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THE NEXUS BETWEEN FINANCIAL GLOBALIZATION AND INCOME INEQUALITY: THE CASE OF EMERGING MARKET ECONOMIES

Orkun ÇELİK*

Abstract

We analyze the causality nexus between financial globalization and income inequality for 19 Emerging Market Economies. We use the bootstrap panel causality analysis. The dataset covers the period 1979-2012. The results indicate that there is a positive causality nexus between financial globalization and income inequality. Also, they show that Granger causality running from financial globalization to income inequality is seen in many countries such as Chile, China, Colombia, Egypt, India, Indonesia, Pakistan, and Singapore while there is Granger causality running from income inequality to financial globalization in Egypt and Iran. Furthermore, there is bidirectional Granger causality in Malaysia, Philippines, and Thailand. The results are not consistent with the conventional wisdom.

Keywords: *Globalization, Financial Globalization, Income Inequality, Sustainable Development.*

FİNANSAL KÜRESELLEŞME VE GELİR EŞİTSİZLİĞİ ARASINDAKİ İLİŞKİ: YÜKSELEN PİYASA EKONOMİLERİ ÖRNEĞİ

Öz

19 yükselen piyasa ekonomileri için finansal küreselleşme ve gelir eşitsizliği arasındaki nedensellik ilişkisini analiz etmekteyiz. Boostrap panel nedensellik analizinden yararlanmaktayız. Veri seti 1979-2012 dönemini kapsamaktadır. Sonuçlar, finansal küreselleşme ve gelir eşitsizliği arasında pozitif bir nedensellik ilişkisi olduğunu göstermektedir. Ayrıca, Şili, Çin, Kolombiya, Mısır, Hindistan, Endonezya, Pakistan ve Singapur'da finansal küreselleşmeden gelir eşitsizliğine doğru bir Granger nedensellik ilişkisi görülürken, Mısır ve İran'da ise gelir eşitsizliğinden finansal küreselleşmeye doğru bir Granger nedensellik bulunmaktadır. Ek olarak, Malezya, Filipinler ve Taylan'da ise, çift yönlü Granger nedensellik vardır. Sonuçlar geleneksel anlayışla tutarlı değildir.

Anahtar Kelimeler: *Küreselleşme, Finansal Küreselleşme, Gelir Eşitsizliği, Sürdürülebilir Kalkınma.*

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1. INTRODUCTION

Globalization has many dimensions. The creation of a global financial market-*so called financial globalization*[1] constitutes the most interested one (Pietrobelli and Zamagni, 2000: 313). The process of financial globalization can be defined as a double-edged concept. It has important risks as far as it presents significant benefits for the capital abundant countries (Alper and Onis, 2003: 6).

According to Schmukler (2004), the net impact of financial globalization is probably positive in the long run for developing countries, with risks being more prevalent right after countries liberalize. However, Martin and Rey (2006) show that financial globalization may induce crashes more likely, while trade globalization may cause them less likely in Emerging Market Economies (EMEs hereafter). Mishkin (2007; 2009) also asserts that whether financial globalization can create a wrong result depends on how process of financial globalization is managed. If the process is not properly managed, financial globalization can go very wrong. According to Rodrik and Subramanian (2009), financial globalization is not created increasing of investments or higher economic growth in EMEs. Broner and Ventura (2016) show that financial globalization induces several outcomes, using a model. The first is domestic capital flight. The second is unclear effects of its on net capital flows, investment, and growth. The third is capital inflows and higher investment and growth. The fourth is volatile capital flows and unstable domestic financial markets.

As it is seen, the debate on the results of financial globalization is not clear. Especially, with the increasing income inequalities in within and between countries in recent years, the distribution effect of financial globalization has been investigated by researchers. However, financial globalization that is one of dimension of globalization has not adequately been considered compared to globalization[2] (usually trade).

According to the comparative advantage theory, globalization must provide to decrease inequality in emerging economies. Nonetheless, this case is not valid for the recent globalization (Maskin, 2015). Recent studies[3] that inquire the nexus between financial globalization and income inequality have not supported the comparative advantage theory. From these studies, Das and Mohapatra (2003) evidence that stock market liberalization increases the highest class income share, while it decrease the middle class income share in EMEs. Lee (2006) shows that foreign direct investment (FDI hereafter) raises income inequality in the 14 European Union (EU hereafter) countries. Kai and Hamori (2009) demonstrate that globalization enhances income inequality in Sub-Saharan Africa countries. Furthermore, it deteriorates the equalizing impact of financial depth, though it helps to decrease income inequality. Elmawazini et al. (2013) evidence that income inequality is deepened through trade and financial globalization for the South-Eastern Europe countries and Commonwealth of Independent States. Jaumotte et al. (2013) indicate that there is an increase in fluence of financial globalization on income inequality for 51 countries. Asteriou et al. (2014) conclude that financial globalization increases income inequality for the EU-27 countries. Especially, it mostly results from FDI. Also, Kang-Kook (2014) finds similar results for all countries. Daisaka et al. (2014) indicate that financial imperfection induces income inequality through helping borrowers and lowers. The impact globalization on borrowers and lowers is in the same direction. Moreover, its impact is grater for borrowers.

Later, Bukhari and Munir (2016) demonstrate that financial globalization induces enhancing of income inequality in Asian countries. Cabral et al. (2016) present that financial integration has a remarkable role on increasing income inequality for 15 economies. Baek and Shi (2016) show that financial integration influences differently income inequality for developed and developing countries. While it reduces income inequality in developed countries, it enhances income inequality in developing countries. De Haan and Sturm (2017) show that all financial variables (finance development and financial liberalization) enhance income inequality for 121 countries. Furceri and Loungani (2018) demonstrate that episodes of capital account liberalization are statistically and permanently associated with increases in income inequality and in top income shares. Khan et al. (2019) show that after a country liberalizes investment across borders, time to rise in inequality decreases for 120 countries.

1 It is a process that financial markets around the world are integrated together (Arestis and Basu, 2003: 183). Moreover, according to Arestis and Basu (2003), though financial liberalization is a required provision for financial globalization, it is not adequate.

2 See Heshmati (2003), Goldberg and Pavcnik (2007), Meschi and Vivarelli (2007), Dreher and Gaston (2008), Atif et al. (2012), Balan et al. (2015), Kratou and Goaied (2016), Destek (2018), Özcan and Özmen (2018), Tunalı and Çetinkaya (2019).

3 The literature is summarized in Appendix 1.

Stated in other words, the results show that there is a significant declining effect of financial globalization on time to upsurge in income inequality (TUII). Furceri et al. (2019) conclude that financial globalization polices contribute to increase income inequality, using country and industry level data. Acun (2019) gives that economic and financial globalization increases income inequality in Organization for Economic Co-operation and Development (OECD hereafter) countries. Akbakay and Barak (2020) evidence that financial globalization increases income inequality in the long-term, while it has statistically not an effect in the short-term for EMEs.

Unlike the previous studies, Çelik and Basdas (2010) indicates that FDI inflows reduce income inequality in developed and developing countries, while it increase income inequality in miracle countries[4]. Furthermore, they present that FDI outflows negatively influence income inequality in developed countries. Agnello et al. (2012) find that financial reforms reduce income inequality for 62 countries. They are removal of policies towards directed credit ad exceedingly high reserve requirements and reforms in the securities market. Kunieda et al. (2014) predicate that financial development narrows income inequality in country, when a country is closed to the world in terms of financial. Moreover, financial development widens income inequality in country, when a country is highly open to the world. Using the panel data of 106 countries, Bumann and Lensink (2016) indicate that financial liberalization will develop income distribution of countries in which financial depth is high. Using the ordinary least squares (OLS hereafter) estimation, Dorn et al. (2018) find that financial globalization by FDI positively affects income inequality. However, they do not statistically find a significant nexus between financial globalization and income inequality, using two-stage least squares (2SLS hereafter) estimation. Lee et al. (2019) assert that globalization, urbanization, and financial development affect regional income in China positively. Furthermore, foreign investment reduces regional income inequality.

To the best of our knowledge, there is no research article that evaluates the nexus between financial globalization and income inequality at country level for EMEs. Furthermore, the panel data analysis is mostly used in the studies which survey the impact of financial globalization on income inequality. Therefore, heterogeneity amongst countries is ignored. Especially, the nexus between financial globalization and income inequality should be considered at country level for countries, which have idiosyncratic features (e.g. high volatility, high risk), such as EMEs. Hence, it is seen that there is a clear need to examine the nexus between financial globalization and income inequality for EMEs. The study also aims to survey the causal nexus between financial globalization and income inequality for EMEs, using the bootstrap panel causality analysis.

The purpose of the research article is to evaluate causality nexus between financial globalization and income inequality for 19-EMEs over the time period 1979-2012, using the bootstrap panel causality method. These countries are considered, as they have become outstanding on the world economic stage, especially, and a significant role international trade and financial flows (Kose and Prasad, 2010; ILO, 2011). The study unfolds as follows. Section 2 gives information about data and method using in the analysis. Section 3 argues the findings of the analysis. Section 4 presents conclusion and recommends for policy makers.

The study differentiates from previous studies in several aspects. Firstly, we search the bi-directional nexus between financial globalization and income inequality, unlike the previous studies. Secondly, we present the results at country level unlike previous studies. The country groups with the heterogeneity (such as EMEs) should be considered at individual level. Nevertheless, they find generally the results at panel level. Thirdly, the previous studies consider usually developed or developing countries. There are few studies that consider also EMEs in the literature. We consider EMEs which have not only high volatility and economic growth, but also high poverty and inequality. Finally, we present a comprehensive literature review.

4 China, India, Korea, Malaysia, Singapore, Thailand.

2. EMPIRICAL STRATEGY

2.1.Data

In this section, we present information about dataset using in the analysis. The dataset covers the period 1979-2012[5] for 19-EMEs[6].

The income inequality is measured by the Standardized World Income Inequality (SWIID hereafter)[7] Version 8 database. This database has recently used in many studies such as Bergh and Nilsson (2010), Kunieda et al. (2014), De Haan and Sturm (2017), Dorn et al. (2018), Furceri et al. (2019) etc.

There are two different indicators for Gini index in the database. The first is inq_{disp}. It is estimation of Gini index of inequality in equalized household disposable (post-tax, post-transfer) income. The second is inq_{mkt}. It states estimation of Gini index of inequality in equalized household market (pre-tax, pre-transfer) income. The Luxembourg Income Study data is used as the standard in both these indicators (Solt, 2019). Figure 1 displays the scatter plots of the nexus between financial globalization and income inequality for EMEs.

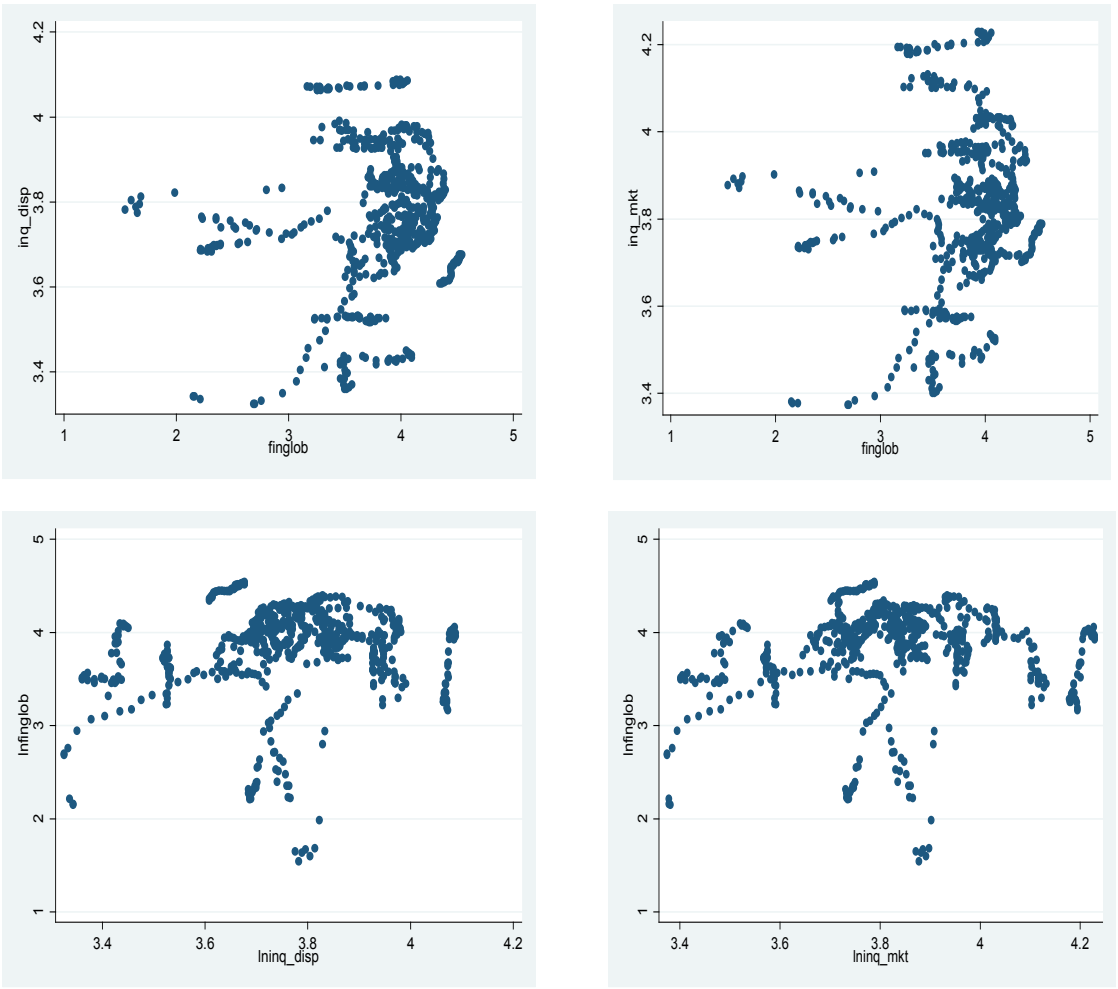

Figure 1: The scatter plots of the financial globalization-income inequality nexus for EMEs

Source: Own figure. *finglob* denotes logarithm of financial globalization index. inq_{disp} is logarithm of Gini index of inequality in equalized household disposable income (post-tax, post-transfer). inq_{mkt} is logarithm of Gini index of inequality in equalized household market income (pre-tax, pre-transfer).

5 It cannot be extended due to the unavailability of the data for some countries.

6 Argentina, Brazil, Chile, China, Colombia, Egypt, India, Indonesia, Iran, South Korea, Malaysia, Mexico, Pakistan, Peru, Philippines, Singapore, South Africa, Thailand, Venezuela. Tsunekawa (2019)'s study is considered in determining these countries.

7 It aims to present a cross-national dataset on income inequality. It depends on many reports on Gini indices from OECD, World Bank, Eurostat etc.

Financial globalization is quantified by KOF index[8] (Gygli et al., 2019). There are three kinds of financial globalization index in this database. The first is *de facto* financial globalization index ($finglob_{de\ facto}$). It covers foreign direct investment, portfolio investment, international debt, income payments and reserves. The second is *de jure* financial globalization index ($finglob_{de\ jure}$). It consists of three elements. They are investment restrictions, capital account openness, and International investment agreements. The third is total financial globalization index (*finglob*). The financial globalization index by KOF is benefited in some studies (Dorn et al., 2018; Akbakay and Barak, 2020 etc.). Table 1 presents descriptive statistics.

Table 1: The descriptive statistics

Variables	Number of Observation	Mean	Standard Deviation	Minimum Value	Maximum Value
finglob	646	3.819	0.509	1.54	4.544
$finglob_{de\ facto}$	646	3.766	0.513	1.531	4.586
$finglob_{de\ jure}$	646	3.839	0.589	0.309	4.505
inq_{disp}	646	3.757	0.161	3.325	4.088
inq_{mkt}	646	3.822	0.178	3.374	4.228

Note: The logarithmic values of all variables are shown.

2.2. Method

Using the bootstrap panel Granger causality analysis, we aim to investigate the causality nexus between financial globalization and income inequality for 19-EMEs. Before estimation, two issues should be considered in the analysis. The first is testing of cross-section dependence, and the second is testing of cross-country heterogeneity (Kar et al., 2011; Chang and Tsai, 2015). Hence, we try to explain both cross-section dependence and cross-country heterogeneity, respectively.

Cross-sectional dependence is significant amongst panel members, when the panel especially comprise of countries which have same structure such developed, emerging, and transition countries. Furthermore, the one country, which is affected by a shock because of globalization, financial integration, and international trade, can influence other countries (Kar et al., 2011; Menyah et al., 2014; Ozcan and Ozturk, 2019). We use four different tests for testing cross-section dependence. The first is Lagrange multiplier (LM) test statistic developed by Breusch and Pagan (1980). Hence, in order to estimate the LM test statistic, we follow the panel model:

$$inq_{it} = \varphi_i + \delta_i finglob_{it} + \varepsilon_{it} \text{ for} = 1,2,\dots,N\ ;\ t = 1,2,\dots,T \quad (1)$$

In Equation (1), i and t denote the number of cross-sections and the number of time periods, respectively. φ_i and δ_i indicate the individual intercepts and the slope coefficients, as well. inq and $finglob$ are income inequality and financial globalization, respectively.

In the LM test statistic, the null hypothesis is no-cross-section dependence ($H_0 : Cov\left(\varepsilon_{it}, \varepsilon_{jt}\right) = 0$) for all t and $i \neq j$. The alternative hypothesis is cross-section dependence ($H_1 : Cov\left(\varepsilon_{it}, \varepsilon_{jt}\right) \neq 0$) for at the least one pair of $i \neq j$ (Chang et al., 2013; Chang and Tsai, 2015). Hereunder, the LM test statistic by Breusch and Pagan (1980) is

$$LM = T \sum_{i=1}^{N-1} \sum_{j=i+1}^{N} \hat{\rho}_{ij}^2 \quad (2)$$

In Equation (2), $\hat{\rho}_{ij}$ denotes the sample estimate of the pair-wise correlation of the residuals from OLS estimation of Equation 1. The LM test statistic has asymptotically distributed as chi-squared with *N(N-1)/2* degrees of freedom (Chang et al., 2013). Further, it is appropriate, if is relatively small and is large. Hence, it is not valid, when *N* is large (Ozcan and Ozturk, 2019).

The second cross-section dependence test is proposed by Pesaran (2004). He shows that the LM test statistic is not valid under large N. He suggests the following scaled version of CD_{lm} test statistic:

8 It measures the economic, social and political aspects of globalization and generated by Swiss Economic Institute.

$$CD_{lm} = \sqrt{\frac{1}{N(N-1)}} \sum_{i=1}^{N-1} \sum_{j=i+1}^{N} (T\hat{\rho}_{ij}^2 - 1) \tag{3}$$

Under the null hypothesis, $T \to \infty$ and $N \to \infty$, it is asymptotically distributed as standard normal. However, the CD_{lm} test statistic has substantial size distortions for large N relative to T (Ozcan and Ozturk, 2019). Hence, Pesaran (2004) suggests a new test for cross-section dependence. Hereunder:

$$CD = \sqrt{\frac{2T}{N(N-1)}} \left(\sum_{i=1}^{N-1} \sum_{j=i+1}^{N} \hat{\rho}_{ij} \right) \tag{4}$$

This test statistic is our third cross-section dependence test. Under the null hypothesis for $T \to \infty$ and $N \to \infty$, the *CD* test statistic is a is asymptotically follows a standard normal distribution (Akadiri et al., 2020).

The fourth cross-section dependence test statistic is the bias-adjusted LM test statistic. Pesaran et al. (2008) suggest the bias-adjusted LM test statistic, as the *CD* test has significant deficiency. The *CD* test statistics will lack power in particular circumstance in which the population average pair-wise correlations is zero, though the underlying individual population pair-wise correlations are non-zero. Hereunder, the bias-adjusted LM test statistic is defined as

$$LM_{adj} = \sqrt{\frac{2}{N(N-1)}} \sum_{i=1}^{N-1} \sum_{j=i+1}^{N} \frac{(T-k)\hat{\rho}_{ij}^2 - \mu_{Tij}}{v_{Tij}} \to d\ N(0,1) \tag{5}$$

In Equation 5, μ_{Tij} and v_{Tij} denote the exact mean and variance of $(T-k)\hat{\rho}_{ij}^2$. Under the null hypothesis with the first $T \to \infty$ and then $N \to \infty$, it has asymptotic distribution as a standard normal distribution (Chang et al., 2013).

After the cross-section dependence, the second important issue is heterogeneity. To test cross-country heterogeneity, we use slope homogeneity tests. In order to test slope homogeneity, Pesaran and Yamagata (2008) suggest the delta $(\tilde{\Delta})$ test[9]. It is valid as $(N,T) \to \infty$ without any limitations on the relative expansion rates of and , when the error terms have normal distribution (Menyah et al., 2014). It depends on the Swamy (1970)'s slope homogeneity test which following as;

$$S = \sum_{i=1}^{N} (\hat{\delta}_i - \hat{\delta}_{wfe})' \frac{x_i' M_\tau x_i}{\hat{\sigma}_i^2} (\hat{\delta}_i - \hat{\delta}_{wfe}) \tag{6}$$

In Equation 6, $\hat{\delta}_i$ and $\hat{\delta}_{wfe}$ denote the pooled and the weighted fixed effect pooled OLS estimator, respectively. M_τ shows an identify matrix of order T, where τ_T is a $T \times 1$ vector of ones. $\hat{\sigma}_i^2$ indicates the estimator of error variance. When N is fixed and $T \to \infty$, the S is asymptotically distributed (Chu, 2012). The standardized dispersion statistic is descripted as

$$\tilde{\Delta} = \sqrt{N} \left(\frac{N^{-1}\tilde{S} - k}{\sqrt{2k}} \right) \tag{7}$$

In Equation 7, under the null hypothesis with the condition of $(N,T) \to \infty$ as long as $\sqrt{N}/T \to \infty$ and the error terms have normal distributions, the test has asymptotic standard normal distribution (Menyah et al., 2014). Furthermore, under normally distributed errors, the small sample properties of the test $(\tilde{\Delta})$ can be developed by using the following bias-adjusted version:

$$\tilde{\Delta}_{adj} = \sqrt{N} \left(\frac{N^{-1}\tilde{S} - E(\tilde{z}_{it})}{\sqrt{var(\tilde{z}_{it})}} \right) \tag{8}$$

In Equation 8, $E(\tilde{z}_{it}) = k$, and $var(\tilde{z}_{it}) = 2k(T-k-1)/T+1$ (Ozcan and Ozturk, 2019). Up till now, we try to explain two important issues before using the bootstrap panel causality test. In order to consider both cross-section dependence and cross-country heterogeneity, the bootstrap panel causality test developed by Kónya

9 In Equation 1, the null hypothesis of slope homogeneity can be defined as for all and the alternative hypothesis can be described as for a non-zero fraction of pairwise slopes for (Chu, 2012).

(2006)[10]. The test[11] depends on seemingly unrelated regression (SUR hereafter) estimation and the critical values of the Wald test. We will estimate the following the bootstrap panel causality equations by Kónya (2006):

$$inq_{1t} = \varphi_{11} + \sum_{l=1}^{m1} \delta_{11l}\, inq_{1t-l} + \sum_{l=1}^{m1} \varphi_{11l}\, finglob_{1t-l} + \varepsilon_{11t}$$

$$\vdots \qquad (9)$$

$$inq_{Nt} = \varphi_{1N} + \sum_{l=1}^{m1} \delta_{1Nl}\, inq_{Nt-l} + \sum_{l=1}^{m1} \varphi_{1Nl}\, finglob_{Nt-l} + \varepsilon_{1Nt}$$

and

$$finglob_{1t} = \varphi_{21} + \sum_{l=1}^{m2} \delta_{21l}\, finglob_{1t-l} + \sum_{l=1}^{m2} \varphi_{21l}\, inq_{1t-l} + \varepsilon_{21t}$$

$$\vdots \qquad (10)$$

$$finglob_{Nt} = \varphi_{2N} + \sum_{l=1}^{m2} \delta_{2Nl}\, finglob_{Nt-l} + \sum_{l=1}^{m2} \varphi_{2Nl}\, inq_{Nt-l} + \varepsilon_{2Nt}$$

In Equation 9 and 10, is income inequality; is financial globalization. *N* and *T* denote the number of countries and the time period, respectively. (*i=1,…,N*) and *t=1,…,T*). *l* indicates the lag length. The baseline model consists of $finglob$, inq_{disp}, and inq_{mkt} variables. To check the robust of the baseline model results, we consider two different variables ($finglob_{de\ facto}$ and $finglob_{de\ jure}$)[12] for financial globalization.

In order to identify the direction of causality, we compare Wald statistics with the critical values at 1, 5, and 10 percent significance level. The bootstrap panel causality test[13] by Kónya (2006) is used in studies on the nexus between globalization and income inequality (e.g. Balan et al., 2015; Destek, 2018).

3. EMPIRICAL FINDINGS

Before the estimation, we need to consider the two issues in the bootstrap panel causality analysis. The first issue is cross-section dependence. According to Kónya (2006), if there is no cross-section dependence across countries, the equations are estimated for each country by the OLS. On the other hand, in the existence of cross-section dependence across countries, the equations can be estimated by feasible generalized least squares (FGLS) or maximum likelihood (ML) estimators. In this study, as is seen in Table 2, we employ the SUR estimator[14], as there is cross-section dependence across countries. We test cross-section dependence by four LM tests (LM,CD_{lm}, CD, and LM_{adj}). The second issue is the cross-country heterogeneity. To test the cross-country heterogeneity, we use the slope heterogeneity test by the delta $(\tilde{\Delta})$ and adjusted delta $(\tilde{\Delta}_{adj})$ tests. According to the results of the tests in the Table 2, the null hypothesis is strongly rejected. Stated in other words, the causality nexus between financial globalization and income inequality may differ across 19-EMEs.

Furthermore, Kónya (2006) remarks importance of the determination of the lag lengths. Accordingly, the determination of the lengths is very crucial step, as the results of causality tests may base critically on the lag structure. Too few lags infer that specification error will generally induce bias in the retained regression coefficients, as some significant variables are omitted from the model. Hence, it causes incorrect conclusions. However, too many lags induce another specification error because of more observation loss. The error will generally enhance the standard errors of the estimated coefficients, and this induces the results less precise. Hence, we try to determine the optimal lag length by Akaike information criteria.

Table 2 displays the causality nexus between financial globalization and income inequality for 19-EMEs. Using the bootstrap panel causality test taking into account both cross-section dependence and cross-country heterogeneity, we estimate the baseline model. In the model, we consider two different indicators for income inequality (inq_{disp} and inq_{mkt}).

10 We prefer the bootstrap panel causality test by Kónya (2006) as it considers both cross-section dependence and cross-country heterogeneity, unlike the bootstrap panel causality test Dumitrescu and Hurlin (2012) (follow Wolde-Rufael, 2014).
11 See Kónya (2006) for the detailed information.
12 See Section 3.1 for the detailed information.
13 Gauss 10 program is used in the estimation process.
14 It is a FGLS estimator developed by Zellner (1962).

There is no the causality nexus between financial globalization and income inequality in any direction for 7 out of 19-EMEs, as the Wald statistics is smaller than the critical values. These countries are Argentina, Brazil, Indonesia, South Korea, Peru, Singapore, and Venezuela.

The unidirectional causality running from financial globalization to income inequality in disposable income (post-tax, post-transfer income-inq_{disp}) is detected for Chile, China, Colombia, Egypt, India, Pakistan, Philippines, and Thailand. Further, there is a unidirectional causality running from financial globalization to income inequality in market income (pre-tax, pre-transfer income-inq_{mkt}) in Chile, China, Colombia, Egypt, India, South Africa, and Thailand. The results also indicate that financial globalization causes both inq_{disp} and inq_{mkt} income inequalities. These results are in harmony with Das and Mohapatra (2003), Lee (2006), Kai and Hamori(2009), Elmawazini et al. (2013), Jaumotte et al. (2013), Asteriou et al. (2014), Kang-Kook (2014), Daisaka et al. (2014), Bukhari and Munir (2016), Cabral et al. (2016), De Haan and Sturm (2017), Khan et al. (2019), Furceri et al. (2019), Akbakay and Barak (2020).

Unlike the causality nexus running from financial globalization to income inequality, the unidirectional causality running from income inequality to financial globalization is seen in few countries. The results show that the unidirectional causality running from income inequality in disposable income (inq_{disp}) to financial globalization is seen in Egypt, Iran, Malaysia, Mexico, and Philippines. Additionally, the unidirectional causality running from income inequality in market income (inq_{mkt}) to financial globalization is detected only for Egypt and Malaysia. The results show that there is a causality nexus between income inequality and financial globalization.

There is no theoretically an explanation on the Granger causality nexus running from income inequality to financial globalization. Hence, these results can be interpreted as following: the income inequality induces to increasing of private debts (Iacoviello, 2008) and then this leads to deepening of financial markets in these countries. Therefore, the financial markets in these countries will further integrate with global market (following Rajan (2010)). Additionally, the bidirectional causality nexus between financial globalization and income inequality is seen only in Egypt and Philippines.

Table 2: The results for the causality nexus between financial globalization and income inequality

	$finglob \rightarrow inq_{disp}$					$finglob \rightarrow inq_{mkt}$					$inq_{disp} \rightarrow finglob$					$inq_{mkt} \rightarrow finglob$				
			Critical Values					Critical Values					Critical Values					Critical Values		
Country	WS	Bp	%1	%5	%10	WS	Bp	%1	%5	%10	WS	Bp	%1	%5	%10	WS	Bp	%1	%5	%10
Argentina	7.33	0.39	50.99	29.51	21.42	9.17	0.31	45.07	27.39	20.37	12.66	0.76	67.77	46.89	38.85	13.71	0.79	67.56	49.97	41.87
Brazil	10.75	0.51	41.59	28.24	23.06	6.67	0.65	33.11	22.33	18.30	1.08	0.80	18.88	12.51	9.65	1.11	0.88	22.59	15.02	12.21
Chile	86.53***	0.00	42.91	30.96	26.43	23.25***	0.00	14.11	8.98	7.00	0.58	0.65	12.07	7.14	5.35	0.89	0.56	12.05	7.10	5.15
China	74.02***	0.00	34.53	25.57	21.51	43.99***	0.00	37.12	26.31	21.72	3.27	0.76	28.01	19.31	15.45	3.98	0.65	26.35	17.99	14.46
Colombia	4.15**	0.03	5.99	3.44	2.42	14.48***	0.01	13.48	9.09	7.08	2.78	0.18	10.91	6.09	4.22	0.00	0.6	7.21	3.88	2.72
Egypt	18.76***	0.00	10.38	5.84	4.04	15.67**	0.03	21.82	13.54	10.06	9.51**	0.06	19.06	10.04	7.17	6.26*	0.08	13.11	7.84	5.46
India	59.13*	0.06	79.65	60.42	51.89	76.28***	0.00	63.81	46.77	39.58	10.92	0.23	37.27	23.16	18.18	8.92	0.39	43.61	28.41	22.04
Indonesia	1.11	0.39	13.40	6.77	4.52	3.59	0.10	9.98	5.42	3.66	3.98	0.14	11.95	6.70	4.83	0.00	0.64	16.23	8.72	5.63
Iran	0.21	0.74	10.20	6.24	4.42	0.55	0.43	6.89	3.66	2.52	29.13**	0.03	34.32	27.39	24.03	24.23	0.17	40.04	30.9	27.28
S. Korea	6.97	0.27	19.04	12.77	10.34	9.12	0.38	25.34	18.01	15.17	2.45	0.74	22.39	14.82	11.79	4.19	0.90	40.32	28.66	23.53
Malaysia	0.28	0.66	8.36	4.81	3.44	1.33	0.27	8.44	4.29	2.97	5.24**	0.06	9.99	5.68	3.88	3.93*	0.08	9.11	5.06	3.51
Mexico	0.01	0.94	10.16	5.79	4.18	0.88	0.42	8.26	5.01	3.51	2.15*	0.10	6.08	3.31	2.18	10.04	0.16	23.30	15.5	12.16
Pakistan	7.26**	0.05	11.22	7.39	5.79	7.19	0.19	20.08	12.77	9.89	0.14	0.76	10.34	5.84	4.01	0.00	0.99	28.06	16.92	13.04
Peru	2.89	0.45	20.11	11.67	8.84	1.79	0.74	24.03	15.92	12.19	1.43	0.89	27.47	18.12	14.72	2.14	0.81	25.07	16.97	13.86
Philippines	3.82**	0.03	5.37	3.03	2.06	2.14	0.14	7.44	3.98	2.66	8.41**	0.02	11.79	6.25	4.27	1.82	0.28	9.73	5.97	4.17
Singapore	20.26	0.47	74.69	50.19	41.00	1.36	0.75	25.49	15.78	12.16	4.17	0.97	65.34	45.18	36.88	10.76	0.96	92.90	66.97	55.25
S. Africa	11.15	0.41	42.09	27.62	22.04	72.22***	0.00	60.36	40.79	33.38	5.80	0.76	45.90	31.15	24.76	6.64	0.79	46.96	33.38	27.09
Thailand	103.24***	0.00	35.6	27.79	23.89	82.16***	0.00	34.91	26.35	22.44	0.56	0.62	9.77	6.168	4.43	0.38	0.64	9.13	5.47	3.92
Venezuela	11.03	0.99	147.92	105.44	88.14	14.84	0.98	138.11	98.66	82.82	32.69	0.79	149.19	106.99	90.65	5.77	0.99	109.66	75.95	62.47
CD tests																				
LM	2644.47***	0.00				2850.34***	0.00				606.59***	0.00				428.69***	0.00			
CD_{lm}	133.75***	0.00				144.88***	0.00				23.55***	0.00				13.93***	0.00			
CD	47.73***	0.00				50.83***	0.00				8.18***	0.00				4.66***	0.00			
LM_{adj}	1.46*	0.07				3.04***	0.00				1.47***	0.00				3.02***	0.00			
Slope H.T.																				
$(\tilde{\Delta})$	45.31***	0.00				43.65***	0.00				37.76***	0.00				38.7***	0.00			
$(\tilde{\Delta}_{adj})$	47.38***	0.00				45.65***	0.00				39.49***	0.00				40.474***	0.00			

Note: WS: Wald Statistic, Bp: Bootstrap p-value, H.T: Heterogeneity Test. The number of the bootstrap replications is 10000. The maximum number of the lag length is 2 and the lag lengths are determined by Akaike information criteria. $p < 0.01$ ***, $p < 0.05$ **, $p < 0.1$ *.

Robustness Checks

Using the bootstrap panel causality analysis, we estimate the baseline model and present our results in Table 2. To check the robustness of the results, we use two different indicators for financial globalization. These indicators are the *de facto* ($finglob_{de\ facto}$) and *de jure* ($finglob_{de\ jure}$) financial globalization, respectively.

Table 3 presents the causality nexus between de facto financial globalization ($finglob_{de\ facto}$) and income inequality for EMEs. The Granger causality running from $finglob_{de\ facto}$ to inq_{disp} is seen in Argentina, Chile, China, Pakistan, Singapore, and Thailand. In these countries, $finglob_{de\ facto}$ causes inq_{disp}. The causality running from $finglob_{de\ facto}$ to inq_{mkt} is also seen in Argentina, Chile, China, India, Indonesia, and Thailand. There is unidirectional causality running from inq_{disp} to $finglob_{de\ facto}$ in Egypt, Iran, Malaysia, and Philippines. The unidirectional causality running from inq_{mkt} to $finglob_{de\ facto}$ is seen only in Egypt and Iran.

Table 4 also shows the causality nexus between de jure financial globalization ($finglob_{de\ jure}$) and income inequality for EMEs. The Granger causality running from $finglob_{de\ jure}$ to inq_{disp} is observed in Brazil, Chile, China, Colombia, Egypt, South Korea, Philippines, and Thailand. Moreover, there is unidirectional causality running from $finglob_{de\ jure}$ to inq_{mkt} in ten countries (Chile, China, Colombia, Egypt, India, Iran, South Korea, Philippines, South Africa, and Thailand). While the Granger causality running from inq_{disp} to $finglob_{de\ jure}$ is seen only in Indonesia, Malaysia, and Thailand, the Granger causality running from inq_{mkt} to $finglob_{de\ jure}$ is observed in Malaysia and Thailand.

In sum, there is a causality nexus between financial globalization and income inequality for EMEs. Moreover, as is seen, the results of the robustness check support the baseline model. Accordingly, the Granger causality running from financial globalization to income inequality is observed in many studies (especially Chile, China, Colombia, India, Indonesia, Malaysia, and Thailand) compare to the Granger causality running from income inequality to financial globalization. Furthermore, these results show how the taxes on disposable income have an important role on the financial globalization-inequality nexus. This result is very significant in the determining of tax rates for policy makers.

Table 3: The results for the causality nexus between financial globalization (de facto) and income inequality

	$finglob_{de\,facto} \rightarrow inq_{disp}$						$finglob_{de\,facto} \rightarrow inq_{mkt}$						$inq_{disp} \rightarrow finglob_{de\,facto}$						$inq_{mkt} \rightarrow finglob_{de\,facto}$				
			Critical Values						Critical Values						Critical Values						Critical Values		
Country	WS	Bp	%1	%5	%10		WS	Bp	%1	%5	%10		WS	Bp	%1	%5	%10		WS	Bp	%1	%5	%10
Argentina	77.01***	0.00	36.11	21.18	15.55		132.43***	0.00	58.06	36.56	28.71		14.95	0.29	37.91	27.26	22.24		13.25	0.32	36.59	25.24	20.79
Brazil	3.65	0.58	29.09	18.11	13.93		0.26	0.91	24.03	14.61	11.09		0.69	0.85	20.54	12.59	9.76		1.38	0.82	21.69	13.75	10.69
Chile	42.21***	0.00	28.41	19.61	15.7		6.01**	0.05	10.19	6.16	4.29		2.02	0.19	7.0	4.22	2.99		1.27	0.19	5.65	3.15	2.12
China	31.2****	0.01	32.29	22.63	18.58		32.06**	0.02	36.86	26.24	21.75		8.64	0.96	71.78	52.46	44.41		3.98	0.99	63.77	46.86	39.77
Colombia	3.87	0.34	15.92	10.08	7.81		10.78	0.16	25.49	16.77	13.37		0.03	0.97	15.61	10.05	7.67		0.00	0.99	12.63	8.03	6.12
Egypt	0.38	0.52	7.15	3.81	2.64		0.43	0.53	8.52	4.63	3.15		5.49**	0.03	7.5	4.58	3.36		3.82**	0.02	4.65	2.72	1.94
India	20.83	0.12	38.76	27.14	22.41		45.29***	0.01	41.8	28.94	24.21		1.32	0.79	22.14	14.62	11.6		2.52	0.88	34.98	24.89	20.17
Indonesia	4.49	0.35	23.71	14.46	10.87		10.11**	0.05	18.09	10.15	7.37		0.05	0.82	7.29	3.72	2.54		0.02	0.90	9.25	4.96	3.41
Iran	0.14	0.72	7.82	4.34	3.06		0.85	0.39	8.25	4.62	3.17		19.69**	0.02	22.72	16.99	14.52		23.44**	0.02	25.17	19.19	16.44
S. Korea	3.84	0.99	122.42	86.67	72.74		1.44	1.00	134.18	93.35	77.59		12.76	0.99	186.06	130.03	109.53		42.03	0.92	218.13	158.14	134.08
Malaysia	1.00	0.37	9.0	4.72	3.38		0.10	0.81	13.49	7.2	4.91		22.41*	0.07	35.98	24.41	19.79		22.97	0.12	41.74	29.47	24.52
Mexico	0.04	0.96	36.27	22.03	16.24		2.27	0.45	25.15	14.11	9.99		13.79	0.43	57.11	37.62	30.12		2.66	0.72	34.5	21.59	16.79
Pakistan	9.14*	0.06	15.20	9.88	7.69		4.42	0.69	33.83	21.86	17.3		0.19	0.65	7.24	3.93	2.73		0.93	0.95	42.82	29.84	23.38
Peru	5.16	0.83	60.22	39.71	30.63		2.68	0.61	35.85	21.53	15.88		1.95	0.72	22.59	14.87	11.35		2.3	0.69	24.21	14.96	11.49
Philippines	1.23	0.43	10.15	6.22	4.49		0.29	0.60	7.14	4.21	2.89		4.48*	0.09	10.32	5.99	4.21		1.99	0.14	6.45	3.53	2.45
Singapore	35.79*	0.07	60.89	40.01	32.09		3.07	0.75	32.28	20.84	16.29		1.8	0.99	63.15	44.06	35.87		5.28	0.97	78.45	55.81	45.82
S. Africa	0.33	0.87	16.45	10.23	7.81		0.65	0.84	20.39	13.46	10.49		3.91	0.72	28.39	19.35	15.59		5.59	0.47	20.67	14.61	11.84
Thailand	108.58***	0.00	41.32	32.12	27.7		80.17***	0.00	33.29	25.22	21.77		0.26	0.56	5.34	3.01	2.04		1.14	0.28	6.92	3.73	2.58
Venezuela	1.221	0.97	73.17	47.14	37.03		0.12	0.99	114.5	75.05	59.75		3.28	0.87	41.52	28.56	22.6		2.19	0.94	47.95	32.68	26.52
CD tests																							
LM	3345.77***	0.00					3696.05***	0.00					396.76***	0.00					503.28***	0.00			
CD_{lm}	171.67***	0.00					190.61***	0.00					12.208***	0.00					17.97***	0.00			
CD	49.33***	0.00					56.24***	0.00					-0.593	0.277					2.58***	0.01			
LM_{adj}	1.92***	0.00					1.56***	0.00					1.983**	0.024					1.598**	0.06			
Slope H.T.																							
$(\tilde{\Delta})$	45.79***	0.00					49.43***	0.00					39.34***	0.00					42.39***	0.00			
$(\tilde{\Delta}_{adj})$	47.89***	0.00					51.69***	0.00					41.35***	0.00					44.33***	0.00			

Note: WS: Wald Statistic, Bp: Bootstrap p-value, H.T: Heterogeneity Test. The number of the bootstrap replications is 10000. The maximum number of the lag length is 2 and the lag lengths are determined by Akaike information criteria. $p < 0.01$ ***, $p < 0.05$ **, $p < 0.1$ *.

Table 4: The results for the causality nexus between financial globalization (de jure) and income inequality

	$finglob_{de\ jure} \rightarrow inq_{disp}$						$finglob_{de\ jure} \rightarrow inq_{mkt}$						$inq_{disp} \rightarrow finglob_{de\ jure}$						$inq_{mkt} \rightarrow finglob_{de\ jure}$				
			Critical Values						Critical Values						Critical Values						Critical Values		
Country	WS	Bp	%1	%5	%10		WS	Bp	%1	%5	%10		WS	Bp	%1	%5	%10		WS	Bp	%1	%5	%10
Argentina	29.55	0.24	71.35	49.5	40.66		39.89	0.28	100.48	71.23	58.27		1.29	0.96	46.42	30.59	24.27		1.12	0.97	45.01	29.53	23.54
Brazil	11.44*	0.06	16.67	11.86	9.92		13.09	0.18	26.94	18.96	15.81		0.03	0.97	16.32	10.55	8.16		0.08	0.97	17.64	11.51	9.07
Chile	62.55***	0.00	36.32	26.11	22.02		22.48***	0.00	18.96	12.43	10.02		0.04	0.95	16.97	10.74	8.23		0.68	0.56	10.76	6.28	4.44
China	57.65***	0.00	44.77	31.22	25.87		34.28***	0.01	37.46	24.58	19.72		2.46	0.94	43.78	31.56	26.08		3.03	0.86	35.44	25.36	20.76
Colombia	5.59**	0.03	8.26	4.65	3.15		12.32**	0.03	16.08	10.25	7.7		2.08	0.29	15.75	8.38	5.81		0.93	0.42	13.19	6.55	4.31
Egypt	23.78***	0.00	10.81	6.11	4.18		21.02***	0.01	21.31	12.59	9.47		6.15	0.66	49.29	32.46	25.69		4.55	0.67	33.37	22.13	17.69
India	49.54	0.13	88.04	63.61	53.12		45.87**	0.05	64.96	45.23	37.43		0.46	0.99	125.88	85.82	68.97		0.19	0.99	92.14	66.04	54.59
Indonesia	0.01	0.95	14.37	7.91	5.52		0.18	0.75	13.31	7.13	4.88		7.36**	0.05	13.42	7.32	4.75		3.74	0.17	14.78	8.13	5.53
Iran	2.63	0.17	10.61	5.71	3.93		14.09**	0.02	16.23	8.61	6.15		18.99	0.53	53.91	38.18	32.66		25.38	0.47	60.68	45.82	40.19
S. Korea	3.7**	0.05	6.55	3.83	2.68		10.71***	0.00	8.38	5.26	4.01		0.01	0.92	5.99	3.36	2.24		0.07	0.76	5.5	3.02	2.07
Malaysia	3.32	0.21	13.34	7.5	5.41		4.61	0.12	13.93	7.67	5.16		14.31**	0.05	20.27	14.42	12.17		12.69**	0.03	15.18	11.08	9.14
Mexico	0.27	0.58	5.55	3.25	2.28		0.23	0.96	31.57	20.06	15.51		0.01	0.95	7.89	4.42	2.98		5.63	0.93	68.86	47.73	38.53
Pakistan	0.00	0.99	13.23	7.74	5.62		1.05	0.41	11.99	6.56	4.59		0.04	0.92	17.42	9.92	7.23		0.02	0.96	21.04	11.91	8.73
Peru	0.66	0.41	7.83	4.22	2.88		0.77	0.49	10.47	5.99	4.23		1.33	0.79	21.69	14.39	11.16		0.72	0.87	20.1	13.29	10.55
Philippines	3.45*	0.07	7.66	4.18	2.86		5.62*	0.06	10.94	6.06	4.18		4.44	0.11	12.76	6.47	4.61		2.27	0.35	13.05	8.27	6.04
Singapore	0.56	0.89	47.03	28.36	21.01		0.00	0.97	15.69	8.38	5.92		31.99	0.47	98.64	69.54	58.18		31.27	0.46	93.95	65.78	55.31
S. Africa	9.54	0.37	32.9	22.29	17.87		61.39***	0.00	42.19	28.34	22.51		3.52	0.95	61.02	43.01	34.64		2.69	0.93	51.22	34.38	28.01
Thailand	22.69**	0.04	34.31	19.24	13.49		25.24**	0.04	42.73	24.1	16.68		39.45**	0.04	56.56	35.56	27.94		43.93**	0.02	52.46	33.81	26.34
Venezuela	9.57	0.95	99.71	70.19	58.82		12.98	0.88	89.59	63.84	53.15		5.71	0.99	108.62	77.91	64.27		0.86	0.99	54.83	37.06	30.13
CD tests																							
LM	2947.06***	0.00					3123.99***	0.00					762.28***	0.00					550.45***	0.00			
CD_{lm}	150.11***	0.00					159.68***	0.00					31.97***	0.00					20.52***	0.00			
CD	51.16***	0.00					53.09***	0.00					12.96***	0.00					5.8***	0.00			
LM_{adj}	4.54***	0.00					6.5***	0.00					4.51***	0.00					6.46***	0.00			
Slope H.T.																							
$(\tilde{\Delta})$	37.57***	0.00					38.15***	0.00					25.33***	0.00					28.04***	0.00			
$(\tilde{\Delta}_{adj})$	39.29***	0.00					39.89***	0.00					26.49***	0.00					29.33***	0.00			

Note: WS: Wald Statistic, Bp: Bootstrap p-value, H.T: Heterogeneity Test. The number of the bootstrap replications is 10000. The maximum number of the lag length is 2 and the lag lengths are determined by Akaike information criteria. $p < 0.01$ ***, $p < 0.05$ **, $p < 0.1$ *.

4. CONCLUSION AND POLICY IMPLICATIONS

The main aim of this study is to explore the nexus between financial globalization and income inequality for 19-EMES. We use the bootstrap panel causality analysis by Kónya (2006). The dataset covers the period 1979-2012.

In general, the findings demonstrate that there is a causality nexus between financial globalization and income inequality for EMEs. The Granger causality running from financial globalization to income inequality is observed in many countries such as Chile, China, Colombia, Egypt, India, Indonesia, Malaysia, Pakistan, Philippines, Singapore, and Thailand, unlike the conventional wisdom. The results are consistent with Das and Mohapatra (2003), Lee (2006), Kai and Hamori(2009), Elmawazini et al. (2013), Jaumotte et al. (2013), Asteriou et al. (2014), Kang-Kook (2014), Daisaka et al. (2014), Bukhari and Munir (2016), Cabral et al. (2016), De Haan and Sturm (2017), Khan et al. (2019), Furceri et al. (2019), Akbakay and Barak (2020). The findings also indicate that the Granger causality running from income inequality to financial globalization is seen in Egypt, Iran, Malaysia, Philippines, and Thailand. It can be said that these findings are new evidence for the literature.

Additionally, the taxes on disposable income have a significant role on the nexus between financial globalization and income inequality. To avoid the negative effects of financial globalization, this result is very significant in determining of tax rates for policy makers. In light of these findings, in order to reduce the negative effects of financial globalization, policy makers must increase the tax rates for top income (top 0.1 percent) class as fiscal policy (See Cabral et al., 2016 for more information).

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Appendix 1: The summarized literature on the nexus between financial globalization and income inequality

Year	Author	Period	Country	Method	Result
2003	Das and Mohapatra	1986-1995	11-EMEs	PA	FG→II (↑)
2006	Lee	1951-1992	14-EU	GLS	FG→II (↑)
2009	Kai and Hamori	1980-2002	29-SSAC	PA	FG→II (↑)
2010	Çelik and Basdas	1995-2007-DEV 1995-2006-DEVL 1990-2005& 1995-2005-MIRC	5-DEV 5-DEVL 6-MIRC	FM-OLS	FG→II (↓) DEV FG→II (↓) DEVL FG→II (↑) MIRC
2012	Agnello et al.	1973-2005	62	PA	FR→II (↓)
2013	Elmawazini et al.	1992-2007	8 (SE and CIS)	LSDV, Parks	FG→II (↑)
2013	Jaumotte et al.	1981-2003	51	PA	FG→II (↑)
2014	Asteriou et al.	1995-2009	27-EU	PA	FG→II (↑)
2014	Daisaka et al.	-	-	CGE	FG→II (↑)
2014	Kang-Kook	1976-2004	All countries	OLS	FG→II (↑)
2014	Kunieda et al.	1985-2009	119	OLS, IV	FG→II (↑↓)
2016	Baek and Shi	1990-2010	26 DEV 52DEVL	AR(1) PA	FG→II (↓) DEV FG→II (↑) DEVL
2016	Bukhari and Munir	1990-2014	AC	PA IVLS	FG→II (↑)
2016	Cabral et al.	1970-2004	15	system GMM	FG→II (↑)
2016	Bumann and Lensink	1973-2008	106	GMM	FG→II (↓)
2017	De Haan and Sturm	1975-2005	121	Dynamic PA	FG→II (↑)
2018	Dorn et al.	1970-2014	140	OLS, 2SLS	FG→II (↑) OLS FGII 2SLS
2018	Furceri and Loungani	1970-2010	149	Panel ARDL	FG→II (↑)
2019	Furceri et al.	1970-2016	149	PA	FG→II (↑)
2019	Lee et al.	2007-2012	31 regions (CHN)	DA	FG→II (↓)
2019	Khan et al.	1970-2018	120	PAF	FG→II (↑)
2019	Acun	1987-2014	OECD	PA	FG→II (↑)
2020	Akbakay and Barak	1994-2014	13-EMEs	PMG	FG→II (↑)

Note: SSAC: Sub-Saharan Africa countries, SE: South-East Europe, CIS: Commonwealth of Independent States, EU: European Union, DEV: Developed countries, DEVL: Developing countries, MIRC: Miracle countries, AC: Asian countries, EMEs: Emerging market economies, CHN: China, PA: Panel analysis, FM-OLS: Fully modified ordinary least squares, OLS: Ordinary least square, IV: Instrumental variable, CGE: Computable general equilibrium, AR: Autoregressive, DA: Decomposition Analysis, GMM: Generalized method of moments, PAF: Parametric accelerated failure time survival analysis. PMG: Pooled mean group. FG: Financial globalization, FR: Financial reform, II: Income inequality.

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