IPRPD
International Journal of Arts, Humanities and Social Sciences
ISSN 2693-2547 (Print), 2693-2555 (Online)
Volume 05; Issue no 02: February, 2024
DOI: 10.56734/ijahss.v5n2a2

TOTAL FACTOR PRODUCTIVITY AND FINANCIAL DEVELOPMENT

S. Meral Cakici[1]

[1]*Associate Professor of Economics, Faculty of Economics and Administrative Sciences, Piri Reis University, Turkey*

Abstract

The main objective of this study is to explore the relationship between total factor productivity and financial development for a group of Latin American countries consisting of Brazil, Colombia, Costa Rica and Mexico covering the period from 1996 to 2019. Total factor productivity, which is considered as one of the main drivers of sustainable economic growth, especially for emerging economies, is the measure of productive efficiency given by the ratio of aggregate output to aggregate inputs. Financial development refers to the development of financial institutions and financial markets. Latin American countries exhibit different levels of both total factor productivity and financial development mainly due to the emerging nature of their economies, which explains the motivation of choosing four of these countries as the sample to analyze the association between total factor productivity and financial development. Data for total factor productivity is taken from the Penn World Table while the Financial Development Index Database provided by the IMF is used in order to examine financial development. The results of this study indicate that countries with higher levels of total factor productivity also have higher levels of financial development. This finding can be interpreted as the outcome of the fact that there are macroeconomic and financial factors determining or similarly influencing both total factor productivity and financial development. Significant policy implications for emerging countries can be inferred from this close connection between total factor productivity and financial development, which constitutes the major contribution of this study to the literature.

Keywords

Total Factor Productivity, Financial Development, Latin American Economies

Introduction

Total factor productivity (TFP, henceforth) as a measure of productive efficiency has been analyzed extensively in the literature in terms of its determinants and implications for economic growth and macroeconomic stability. Under some simplifying assumptions about the production technology, TFP growth becomes the part of output growth that cannot be explained by growth in factors of production; namely, capital and labor. Financial development, which refers to the development of financial markets and financial institutions, has also been studied comprehensively with respect to its causes and consequences as well as its associations with key macroeconomic and financial indicators, especially in emerging countries. This study aims to investigate the relationship between TFP and financial development, that has not been adequately examined so far in the literature, for a group of Latin American countries consisting of Brazil, Colombia, Costa Rica and Mexico covering the period from 1996 to 2019.

The literature on TFP has focused on the determinants of TFP growth and the implications of TFP growth for economic growth and macroeconomic stability. Felipe (1999) reviews the empirical literature on TFP growth in East Asia and discusses the drivers of growth in the region. The author points out the fact that the TFP growth estimates vary significantly, even for the same time period and country. In another survey on TFP as a source of growth in East Asian economies, Chen (1997) aims to show that the impact of TFP on economic growth depends mainly on how TFP is defined and measured. Baier et al. (2006) investigate the relative significance of capital accumulation and TFP growth in determining economic growth using data on 145 countries. The authors show that only fourteen percent of average output growth per worker is associated with TFP growth. Lipsey and Carlaw (2004) argue that changes in TFP do not measure technological changes and can be interpreted as being an imperfect measure of the returns to investing in new technologies, which are in excess of the return to investing in existing technologies. In an empirical study on TFP, Jajri (2007) analyzes the determinants of TFP growth in

Malaysia during the 1971-2004 period. The TFP growth model used in the study yields results showing that openness to foreign companies and world economy as well as restructuring of the economy through a shift of resources between sectors are the main contributors to TFP growth.

Financial development has been analyzed in terms of its drivers and its implications for key macroeconomic and financial indicators in the literature. In an empirical study, Gregorio and Guidotti (1995) investigate the relationship between financial development and long-run growth, using private credit to GDP ratio as the measure for financial development. It is found that financial development is positively correlated with growth in a large sample while it turns out to have a negative impact on growth for Latin America. The authors attribute this finding to financial liberalization in a poor regulatory environment observed in Latin America. Benhabib and Spiegel (2000) analyze the relationship between financial development and growth while examining whether financial development affects growth only through factor accumulation or it also has a positive effect on TFP growth. The results of the study suggest that financial development indicators are correlated with both TFP growth and investment while the indicators that are correlated with TFP growth differ from those that encourage investment. Beck (2002) uncovers the link between financial development and trade in manufactures both theoretically and empirically. The author presents a theoretical model that focuses on the role of financial intermediaries in facilitating large-scale, high-return projects and shows that economies with more developed financial systems have a comparative advantage in manufacturing sector. There is also empirical evidence provided by the author using data for 65 countries covering a period of 30 years, showing that financial development exerts a significant impact on both trade balance and exports of manufactured goods. Hassan et al. (2011) investigates the relationship between financial development and economic growth in developing countries. The authors estimate both panel regressions and variance decompositions of annual GDP per capita growth rates in order to explore the most important measures of financial development in determining economic growth over time and the extent to which these measures contribute to explaining economic growth across geographic regions and income groups. It is found that there is a positive relationship between financial development and economic growth in developing countries. Valickova et al. (2015) provide a survey of the literature analyzing the impact of financial development on economic growth, using estimates from 67 studies. The authors point out the fact that although the studies imply a positive and significant effect, the individual estimates vary dramatically. It is shown that the effect seems to be weaker in less developed countries and decreases worldwide after the 1980s.[i]

There is also an extensive literature on Latin American countries focusing on a wide range of topics including economic growth, financial integration, business cycles, financial crises and fiscal reforms. Basnet and Sharma (2013) investigate the feasibility of economic integration in Latin America through examining the existence of long-term and short-term common movements among key macroeconomic variables including real GDP, intra-regional trade, private investment and consumption. The results of the study indicate that the economic fluctuations in Brazil, Mexico, Argentina, Chile, Venezuela, Colombia and Peru follow a similar pattern in terms of intensity, duration, timing and response both in the short run and in the long run. Forte and Santos (2015) provide an empirical investigation of the foreign direct investment (FDI, henceforth) performance of Latin American countries using cluster analysis. The findings of the study disclose 3 clusters in 2011 in comparison to 2 in 2005. The cluster with better FDI performance turns out to perform better also in terms of variables such as trade openness, market size and human capital. Hallerberg and Scartascini (2015) explore the connection between financial crises and fiscal institutional reforms using a data set of Latin American countries that experienced several crises and several periods of reform from 1990 to 2005. The authors find that the type of the crisis and its duration play important roles in determining the association between financial crises and fiscal reforms. More precisely, fiscal reforms turn out to be less likely to be observed during a banking crisis while fiscal crises are most likely to lead to fiscal reforms. Raffo et al. (2008) provide a comparative analysis of the role of innovation and economic performance across Latin American and European countries, using firm-level data from Spain, France, Switzerland, Brazil, Argentina and Mexico. Employing a standard structural model linking intensity of R&D, innovation and productivity, the authors find evidence for structural differences between Europe and Latin America as well as heterogeneity within each region. Bittencourt (2012) analyzes the role of financial development in producing economic growth in four Latin American countries covering the period from 1980 to 2007. The author shows that financial development supports economic growth and highlights the importance of macroeconomic stability as well as a more open, competitive and active financial sector in allocating financial resources among entrepreneurs.

This study contributes to the existing literature through analyzing TFP and financial development together for a group of Latin American countries that experience crucial changes in both TFP and financial development levels mainly due to their emerging nature. The results of this study indicate that countries with higher levels of TFP also have higher levels of financial development. This finding can be interpreted as the outcome of the fact that there are macroeconomic and financial factors determining or similarly influencing both TFP and financial development. Significant policy implications for emerging countries can be inferred from this close connection between TFP and financial development, which constitutes the major contribution of this study to the literature.

Methodology

The relationship between TFP and financial development is analyzed for a sample of Latin American countries consisting of Brazil, Colombia, Costa Rica and Mexico covering the period from 1996 to 2019. Latin American countries exhibit different levels of both TFP and financial development mainly due to the emerging nature of their economies, which explains the motivation of choosing four of these countries as the sample to examine the association between TFP and financial development.

TFP data is taken from the TFP Index created by Feenstra et al. (2015) using the Penn World Table (2021).[ii] The index, which is provided with major processing by Our World in Data, presents TFP levels computed with data on GDP (using national accounts growth rates), capital stock, labor, share of labor compensation in GDP as well as share of labor income of employees and self-employed workers in GDP.[iii]

Financial development is commonly measured by the ratio of private credit to GDP or the ratio of stock market capitalization to GDP, as indicators of financial depth, in the literature.[iv] In this study, data for financial development is obtained from the Financial Development Index Database provided by the IMF. The index captures the complex multidimensional nature of financial development through summarizing the development levels of financial markets and financial institutions in terms of their efficiency, depth and access. More precisely, the index is an aggregate of the Financial Institutions Index and the Financial Markets Index. The Financial Institutions Index is composed of the Financial Institutions Depth Index, the Financial Institutions Access Index and the Financial Institutions Efficiency Index. The Financial Institutions Depth Index compiles data on private sector credit by banks as fraction of GDP, mutual fund assets to GDP, pension fund assets to GDP and insurance premiums to GDP. The Financial Institutions Access Index involves data on bank branches per 100.000 adults and ATMs per 100.000 adults. The Financial Institutions Efficiency Index collects data on lending-deposits spread, banking sector net interest margin, overhead costs to total assets, non-interest income to total income, return on assets and return on equity. The Financial Markets Index consists of the Financial Markets Depth Index, the Financial Markets Access Index and the Financial Markets Efficiency Index. The Financial Markets Depth Index compiles data on stocks traded to GDP, stock market capitalization to GDP, total debt securities of financial and nonfinancial corporations to GDP as well as international debt securities of government to GDP. The Financial Markets Access Index collects data on fraction of market capitalization outside of top 10 largest companies and total number of issuers of debt per 100.000 adults. Finally, the Financial Markets Efficiency Index involves data on stock market turnover ratio.

Figure 1. Total Factor Productivity

Figure 1 presents the TFP levels for Brazil, Colombia, Costa Rica and Mexico for the 1996-2019 period. The data is adjusted for inflation and TFP is measured relative to each country's TFP in 2017. Brazil exhibits the highest level of TFP in the sample between 1996 and 2015 while Costa Rica has the lowest level of TFP until the base year 2017 and moves to the top spot during the last two years of the analyzed period. Mexico remains in the second place until 2010 and moves to the third place in 2011 after Colombia, which comes third after Mexico until 2010 before it moves to the second place in 2011 and to the top spot for one year in 2016.

The relative ranking of the countries in terms of financial development is given in Figure 2. The financial development levels depicted here are obtained from the Financial Development Index, which is the aggregate of the Financial Institutions Index and the Financial Markets Index. As far as the development levels of financial markets and financial institutions in terms of efficiency, depth and access criteria are concerned, Brazil performs the best in the sample, in line with its performance with respect to TFP. Mexico takes the second place followed by Colombia while Costa Rica displays the lowest level of financial development during the time period covered. The ranking of the countries with respect to financial development is compatible with the performances of the countries in terms of TFP, which suggests that there are macroeconomic and financial factors determining or similarly influencing both TFP and financial development. In other words, those variables causing or affecting TFP in Latin American countries turn out to have similar effects on financial development. This finding has significant policy implications for emerging countries that have considerable potential to improve on both dimensions.

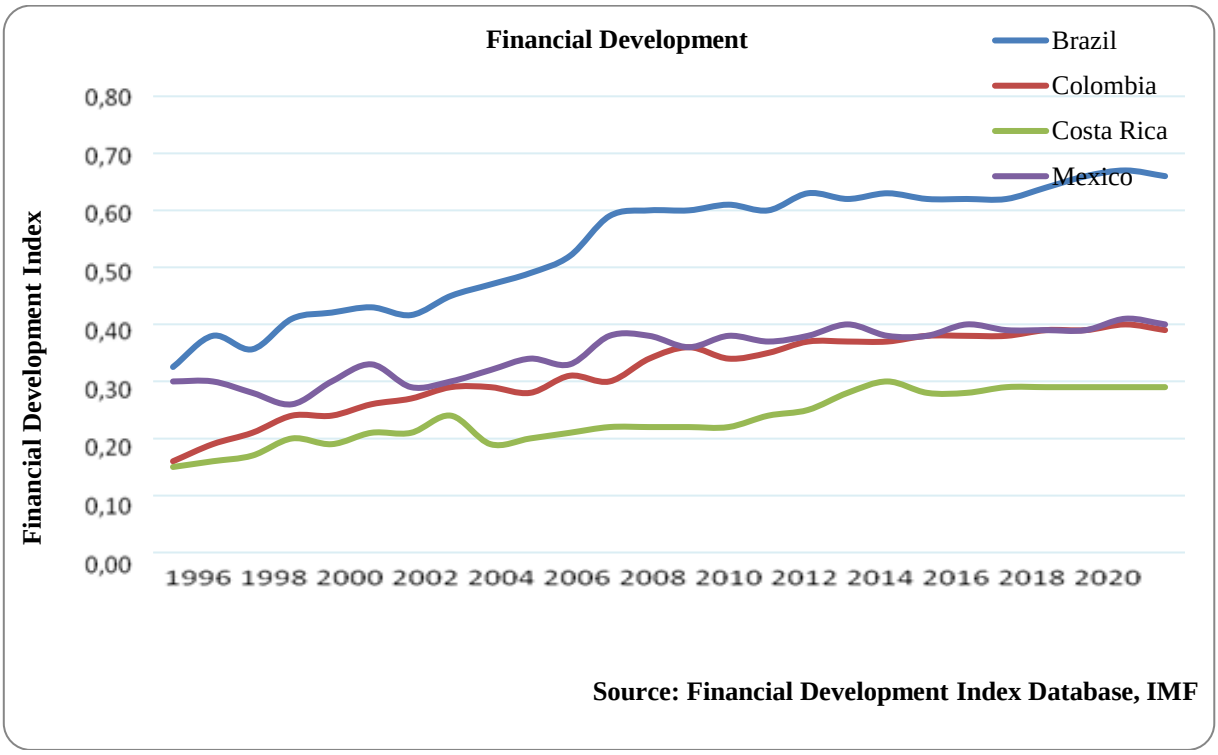

Figure 2. Financial Development

The financial development levels of the countries in the sample reflect a pattern that is in line with the performances of the countries with respect to TFP when the overall financial development measured by the Financial Development Index is considered; however, the picture looks slightly different when the components of the index focusing on financial institutions and financial markets are evaluated. More precisely, analyses of the development levels of financial institutions and the development levels of financial markets, which are illustrated in Figure 3 and Figure 4, respectively, provide more detailed information about the financial development performances of the countries, some of which are different from the observations related to overall financial development.

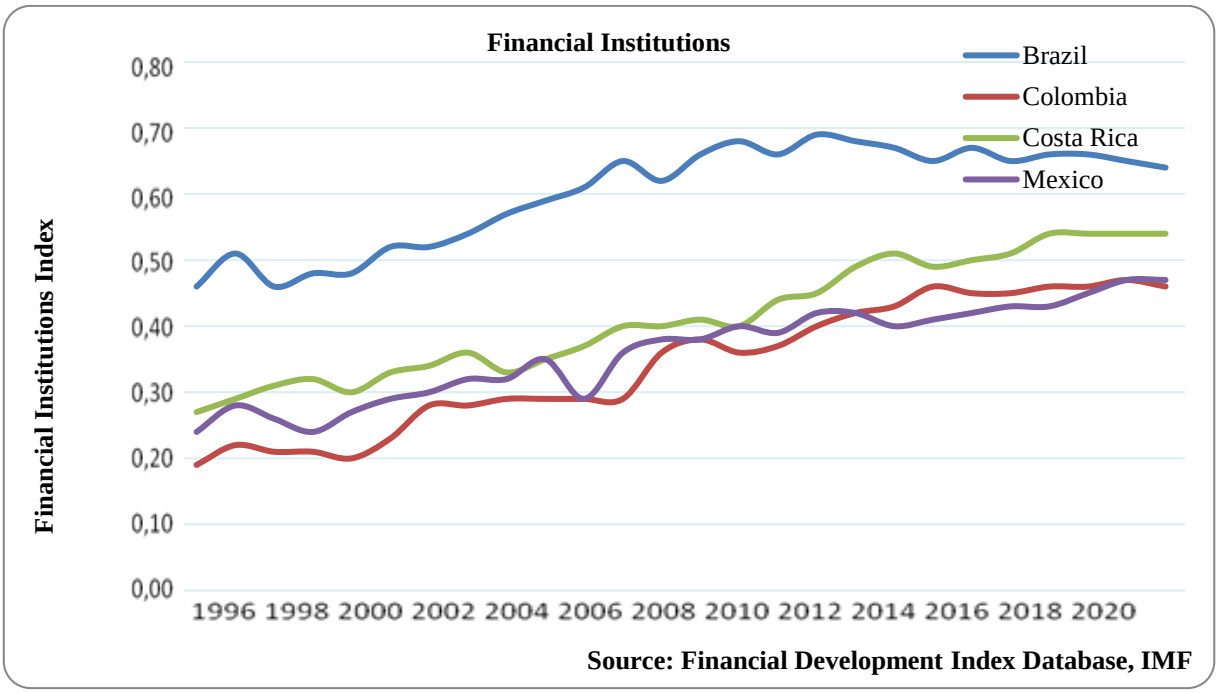

Figure 3. Development Levels of Financial Institutions

The development levels of financial institutions in terms of efficiency, depth and access are presented in Figure 3. The most remarkable observation regarding the performances of the countries is that Costa Rica, which exhibits the lowest level of overall financial development in the sample, takes the second place after Brazil as far as development levels of financial institutions are concerned. This fact can be explained by the argument that the financial markets in Costa Rica constitute the major reason behind the low overall financial development level in the country in comparison to the other countries in the sample. The fact that the inadequate development of financial markets pushes the overall financial development down in Costa Rica can also be seen in Figure 4. Colombia has the least developed financial institutions in the sample until 2013 while Mexico performs slightly better during this period. After 2013, Colombia moves to the third place followed by Mexico. Throughout the entire period covered in this study, Brazil displays significantly higher development levels with respect to financial institutions than the rest of the countries in the sample, which also explains its lead in terms of overall financial development.

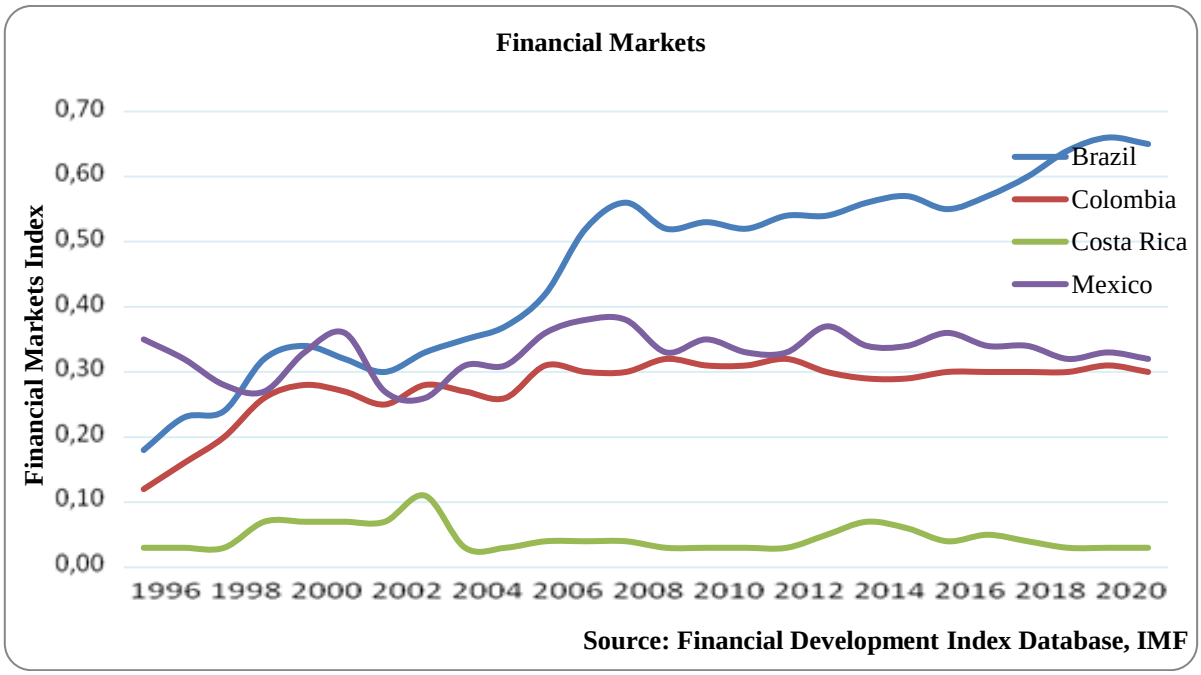

Figure 4. Development Levels of Financial Markets

Finally, Figure 4 illustrates the development levels of financial markets in terms of efficiency, depth and access. The clear lead of Brazil in terms of both overall financial development and development of financial institutions seems to be absent until 2002 as far as development of financial markets is concerned. More precisely, Brazil and Mexico take the top spot alternately until 2002 followed by Colombia and Costa Rica. Colombia surpasses Mexico briefly in 2003 while it remains in the third place for the rest of the time period covered in this study. The gap between Costa Rica and the rest of the countries in the sample with respect to development of financial markets is quite large, which explains the fact that Costa Rica has the lowest level of overall financial development despite taking the second place after Brazil with respect to development of financial institutions.

Conclusion

TFP as a measure of productive efficiency has been analyzed extensively in the literature in terms of its determinants and implications for economic growth and macroeconomic stability. Financial development, which refers to the development of financial markets and financial institutions, has also been studied comprehensively with respect to its drivers and consequences as well as its associations with key macroeconomic and financial indicators, especially in emerging countries. This study aims to investigate the relationship between TFP and financial development, that has not been adequately examined so far in the literature, for a group of Latin American countries consisting of Brazil, Colombia, Costa Rica and Mexico covering the period from 1996 to 2019.

TFP is considered as one of the main drivers of sustainable economic growth, especially for emerging economies. Under some simplifying assumptions about the production technology, TFP growth becomes the part of output growth that cannot be explained by growth in factors of production; namely, capital and labor. The complex multidimensional nature of financial development is captured in this study through focusing on the development levels of financial markets and financial institutions in terms of their efficiency, depth and access. Latin American countries exhibit different levels of both TFP and financial development mainly due to the emerging nature of their economies, which explains the motivation of choosing four of these countries as the sample to analyze the association between TFP and financial development. The results of this study indicate that countries with higher levels of TFP also have higher levels of financial development. This finding can be interpreted as the outcome of the fact that there are macroeconomic and financial factors determining or similarly influencing both TFP and financial development. Significant policy implications for emerging countries can be inferred from this close connection between TFP and financial development, which constitutes the major contribution of this study to the literature.

References

Arestis, P., G. Chortareas and G. Magkonis (2015). The Financial Development and Growth Nexus: A Meta-Analysis. *Journal of Economic Surveys*, 29, 549-565.

Baier, S. L., G. P. Dwyer Jr. and R. Tamura (2006). How Important are Capital and Total Factor Productivity for Economic Growth? *Economic Inquiry*, 44, 23-49.

Basnet, H. C. and S. C. Sharma (2013). Economic Integration in Latin America. *Journal of Economic Integration*, 28, 551-579.

Beck, T. (2002). Financial Development and International Trade: Is There a Link? *Journal of International Economics*, 57, 107-131.

Benhabib, J. and M. M. Spiegel (2000). The Role of Financial Development in Growth and Investment. *Journal of Economic Growth*, 5, 341-360.

Bittencourt, M. (2012). Financial Development and Economic Growth in Latin America: Is Schumpeter Right? *Journal of Policy Modeling*, 34, 341-355.

Chen, E. K. Y. (1997). The Total Factor Productivity Debate: Determinants of Economic Growth in East Asia. *Asian-Pacific Economic Literature*, 11, 18-38.

Feenstra, R. C., R. Inklaar and M. P. Timmer (2015). The Next Generation of the Penn World Table. *American Economic Review*, 105, 3150-3182.

Felipe, J. (1999). Total Factor Productivity Growth in East Asia: A Critical Survey. *Journal of Development Studies*, 35, 1-41.

Forte, R. and N. Santos (2015). A Cluster Analysis of FDI in Latin America. *Latin American Journal of Economics*, 52, 25-56.

Gregorio, J. D. and P. E. Guidotti (1995). Financial Development and Economic Growth. *World Development*, 23, 433-448.

Hallerberg, M. and C. Scartascini (2015). When Do Governments Improve Fiscal Institutions? Lessons from Financial Crisis and Fiscal Reform in Latin America. *Economia*, 16, 43-76.

Hassan, M. K., B. Sanchez and J. S. Yu (2011). Financial Development and Economic Growth: New Evidence from Panel Data. *Quarterly Review of Economics and Finance*, 51, 88-104.

Jajri, I. (2007). Determinants of Total Factor Productivity Growth in Malaysia. *Journal of Economic Cooperation*, 28, 41-58.

Lipsey, R. G. and K. I. Carlaw (2004). Total Factor Productivity and the Measurement of Technological Change. *Canadian Journal of Economics*, 37, 1118-1150.

Perez-Moreno, S. (2011). Financial Development and Poverty in Developing Countries: A Causal Analysis. *Empirical Economics*, 41, 57-80.

Raffo, J., S. Lhuillery and L. Miotti (2008). Northern and Southern Innovativity: A Comparison Across European and Latin American Countries. *European Journal of Development Research*, 20, 219-239.

Taghizadeh-Hesary, F., N. T. M. Phi, H. H. T. Hong and V. T. Chu (2019). Does Financial Integration Matter for Financial Development? Evidence from the East Asian and Pacific Region. *Journal of Economic Integration*, 34, 591-618.

Valickova, P., T. Havranek and R. Horvath (2015). Financial Development and Economic Growth: A Meta-Analysis. *Journal of Economic Surveys*, 29, 506-526.

Voghouei, H., M. Azali and M. A. Jamali (2011). A Survey of the Determinants of Financial Development. *Asian-Pacific Economic Literature*, 25, 1-20.

[i] Arestis et al. (2015) provide another survey on the relationship between financial development and economic growth. For a survey on the determinants of financial development, see, among others, Voghouei et al. (2011).

[ii] Penn World Table is a database with information on GDP and its composition, employment, productivity and trade, covering 183 countries between1950 and 2019.

[iii] Our World in Data provides data and visualizations that rely on data sourced from one or several original data providers. Preparation of this original data involves several processing steps such as standardization of country names and world region definitions, unit conversions as well as calculations of derived indicators such as per capita measures.

[iv] See, among others, Perez-Moreno (2011) and Taghizadeh-Hesary et al. (2019).