of PCA and FA in different income level countries. From five financial openness variables (KAOPEN, KANEW, KA, IFHeritage, and LMF), five components are extracted. Panel A in Table 13 shows how much each components can explain the total variance. Eigenvalues show the amount of variability of corresponding eigenvector. Components can be adequate only if the eigenvalue is higher than or equal to the unit be-

cause the higher eigenvalue stands for more explanatory power for the variance.

Panel C in Table 12 shows common variance that five indices can be merged into one factor. At the same time, all factors other than factor 1 has an eigenvalue less than unit. Therefore, it is possible to conclude that factor 1 is only variable for data reduction. Put simply, factor loading is known as an indicator that shows the relative importance of variable so that values represents the strength of the relationship between unobserved factor and variables. Panel B in Table 13 also shows that factor 1 is closely related to financial indices except LMF. Even though Factor 2 has the eigenvalue less than 1, however, it is more related to LMF. Therefore, factor 1 as well as factor 2 are employed to estimate the effect of financial openness as PCA.

2 Transition of Countries by Development Level

According to Kose et al. (2009), the effect of financial openness on growth is complicated by threshold condition. Without satisfying threshold conditions, financial openness alleviate its positive effect by making a country vulnerable to financial crisis and the effect of financial can be ambiguous a priori. Therefore, Kose, Prasad and Taylor (2011) developed the empirical framework that the flow of FDI and portfolio equity are safer and beneficial than deb flows at low levels of financial development. This implies that the effect of financial openness on economic growth can vary, depending on the maturity of economy. In this vein, World Development Indicator (WDI) provided by World Bank categorizes countries into 4 income groups by low income, lower middle income, upper middle income, and high based on GNI Per Capita in U.S. Dollar, converted from local currency using the Atlas Method.[13][14] Similar groupings have been introduced with the World Development Report since 1970. Before 1987, however, countries are categorized into 3 income groups by low income, middle

[13]The Atlas method is a method which smooths exchange rate fluctuation by a three year moving average using price-adjusted conversion factor. For measuring inflation, the current methodology is using the change in SDR deflator complied from inflation measures represented in the IMF's Special Drawing Rights. The thresholds are updated annually at the beginning of the World Bank's fiscal year, July 1st

[14]Available at https://datacatalog.worldbank.org/dataset/world-development-indicators

income, and high income. Therefore, there is discrepancy between pre-1987 and post-1987. Based on the idea of Kose et al. (2009) and WDI, countries are categorized by the transition of each countries by development level as shown in Table 14 and Table 15. Rather than employing specific threshold categorization mentioned above, we focused on counties' transition. This seems to be more robust because the final impact of financial openness can be affected by changes in development level such as moving to high-income category. Also, political or institutional aspects are too broad to define clearly.

Table 14 shows countries in which there is no transition but staying in same income group, while Table 15 shows countries in which transition occurs. Because there is discrepancy in WDI between pre-1987 and post-1987, the range is adjusted according to new categorization of WDI so the categorization has range from 1987 to 2016.

3 Result

As shown in Table 14 and Table 15, the countries are divided into stable countries and tier-changing categories. Stable countries imply that the countries remain the same income level since 1987 or their income level at 1987 is equal to the level in 2011 (or 2017). In other words, even if there is fluctuation in income level during this period, it is included in stable countries as long as the income level at the beginning equals the end of the data. In addition to this, the effect of financial openness at the industry levels rather than the national level is estimated. Because the effect of financial openness on each industry can be varied as the effect of financial openness at different levels of income, the estimation of each industry at different levels of income can provide a more detailed picture of the effect of financial openness. As mentioned in Gupta and Yuan (2009), the effect of financial openness does not have any effect on industrial growth in contrast with a traditional hypothesis regarding financial openness.

First of all, one of the key findings is statistical consistency in methodologies. Even though

Principle Component Analysis has a different foundation to *Factor Analysis*, the overall sign of coefficients is consistent with the same income level. Particularly, the signs of coefficients are identical between *Principle Component Analysis* and *Factor Analysis* as long as the coefficients are statistically significant. In the case of statistically insignificant coefficients, there are very similar patterns across industries in control and financial openness variables.

Among control variables, Total Factor Productivity has a positive effect on economic growth regardless of income levels and industries. This result is consistent with the traditional argument predicted by the Solow-Swan model (Solow, 1956; Swan, 1956) except for the agricultural industry in tier-changing categories. According to Schefold (1976), there are different forms in technological progress such as saving of labor, saving of raw materials, mechanization, and inventions. Generally, technological progress increases the productivity of either capital or labor productivity so that either saving of labor or saving of raw materials can be the one way to improve productivity. Rather than saving these, however, modern technological progress is more closely associated with mechanization and/or inventions. Because less developed countries or tier-changing categories from low income to upper-medium or high income are more akin to labor-intensive in the agricultural industry, it possibly takes technological transformation cost such as reequipping, retraining, relocating, and reorganizing their economy, known as industrialization. (Solo, 1969) Therefore, it is possible for technological progress to harm the growth in the agricultural industry at transitioning stages. in this point of view, a negative effect of TFP on economic growth can be acceptable.

In the case of domestic credit, its effect on economic growth in each industry at different income levels is an almost negative effect or no effect on economic growth except for the service industry in Low-income countries. Overall, these results are consistent with Gozgor (2015) that only seven countries have statistically significant Granger causality between domestic credit and economic growth among 58 developed and developing countries over 1970-2010. This suggests that the higher domestic credit causes financial institutions to have higher screening costs rather than encouraging economic growth through lowering financial costs.

However, one surprising result is that the domestic credit variable has a positive effect on the growth of the service industry in Low-income countries and it is statistically significant. one possible explanation might be the structure of the service industry in Low-income countries. As known, the service industry such as professional service, education, medical service, and so on (ISIC 50-99) is well-developed in high-income or developed countries. In other words, the cost of using these services is relatively low compared to low-income or less-developed countries. Possibly, this is because Low-income or less developed countries face a lack of highly skill-intensive human capital so that banking, finance, insurance, and other business services need to pay high wages due to its high productivity. This can cause the service industries to charge higher costs than high-income countries. Paradoxically, therefore, the increase in the costs rather than reducing the costs can encourage the development of the service industries and can contribute to economic growth.

One of the classical theories in international economics is *Comparative Advantage* developed by *David Ricardo* (1772-1823) that describes how individuals, firms, or countries can get gains from trade at lower relative opportunity cost. Since then, most economists believe that trade liberalization has a favorable effect on economic growth. As predicted by the classical growth model, Solow-Swan model, technological progress is a critical factor to determine the long-run growth of an economy. Low-income or less developed countries, however, are not able to invest in R&D because its cost is certain while its outcome is uncertain. For Low-income or less developed countries to have R&D knowledge, trade can be a solution to have the knowledge. This is because some of the imported goods are technology-intensive goods so that low-income or less developed countries can learn advanced technology through trade. This is known as *the diffusion of knowledge* through trade. The empirical results of the effect of trade are not quite different from the classical theory. However, agricultural industries in High, Upper Medium, and Low Medium show an unfavorable effect of trade on economic growth. Possibly, this is because most countries try to impose trade barriers due to the importance of the agricultural industries. Generally, agricultural industries are

related to not only a country's well-being but also natural resources so that the importance of the industry is critical in the economy as well as the stability of a country. However, trade has a positive effect on economic growth in low-income countries. This can be rationalized by the fact that low-income countries have relied on the export of agricultural products. In contrast with other countries, trade has a negative effect on service industries. Because trade encourages *the diffusion of knowledge*, it can lower the cost of some sort of professional services. As mentioned above, Low-income or less developed countries need to charge higher costs to maintain their high productivity. Due to the effect of the diffusion of knowledge, trade can lower the cost so that it can discourage economic growth. Therefore, the negative effect of trade on service industries in Low-income can be acceptable in this vein. In contrast with this, tier-changing categories from Upper Medium to High has a positive effect of trade on economic growth in agricultural industries. One possible explanation for this exception is that some countries in this category export one specific agricultural product. As known, for example, South Korea is one country in this category, but they still export agricultural products in spite of the fact that South Korea is a developed country. In this point of view, the positive effect of trade on agricultural industries in tier-changing categories from Upper Medium to high can be exceptional and it can be acceptable that some countries such as the United States enjoy the fruit of the trade of the agricultural products.

As predicted in the classical economic growth model, particularly, Solow-Swan model, capital accumulation is one factor to encourage economic growth. In other words, a continuous capital accumulation cannot sustain long-run economic growth but increase the growth rate temporarily. In this point of view, the effect of capital service can have a positive effect on economic growth. The results show that the pattern of the effect of the capital service. For example, the capital service has a positive effect on high-level income countries such as High- and Upper Medium Income levels and then has a negative effect on some industries such as agricultural and service industries. In addition to this, a similar pattern is also observed in tier-changing categories. For instance, tier-changing categories from upper medium to

high shows a positive effect across industries. However, tier-changing categories from Lower Medium to Upper Medium, Lower Medium to High, and Lower Medium to Upper Medium shows no effect or a negative effect. Thus, it is possible to conclude that a positive effect of the capital service is only for developed countries or developing countries close to developed countries, whereas less-developed or developing countries have a negative effect. Possibly, this is because the capital service is the variable to measure how much capital is utilized and most of the negative effects have appeared in agricultural and service industries. Considering the properties of agricultural and service industries, the utilization of capital service is critical in these industries. In this vein, a different effect of the capital service in different income level countries across industries can be acceptable.

According to Melo et al. (2001), there are 11 variables to characterize the initial conditions of developing or tier-changing categories to a market economy.[15] They have constructed the linkage system among initial conditions, policies, and performance and found that initial conditions are critical to economic performance as well as the speed of economic liberalization. In other words, initial conditions are critical factors to determine economic performance and generate different economic outcomes. Therefore, it is safe to say that current economic growth relies on previous economic conditions or growth as long as initial conditions matter to economic performance and its outcomes. Even though it is clear that initial conditions or previous economic developments have an effect on economic growth, however, the results show that it is not clear how growth lag affects economic development. This is because the effect of the growth lag is varied among different income levels and tier-changing categories across industries. One pattern observed in the results is that a negative effect is dominant in tier-changing categories. In stable countries, a positive effect of the growth lag is dominant except in low-income countries. Note that all industries in low-income countries have a negative effect of the growth lag on economic development. These results imply that the initial condition or previous economic growth of low-income level or tier-changing categories

[15]For example, economic development, resources, initial macroeconomic distortion, income level, urbanization, industrialization, etc. are determinants of initial conditions.

from relatively low-income have an obstacle to taking off from the poverty trap.

Contradict to the traditional perception and/or argument in economics, one surprising result is the effect of financial openness on economic growth is no effect or a negative effect. In addition to this, the result shows that there is no critical difference between *Principal Component Analysis* and *Factor Analysis*. Except for High-income countries, most of the countries either stable or tier-changing categories have different effects across the industries. In High-income countries, the effect of financial openness has a consistent negative effect of financial openness on economic growth. This is counter-intuitive because High-income countries are generally known as financially developed countries. At the same time, the result shows that the first component or factor outweighs the second factor or component in most countries and industries. This implies that *de jure* is a more important factor than *de facto* so that an institutional aspect for financial openness matters more than economic aspects. For example, since the crisis of 2007-2009, the so-called *Global Financial Crisis*, was triggered in the United States, and its adverse effect is propagated from rich countries to poor countries. This implies that even developed countries do not have an institutional preparation to absorb the adverse shocks even though developed countries are financially more opened in terms of the economic aspect. This can be supported by the fact that a number of new financial measures have been proposed and implemented to minimize the financial distress risk after the aftermath of the Global Financial Crisis of 2007-2009. For example, the Federal Reserve Bank system requires all financial institutions to do stress testing to encourage banks to accumulate capital rather than paying dividends to minimize the risk.[16] Moreover, Bank for International Settlements also requires traditional banks to increase the amount of required capital overall, particularly, "*Systematic Important*" Financial Institution. (BIS, 2011*a*,*b*) and limit the amount of banks' maturity transformation through liquidity standards. (BIS, 2013). This evidence supports the results of why high-income countries have a negative effect of financial openness on economic growth while developing

[16]See https://www.govinfo.gov/content/pkg/FR-2011-12-01/pdf/2011-30665.pdf

or tier-changing categories have different effects across the industries.

This study has reported the results of an analysis of the empirical evidence regarding the relationship between financial openness and economic growth. The aim of this paper is to investigate this relationship among a large choice of measurements, which are available, with different methodologies and grouping techniques. Perhaps most importantly, I econometrically verify an institutional aspect of financial openness matters more than economic aspects. In this sense, the results are in line with the neoclassical model. Some directions for future work on financial openness and economic growth follow directly from this analysis. Continuous updates of the available measures, as well as the broader country samples, will guide me for continued research to make further progress, especially considering the importance of the time dimension.

Table 12: Component Analysis and Factor Analysis

Stable: High									
Variable	Comp1	Comp2	Comp3	Comp4	Comp5	Unexplained	Factor1	Factor2	Uniqueness
KAOPEN	0.5522	0.0015	-0.1158	0.8245	0.0433	0	0.8303	0.1593	0.2846
KA	-0.5694	0.2139	-0.0384	0.3379	0.7172	0	-0.9235	0.1815	0.1142
IFHeritage	0.1385	0.5458	0.8258	0.0233	-0.0197	0	0.1514	0.0879	0.9647
KANEW	0.577	-0.1118	0.0055	-0.4217	0.6905	0	0.9308	-0.0379	0.1319
LMF	0.137	0.8024	-0.5505	-0.1662	-0.0817	0	0.1529	0.3752	0.8358
Stable: Upper Medium									
Variable	Comp1	Comp2	Comp3	Comp4	Comp5	Unexplained	Factor1	Factor2	Uniqueness
KAOPEN	0.4581	0.2566	0.84	0.1362	0.01	0	0.759	0.1371	0.4052
KA	-0.4783	-0.4008	0.3763	-0.0072	0.6847	0	-0.8838	-0.3765	0.0772
IFHeritage	0.4173	-0.5191	-0.1863	0.7157	0.0976	0	0.6927	-0.4679	0.3013
KANEW	0.5015	0.2909	-0.3282	-0.262	0.6982	0	0.9254	0.2559	0.0782
LMF	-0.3683	0.6476	-0.1018	0.6329	0.1844	0	-0.6092	0.5737	0.2998
Stable: Lower Medium									
Variable	Comp1	Comp2	Comp3	Comp4	Comp5	Unexplained	Factor1	Factor2	Uniqueness
KAOPEN	0.5398	-0.0466	-0.1805	0.8165	-0.085	0	0.9227	-0.0011	0.1486
KA	-0.5489	0.083	0.1818	0.4762	0.6572	0	-0.9692	0.1072	0.0492
IFHeritage	0.3117	0.131	0.9408	0.0072	-0.0216	0	0.4104	0.1364	0.8129
KANEW	0.5552	-0.0245	-0.1608	-0.3262	0.7476	0	0.982	0.0377	0.0343
LMF	0.0441	0.9865	-0.1528	-0.0105	-0.0378	0	0.0527	0.2266	0.9459
Stable: Low									
Variable	Comp1	Comp2	Comp3	Comp4	Comp5	Unexplained	Factor1	Factor2	Uniqueness
KAOPEN	0.5042	-0.2564	0.1334	0.6419	-0.5002	0	0.9207	-0.2017	0.1011
KA	-0.4801	0.2078	0.5956	0.5466	0.2698	0	-0.8541	0.1572	0.1911
IFHeritage	0.4402	0.3696	0.6816	-0.4358	-0.1232	0	0.7501	0.4028	0.2551
KANEW	0.5094	-0.2728	0.0367	0.1125	0.8075	0	0.9407	-0.2316	0.0596
LMF	0.249	0.8247	-0.4019	0.2944	0.0988	0	0.3884	0.6071	0.4697
Transition: UM to High									
Variable	Comp1	Comp2	Comp3	Comp4	Comp5	Unexplained	Factor1	Factor2	Uniqueness
KAOPEN	0.5388	-0.1252	0.0992	0.8264	-0.0345	0	0.8652	-0.1816	0.2184
KA	-0.5506	-0.0946	-0.2365	0.4016	0.6861	0	-0.9279	-0.1406	0.1192
IFHeritage	0.2102	0.6984	-0.6823	0.0506	0.0001	0	0.2653	0.318	0.8285
KANEW	0.5576	0.0476	0.1947	-0.3495	0.7257	0	0.9418	0.0676	0.1084
LMF	-0.2268	0.6967	0.6564	0.1762	0.0372	0	-0.2919	0.416	0.7418
Transition LM to UM									
Variable	Comp1	Comp2	Comp3	Comp4	Comp5	Unexplained	Factor1	Factor2	Uniqueness
KAOPEN	0.5129	0.0353	0.2671	0.8039	-0.134	0	0.7038	0.2278	0.4307
KA	-0.5453	0.2972	0.2452	0.3619	0.6506	0	-0.9044	0.2607	0.0933
IFHeritage	0.2676	0.6323	0.5985	-0.4079	-0.0632	0	0.294	0.5022	0.6614
KANEW	0.5789	-0.2528	-0.0597	-0.2146	0.7425	0	0.9598	-0.1491	0.0531
LMF	0.1811	0.6684	-0.7119	0.1014	0.0585	0	0.1846	0.3839	0.7923
Transition: LM to High									
Variable	Comp1	Comp2	Comp3	Comp4	Comp5	Unexplained	Factor1	Factor2	Uniqueness
KAOPEN	0.4934	-0.3957	-0.0359	0.735	-0.2419	0	0.8844	-0.3346	0.1024
KA	-0.5284	0.1028	0.2354	0.6002	0.5427	0	-0.9581	-0.0268	0.0565
IFHeritage	0.3492	0.327	0.8752	-0.036	-0.0617	0	0.5048	0.2057	0.6677
KANEW	0.5403	-0.1412	-0.1137	-0.1804	0.8017	0	0.9881	-0.0314	0.0225
LMF	0.2519	0.8403	-0.4054	0.2564	-0.0216	0	0.3686	0.5354	0.5768
Transition: Low to UM									
Variable	Comp1	Comp2	Comp3	Comp4	Unexplained		Factor1	Factor2	Uniqueness
KA	0.5843	0.0607	0.3797	-0.7147	0		0.9581	0.0543	0.0791
IFHeritage	0.4215	0.6495	-0.6295	0.0653	0		0.5672	0.3469	0.5579
KANEW	-0.3779	0.7569	0.5319	0.038	0		-0.4892	0.3552	0.6346
LMF	0.5815	-0.0399	0.4203	0.6954	0		0.9518	-0.0789	0.0879
Transition: Low to LM									
Variable	Comp1	Comp2	Comp3	Comp4	Comp5	Unexplained	Factor1	Factor2	Uniqueness
KAOPEN	0.4846	0.2526	0.0479	0.8342	-0.0561	0	0.6933	0.3418	0.4025
KA	-0.527	0.3624	-0.2403	0.2561	0.6839	0	-0.9287	0.2873	0.0549
IFHeritage	0.2618	0.8517	0.1644	-0.4217	-0.0339	0	0.3172	0.4234	0.7202
KANEW	0.5476	-0.2819	0.2319	-0.1972	0.7267	0	0.9612	-0.1712	0.0468
LMF	-0.3451	0.0003	0.9269	0.1475	0.0043	0	-0.4305	-0.1396	0.7951

Table 13: Coefficient of Correlation

Stable: High					
	KAOPEN	KA	IFHeritage	KANEW	LMF
Component 1	0.9066	-0.9349	0.2274	0.9474	0.225
Component 2	0.0015	0.2158	0.5507	-0.1128	0.8096
Factor 1	0.8643	-0.9613	0.1576	0.9689	0.1591
Factor 2	0.2764	0.3149	0.1525	-0.0658	0.651
Stable: Upper Medium					
	KAOPEN	KA	IFHeritage	KANEW	LMF
Component 1	0.8331	-0.8698	0.759	0.912	-0.6699
Component 2	0.2658	-0.4151	-0.5376	0.3013	0.6707
Factor 1	0.7815	-0.91	0.7132	0.9528	-0.6272
Factor 2	0.1591	-0.4372	-0.5432	0.2971	0.6661
Stable: Lower Medium					
	KAOPEN	KA	IFHeritage	KANEW	LMF
Component 1	0.9468	-0.9627	0.5467	0.9737	0.0774
Component 2	-0.0467	0.0831	0.1312	-0.0246	0.9879
Factor 1	0.9347	-0.9818	0.4158	0.9947	0.0533
Factor 2	-0.002	0.1925	0.245	0.0677	0.4069
Stable: Low					
	KAOPEN	KA	IFHeritage	KANEW	LMF
Component 1	0.9261	-0.8818	0.8086	0.9357	0.4573
Component 2	-0.2634	0.2135	0.3797	-0.2803	0.8473
Factor 1	0.9445	-0.8761	0.7695	0.965	0.3984
Factor 2	-0.2453	0.1912	0.4898	-0.2817	0.7383
Transition: UM to High					
	KAOPEN	KA	IFHeritage	KANEW	LMF
Component 1	0.9166	-0.9366	0.3575	0.9486	-0.3858
Component 2	-0.1328	-0.1004	0.7412	0.0505	0.7393
Factor 1	0.895	-0.9598	0.2744	0.9742	-0.3019
Factor 2	-0.2917	-0.2259	0.5108	0.1086	0.6682
Transition: LM to UM					
	KAOPEN	KA	IFHeritage	KANEW	LMF
Component 1	0.8268	-0.879	0.4314	0.9331	0.2919
Component 2	0.039	0.3284	0.6987	-0.2793	0.7386
Factor 1	0.7255	-0.9324	0.3031	0.9895	0.1904
Factor 2	0.3238	0.3706	0.7138	-0.2119	0.5457
Transition: LM to High					
	KAOPEN	KA	IFHeritage	KANEW	LMF
Component 1	0.8887	-0.9517	0.629	0.9732	0.4537
Component 2	-0.3883	0.1008	0.3208	-0.1386	0.8245
Factor 1	0.8936	-0.9681	0.51	0.9984	0.3725
Factor 2	-0.4308	-0.0345	0.2649	-0.0405	0.6894
Transition: Low to UM					
	KAOPEN	KA	IFHeritage	KANEW	LMF
Component 1	.	0.9522	0.6869	-0.6158	0.9477
Component 2	.	0.0575	0.6152	0.717	-0.0378
Factor 1	.	0.9843	0.5827	-0.5026	0.9778
Factor 2	.	0.0944	0.6027	0.6171	-0.137
Transition: Low to LM					
	KAOPEN	KA	IFHeritage	KANEW	LMF
Component 1	0.8141	-0.8852	0.4398	0.9198	-0.5797
Component 2	0.251	0.3601	0.8463	-0.2801	0.0003
Factor 1	0.7123	-0.9541	0.3258	0.9875	-0.4423
Factor 2	0.469	0.3942	0.5809	-0.2349	-0.1915

Table 14: List of No Tier-Changing Categories

Low Income	Afghanistan, Benin, Burkina Faso, Burundi, Central African Republic, Chad, Comoros, Congo, Dem.Rep., Eritrea, Ethiopia, The Gambia, Guinea, Guinea-Bissau, Haiti, Liberia, Madagascar, Malawi, Mali, Mozambique, Nepal, Niger, Rwanda, Sierra Leone, Somalia, Tanzania, Togo, Uganda	27
Lower Middle	Angola, Armenia, Bolivia, Cameroon, Cape Verde, Congo, Rep., Cote d'Ivoire, Djibouti, Egypt, Arab Rep., El Salvador, Georgia, Guatemala, Honduras, Jordan, Kiribati, Kyrgyz Republic, Micronesia, Fed. Sts., Moldova, Mongolia, Morocco, Nicaragua, Philippines, Syrian Arab Republic, Tajikistan, Tunisia, Ukraine, Uzbekistan, Vanuatu, Yemen, Rep.	29
Upper Middle	Algeria, Argentina, Belarus, Brazil, Gabon, Iran, Islamic Rep., Iraq, Libya, Romania, Russian Federation, Suriname, Venezuela, RB	12
High	Aruba, Australia Austria, The Bahamas, Bahrain, Belgium, Canada, Cyprus, Denmark, Finland, France, Germany, Hong Kong, China, Iceland, Ireland, Israel, Italy, Japan, Kuwait, Netherlands, New Zealand, Norway, Qatar, San Marino, Saudi Arabia, Singapore, Spain, Sweden, Switzerland, United Arab Emirates, United Kingdom, United States	32

Table 15: List of Tier-Changing Categories

Low to Lower Middle	Bhutan, Cambodia, Ghana, India, Indonesia, Kenya, Lao PDR, Lesotho, Mauritania, Myanmar, Nigeria, Pakistan, Papua New Guinea, Sao Tome and Principe, Solomon Islands, Sri Lanka, Sudan, Vietnam, Zambia	19
Low to Upper Middle	Bangladesh, China, Equatorial Guinea, Guyana, Maldives	5
Lower Middle to Upper Middle	Albania, Azerbaijan, Belize, Bosnia and Herzegovina, Botswana, Bulgaria, Colombia, Costa Rica, Croatia, Dominica, Dominican Republic, Ecuador, Ecuador, Fiji, Grenada, Jamaica, Kazakhstan, Lebanon, Malaysia, Marshall Islands, Mauritius, Mexico, Namibia, Panama, Paraguay, Peru, Samoa, South Africa, St. Lucia, St. Vincent and the Grenadines, Thailand, Tonga, Turkey, Turkmenistan	34
Lower Middle to High	Chile, Czech Republic, Poland, Slovak Republic	4
Upper Middle to High	Antigua and Barbuda, Barbados, Estonia, Greece, Hungary, Korea, Rep., Latvia, Lithuania, Malta, Oman, Portugal, Seychelles, Slovenia, St. Kitts and Nevis, Trinidad and Tobago, Uruguay	16
Lower Middle to Low	Senegal, Zimbabwe	2

Table 16: Results of Stable Countries

Status	High								Upper Medium							
Industry	MFG.	UTIL.	AGR.	SVCS.	MFG.	UTIL.	AGR.	SVCS.	MFG.	UTIL.	AGR.	SVCS.	MFG.	UTIL.	AGR.	SVCS.
Financial Openness																
Component 1	-0.5225***	-0.2791	-0.1201	-0.1939***	.	.	.	.	0.5711	0.1773	0.0355	-0.2777	.	.	.	.
	(0.1601)	(0.2286)	(0.2361)	(0.0902)					(0.4988)	(0.3978)	(0.5988)	(0.3151)				
Component 2	-0.0485	0.5486	-0.1268	0.7959***	.	.	.	.	-0.6062	-0.5342	-0.4055	0.5777		.	.	.
	(0.4144)	(0.4882)	(0.6739)	(0.2201)					(1.272)	(0.9659)	(0.9975)	(0.7402)				
Factor 1	.	.	.	.	-0.8697***	-0.5032	-0.2125	-0.4085**	.	.	.	.	0.8934	0.2507	0.0412	-0.5957
					(0.266)	(0.3945)	(0.3941)	(0.1886)					(0.975)	(0.7804)	(1.146)	(0.6193)
Factor 2	.	.	.	.	0.0614	-0.315	-0.5263	0.3858	.	.	.	.	-1.148	-0.8741	-0.5141	0.5615
					(0.6302)	(0.5428)	(0.728)	(0.2552)					(1.439)	(1.119)	(1.165)	(0.874)
Control Variables																
Capital Service	4.154***	1.43	0.6406	0.2034	0.3916	2.115	0.9378	0.5797	26.08**	24.25**	14.47	18.26*	25.11**	23.62***	14.06	18.36*
	(1.575)	(1.346)	(2.566)	(0.5735)	(1.595)	(1.374)	(2.516)	(0.5669)	(12.9)	(11.03)	(20.06)	(9.934)	(12.68)	(10.94)	(20.57)	(9.801)
TFP	4.247***	4.328***	4.501*	-0.0982	4.104***	4.789***	4.548*	0.0957	13.79***	8.512*	4.256	5.058	14.03***	8.656*	4.186	5.183
	(1.232)	(1.478)	(2.611)	(0.815)	(1.222)	(1.403)	(2.57)	(0.7437)	(5.596)	(4.808)	(7.261)	(3.686)	(5.435)	(4.688)	(7.372)	(3.624)
Domestic Credit	-0.0337***	-0.0259***	-0.0126	-0.0157***	-0.0336***	-0.0268***	-0.0146*	-0.0137***	-0.1236	-0.0837	-0.0602	-0.0552	-0.1196	-0.0825	-0.0598	-0.0549
	(0.0069)	(0.0077)	(0.0096)	(0.0033)	(0.007)	(0.0074)	(0.0102)	(0.0032)	(0.0864)	(0.0793)	(0.1452)	(0.0558)	(0.0857)	(0.0793)	(0.1475)	(0.0563)
Trade	0.0116*	0.0065	-0.0102	0.0038	0.0102*	0.0119***	-0.0099*	0.0059***	0.1502***	0.1066**	0.0062	0.0453	0.1573***	0.1099***	0.0055	0.0502
	(0.0065)	(0.0062)	(0.0082)	(0.0027)	(0.0057)	(0.0046)	(0.0052)	(0.0022)	(0.0482)	(0.0447)	(0.0964)	(0.0361)	(0.0438)	(0.0421)	(0.0937)	(0.0347)
Constant	0.3292	-0.119	-0.8084	4.574***	0.6155	-1.094	-0.7171	3.545***	-10.99**	-7.039*	0.1013	-1.332	-11.47***	-7.252*	0.2041	-1.647
	(1.84)	(2.119)	(3.176)	(0.9913)	(1.739)	(1.772)	(2.843)	(0.8839)	(5.397)	(4.125)	(5.814)	(3.259)	(4.962)	(3.897)	(5.724)	(3.087)
Observation	323	323	323	313	323	323	323	313	80	84	85	84	80	84	85	84
R^2	0.0969	0.0431	0.0654	0.1237	0.0922	0.0961	0.0601	0.1251	0.2721	0.2663	0.2482	0.3557	0.2112	0.2458	0.2461	0.3333
Status	Lower Medium								Low							
Industry	MFG.	UTIL.	AGR.	SVCS.	MFG.	UTIL.	AGR.	SVCS.	MFG.	UTIL.	AGR.	SVCS.	MFG.	UTIL.	AGR.	SVCS.
Financial Openness																
Component 1	0.3506	0.5201	-0.6948	0.4574*	.	.	.	.	-2.492	9.08	-2.957	-1.119	.	.	.	.
	(0.5237)	(0.4053)	(1.065)	(0.2771)					(3.227)	(6.658)	(3.322)	(2.224)				
Component 2	-0.661	-0.0599	-0.727	0.02796	.	.	.	.	-0.2247	-1.148	4.026**	-0.9085		.	.	.
	(0.5333)	(0.5391)	(0.8993)	(0.2669)					(2.629)	(3.535)	(2.048)	(1.892)				
Factor 1	.	.	.	.	0.7697	1.041	-1.268	0.7203	.	.	.	.	1.57	14.01	2.357	-2.61
					(0.9115)	(0.7271)	(1.993)	(0.4712)					(5.182)	(10.66)	(5.739)	(3.503)
Factor 2	.	.	.	.	2.183	1.463	-0.0204	0.6832	.	.	.	.	-5.022*	0.942	0.0214	-1.402
					(1.601)	(1.291)	(1.571)	(1.016)					(2.855)	(2.968)	(2.426)	(1.364)
Control Variables																
Capital Service	121.4	64.17	-0.491	-33.13	44.43	30.2	-29.86	-42.28	194.7	1219	-1138*	399.6	1614*	1024	66.46	440.8
	(77.31)	(65.59)	(103.1)	(43.09)	(76.93)	(62.23)	(89.36)	(50.22)	(872.7)	(1310)	(664.5)	(595.2)	(892.9)	(1348)	(787)	(482.8)
TFP	3.69	3.985	3.762	3.186	0.3438	3.047	2.212	3.506*	9.917	6.076	-10.82	43.87**	14.46	-2.662	1.795	44.47**
	(2.961)	(2.545)	(3.915)	(1.942)	(2.203)	(2.035)	(2.968)	(1.995)	(28.15)	(37.35)	(24.19)	(21.06)	(23.18)	(41.03)	(28.4)	(19.04)
Domestic Credit	-0.0195	-0.0109	-0.0033	-0.0029	-0.0269	-0.0176	1.80E-05	-0.0037	-0.3573*	-0.3353	-0.3008	0.2789**	-0.3181*	-0.3004	-0.181	0.2727**
	(0.0461)	(0.0424)	(0.067)	(0.0315)	(0.0482)	(0.0434)	(0.0684)	(0.0335)	(0.2017)	(0.263)	(0.2286)	(0.1405)	(0.193)	(0.2651)	(0.1911)	(0.1289)
Trade	0.0296	0.0252	-0.0399	0.0415***	0.0424	0.0364*	-0.0472	0.0469***	-0.0126	0.3284**	0.0124	-0.075	-0.0821	0.2811**	-0.0244	-0.0786
	(0.0289)	(0.0209)	(0.0626)	(0.015)	(0.0314)	(0.022)	(0.0689)	(0.0166)	(0.1033)	(0.1491)	(0.0935)	(0.0638)	(0.1076)	(0.1291)	(0.0873)	(0.0613)
Constant	-1.311	-0.9601	4.989	-0.172	0.27	-0.7817	6.484	-0.4164	4.85	1.242	7.463	-7.578	8.766	3.935	7.696	-7.615
	(3.564)	(2.719)	(6.836)	(1.836)	(3.776)	(2.794)	(7.372)	(1.965)	(8.744)	(9.272)	(6.72)	(6.216)	(8.33)	(11.75)	(9.4)	(6.303)
Observation	143	153	153	147	143	153	153	147	41	41	41	41	41	41	41	41
R^2	0.1474	0.1253	0.3612	0.0814	0.1233	0.1312	0.3579	0.0633	0.1073	0.1132	0.388	0.1775	0.1345	0.1123	0.3721	0.1946

Note: MFG., AGR., UTIL., and SVCS. stand for Manufacturing, Agriculture, Utility, and Services, respectively.
Standard error in parentheses.
$^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$

Table 17: Results of Tier-Changing Categories

Status	Upper Medium to High								Lower Medium to Upper Medium							
Industry	MFG.	UTIL.	AGR.	SVCS.	MFG.	UTIL.	AGR.	SVCS.	MFG.	UTIL.	AGR.	SVCS.	MFG.	UTIL.	AGR.	SVCS.
Financial Openness																
Component 1	-0.9092	-0.4176	0.3985	0.1311	.	.	.	.	-0.3723	-0.0222	-0.3349	-0.3758	.	.	.	.
	(0.5905)	(0.4796)	(1.008)	(0.2122)					(0.4777)	(0.4707)	(0.4842)	(0.283)				
Component 2	0.7563	0.5472	0.5347	0.7148**	.	.	.	.	0.2292	0.0014	0.4873	-0.1294	.	.	.	.
	(0.7534)	(0.7343)	(1.232)	(0.4134)					(0.5371)	(0.566)	(0.4969)	(0.3038)				
Factor 1	.	.	.	.	-01.868	0.8756	0.2399	0.0634	.	.	.	.	-0.5118	0.0665	-0.6701	-0.6411
					(1.183)	(0.989)	(1.799)	(0.4898)					(0.7298)	(0.7452)	(0.781)	(0.4552)
Factor 2	.	.	.	.	2.168	1.388	1.487	0.8595	.	.	.	.	-0.0304	-0.2931	0.8182	-0.3055
					(1.596)	(1.475)	(2.419)	(0.8419)					(1.081)	(1.097)	(0.8394)	(0.6171)
Control Variables																
Capital Service	45.23	64.07**	28.75	37.12**	21.66	51	8.145	36.3*	22.7	17.04	-33.01	-28.83	26.23	22.27	-40.11	-29.46
	(37.11)	(30.99)	(55.45)	(15.79)	(45.84)	(39.31)	(68.51)	(20.9)	(33.74)	(32.59)	(27.05)	(17.88)	(31.68)	(31.8)	(28.44)	(18.03)
TFP	8.49	32.04**	13.63	34.74**	10.16	32.67**	13.36	32.57**	-0.5115	0.8378	-3.693	4.706**	-0.5068	0.6902	-3.211	4.562**
	(16.06)	(14.16)	(18.94)	(9.713)	(15.52)	(13.84)	(20.54)	(9.733)	(3.79)	(3.92)	(3.509)	(2.035)	(3.315)	(3.466)	(3.466)	(1.813)
Domestic Credit	-0.0549**	-0.0783***	-0.0475	-0.0496**	-0.0473**	-0.0739***	-0.0383	-0.0489***	-0.0253**	-0.0253**	-0.0131	-0.0097	-0.0222*	-0.0272**	-0.0133	-0.0096
	(0.0228)	(0.0185)	(0.04)	(0.0112)	(0.0239)	(0.02)	(0.0394)	(0.012)	(0.0129)	(0.0126)	(0.0163)	(0.0081)	(0.0131)	(0.013)	(0.0162)	(0.0081)
Trade	0.0286	0.0226	0.0333	0.0112	0.0299	0.023	0.0342	0.0085	0.0166	0.019**	-0.0063	0.0257***	0.0163	0.0198*	-0.0086	0.0258***
	(0.021)	(0.0187)	(0.055)	(0.0094)	(0.0204)	(0.0182)	(0.0532)	(0.0092)	(0.0118)	(0.0097)	(0.0132)	(0.0069)	(0.0123)	(0.0102)	(0.0132)	(0.0072)
Constant	-1.061	-15.34**	-7.218	-17.12	-2.056	-15.7*	-7.061	-15.6***	3.016	2.666	7.182***	0.6998	2.804	2.451	7.265***	0.7872
	(9.985)	(9.028)	(10.61)	(6.05)	(9.62)	(8.798)	(11.16)	(6.047)	(2.115)	(2.276)	(2.305)	(1.239)	(2.061)	(2.234)	(2.208)	(1.235)
Obervation	75	75	75	75	75	75	75	75	220	225	225	225	220	225	225	225
R^2	0.3389	0.3955	0.1454	0.5713	0.2345	0.3013	0.1423	0.5357	0.064	0.1012	0.2334	0.1182	0.063	0.152	0.2424	0.1245
Status	Lower Medium to High											Low to Low Medium				
Industry	MFG.	UTIL.	AGR.	SVCS.	MFG.	UTIL.	AGR.	SVCS.	MFG.	UTIL.	AGR.	SVCS.	MFG.	UTIL.	AGR.	SVCS.
Financial Openness																
Component 1	-0.9156**	-0.8862**	1.868**	0.4849	.	.	.	.	-1.251**	-1.824***	-0.7321	-1.055*	.	.	.	.
	(0.4564)	(0.3747)	(0.7893)	(0.338)					(0.5648)	(0.4951)	(0.6013)	(0.6303)				
Component 2	0.4465	0.2045	-1.861	0.6112*	.	.	.	.	1.594	-0.1591	-2.374	2.425	.	.	.	.
	(0.9628)	(0.6791)	(1.278)	(0.3336)					(1.762)	(1.869)	(1.809)	(1.487)				
Factor 1	.	.	.	.	-0.9604	-1.295**	3.377**	0.7784	.	.	.	.	-2.271**	-2.584***	-0.6942	-2.369**
					(0.883)	(0.6477)	(1.497)	(0.5758)					(0.9455)	(0.9182)	(0.7676)	(1.186)
Factor 2	.	.	.	.	1.419	0.8706	-0.9225	0.2145	.	.	.	.	0.2696	0.0586	-2.115	0.9799
					(1.121)	(0.8179)	(1.463)	(0.4306)					(1.42)	(1.073)	(2.252)	(1.082)
Control Variables																
Capital Service	-336.4**	-350.9***	-143.8	-83.35	-293.4**	-322.9***	-172.2	-93.57	4.631	-14.08	-10.28	4.753	0.7611	-7.865	-6.048	-0.3891
	(152.9)	(99.79)	(250.9)	(119.5)	(144)	(93.88)	(244.2)	(116.6)	(15.43)	(10.17)	(13.11)	(9.015)	(13.54)	(8.523)	(12.7)	(6.463)
TFP	27.07***	27.52***	10.95	13.81**	32.39***	30.84***	18.03	11.13***	2.623	-3.26	-0.8085	11.55***	2.4.3	-1.933	-2.15	12.64***
	(10.37)	(8)	(14.79)	(6.334)	(10.6)	(8.127)	(15)	(7.467)	(6.178)	(4.753)	(5.733)	(2.853)	(6.712)	(5.013)	(8.199)	(2.999)
Domestic Credit	-0.0751*	-0.0601*	-0.0164	-0.0482*	-0.096**	-0.0731**	-0.0254	-0.0382	0.0107	0.0873	-0.009	-0.1171	0.0489	0.046	-0.0353	-0.0745
	(0.041)	(0.0298)	(0.0637)	(0.0252)	(0.0424)	(0.0267)	(0.0617)	(0.0254)	(0.1201)	(0.1156)	(0.0487)	(0.0832)	(0.0977)	(0.0814)	(0.0502)	(0.0802)
Trade	0.2222***	0.1659***	-0.1148	-0.036	0.2176***	0.1694***	-0.0887	-0.0472	-0.1267	-0.0892	-0.0182	-0.2483**	-0.0848	-0.1093	-0.0759*	-0.1846**
	(0.047)	(0.0363)	(0.108)	(0.0525)	(0.0453)	(0.0341)	(0.1033)	(0.0557)	(0.1101)	(0.1327)	(0.0519)	(0.107)	(0.0949)	(0.0897)	(0.0424)	(0.0877)
Constant	-18.54***	-16.58***	7.668	2.865	-21.19***	-18.77***	2.337	5.08	8.877	8.882	6.88	17.36**	6.141	10.23	10.78**	12.84**
	(6.168)	(4.62)	(10.73)	(6.433)	(6.054)	(4.904)	(9.89)	(7.215)	(7.638)	(9.438)	(4.243)	(7.432)	(6.794)	(6.568)	(5.375)	(6.187)
Observation	47	47	47	47	47	47	47	47	63	63	63	51	63	63	63	51
R^2	0.2923	0.3943	0.1209	0.2947	0.4094	0.4238	0.0871	0.293	0.0726	0.2	0.1324	0.4872	0.045	0.2011	0.0872	0.5172

Note: MFG., AGR., UTIL., and SVCS. stand for Manafacturing, Agriculture, Utility, and Services, respectively.
Standard error in parentheses.
$^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$

A Financial Openness Indices Availability

Table 18: Financial Openness Indices Availability

No.	Country	KAOPEN	KA	IF_Heritage	KA_NEW	LMF
1	Afghanistan	1971-1994 and 2000	1995-2016	N/A	N/A	2002-2011
2	Albania	1995-2016	N/A	1995-2016	1996-2013	1993-2011
3	Algeria	1971-2016	N/A	1995-2016	2010-2013	1971-2011
4	Angola	1993-2016	1995-2016	1995-2000 and 2006-2016	1996-2013	1985-2011
5	Antigua and Barbuda	1985-2009	N/A	N/A	1996-2005	1977-2011
6	Argentina	1971-2016	1995-2016	1995-2016	1996-2013	1971-2011
7	Armenia	1996-2016	N/A	1996-2016	1996-2013	1996-2011
8	Aruba	1992-2016	N/A	N/A	N/A	1991-2011
9	Australia	1971-2016	1995-2016	1995-2016	1996-2013	1971-2011
10	Austria	1971-2016	1995-2016	1995-2016	1996-2013	1971-2011
11	Azerbaijan	1996-2016	N/A	1996-2016	1996-2013	1995-2011
12	Bahamas, The	1977-2016	N/A	1995-2016	1996-2013	N/A
13	Bahrain	1976-2016	1995-2016	1995-2016	1996-2013	1971-2011
14	Bangladesh	1976-2016	1995-2016	1995-2016	2001-2013	1973-2011
15	Barbados	1974-2016	1995-2016	1996-2016	1996-1998 and 2005-2014	N/A
16	Belarus	1996-2016	N/A	1995-2016	2002-2013	1994-2011
17	Belgium	1971-2016	N/A	1996-2016	1997-2014	1971-2011
18	Belize	1985-2016	N/A	1995-2016	1996-2013	1976-2011
19	Benin	1979-2016	N/A	1996-2016	1996-2013	1971-2011
20	Bhutan	1985-2016	N/A	2009-2016	1996-2013	1983-2011
21	Bolivia	1971-2016	1995-2016	1995-2016	1996-2013	1971-2011
22	Bosnia and Herzegovina	1999-2016	N/A	1998-2016	N/A	1998-2011
23	Botswana	1972-2016	N/A	1995-2016	1996-2013	1974-2011
24	Brazil	1971-2016	1995-2016	1995-2016	1996-2013	1971-2011
25	Bulgaria	1994-2016	1995-2016	1995-2016	1996-2013	1991-2011
26	Burkina Faso	1988-2016	1995-2016	1996-2016	1996-2013	1974-2011
27	Burundi	1971-2016	1995-2016	1997-2000 and 2006-2016	2010-2013	1971-2011
28	Cambodia	1973-1974 and 1995-2016	N/A	1997-2016	2013	1993-2011
29	Cameroon	1971-2016	N/A	1995-2016	N/A	1971-2011
30	Canada	1971-2016	1995-2016	1995-2016	1996-2013	1971-2011
31	Cape Verde	1982-2016	N/A	N/A	N/A	1981-2011
32	Central African Republic	1971-2016	N/A	2002-2016	1996-1998 and 2008-2013	1971-2011
33	Chad	1971-2016	1995-2016	1997-2016	2008-2013	1971-2011
34	Chile	1971-2016	N/A	1995-2016	1996-2013	1971-2011
35	China	1984-2016	1995-2016	1995-2016	1996-2013	1981-2011
36	Colombia	1971-2016	1995-2016	1995-2016	2002-2013	1971-2011
37	Comoros	1981-2016	N/A	2009-2016	2011-2013	1979-2011
38	Congo, Dem. Rep.	1971-2012	N/A	N/A	1996-2013	1971-2011
39	Congo, Rep.	1971-2016	N/A	1996-2016	2008-2013	1971-2011
40	Costa Rica	1971-2016	1995-2016	1995-2016	2006-2013	1971-2011
41	Cote d'Ivoire	1971-2016	1995-2016	N/A	2000-2013	1971-2011
42	Croatia	1996-2016	N/A	1996-2016	1996-2000 and 2003-2013	1996-2011
43	Cyprus	1971-2016	1995-2016	1996-2016	1996-2013	1973-2011
44	Czech Republic	1996-2016	1995-2016	1995-2016	1996-2013	1993-2011
45	Denmark	1971-2016	1995-2016	1996-2016	1996-2013	1971-2011
46	Djibouti	1982-2016	N/A	1997-2016	1996-2013	1977-2011
47	Dominica	1982-2016	N/A	2009-2016	N/A	1977-2011
48	Dominican Republic	1971-2016	1995-2016	1995-2016	1996-2013	1971-2011
49	Ecuador	1971-2016	1995-2016	1995-2016	1996-2013	1971-2011
50	Egypt, Arab Rep.	1971-2016	1995-2016	1995-2016	1999-2013	1971-2011
51	El Salvador	1971-2016	1995-2016	1995-2016	1996-2013	1971-2011
52	Equatorial Guinea	1973-2016	N/A	1999-2016	2008-2013	1971-2011
53	Eritrea	1998-2016	N/A	2009-2016	N/A	1995-2011
54	Estonia	1996-2016	N/A	1995-2016	1998-2013	1992-2011
55	Ethiopia	1971-2016	1995-2016	1995-2016	2009-2013	1971-2011
56	Fiji	1975-2016	N/A	1995-2016	1996-2013	1977-2011
57	Finland	1971-2016	1995-2016	1996-2016	1996-2013	1971-2011
58	France	1971-2016	1995-2016	1995-2016	1996-2013	1971-2011
59	Gabon	1971-2016	N/A	1995-2016	2003-2013	1971-2011
60	Gambia, The	1971-2016	N/A	1997-2016	N/A	1971-2011
61	Georgia	1996-2016	1995-2016	1996-2016	1996-2013	1995-2011
62	Germany	1971-2016	1995-2016	1995-2016	1996-2013	1971-2011
63	Ghana	1971-2016	1995-2016	1995-2016	1996-2013	1971-2011
64	Greece	1971-2016	1995-2016	1995-2016	1996-2013	1971-2011
65	Grenada	1979-2016	N/A	N/A	2008-2013	1971-2011
66	Guatemala	1971-2016	1995-2016	1995-2016	1996-2013	1971-2011
67	Guinea	1971-2016	N/A	1995-2016	1996-1998	1971-2011
68	Guinea-Bissau	1981-2016	N/A	1999-2016	2010-2013	1980-2011
69	Guyana	1971-2016	N/A	1995-2016	1996-2013	1971-2011
70	Haiti	1971-1976 and 1984-2016	N/A	1995-2016	2003-2013	1971-2011
71	Honduras	1971-2016	N/A	1995-2016	1996-2013	1971-2011
72	Hong Kong, China	1971-2016	1995-2016	1995-2016	1996-2013	1980-2011
73	Hungary	1986-2016	1995-2016	1995-2016	1996-2013	1982-2011
74	Iceland	1971-2016	1995-2016	1997-2016	1996-2013	1971-2011
75	India	1971-2016	1995-2016	1995-2016	2004-2013	1971-2011
76	Indonesia	1971-2016	1995-2016	1995-2016	1996-1998 and 2008-2013	1971-2011
77	Iran, Islamic Rep.	1971-2016	1995-2016	1996-2016	2003-2013	1971-2011
78	Iraq	1971-1994 and 2000-2002	N/A	1996-2002	2008-2013	2005-2011
79	Ireland	1971-2016	1995-2016	1995-2016	1996-2013	1971-2011
80	Israel	1971-2016	1995-2016	1995-2016	1996-2016	1971-2011

Financial Openness Indices Availability (Continued)

No.	Country	KAOPEN	KA	IF_Heritage	KA_NEW	LMF
81	Italy	1971-2016	1995-2016	1995-2016	1996-2013	1971-2011
82	Jamaica	1971-2016	1995-2016	1995-2016	2009-2013	1971-2011
83	Japan	1971-2016	1995-2016	1995-2016	1996-2013	1971-2011
84	Jordan	1971-2016	N/A	1995-2016	1996-2013	1971-2011
85	Kazakhstan	1996-2016	1995-2016	1998-2016	1996-2013	1994-2011
86	Kenya	1971-2016	1995-2016	1995-2016	1996-2013	1971-2011
87	Kiribati	1990-2005	N/A	2009-2016	N/A	1988-2011
88	Korea, Rep.	1971-2016	1995-2016	1995-2016	1996-2013	1971-2011
89	Kuwait	1971-2016	1995-2016	1996-2016	1996-2013	1974-2011
90	Kyrgyz Republic	1997-2016	1995-2016	1998-2016	1999-2013	1993-2011
91	Lao PDR	1971-1975 and 1981-2016	N/A	1996-2016	2003-2013	1977-2011
92	Latvia	1996-2016	1995-2016	1996-2016	1996-2013	1992-2011
93	Lebanon	1971-2016	1995-2016	1996-2016	1996-2013	1971-2011
94	Lesotho	1972-2016	N/A	1996-2016	N/A	1975-2011
95	Liberia	1971-2016	N/A	2009-2016	1996-2013	1971-2011
96	Libya	1971-1972 and 1977-2016	N/A	1996-2012	N/A	1972-2011
97	Lithuania	1996-2016	N/A	1996-2016	1996-2013	1992-2011
98	Macedonia, FYR	1997-2016	N/A	2003-2016	2002-2016	1993-2011
99	Madagascar	1971-2016	N/A	1995-2016	2008-2013	1971-2011
100	Malawi	1971-2016	N/A	1995-2016	1996-2013	1971-2011
101	Malaysia	1971-2016	1995-2016	1995-2016	1996-2013	1971-2011
102	Maldives	1982-2016	N/A	2009-2016	1999-2013	1978-2011
103	Mali	1971-2016	N/A	1995-2016	1998-2013	1971-2011
104	Malta	1972-2016	1995-2016	1995-2016	1996-2013	1971-2011
105	Marshall Islands	1996-2016	N/A	N/A	N/A	N/A
106	Mauritania	1971-2016	N/A	1996-2016	2007-2013	1971-2011
107	Mauritius	1972-2016	1995-2016	1999-2016	1996-2013	1971-2011
108	Mexico	1971-2016	1995-2016	1995-2016	1996-2013	1971-2011
109	Micronesia, Fed. Sts.	1996-2016	N/A	2009-2016	N/A	N/A
110	Moldova	1996-2016	1995-2016	1995-2016	1996-2013	1994-2011
111	Mongolia	1995-2016	N/A	1995-2016	2008-2013	1992-2011
112	Morocco	1971-2016	1995-2016	1995-2016	1996-2013	1971-2011
113	Mozambique	1988-2016	N/A	1995-2016	1996-2013	1980-2011
114	Myanmar	1971-2016	1995-2016	N/A	1996-1997	1971-2011
115	Namibia	1994-2016	N/A	1997-2016	2011-2013	1989-2011
116	Nepal	1971-2016	N/A	1996-2016	2007-2013	1971-2011
117	Netherlands	1971-1974 and 1981-2016	1995-2016	1996-2016	1996-2013	1971-2011
118	New Zealand	1971-2016	1995-2016	1996-2016	1996-2013	1971-2011
119	Nicaragua	1971-2016	1995-2016	1995-2016	1996-2013	1971-2011
120	Niger	1971-2016	N/A	1996-2016	1996-2013	1971-2011
121	Nigeria	1971-2016	1995-2016	1995-2016	1996-2013	1971-2011
122	Norway	1971-2016	1995-2016	1996-2016	1996-2013	1971-2011
123	Oman	1977-2016	1995-2016	1995-2016	1996-2013	1973-2011
124	Pakistan	1971-2016	1995-2016	1995-2016	1996-2013	1971-2011
125	PaN/Ama	1971-2016	1995-2016	1995-2016	1996-2013	1971-2011
126	Papua New Guinea	1979-2016	N/A	1996-2001 and 2009-2016	1999-2013	1973-2011
127	Paraguay	1971-2016	1995-2016	1995-2016	1996-2013	1971-2011
128	Peru	1971-2016	1995-2016	1995-2016	1996-2013	1971-2011
129	Philippines	1971-2016	1995-2016	1995-2016	1996-2013	1971-2011
130	Poland	1986-2016	1995-2016	1995-2016	1996-2013	1975-2011
131	Portugal	1971-2016	1995-2016	1995-2016	1996-2013	1972-2011
132	Qatar	1976-2016	1995-2016	1999-2016	1996-2013	1971-2011
133	Romania	1976-2016	1995-2016	1995-2016	1996-2013	1990-2011
134	Russian Federation	1996-2016	1995-2016	1995-2016	1996-2013	1993-2011
135	Rwanda	1971-2016	N/A	1997-2016	1996-2013	1993-2011
136	Sao Tome and Principe	1981-2016	N/A	2009-2016	N/A	1987-2011
137	Samoa	1975-2016	N/A	1996-2001 and 2009-2016	1996-2013	N/A
138	San Marino	1996-2016	N/A	N/A	N/A	N/A
139	Saudi Arabia	1971-2016	1995-2016	1996-2016	1996-2013	1971-2011
140	Senegal	1971-2016	N/A	1996-2016	1996-2013	1971-2011
141	Seychelles	1981-2016	N/A	2009-2016	1996-2013	1977-2011
142	Sierra Leone	1971-2016	N/A	1995-2000 and 2003-2016	2008-2013	1971-2011
143	Singapore	1971-2016	1995-2016	1995-2016	1996-2013	1971-2011
144	Slovak Republic	1996-2016	N/A	1995-2016	1996-2001 and 2005-2013	1993-2011
145	Slovenia	1996-2016	1995-2016	1996-2016	1996-2013	1992-2011
146	Solomon Islands	1982-2016	N/A	2009-2016	1996-2013	1977-2011
147	Somalia	1971-1994 and 2000-2007	N/A	N/A	N/A	N/A
148	South Africa	1971-2016	1995-2016	1995-2016	1996-2013	1971-2011
149	Spain	1971-2016	1995-2016	1995-2016	1996-2013	1971-2011
150	Sri Lanka	1971-2016	1995-2016	1995-2016	1996-2013	1971-2011
151	St. Kitts and Nevis	1988-2016	N/A	N/A	1996-1998 and 2002-2013	1983-2011
152	St. Lucia	1983-2016	N/A	N/A	N/A	1976-2011
153	St. Vincent and the Grenadines	1983-2016	N/A	N/A	2008-2013	1976-2011
154	Sudan	1971-2007 and 2009-2016	N/A	1995-2000	1996-2013	1971-2011
155	Suriname	1971-1974 and 1982-2016	N/A	1996-2016	2006-2013	1976-2011
156	Swaziland	1973-2016	1995-2016	N/A	1996-2013	1971-2011
157	Sweden	1971-2016	1995-2016	1995-2016	1996-2013	1971-2011
158	Switzerland	1996-2016	1995-2016	1996-2016	1996-2013	1971-2011
159	Syrian Arab Republic	1971-2016	N/A	1996-2012	2008-2012	1971-2011
160	Tajikistan	1997-2016	N/A	1998-2016	1996-2013	1997-2011

Financial Openness Indices Availability (Continued)

No.	Country	KAOPEN	KA	IF_Heritage	KA_NEW	LMF
161	Tanzania	1971-2016	1995-2016	1995-2016	1996-1998 and 2005-2013	1971-2011
162	Thailand	1971-2016	1995-2016	1995-2016	1996-2013	1971-2011
163	Togo	1971-2016	1995-2016	1999-2016	1996-2013	1971-2011
164	Tonga	1989-2016	N/A	2009-2016	1996-2013	1980-2011
165	Trinidad and Tobago	1971-2016	N/A	1996-2016	1996-2013	1971-2011
166	Tunisia	1971-2016	1995-2016	1995-2016	1996-2013	1971-2011
167	Turkey	1971-2016	1995-2016	1995-2016	1996-2013	1971-2011
168	Turkmenistan	1996-2016	N/A	1998-2016	N/A	1993-2011
169	Uganda	1971-2016	1995-2016	1995-2016	1996-2013	1971-2011
170	Ukraine	1996-2016	1995-2016	1995-2016	1996-2013	1994-2011
171	United Arab Emirates	1976-2016	1995-2016	1996-2016	1996-2013	1973-2011
172	United Kingdom	1971-2016	1995-2016	1995-2016	1996-2013	1971-2011
173	United States	1971-2016	1995-2016	1995-2016	1996-2013	1971-2011
174	Uruguay	1971-2016	1995-2016	1995-2016	2000-2013	1971-2011
175	Uzbekistan	1996-2016	1995-2016	1998-2016	2010-2013	1992-2011
176	Vanuatu	1985-2000	N/A	2009-2016	N/A	1973-2011
177	Venezuela, RB	1971-2016	1995-2016	1995-2016	1996-2013	1971-2011
178	Vietnam	1971-1974 and 1980-2016	1995-2016	1995-2016	1996-2013	1995-2011
179	Yemen, Rep.	1995-2000 and 2002-2016	1995-2016	1995-2015	1996-2005	1990-2011
180	Zambia	1971-2016	1995-2016	1995-2016	1996-2013	1971-2011
181	Zimbabwe	1984-2016	N/A	1995-2016	1996-2013	1976-2011

References

Arellano, Manuel and Olympia Bover. 1995. "Another Look at the Instrumental Variable Estimation of Error-Components Models." *Journal of Econometrics* 68(1):29–51.

Arellano, Manuel and Stephen Bond. 1991. "Some Tests of Specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equations." *Review of Economic Studies* 58(2):277–291.

Bekaert, Geert, Campbell R. Harvey and Christian Lundblad. 2005. "Does Financial Liberaliztion Spur Growth?" *Journal of Financial Economics* 77(1):3–55.

Bekaert, Geert, Campbell R. Harvey and Christian Lundblad. 2011. "Financial Opennes and Productivity." *World Development* 39(1):1–19.

BIS. 2011*a*. "Basel III: A Global Regulatory Framework for More Resilient Banks and Banking System." June.

BIS. 2011*b*. "Global Systematically Important Banks: Assessment Methodology and the Additional Loss Absorbency Requirement." July.

BIS. 2013. "Basel III: Liquidity Coverage Ratio and Liquidity Risk Monitoring Tools." January.

Blundell, Richard and Stephen Bond. 1998. "Initial Conditions and Moment Restrictions in Dynamic Panel Data Models." *Journal of Econometrics* 87(1):115–143.

Bond, Stephen, Anke Hoeffler and Jonathan Temple. 2001. "GMM Estimation of Empirical Growth Models." *Economics Papers, Economics Group, Nuffield College, University of Oxford* 2001-W21.

Bond, Stephen R. 2002. "Dynamic Panel Data Models: A Guide to Micro Data Methods and Practice." *Portuguese Economic Journal* 1(2):141–162.

Cerdeiro, Diego A. and Andras Komaromi. 2021. "Financial Openness and Capital Inflows to Emerging Markets: In Search of Robust Evidence." *International Review of Economics and Finance* 73:444–458.

Chinn, Menzie D. and Hiro Ito. 2008. "A New Measure of Financial Openness." *Journal of Comparative Policy Analysis* 10(3):309–322.

Edison, Hali J., Ross Levine, Luca Ricci and Torsten Sløk. 2002. "International Financial Integration and Economic Growth." *Journal of International Money and Finance* 21(6):749–776.

Garrett, Geoffrey. 1995. "Capital Mobility, Trade, and the Domestic Politics of Economic Policy." *International Organization* 49(4):657–687.

Gozgor, Giray. 2015. "Casual Relation between Economic Growth and Domestic Credit in the Economic Globalization: Evidence from the Hatemi-J's Test." *Journal of International Trade and Economic Development* 24(3):395–408.

Gräbner, Claudius, Philipp Heimberger, Jakob Kapeller and Florian Springholz. 2020. "Understanding Economic Openness: A Review of Existing Measures." *Review of World Economics* .

Grilli, Vittorio and Gian Maria Milesi-Ferretti. 1994. "Economic Effects and Structural Determinants of Capital Controls." *Staff Papers (International Monetary Fund)* 42(3):517–551.

Grossman, Gene M. and Elhanan Helpman. 1990. "Comparative Advantage and Long-Run Growth." *American Economic Review* 80(4):796–815.

Gupta, Nandini and Kathy Yuan. 2009. "On the Growth Effect of Stock Market Liberalization." *Review of Financial Studies* 22(11):4715–4752.

Ianchovichina, Elena and Will Martin. 2001. "Trade Liberalization in China's Accession to WTO." *Journal of Economic Integration* 16(4):421–445.

IMF. 2012. "The Liberalization and Management of Capital Flows: An Institutional View." pp. 1–48.

Johnston, R. B. and N. T. Tamirisa. 1998. "Why do countries use capital controls?" *IMF Working Paper* (181).

Kim, Hee-Ju. 2008. "Common Factor Analysis Versus Principle Component Analysis: Choice for Symptom Cluster Research." *Asian Nursing Research* 2(1):17–24.

Kose, M. Ayhan, Eswar S. Prasad and Ashley D. Taylor. 2011. "Thresholds in the Process of International Financial Integration." *Journal of International Money and Finance* 30(1):147–179.

Kose, M. Ayhan, Eswar S. Prasad, Kenneth Rogoff and Shang-Jin Wei. 2009. "Financial Globalization: A reappraisal." *IMF Staff Paper* 56(1):8–62.

Krugman, Paul. 1994. "The Myth of Asia's Miracle." *Foreign Affairs* 73(6):62–78.

Mankiw, N. Gregory, Daivd Romer and Daivd N. Weil. 1992. "A Contribution to the Empiric of Economic Growth." *Quarterly Journal of Economics* 107(2):407–437.

Melo, Martha De, Cevdet Denizer, Alan Gelb and Stoyan Tenev. 2001. "Circumstance and Choice: The Role of Inital Conditions and Policies in Transition Economies." *World Bank Economic Review* 15(1):1–31.

Miniane, Jacques. 2004. "A New Set of Measures on Capital Account Restrictions." *IMF Staff Paper* 51(2).

Nickell, Stephen. 1981. "Biases iin Dynamic Models with Fixed Effects." *Econometrica* 49(6):1417–1426.

Quinn, Dennis P. and A. Maria Toyoda. 2008. "Does Capital Account Liberalization Lead to Growth?" *Review of Financial Studies* 21(3):1403–1449.
URL: *https://EconPapers.repec.org/RePEc:oup:rfinst:v:21:y:2008:i:3:p:1403-1449*

Rodrik, Dani. 1998. "Who Needs Capital Account Convertibility?" *Princeton International Finance Section Symposium* .

Rodrik, Dani and Arvind Subramania. 2009. "Why Did Financial Grlobalization Disappoint?" *IMF Staff Papers* 56(1):112–138.

Roodman, David. 2009. "How to Do xtabond2: An Introduction to Difference and System GMM in STATA." *Stata Journal* 9(1):86–136.

Schefold, Bertram. 1976. "Dfferent Forms of Technological Progress." *Economic Journal* 86(344):806–819.

Solo, Robert. 1969. "Capital and Labor Intensive Technology in Developing Countries." *Journal of Economic Issue* 3(4):96–103.

Solow, Robert M. 1956. "A Contribution to the Theory of Economic Growth." *Quarterly Journal of Economics* 70(1):65–94.

Solow, Robert M. 1957. "Technical Change and the Aggregate Production Function." *Review of Economics and Statistics* 39(3):312–320.

Stiglitz, Joseph E. and Andrew Weiss. 1981. "Credit Rationing in Markets with Imperfect Information." *American Economic Review* 71(3):393–410.

Stock, James H. and Mark W. Watson. 2002. "Macroeconomic Forecasting Using Diffusion Indexes." *Journal of Business and Economic Statistics* 20(2):147–162.

Swan, Trevor W. 1956. "Economic Growth and Capital Accumulation." *Economic Record* 32(2):334–361.

UNCTAD. 2018. "The Least Developed Countries Report 2018." Onilne Reports.
URL: *https://unctad.org/system/files/official-document/ldcr2018_ch3_en.pdf*

Yanikkaya, Halit. 2003. "Trade Openness and Economic Growth: A Cross-Country Empirical Investigation." *Journal of Development Economics* 72(1):57–89.

Young, Alwyn. 1991. "Learning by Doing and the Dynamic Effects of International Trade." *Quarterly Journal of Economics* 106(2):369–405.