

Diem Pham Thi Thuy; Hoai Nguyen Trong

Article

Impacts of openness on financial development in developing countries: Using a Bayesian model averaging approach

Cogent Economics & Finance

Provided in Cooperation with:

Taylor & Francis Group

Suggested Citation: Diem Pham Thi Thuy; Hoai Nguyen Trong (2021) : Impacts of openness on financial development in developing countries: Using a Bayesian model averaging approach, Cogent Economics & Finance, ISSN 2332-2039, Taylor & Francis, Abingdon, Vol. 9, Iss. 1, pp. 1-17,
<https://doi.org/10.1080/23322039.2021.1937848>

This Version is available at:

<https://hdl.handle.net/10419/270109>

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.



<https://creativecommons.org/licenses/by/4.0/>

Impacts of openness on financial development in developing countries: Using a Bayesian model averaging approach

Diem Pham Thi Thuy & Hoai Nguyen Trong |

To cite this article: Diem Pham Thi Thuy & Hoai Nguyen Trong | (2021) Impacts of openness on financial development in developing countries: Using a Bayesian model averaging approach, Cogent Economics & Finance, 9:1, 1937848, DOI: [10.1080/23322039.2021.1937848](https://doi.org/10.1080/23322039.2021.1937848)

To link to this article: <https://doi.org/10.1080/23322039.2021.1937848>



© 2021 The Author(s). This open access article is distributed under a Creative Commons Attribution (CC-BY) 4.0 license.



Published online: 21 Jun 2021.



Submit your article to this journal [↗](#)



Article views: 2807



View related articles [↗](#)



View Crossmark data [↗](#)



Citing articles: 2 View citing articles [↗](#)



Received: 02 February 2021
Accepted: 30 May 2021

*Corresponding author:: Diem Pham Thi Thuy, Institute for Research & Banking Technology, International Economics Faculty, Banking University Ho Chi Minh City, Vietnam
E-mail: diempham.edu.vn@gmail.com

Reviewing editor:
Evan Lau, Department of Economics, Universiti Malaysia Sarawak, Kuching, MALAYSIA

Additional information is available at the end of the article

GENERAL & APPLIED ECONOMICS | RESEARCH ARTICLE

Impacts of openness on financial development in developing countries: Using a Bayesian model averaging approach

Diem Pham Thi Thuy^{1*} and Hoai Nguyen Trong²

Abstract: This study investigates the influences of trade and financial openness on financial development over the period 2003–2017 from a sample of 64 developing countries, employing a Bayesian model averaging approach to take into account model uncertainty. The results demonstrate that the contribution of trade openness to financial development is important in developing economies with better institutions. However, financial openness has an insignificant positive effect on financial development. There is no evidence to support the Rajan and Zingales hypothesis that the simultaneous openness to both trade and capital flows promotes financial development. Our findings also indicate that a better institutions environment allows a developing economy to exploit the benefits of openness to financial development.

Subjects: Macroeconomics; International Finance; International Trade; incl; trade agreements & tariffs; Development Economics

Keywords: Openness; financial development; developing countries; Bayesian model averaging

JEL classification: F19; F36; O16.

ABOUT THE AUTHOR

Pham Thi Thuy Diem is a lecturer at the Banking University Ho Chi Minh City (BUH) and is also serving as an editor for Asian Journal of Economics and Banking (Vietnamese version) (AJEB) which is owned by BUH. Her primary research interests are in the areas of international trade, financial liberalization, financial development, and environmental economics. Nguyen Trong Hoai is a professor in economics at the University of Economics Ho Chi Minh (UEH) and currently holds the position of Editor-in-Chief for Journal of Asian Business and Economic Studies (JABES) which is owned by UEH. His research focuses on development studies.

PUBLIC INTEREST STATEMENT

The driving force of financial development is openness; however, the benefits of this process is controversial. This paper aims to provide new evidence on the impacts of trade and financial openness on financial development in the context of developing countries. Our main findings suggest that trade openness (as proxied by the ratio of total trade to GDP) is a crucial determinant of financial development (as proxied by the ratio of private credit to GDP) while we find little support for the view that financial openness (as proxied by capital account openness index) leads to financial development. In addition, there is no evidence to support the Rajan and Zingales hypothesis that the simultaneous openness to both trade and capital accounts encourages financial development. We recommend that institutional reform should be promoted actively to exploit the benefits of openness on financial development in developing countries.

1. Introduction

In the past two decades, there have been remarkable differences between developing countries and developed ones in financial development, measured by the ratio of private credit to GDP. Financial development in developing countries has been increasing steadily during this period, but it has been gradually stagnating in developed economies especially from 2009 (Figure 1). Accordingly, understanding the causes underlying financial development is crucial because it allows countries, especially developing ones, to encourage banking sector activities and this can affect economic growth.

This paper aims to examine the new evidence on the impacts of trade and financial openness on financial development in developing countries. In a seminal work, Rajan and Zingales (2003) argue that, for genuine financial development, a combined liberalisation of both trade and capital accounts are a necessary condition; this is the simultaneous openness hypothesis on financial development. According to Rajan and Zingales (2003), interest groups (incumbents) are often against financial development because it generates stronger competition that erodes their rents. They argue that contemporaneous opening of both the trade and capital flows will reduce incumbents' powers, hence enhancing financial development. Moreover, through new opportunities, trade and financial openness might bring sufficient new profits that exceed the negative effects of competition. In contrast, McKinnon (1991) suggests that trade liberalisation should precede financial liberalisation to promote financial development, especially in developing countries. Figure 2 presents the trends in trade openness and financial openness from 2003 to 2017.

Figure 1. Financial development in developing countries over the period 2003–2017.

Source: Global Financial Development Database (GFDD) and author's calculations.

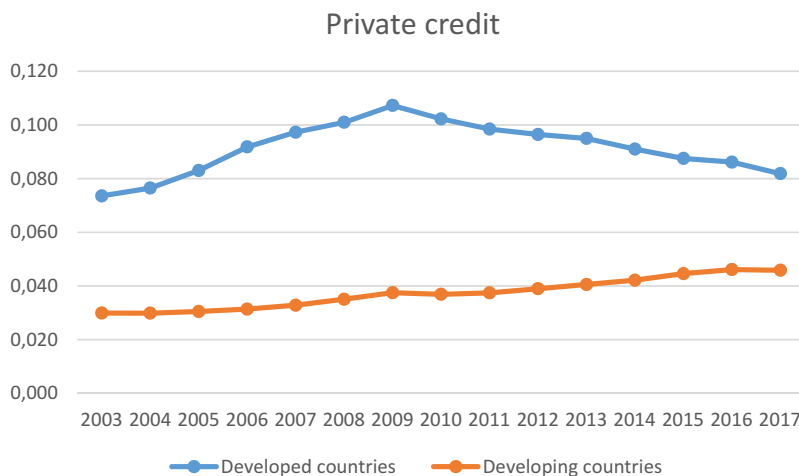
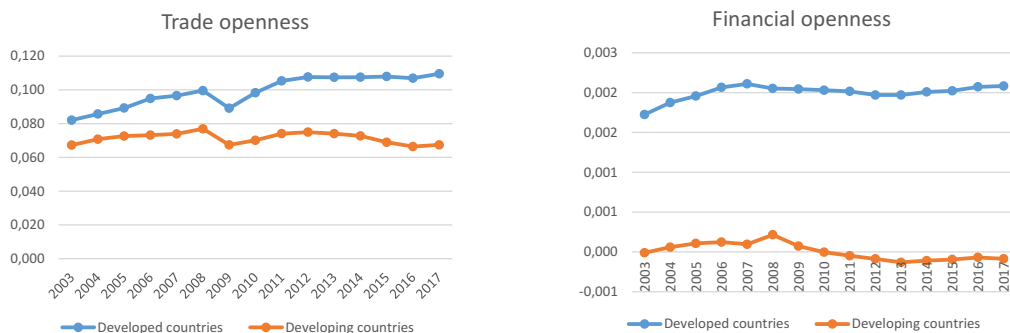


Figure 2. Openness in developing countries over the period 2003–2017.

Source: World Development Indicators (WDI), Annual report on Exchange Arrangements and Exchange Restrictions (AREAER), Chinn and Ito (2019) and author's calculations.



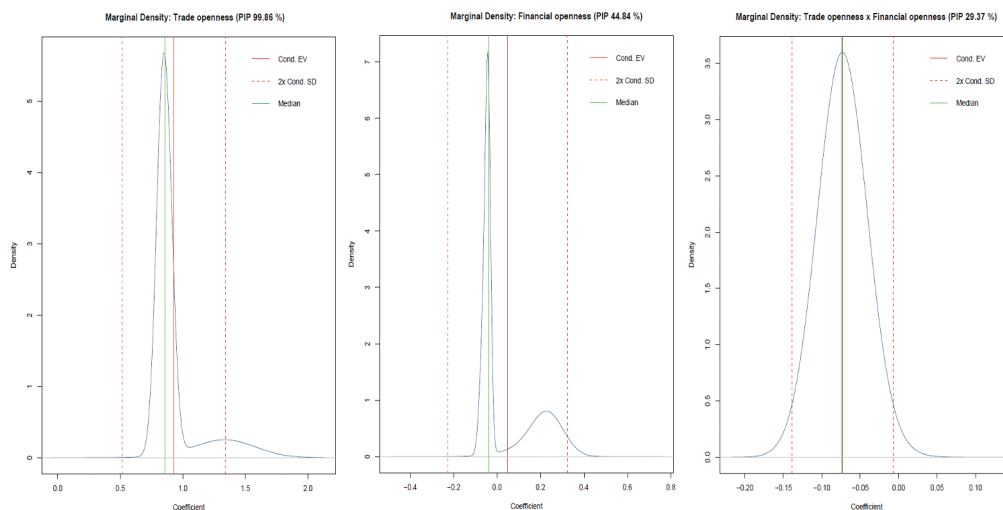
Our paper was inspired by the simultaneous openness hypothesis of Rajan and Zingales (2003), as well as the empirical work of Baltagi et al. (2009); however, we focus on developing countries where there were relatively few works from this perspective. Using a Bayesian model averaging approach to take into account model uncertainty, this study analyses the impacts of trade and financial openness on financial development while controlling for other institutional and macro-economic factors over the period 2003–2017 with a sample of 64 developing countries.

This study contributes to the empirical literature on openness and financial development in five aspects. Firstly, we use a Bayesian model averaging approach suggested by several seminal works such as Raftery (1993), Raftery et al. (2005), Raftery et al. (1997), and Hoeting et al. (1999), etc. to take into account model uncertainty. This approach has not been used before in investigating the impacts of openness on financial development; therefore, the present study aims at filling this gap in the econometrics literature. Secondly, as there are several controversies that surround the measurement of financial development, this study uses the ratio of private credit to GDP to capture the state of financial development, due to its being often taken as the most suitable indicator for developing countries. Thirdly, there is a persistent scarcity of empirical works on the impacts of openness on financial development for developing countries using the legal origins variable as an important determinant of its protection of corporate shareholders and creditors in a financial system. Fourthly, the paper utilises a variety of the interactions between trade openness with other variables including financial openness, institutional quality, and real GDP per capita to capture the different channels through which trade liberalisation can affect financial development. Finally, the regional dummy variables (Africa, Asia, and Latin America and The Caribbean) are included in the regressions as control variables to compare levels of financial development across regions.

2. Empirical background

Most studies have focused only on perspectives of the sources of financial development such as financial liberalization (Chinn & Ito, 2002, 2006), legal systems (Beck & Levine, 2005; Porta et al., 1998), and institutions (Feng & Yu, 2020; Kutan et al., 2017). However, there is little concern for another key source of financial development, which is openness. In particular, the relevant literature has focused primarily on the two-variable case between financial development and trade openness (Beck, 2002; Gries et al., 2009; Kim et al., 2010a, 2010b; Svaleryd & Vlachos, 2002), financial development and financial openness (Chinn & Ito, 2002, 2006), financial development, trade openness and financial openness (Aizenman & Noy, 2009; Baltagi et al., 2009; Rajan & Zingales, 2003). The impacts of openness on financial development has received considerable

Figure 3. Marginal densities of trade openness, financial openness, and the interaction between trade openness and financial openness.



attention. However, the empirical evidence for the link between openness and financial development is mixed across developed and developing economies.

Firstly, the relationship between financial development and trade openness has been examined in recent years by a variety of studies. Beck (2002) investigates a possible relationship between financial development and trade in manufactured goods employing both Ordinary Least Squares (OLS) and Instrumental Variables (IV) estimations. Specifically, this study analyses the theoretical channel via which the trade balance in manufactures is determined by the economy-wide level of external finance. The empirical validity of this theoretical model is assessed using panel data from 65 countries from 1966 and 1995. Beck (2002) argues that a higher level of financial development leads to a higher export share and trade balance in manufactured goods, in particular in countries with better-developed financial systems. Svaleryd and Vlachos (2002) empirically investigate the relationship between financial development and trade openness in 80 countries over the period 1960–1994. They show that trade openness may be closely related to higher risks, including exposure to foreign competition and external shocks which will stimulate the financial market development that can be used for risk diversification, allowing firms to overcome adverse shocks or short-term cash flow problems. Using data from 32 manufacturing industries in 20 OECD countries over the period 1989–1991, Svaleryd and Vlachos (2005) show that financial areas significantly influence industrial specialisation in 20 OECD countries. This evidence argues that countries with relatively high levels of financial development tend to encourage export industries that are mainly dependent on finance. For relatively high-income or low-income countries, Kim et al. (2010a) find that trade openness is positively correlated with financial development in the long—run but there is a negative relationship in the short—run. Kim et al. (2010b) also show long-run complementarity between trade openness and financial development with short-run substitution between them for non-OECD economies. In a study in Kenya, Wolde-Rufael (2009) provides some evidence to support the hypothesis that both imports and exports growth are promoted by financial development but the causality running in the opposite direction from trade openness to financial development was not strong. Nevertheless, Gries et al. (2009) consider the connections between trade openness, financial deepening, and financial development with a sample of 16 Sub-Saharan African countries using VAR/VECM frameworks. Their results indicate that the connections between trade openness and financial development are not very strong, with results differing significantly from country to country, despite the fact that the estimates provide evidence that trade openness may strengthen financial depth in some countries. Braun and Raddatz (2005) investigate trade liberalisation in association with the political channel and indicate that economies in which trade liberalisation causes a reduction in the power of groups most interested in blocking financial development observe an improvement in their financial systems. Nevertheless, external finance suffers when trade openness strengthens those groups. Do and Levchenko (2007) state that the demand for external finance endogenously determines partly financial development in each country. A country's comparative advantage in international trade might influence the pattern of production and affecting demand for external finance. Therefore, when an economy specialises in financially dependent goods, a high demand for external finance may be generated. As a consequence, a higher level of financial intermediation may ensue. On the other hand, financial development could be less promoted in economies that specialise in goods less dependent on external finance.

Secondly, the debate about whether or not the decision of complete financial openness contributes to financial development remains open in policy makers and scholars. Chinn and Ito (2002) examine the link between capital controls, institutions and financial development using OLS, FEM and two-stage least squares estimators for 105 countries over the period 1970–1997. A series of six indicators is employed to estimate the degree of financial development, including the ratio of liquid liabilities to GDP, the ratio of credit to the private sector from deposit banks, the ratio of stock market capitalisation to GDP, the ratio of total value of stocks traded to GDP, the stock market turnover ratio, and the ratio of equity issues to GDP. The capital account openness index is used as a proxy variable for financial openness. The results suggest that the degree of financial development in terms of stock market activity and private credit creation is associated with the existence of capital controls. Chinn

and Ito (2006) use the same approach of Chinn and Ito (2002) to analyse the relationship between financial openness, institutions, and financial development in a sample from 108 countries during the period 1980–2000. The evidence indicates that a higher degree of financial openness promotes equity market development only if a threshold degree of legal and institutional development is achieved, especially in emerging market countries. Similarly, Ito (2006) explores the nexus between financial openness and financial development using panel data of a sample of 87 less developed countries for 1980–2000. The development of equity markets is spurred by a higher degree of financial openness only if a threshold degree of legal development is attained, which is more widespread among emerging market countries in Asia. Employing updated de jure measures of financial development and openness, Hauner et al. (2013) provide strong evidence to support that trade liberalisation boosts domestic financial liberalisation. On the other hand, there is little support for the idea that capital account liberalisation leads to financial development.

Thirdly, empirical evidence on the relationships among trade and financial openness and financial development has received much attention (Baltagi et al., 2007, 2009; Kim et al., 2010a, 2010b). However, the seminal Rajan and Zingales (2003) work shows that the effects of the two-variable links may be incomplete or misleading. According to their findings, they propose an important three-variable link between trade and financial openness, and financial development. Particularly, they suggest that trade openness unaccompanied by financial openness cannot contribute to financial development and test their hypothesis utilising a data set for the years 1913–1999 in 24 industrialized countries. Rajan and Zingales (2003) emphasise the theory of interest groups to sum up their findings. Particularly among industrial and financial incumbents, interest groups frequently stand to lose from financial development. This result is explained by the fact that financial development brings opportunities in established firms, thereby fostering competition and eroding incumbents' interests. These authors suggest that incumbents tend to oppose financial development where they will be weaker in the circumstances of both trade openness and financial openness in economies. Rajan and Zingales (2003) hypothesis is addressed by Baltagi et al. (2009). Using data from both developing and industrialized countries, these authors emphasise the interactive impacts of financial openness and trade openness on financial development in evaluating the simultaneous openness hypothesis. In order to evaluate the marginal effect of rising trade/financial openness on financial development in conditions of relative trade/financial openness, the interaction between financial openness and trade openness can be used. If an economy is open to trade but is closed to capital account, the government can protect industrial incumbents though additional financial repression. This would prevent financial development. Hence, the marginal impact of trade openness may be non-positive in association with a closed capital account. Similarly, Karimu and Marbuah (2017) use dynamic panel techniques to investigate the nexus between openness and financial development with data from 44 developing countries for the period 1975–2010. They use the ratio of bank credit to the private sector to GDP as a measure of financial development. The volume of external assets and liabilities and capital account openness index (KAOPEN) are employed as proxies for financial openness. Trade openness is estimated by the ratio of total trade to GDP. They find that both trade and financial openness have a strong effect on financial development. Financial development is still stimulated by one of the openness variables without the other. This result only partially supports the Rajan and Zingales hypothesis. Using data from 43 developing countries for the period 1980–2001, Law and Demetriades (2006) applies panel generalized methods of moments and pooled mean group estimations to analyse the relationship between openness, institutional environments and financial development. Two groups of variables to measure the degree of financial development are banking development and capital market development. The three different indicators to measure banking development are the ratio of liquid liabilities to GDP, the ratio of private sector credit to GDP and the ratio of domestic credit to GDP, whereas three indicators representing capital market development are the ratio of stock market capitalization to GDP, the ratio of total shares traded to GDP and the ratio of number of companies listed to total population. Financial openness and trade openness are estimated by the capital account openness index (KAOPEN) and the ratio of total trade to GDP, respectively. Openness and institutional environments are main determinants of

financial development. In middle-income economies, trade and financial openness are particularly potent in boosting financial development but weaker in low-income economies. Law and Demetriades (2006) provide strong evidence to support the hypothesis of Rajan and Zingales (2003) that financial development is promoted when an economy is simultaneously open to both capital flows and trade. David et al. (2014) investigate the relationship between openness and financial development using data from 34 sub-Saharan Africa economies over the period 1970–2009. The capital account openness index (KAOPEN) and the ratio of total trade to GDP are proxy variables for financial openness and trade openness, respectively. To measure financial development, six indicators are used including the ratio of liquid liabilities to GDP, the ratio of credit to the private sector by deposit-taking banks to GDP, the ratio of credit to the private sector by financial institutions to GDP, the ratio of bank deposits to GDP, the ratio of financial system deposits to GDP, and the ratio of credit to the private sector to GDP. Based on panel data techniques, the results show that trade openness has contributed to financial development more strongly in economies with better institutions. Using data from 119 countries over the period 1960–1989, Levine and Renelt (1992) show a positive, strong relationship between the share of investment in GDP and openness. Trading economies with high investment rates could boost financial development. Openness might also affect the demand for external finance originating from the nature of sectoral structure and specialisation, or through the technology transfer and innovation space. These activities may make intensive use of external finance. Several empirical studies indicate that trade openness and financial openness are not independent (Aizenman, 2004; Chinn & Ito, 2006; Ito, 2006). In particular, trade openness may often be followed by capital account liberalisation, as perhaps it is difficult to sustain capital flow restrictions with greater trade integration.

3. Methodology and data

3.1. Methodology

Section 3 gives a brief overview of Bayesian model averaging (BMA henceforth), which provides a coherent mechanism to take into account model uncertainty. Typically, the BMA is used to assess the robustness of results, especially in a wide variety of competing theories and several possible determinants. Our approach most closely follows Fernandez et al. (2001a); however, we also substantially benefit from Hoeting et al. (1999), Eicher et al. (2011), Fernandez et al. (2001b), Feldkircher and Zeugner (2009), and Ley and Steel (2009).

Suppose a response variable Y (in our context, the ratio of private credit to GDP) with a number n of observations (here is the number of developing countries) and a number k of regressors (X_1, \dots, X_k) . Let $M = (M_1, \dots, M_K)$ be the set of all models considered, where $K = 2^k$ is the possible models and hence is characterized by the selection of regressors, all probabilities are implicitly conditional on model space M . According to Hoeting et al. (1999), if Δ is the quantity of interest, then the posterior distribution of given data D is:

$$pr(\Delta|D) = \sum_{k=1}^K pr(\Delta|M_k, D)pr(M_k|D) \tag{3.1}$$

Using the Bayes's theorem, the posterior model probability for M_k is given by:

$$pr(M_k|D) = \frac{pr(D|M_k)pr(M_k)}{\sum_{i=1}^K pr(D|M_i)pr(M_i)} \tag{3.2}$$

Where: $pr(D|M_k) = \int pr(D|\theta_k, M_k)pr(\theta_k|M_k)d\theta_k$ (3.3) denotes the integrated likelihood for model M_k ; θ_k denotes the vector of parameters for model M_k ; $pr(D|\theta_k, M_k)$ denotes the likelihood; $pr(\theta_k|M_k)$ denotes the prior density of the parameters under model M_k ; $pr(M_k)$ denotes the prior probability that M_k is the true model. Based on the prior structure over the model space, the prior

probability implies that a particular variable occurs in the true model, that it is not dependent from the set of variables included in the model, and that a given variable appears in the true model is 0.5.

The above principles provide a straightforward application of the BMA estimate of a parameter θ that this value can be calculated as follows:

$$\hat{\theta}_{BMA} = \sum_{k=1}^K \hat{\theta}_k pr(M_k|D) \tag{3.4}$$

The posterior mean ($E[\Delta|D]$) and posterior variance ($Var[\Delta|D]$) of Δ are defined as follows:

$$E[\Delta|D] = \sum_{k=0}^K \hat{\Delta}_k pr(M_k|D) \tag{3.5}$$

$$Var[\Delta|D] = \sum_{k=0}^K (Var[\Delta|D, M_k] + \hat{\Delta}_k^2) pr(M_k|D) - E[\Delta|D]^2 \tag{3.6}$$

Based on Raftery (1993) and Draper (1995), $\hat{\Delta}_k = E[\Delta|D, M_k]$ (3.7)

However, there are many challenges involved in the computation of (3.1) for a very large number of models. To explore the model space stochastically, this study uses a popular approach though Markov Chain Monte Carlo Model Composition (MC3 henceforth) by Madigan et al. (1995). The core aspect of the MC3 technique is the Markov chain stimulation with enough draws to approximate the relevant posterior quantities with an appropriate degree of accuracy. Therefore, this study takes 1,000,000 burn-ins and 3,000,000 draws of the MC3 sampler.

- Parameter priors

This study employs the BMA approach to our research data under the assumption of uninformative priors over the models because the degree of belief is not specifically high in the context of our empirical regressions (here are financial development, growth and environment quality regressions).

The priors influence the marginal likelihood in (3.3), which parameter priors are preferable (Eicher et al., 2011; Feldkircher & Zeugner, 2009; Ley & Steel, 2009). This is examined by assessing the predictive performance of the model. To deal with this issue, this study uses Unit Information Prior (UIP) proposed by Kass and Wasserman (1995) and hyper g-priors suggested by Fernandez et al. (2001b) to estimate several parameter priors with robustness of results (as well as model priors) since they provide more accurate predictions than other methods.

The first prior (labeled as UIP) is given by:

$$pr(D|M_K) \approx c - 1/2BIC_K, \tag{3.7}$$

Where

$$BIC_K = n \log(1 - R_K^2) + p_K \log(n) \tag{3.8}$$

c is a constant; R_K^2 denotes the coefficient of determination; p_K for the number of regressors.

The g-prior is defined as follows:

$$pr(\alpha_1|M_K) \propto 1, \tag{3.9}$$

$$pr(\sigma|M_K) \propto 1, \tag{3.10}$$

$$pr(\alpha^k|\sigma, M_K) \tilde{N}(0, (g_k Z^k Z^k)^{-1}), \tag{3.11}$$

where Z^k denotes the matrix of size $n \times p_K$ with p_K the demeaned regressors included in M_K . The values of g close to zero provide less informative priors while $g = 1$ implies the same weight to the amount of information contained in the research data and priors. Therefore, benchmark prior (BRIC) parameter priors suggested by Fernandez et al. (2001b) are used for the empirical investigations of financial development.

3.2. Data

3.2.1. Variable definitions

- Financial development

One of the most important issues in assessing the relationships between openness and financial development is how to attain a satisfactory measure of financial development. Several financial development indicators have been proposed as different aspects of financial systems in the literature such as the number of companies listed, stock market capitalization, commercial and savings deposits, liquid liabilities, private credit, domestic credit, money stock M2, the ratio of commercial bank assets divided by commercial bank plus central bank assets (Baltagi et al., 2007; Law, 2009; Rajan & Zingales, 2003). In the context of developing countries, this study uses the ratio of private credit to GDP in measuring financial development as it is often taken as the most suitable indicator for characteristics of these countries. It eliminates credit granted to the public sector and credit issued by the central bank and development banks, and therefore depicts the overall development in private banking markets (Beck et al., 2007; Ito, 2006). This measure focuses particularly on the role of financial intermediaries and financial markets in providing funding to the private entrepreneurial sector, and that makes this sector more suitable for estimating financial activity in bank-based financial systems (De Gregorio & Guidotti, 1995).

- Openness

(1) Trade openness

Trade openness depicts the extent of actual exposure to trade interactions and accounts for the effective level of integration (Kim et al., 2010a, 2010b, 2012). In this study, trade openness in an economy is measured by the sum of exports and imports of goods and services as a percentage of its GDP (Antweiler et al., 2001; Beck & Levine, 2004; Cole & Elliott, 2003; Levine & Renelt, 1992; Rajan & Zingales, 2003).

(1) Financial openness

For the financial openness indicator, this study employs a measure of de facto capital account openness based initially on Chinn and Ito (2006), known by the acronym KAOPEN. This index is based on the four binary dummy variables which provide information on the restrictions on external accounts in a wide cross-section of countries reported in the International Monetary Fund's Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER). More specifically, the variables k_1 , k_2 , k_3 and k_4 indicate the existence of multiple exchange rates, restrictions on current account transactions, restrictions on capital account transactions and the requirement of the surrender of export proceeds, respectively.

However, in order to focus on financial openness rather than controls, Chinn and Ito (2006) have reversed these binary variables so that the variables are equal to one if the capital account restrictions are non-existent and vice versa. In addition, for controls over capital transitions, the authors utilise the share of a five-year window that controls on capital account are not in effect as following: $SHARE_{k_{3,t}} = \left(\frac{k_{3,t} + k_{3,t-1} + k_{3,t-2} + k_{3,t-3} + k_{3,t-4}}{5} \right)$.

Then the obtained index for capital account openness ($KAOPEN_t$) which is the principal component of k_{1t} , k_{2t} , $SHARE_{3,t}$ and k_{4t} , attains higher values when an economy is more open to cross-border transactions. Hence, $KAOPEN$ with higher values indicates greater financial openness.

3.2.2. Controlled variables

To strengthen our empirical results, this study includes controlled variables in the relationship between openness and financial development. These include the following:

Institutional quality: Institutional quality has received a great deal of attention in the literature (Feng & Yu, 2020; Kutan et al., 2017). Acemoglu et al. (2001) indicates that strong institutions play a crucial role in financial development. In developing countries, Law (2009) suggests that institutions outperform the competition in ensuring the positive impacts of openness on financial development while Mishkin (2009) also highlights that globalisation encourages financial development and economic growth through institutional reforms.

In this study, institutional quality is included using all the indicators proposed by Kaufmann et al. (2005). For every country, this research calculates the mean of the six dimensions of governance: (i) voice and external accountability; (ii) political stability and lack of violence; (iii) government effectiveness; (iv) lack of regulatory burden; (v) rule of law; (vi) control of corruption. The range of this index is from -2.5 to 2.5. Higher values indicate better institutional quality and vice versa.

Legal origin: Porta et al. (1998) suggests that a country's legal origin is an important determinant of its protection of corporate shareholders and creditors. Clearly, the historical experience plays a crucial role in a country. However, even within a given legal system, the degree of financial development largely differs among countries. Rajan and Zingales (2003) along these lines suggests that only part of financial development is dependent on the inherited legal system when they show significant variation in the degree of financial development during the past century. To deal with the simultaneity problem, this study uses the legal origin of each country as an instrument which is a set of dummy variables indicating whether the legal system of a country is based on British, German, Scandinavian or French origins.

Real GDP per capita: To control for a link from the openness to financial development, this study uses the level of real per capita GDP and the initial level of real per capita GDP to control for capital deepening (Beck, 2002; Kim et al., 2010a, 2010b). As expected, these variables have positive impacts on changes in financial development.

Inflation: The inflation rate is used as an explanatory variable as it might distort decision-making. More specifically, moderate-to-high levels of inflation might not encourage financial intermediation, and stimulate saving for real assets. Therefore, it may also be a proxy variable for macroeconomic stability (Ito, 2006).

Population, government consumption: This study uses population as a proxy for country size (Svaleryd & Vlachos, 2002) and the ratio of government expenditure to GDP as a crucial factor in obtaining macroeconomic stability. In addition, Keynes stated that government expenditure may be utilised to boost aggregate demand, thereby bring the economy out of recession. Therefore, this measure is also considered as an indicator of macroeconomic stability (Fischer, 1993).

Human capital, FDI: In order to measure the human capital input, this study uses a human capital index, based on years of schooling and returns to education (see Human capital in the Penn World Table, version 9.0) as a proxy variable for the national endowment of human capital (Svaleryd & Vlachos, 2005). This indicator through its expected impact on economic growth is positive via its influence on productivity (Caporale et al., 2014). In checking whether the findings are sensitive to the involvement of openness, gross foreign direct investment (FDI) is utilized.

Other variables: In this study, the trade/financial openness is interacted with the institutional quality variable to determine whether the level of institutional development influences the impacts of trade/financial openness (Chinn & Ito, 2002; Ito, 2006). Moreover, the interactive effects of trade openness and financial openness on financial development is employed for evaluating the simultaneous openness hypothesis suggested by Rajan and Zingales (2003). This study also includes the interactive terms between trade/financial openness and logarithm of the real GDP per capita which are our proxies for the demand for finance (Rajan & Zingales, 2003). Finally, regional dummies and time trends are also added to control the influence of other factors that are not included in the equation.

Table 1 summarizes the definitions of all variables.

3.2.3. Data sources

This study employs panel data from 64 developing countries classified by the United Nations Development Programme (UNDP) over the period 2003–2017. The classification of the UNDP is based on Human Development Index (HDI) that this index has become an important alternative to the traditional multifaceted measure of development. The list of developing countries is given in Table 2. The data used in this work were collected from various databases. In particular, the ratio of private credit to GDP was drawn from the *Global Financial Development Database*. Trade openness, real GDP per capita, inflation, government consumption, and population were taken from the World Development Reports for the given period. To get the data relative to KAOPEN for this paper, we used the updated index of Chinn and Ito (2019). Legal origins were obtained from Porta et al. (1998). Institutional quality was drawn from Worldwide Governance Indicators. Human capital index data were collected from Penn World Table 6.3. The sources of each variable are shown in Table 1.

4. Results and discussions

This section presents the findings of BMA analysis in the context of the cross-country financial development regression model and, in particular, discusses the impacts of openness (both trade openness and financial openness) on financial development. Our dependent variable is the average ratio of private credit to GDP (PrivCredit) as a proxy for financial development over the entire period 2003–2017. In addition to fixed regressors, this study allows 19 variables from 72 developing countries, implying that our model space consists of 2^{19} (= 524,288) different models. The results are obtained from the Markov chain of 20 million recorded draws after 10 million burn-ins and 3,962,772 models are visited. The posterior expected model size is 13.465 (i.e. the average number of included regressors). As noted in section 4.1, this study always uses the benchmark prior (BRIC), the unit information prior (UIP), and the local empirical Bayes (LEB) approach under the assumption of uninformative priors over the parameters within each model.

The results of the posterior estimates are presented in Table 3. As mentioned above, the prior probability of the inclusion of a given variable in the true model is 0.5; hence, the variables are identified as robust determinants of financial development have posterior inclusion probabilities (PIP) higher than 0.5. Table 3 shows that trade openness has PIP higher than 0.5 under all three alternative prior structures on parameters. Particularly, the results suggest that the trade openness with PIP of 0.998 exerts a significant positive effect on financial development. However, no evidence that neither financial openness nor the interaction between trade openness and financial openness contributes to financial development is found. The graphs in Figure 3 present the same PIP, the averaged point estimate (the green solid vertical line) of the corresponding regressor as

Table 1. Information on variables

Variable	Signs of proxies	Description	Unit of measurement	Source	Authors	Expected impact
Financial development	PrivCredit ^(*)	The ratio of private credit to GDP	%	<i>Global Financial Development Database (GFDD)</i>	Baltagi et al. (2007, 2009), Ito (2006), Chinn and Ito (2002, 2006), Kim et al. (2010b), Gries et al. (2009), Estrada et al. (2010, 2015), Cecchetti and Kharroubi (2012), Law and Demetriades (2006), Wolde-Rufael (2009), Adu et al. (2013), Trabelsi and Cherif (2017), Calderón and Liu (2003), Beck (2002), Braun and Raddatz (2005), Caporale et al. (2014), Law and Singh (2014)	
Trade openness	TradeOpen ^(*)	The ratio of total trade (exports and imports) to GDP	%	World Development Indicators (WDI)	Rajan and Zingales (2003), Baltagi et al. (2007), Karimu and Marbuah (2017), Law and Demetriades (2006), David et al. (2014), Kim et al. (2010a, 2010b), Wolde-Rufael (2009), Gries et al. (2009), Do and Levchenko (2007), Baltagi et al. (2009), Levine and Renelt (1992)	(+)
Financial openness	KAOPEN ⁽¹⁾	The capital account openness index (KAOPEN) is based on four binary dummy variables associating with the financial account in AREAER including the presence of multiple exchange rates, restrictions on current account transactions, restrictions on capital account transactions, and the requirement of the surrender of export proceeds.	Scale from -1.92 to 2.35	Annual report on Exchange Arrangements and Exchange Restrictions (AREAER), IMF; Chinn and Ito (2019)		(-/+)
Institutional quality	InsQuality	Average of six dimensions of governance: (i) voice and external accountability; (ii) political stability and lack of violence; (iii) government effectiveness; (iv) lack of regulatory burden; (v) rule of law; (vi) control of corruption (see Kaufmann et al. (2005)).	Scale from -2.5 to 2.5	Worldwide Governance Indicators (WGI)	Baltagi et al. (2007, 2009), Karimu and Marbuah (2017), Chinn and Ito (2002, 2006), David et al. (2014)	(+)
Real GDP per capita	RGDP ^(*)	Real GDP per capita (constant 2010 US\$)	US\$ 2010 constant price	World Development Indicators (WDI)	Baltagi et al. (2007, 2009), Karimu and Marbuah (2017), Law and Demetriades (2006), David et al. (2014), Hauner et al. (2013), Ito (2006)	(+)
Human capital	HCapital	Human capital index, based on years of schooling and returns to education (see Human capital in the Penn World Table version 9.0)		Penn World Table version 9.1.	Svaleryd and Vlachos (2005)	(+)
Inflation	Inflation ^(**)	Inflation, consumer prices (annual %)	%	World Development Indicators (WDI)	Ito (2006), Chinn and Ito (2002, 2006), David et al. (2014), Trabelsi and Cherif (2017), Kim et al. (2010a, 2010b), Levine and Renelt (1992)	(-)

(Continued)

Table1. (Continued)

Variable	Signs of proxies	Description	Unit of measurement	Source	Authors	Expected impact
Government consumption	GovCons ^(*)	General government final consumption expenditure (percent of GDP)	%	World Development Indicators (WDI)	Kim et al. (2010a, 2010b), Levine and Renelt (1992)	(-/+)
Population	Population ^(*)	Total population	People	World Development Indicators (WDI)	Beck (2002), David et al. (2014)	(-)
Foreign direct investment	FDI ^(**)	The ratio of foreign direct investment to GDP	%	World Development Indicators (WDI)	Kim et al. (2010b)	(+)
Legal origins	LegalOrigin	British legal origin dummy (legor_uk), Socialist legal origin dummy (legor_so) or French legal origin dummy (legor_fr)	1 or 0	Porta et al. (1998)	Svaleryd and Vlachos (2005), Do and Levchenko (2007)	(-/+)
Regional dummies	Regional dummies	Africa dummy, Asia dummy, Latin America and The Caribbean dummy	1 or 0	United Nations	Chinn and Ito (2002, 2006)	(-/+)
Time trend	TimeTrend	The time trend from 2003 to 2014.				

Notes: ⁽¹⁾ To get the data relative to KAOPEN for this paper, we used the updated index of Chinn and Ito (2019). The dataset is available at http://web.pdx.edu/~ito/Chinn-Ito_website.htm; ^(*)The above variables were transformed into natural logarithms; ^(**)The above variables were transformed into natural logarithms of (1 + variable).

Table 2. The list of developing countries

AFRICA (27 developing countries):

Algeria, Angola, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Central African Republic, Egypt Arab Rep., Gabon, Ghana, Kenya, Malawi, Mali, Mauritius, Morocco, Namibia, Niger, Rwanda, Senegal, Sierra Leone, South Africa, Togo, Tunisia, Uganda, United Republic of Tanzania, Zambia.

ASIA (21 developing countries):

Bangladesh, Cambodia, China, India, Indonesia, Iran, Islamic Rep., Israel, Jordan, Kuwait, Malaysia, Mongolia, Myanmar, Nepal, Pakistan, Philippines, Singapore, Sri Lanka, Thailand, Turkey, United Arab Emirates, Viet Nam.

LATIN AMERICA AND THE CARIBBEAN (16 developing countries):

Barbados, Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Jamaica, Nicaragua, Paraguay, Peru, Uruguay.

shown in Table 3. The red solid vertical line and the red dotted lines indicate conditional expected values and the double conditional standard deviation, respectively.

Beside trade openness, other variables also play a crucial role in the financial development with PIP higher than 0.5 under all three alternative prior structures on parameters including institutional quality, government consumption, total population, the British legal origin dummy, the Africa dummy, the interaction between trade openness and institutional quality, the time trend, foreign direct investment, inflation, the interaction between financial openness and institutional quality, the Latin America and The Caribbean dummy, and the interaction between financial openness and real GDP per capita.

In contrast, financial openness, the interaction between trade openness and financial openness, real GDP per capita, the interaction between trade openness and real GDP per capita, human capital, and the Socialist legal-origin dummy all have PIP less than 0.5. This implies that these variables are not associated with financial development.

Table 3. The impacts of openness on financial development: posterior estimates under uniform model priors

Variable	g = BRIC			g = UIP			g = EBL		
	PIP	Post mean	Post SD	PIP	Post mean	Post SD	PIP	Post mean	Post SD
Institutional quality	1.000	0.708	0.049	1.000	0.708	0.049	1.000	0.704	0.050
Government consumption	1.000	0.508	0.050	1.000	0.508	0.050	1.000	0.503	0.050
Total population	1.000	0.192	0.016	1.000	0.192	0.016	1.000	0.188	0.015
British legal origin dummy	1.000	-0.235	0.039	1.000	-0.235	0.039	1.000	-0.238	0.039
Africa dummy	1.000	-0.631	0.058	1.000	-0.631	0.058	1.000	-0.635	0.055
Interaction between trade openness and institutional quality	1.000	0.389	0.058	1.000	0.389	0.058	1.000	0.396	0.062
Time trend	1.000	0.035	0.003	1.000	0.035	0.003	1.000	0.034	0.003
Trade openness	0.998	0.926	0.210	0.999	0.926	0.210	0.998	0.941	0.238
Foreign direct investment	0.996	-1.720	0.419	0.996	-1.720	0.419	0.997	-1.679	0.416
Inflation	0.988	-1.085	0.300	0.988	-1.085	0.300	0.994	-1.082	0.289
Interaction between financial openness and institutional quality	0.797	-0.051	0.031	0.797	-0.051	0.031	0.855	-0.054	0.029
Latin America and The Caribbean dummy	0.743	-0.116	0.082	0.744	-0.116	0.082	0.883	-0.141	0.072
Interaction between financial openness and real GDP per capita	0.699	-0.008	0.011	0.698	-0.008	0.011	0.855	-0.054	0.029
Financial openness	0.448	0.022	0.095	0.448	0.022	0.095	0.466	0.013	0.088
Interaction between trade openness and financial openness	0.294	-0.021	0.038	0.294	-0.021	0.038	0.454	-0.032	0.041
Real GDP per capita	0.190	0.008	0.018	0.190	0.008	0.018	0.271	0.010	0.020
Interaction between trade openness and real GDP per capita	0.161	-0.009	0.025	0.160	-0.009	0.025	0.244	-0.013	0.028
Human capital	0.116	0.009	0.030	0.117	0.009	0.030	0.186	0.013	0.035
Socialist legal origin dummy	0.035	0.001	0.015	0.035	0.001	0.015	0.077	0.001	0.021

Notes: BRIC denotes benchmark prior; UIP denotes unit information prior; and EBL denotes local empirical Bayes approach

Recent empirical studies have turned towards investigating the impacts of openness on financial development, while controlling for other potential key determinants of financial development, such as institutions and macro-characteristics. This approach is in line with some noteworthy examples such as Chinn and Ito (2002, 2006), Baltagi et al. (2007), David et al. (2014), etc.

Our findings are in line with the recent work on the role of trade openness in financial development such as Rajan and Zingales (2003), Baltagi et al. (2007, 2009), Law and Demetriades (2006), David et al. (2014), Beck (2002), and Braun and Raddatz (2005), among others. For instance, our findings are consistent with Baltagi et al. (2009), who find that trade openness (as proxied by the ratio of total trade to GDP) is an important determinant of financial development. Differently from Baltagi et al. (2009), this study finds no substantial evidence in favor of the interaction between trade openness and financial openness as a crucial determinant of financial development. These authors and Law and Demetriades (2006) provide strong evidence to support for the hypothesis of Rajan and Zingales (2003) that financial development is promoted when an economy is simultaneously open to both capital flows and trade.

There are several empirical studies investigating the impact of financial openness on financial development employing different econometric methods from the BMA approach. All these studies document a positive/negative effect of financial openness on financial development such as Baltagi et al. (2007), Ito (2006), Chinn and Ito (2002, 2006), Law and Demetriades (2006),

Trabelsi and Cherif (2017), among others. However, our results provide very little support for the view that financial liberalisation leads to financial development as Hauner et al. (2013) point out.

Besides openness, our results also find that institutional quality has a strong positive influence on financial development, as suggested by Acemoglu et al. (2001) and Law (2009). Moreover, the interaction between trade openness and institutional quality leads to a significant increase in financial development, concluding that the strong institutions have much favor in respect to trade openness. On the other hand, financial development in developing countries with higher institutional quality enjoy less benefit from financial liberalisation than those in developing countries with lower institutional quality. It is noteworthy that government consumption also has a significant, positive impact on financial development. This finding supports the conclusions of Kim et al. (2010a) and Kim et al. (2010b), who provide evidence for a positive relationship between government consumption and financial development. The degree of financial development and time trends are associated with higher total populations, which is consistent with the empirical work by David et al. (2014).

On the other hand, the evidence from Table 3 suggests negative impacts of the British legal origin dummy, Africa dummy, Latin America and The Caribbean dummy, foreign direct investment, inflation, and the interaction between financial openness and real GDP per capita on financial development. Compared to the French legal origin, our findings seem to give support for the role of the British legal origin for financial development as argued by Porta et al. (1998). The developing countries in Africa and Latin America and The Caribbean have lower degree of financial development compared with Asia developing countries. Our results are generally in line with Kim et al. (2010b), who show that foreign direct investment is negatively related to the degree of financial development in the short-run while financial development is spurred by a higher degree of inflation in the long-run. Financial openness interacted with real GDP per capita (demand for finance) has a significant negative correlation with financial development, which corresponds to the periods of low international capital mobility in developing countries. This finding is inconsistent with Rajan and Zingales (2003).

5. Conclusions

Using data from 64 developing countries covering the period 2003–2017, this paper provides new evidence on the impacts of financial and trade openness on financial development, proxied by the average ratio of private credit to GDP. One major contribution of the study is the adoption of the regression model based on Bayesian model averaging proposed by Fernandez et al. (2001b) to capture the relationship between openness and financial development.

Our main findings indicate that trade openness (as proxied by the ratio of total trade to GDP) is a crucial determinant of financial development while we find little support for the view that financial openness leads to financial development. Moreover, the evidence suggests that there is an insignificant relationship between financial development and contemporaneous opening up both trade and capital accounts, and hence no support for the Rajan and Zingales hypothesis.

The empirical results also indicate that a better institutions environment allows a developing economy to exploit the benefits of openness on financial development. In the context of developing countries, these findings are supported by Stiglitz (2000: 1075) who writes: *“It has become increasingly clear that financial and capital market liberalisation done hurriedly, without first putting into place an effective regulatory framework, was at the core of the problem. It is no accident that the two large developing countries that survived the crisis and continued with remarkably strong growth in spite of a difficult global economic environment were India and China, both countries with strong controls on these capital flows”*. Therefore, in terms of policy implications, the findings suggest that improving institutional quality will encourage the financial development, providing strong support to Acemoglu et al. (2001), Law (2009), and Mishkin (2009).

Moreover, the empirical results also indicate that total population and legal origins, as well as macroeconomic uncertainties related to government consumption, foreign direct investment and

inflation, are key determinants of financial development. Despite these important findings, the Bayesian model averaging approach does not help us to understand the causality. We leave these potentially important issues for future research.

Acknowledgements

We are very grateful to two anonymous reviewers for their useful comments and suggestions. Any remaining errors are the author's own responsibility.

Funding

The authors received no direct funding for this research.

Author details

Diem Pham Thi Thuy¹
E-mail: diempham.edu.vn@gmail.com
Hoai Nguyen Trong²
E-mail: hoaianh@ueh.edu.vn

¹ Institute for Research & Banking Technology, International Economics Faculty, Banking University Ho Chi Minh City, Vietnam.

² School of Economics, University of Economics Ho Chi Minh City, Vietnam.

Citation information

Cite this article as: Impacts of openness on financial development in Developing countries: Using a Bayesian model averaging approach, Diem Pham Thi Thuy & Hoai Nguyen Trong, *Cogent Economics & Finance* (2021), 9: 1937848.

References

- Acemoglu, D., Johnson, S., & Robinson, J. A. (2001). The colonial origins of comparative development: An empirical investigation. *American Economic Review*, 91(5), 1369–1401. <https://doi.org/10.1257/aer.91.5.1369>
- Adu, G., Marbuah, G., & Mensah, J. T. (2013). Financial development and economic growth in Ghana: Does the measure of financial development matter? *Review of Development Finance*, 3(4), 192–203. <https://doi.org/10.1016/j.rdf.2013.11.001>
- Aizenman, J. (2004). Financial opening and development: Evidence and policy controversies. *American Economic Review*, 94(2), 65–70. <https://doi.org/10.1257/0002828041301434>
- Aizenman, J., & Noy, I. (2009). Endogenous financial and trade openness. *Review of Development Economics*, 13(2), 175–189. <https://doi.org/10.1111/j.1467-9361.2008.00488.x>
- Antweiler, W., Copeland, B. R., & Taylor, M. S. (2001). Is free trade good for the environment? *American Economic Review*, 91(4), 877–908. <https://doi.org/10.1257/aer.91.4.877>
- Baltagi, B. H., Demetriades, P. O., & Law, S. H. (2007). Financial development, openness and institutions: Evidence from panel data, Working Paper, World Economy Finance Research Programme.
- Baltagi, B. H., Demetriades, P. O., & Law, S. H. (2009). Financial development and openness: Evidence from panel data. *Journal of Development Economics*, 89(2), 285–296. <https://doi.org/10.1016/j.jdeveco.2008.06.006>
- Beck, T. (2002). Financial development and international trade: Is there a link? *Journal of International Economics*, 57(1), 107–131. [https://doi.org/10.1016/S0022-1996\(01\)00131-3](https://doi.org/10.1016/S0022-1996(01)00131-3)
- Beck, T., Demirgüç-Kunt, A., & Levine, R. (2007). Finance, inequality and the poor. *Journal of Economic Growth*, 12(1), 27–49. <https://doi.org/10.1007/s10887-007-9010-6>
- Beck, T., & Levine, R. (2004). Stock markets, banks, and growth: Panel evidence. *Journal of Banking & Finance*, 28(3), 423–442. [https://doi.org/10.1016/S0378-4266\(02\)00408-9](https://doi.org/10.1016/S0378-4266(02)00408-9)
- Beck, T., & Levine, R. (2005). Legal institutions and financial development. In *Handbook of new institutional economics* (pp. 251–278). Springer.
- Braun, M., & Raddatz, C. (2005). Trade liberalization and the politics of financial development, Working Paper, The World Bank.
- Calderón, C., & Liu, L. (2003). The direction of causality between financial development and economic growth. *Journal of Development Economics*, 72(1), 321–334. [https://doi.org/10.1016/S0304-3878\(03\)00079-8](https://doi.org/10.1016/S0304-3878(03)00079-8)
- Caporale, G. M., Rault, C., Sova, A. D., & Sova, R. (2014). Financial development and economic growth: Evidence from 10 new European Union members. *International Journal of Finance Economics*, 20(1), 48–60. <https://doi.org/10.1002/ijfe.1498>
- Cecchetti, S., & Kharroubi, E. (2012). Reassessing the impact of finance on growth, Working Paper, Bank for International Settlements.
- Chinn, M. D., & Ito, H. (2002). Capital account liberalization, institutions and financial development: Cross country evidence, Working Paper, National Bureau of Economic Research.
- Chinn, M. D., & Ito, H. (2006). What matters for financial development? Capital controls, institutions, and interactions. *Journal of Development Economics*, 81(1), 163–192. <https://doi.org/10.1016/j.jdeveco.2005.05.010>
- Chinn, M. D., & Ito, H. (2019). *The Chinn-Ito Index – A de jure measure of financial openness*. Retrieved July 10, 2019, from http://web.pdx.edu/~ito/Chinn-Ito_website.htm
- Cole, M. A., & Elliott, R. (2003). Determining the trade–environment composition effect: The role of capital, labor and environmental regulations. *Journal of Environmental Economics Management*, 46(3), 363–383. [https://doi.org/10.1016/S0095-0696\(03\)00021-4](https://doi.org/10.1016/S0095-0696(03)00021-4)
- David, M. A., Mlachila, M. M., & Moheput, A. (2014). *Does openness matter for financial development in Africa?* Working Paper, International Monetary Fund.
- De Gregorio, J., & Guidotti, P. E. (1995). Financial development and economic growth. *World Development*, 23(3), 433–448. [https://doi.org/10.1016/0305-750X\(94\)00132-I](https://doi.org/10.1016/0305-750X(94)00132-I)
- Do, Q. T., & Levchenko, A. A. (2007). Comparative advantage, demand for external finance, and financial development. *Journal of Financial Economics*, 86(3), 796–834. <https://doi.org/10.1016/j.jfineco.2006.11.004>
- Draper, D. (1995). Assessment and propagation of model uncertainty. *Journal of the Royal Statistical Society: Series B*, 57(1), 45–70. <https://doi.org/10.1111/j.2517-6161.1995.tb02015.x>
- Eicher, T. S., Papageorgiou, C., & Raftery, A. E. (2011). Default priors and predictive performance in Bayesian model averaging, with application to growth determinants. *Journal of Applied Econometrics*, 26(1), 30–55. <https://doi.org/10.1002/jae.1112>
- Estrada, G. B., Park, D., & Ramayandi, A. (2010). Financial development and economic growth in developing Asia, Economics Working Paper, Asian Development Bank.
- Estrada, G. B., Park, D., & Ramayandi, A. (2015). Financial development, financial openness, and economic growth, Economics Working Paper, Asian Development Bank.
- Feldkircher, M., & Zeugner, S. (2009). Benchmark priors revisited: On adaptive shrinkage and the supermodel effect in Bayesian model averaging, Working Paper, International Monetary Fund.

- Feng, Y., & Yu, X. (2020). The impact of institutions on financial development: Evidence from East Asian countries. *Australian Economic Papers*, 60(1), 122–137. <https://doi.org/10.1111/1467-8454.12215>
- Fernandez, C., Ley, E., & Steel, M. F. (2001a). Model uncertainty in cross-country growth regressions. *Journal of Applied Econometrics*, 16(5), 563–576. <https://doi.org/10.1002/jae.623>
- Fernandez, C., Ley, E., & Steel, M. F. (2001b). Benchmark priors for Bayesian model averaging. *Journal of Applied Econometrics*, 100(2), 381–427. [https://doi.org/10.1016/S0304-4076\(00\)00076-2](https://doi.org/10.1016/S0304-4076(00)00076-2)
- Fischer, S. (1993). The role of macroeconomic factors in growth. *Journal of Monetary Economics*, 32(3), 485–512. [https://doi.org/10.1016/0304-3932\(93\)90027-D](https://doi.org/10.1016/0304-3932(93)90027-D)
- Gries, T., Kraft, M., & Meierrieks, D. (2009). Linkages between financial deepening, trade openness, and economic development: Causality evidence from Sub-Saharan Africa. *World Development*, 37(12), 1849–1860. <https://doi.org/10.1016/j.worlddev.2009.05.008>
- Hauner, D., Prati, A., & Bircan, C. (2013). The interest group theory of financial development: Evidence from regulation. *Journal of Banking & Finance*, 37(3), 895–906. <https://doi.org/10.1016/j.jbankfin.2012.10.008>
- Hoeting, J. A., Madigan, D., Raftery, A. E., & Volinsky, C. T. (1999). Bayesian model averaging: A tutorial. *Statistical Science*, 14(4), 382–401. <https://doi.org/10.1214/ss/1009212519>
- Ito, H. (2006). Financial development and financial liberalization in Asia: Thresholds, institutions and the sequence of liberalization. *The North American Journal of Economics and Finance*, 17(3), 303–327. <https://doi.org/10.1016/j.najef.2006.06.008>
- Karimu, A., & Marbuah, G. (2017). Re-examining the financial development–openness nexus: Nonparametric evidence for developing countries. *Journal of Applied Economics*, 20(2), 373–394. [https://doi.org/10.1016/S1514-0326\(17\)30017-X](https://doi.org/10.1016/S1514-0326(17)30017-X)
- Kass, R. E., & Wasserman, L. (1995). A reference Bayesian test for nested hypotheses and its relationship to the Schwarz criterion. *Journal of the American Statistical Association*, 90(431), 928–934. <https://doi.org/10.1080/01621459.1995.10476592>
- Kaufmann, D., Kraay, A., & Mastruzzi, M. (2005). Governance matters IV: Governance indicators for 1996–2004, Working Paper, The World Bank.
- Kim, D. H., Lin, S. C., & Suen, Y. B. (2010a). Dynamic effects of trade openness on financial development. *Economic Modelling*, 27(1), 254–261. <https://doi.org/10.1016/j.econmod.2009.09.005>
- Kim, D. H., Lin, S. C., & Suen, Y. B. (2010b). Are financial development and trade openness complements or substitutes? *Southern Economic Journal*, 76(3), 827–845. <https://doi.org/10.4284/sej.2010.76.3.827>
- Kim, D. H., Lin, S. C., & Suen, Y. B. (2012). The simultaneous evolution of economic growth, financial development, and trade openness. *The Journal of International Trade & Economic Development*, 21(4), 513–537. <https://doi.org/10.1080/09638199.2010.497933>
- Kutan, A. M., Samargandi, N., & Sohag, K. (2017). Does institutional quality matter for financial development and growth? Further evidence from MENA countries. *Australian Economic Papers*, 56(3), 228–248. <https://doi.org/10.1111/1467-8454.12097>
- Law, S. H. (2009). Trade openness, capital flows and financial development in developing economies. *International Economic Journal*, 23(3), 409–426. <https://doi.org/10.1080/10168730903268398>
- Law, S. H., & Demetriades, P. (2006). Openness, institutions and financial development, Working Paper, ESRC World Economy and Finance Research Programme, Birkbeck, University of London.
- Law, S. H., & Singh, N. (2014). Does too much finance harm economic growth? *Journal of Banking & Finance*, 41 (2014), 36–44. <https://doi.org/10.1016/j.jbankfin.2013.12.020>
- Levine, R., & Renelt, D. (1992). A sensitivity analysis of cross-country growth regressions. *The American Economic Review*, 82(4), 942–963.
- Ley, E., & Steel, M. F. (2009). On the effect of prior assumptions in Bayesian model averaging with applications to growth regression. *Journal of Applied Econometrics*, 24(4), 651–674. <https://doi.org/10.1002/jae.1057>
- Madigan, D., York, J., & Allard, D. (1995). Bayesian graphical models for discrete data. *International Statistical Review/Revue Internationale De Statistique*, 63(2), 215–232. <https://doi.org/10.2307/1403615>
- McKinnon, R. I. (1991). Financial control in the transition from classical socialism to a market economy. *Journal of Economic Perspectives*, 5(4), 107–122. <https://doi.org/10.1257/jep.5.4.107>
- Mishkin, F. S. (2009). Why we shouldn't turn our backs on financial globalization. *IMF Staff Papers*, 56(1), 139–170. <https://doi.org/10.1057/imfsp.2008.30>
- Porta, R. L., Lopez-de-Silanes, F., Shleifer, A., & Vishny, R. W. (1998). Law and finance. *Journal of Political Economy*, 106(6), 1113–1155. <https://doi.org/10.1086/250042>
- Raftery, A. E. (1993). Bayesian model selection in structural equation models. *Sage Focus Editions*, 154, 163–180. <https://us.sagepub.com/en-us/nam/testing-structural-equation-models/book3893#preview>
- Raftery, A. E., Gneiting, T., Balabdaoui, F., & Polakowski, M. (2005). Using Bayesian model averaging to calibrate forecast ensembles. *Monthly Weather Review*, 133(5), 1155–1174. <https://doi.org/10.1175/MWR2906.1>
- Raftery, A. E., Madigan, D., & Hoeting, J. A. (1997). Bayesian model averaging for linear regression models. *Journal of the American Statistical Association*, 92(437), 179–191. <https://doi.org/10.1080/01621459.1997.10473615>
- Rajan, R. G., & Zingales, L. (2003). The great reversals: The politics of financial development in the twentieth century. *Journal of Financial Economics*, 69(1), 5–50. [https://doi.org/10.1016/S0304-405X\(03\)00125-9](https://doi.org/10.1016/S0304-405X(03)00125-9)
- Stiglitz, J. E. (2000). Capital market liberalization, economic growth, and instability. *World Development*, 28 (6), 1075–1086. [https://doi.org/10.1016/S0305-750X\(00\)00006-1](https://doi.org/10.1016/S0305-750X(00)00006-1)
- Svaleryd, H., & Vlachos, J. (2002). Markets for risk and openness to trade: How are they related? *Journal of International Economics*, 57(2), 369–395. [https://doi.org/10.1016/S0022-1996\(01\)00153-2](https://doi.org/10.1016/S0022-1996(01)00153-2)
- Svaleryd, H., & Vlachos, J. (2005). Financial markets, the pattern of industrial specialization and comparative advantage: Evidence from OECD countries. *European Economic Review*, 49(1), 113–144. [https://doi.org/10.1016/S0014-2921\(03\)00030-8](https://doi.org/10.1016/S0014-2921(03)00030-8)
- Trabelsi, M., & Cherif, M. (2017). Capital account liberalization and financial deepening: Does the private sector matter? *The Quarterly Review of Economics and Finance*, 64(C), 141–151. <https://doi.org/10.1016/j.qref.2016.08.001>
- Wolde-Rufael, Y. (2009). Re-examining the financial development and economic growth nexus in Kenya. *Economic Modelling*, 26(6), 1140–1146. <https://doi.org/10.1016/j.econmod.2009.05.002>



© 2021 The Author(s). This open access article is distributed under a Creative Commons Attribution (CC-BY) 4.0 license.

You are free to:

Share — copy and redistribute the material in any medium or format.

Adapt — remix, transform, and build upon the material for any purpose, even commercially.

The licensor cannot revoke these freedoms as long as you follow the license terms.

Under the following terms:

Attribution — You must give appropriate credit, provide a link to the license, and indicate if changes were made.

You may do so in any reasonable manner, but not in any way that suggests the licensor endorses you or your use.

No additional restrictions

You may not apply legal terms or technological measures that legally restrict others from doing anything the license permits.



***Cogent Economics & Finance* (ISSN: 2332-2039) is published by Cogent OA, part of Taylor & Francis Group.**

Publishing with Cogent OA ensures:

- Immediate, universal access to your article on publication
- High visibility and discoverability via the Cogent OA website as well as Taylor & Francis Online
- Download and citation statistics for your article
- Rapid online publication
- Input from, and dialog with, expert editors and editorial boards
- Retention of full copyright of your article
- Guaranteed legacy preservation of your article
- Discounts and waivers for authors in developing regions

Submit your manuscript to a Cogent OA journal at www.CogentOA.com

