Impact of Financialization and Financial Development on Inequality: Panel Cointegration Results Using OECD Data*

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Abstract
This study compares the long-run impact of financialization and financial development on inequality through the panel cointegration approach using OECD country data. Results show that financialization, especially high-dividend tendency in non-financial corporations, is one of the causes of rising inequality measured as the share of the top 10 percent richest. Other measures of financialization, such as the increasing size of the financial sector and financial globalization, are not robustly linked to inequality. In addition, the argument that financial development reduces inequality by relaxing the credit constraints of the poor is not supported, and no evidence shows that financial development aggravates inequality. Further, the impact of skills-biased technological change is not a robust variable in explaining inequality. A policy implication is that a simple focus on financial development is not enough to reduce inequality. Government policies are necessary, including differentiated taxation on dividends and reinvestments, which induce non-financial firms to focus on productive reinvestments from profits and discourage high dividends for shareholders.

1. Introduction

Financial development has long been regarded as an important factor for economic growth in the established literature (King and Levine 1993; Levine and Zervos 1998; Beck and Levine 2004). Financial development refers to the improvement of financial functions, which...
leads to the production of investment information, efficient allocation of capital, firm monitoring, risk management, savings mobilization, and easy exchange of goods and services (Levine 2005). Thus, several indicators of financial development, such as increasing the ratio of private credit to GDP or stock market capitalization to GDP, have been recommended to promote economic development.

The 2008–09 global financial crisis has cast serious doubts on the role of the financial market on the real economy, however, given that the crisis was triggered in an economy with the highest level of financial development (Beck, Georgiadis, and Straub 2014; Law and Singh 2014). The U.S. financial system normally operates according to the conventional definition of financial development (Levine 2005). The system mobilizes savings from the rest of the economy. Funds are also allocated according to the highest expected return and diversify risk by inventing new financial derivatives, such as collateralized debt obligations or credit default swaps. However, these financial innovations subsequently contributed to a housing market bubble and financial crash.

Thus, some scholars have started to use the term “financialization” to differentiate it from the conventional concept of financial development. Financialization was first used to depict the rapid expansion of financial sectors in an economy (i.e., in the United States since the 1980s). Scholars define financialization in various ways. Stockhammer (2004) defines it as “increased activity of non-financial businesses on financial markets”; Tomaskovic-Devey, Lin, and Meyers (2015) define it as expansion of financial service sectors and increased investments in financial instruments by non-financial sectors; whereas Kus (2012) further included emergence of a new corporate governance view that emphasize the shareholding value and dividends payments to them.

Emerging studies focus on the negative aspects of financialization. The argument is that financialization is coupled with shareholder capitalism to force firms to pay high dividends to shareholders rather than use profits for reinvestments, which becomes a source of low growth (Lazonick 2014; Dore, Lazonick, and O’Sullivan 1999). Furthermore, several studies show that the growing dominance of financial sectors is related to the rising inequality in developed countries (Godechot 2012; Kus 2012; Lin and Tomaskovic-Devey 2013; Stockhammer 2013; Alvarez 2015; Tomaskovic-Devey, Lin, and Meyers 2015). However, these studies do not conduct a quantitative analysis using multi-country data, thus focusing on one country (such as the United States or France), or tend to be less rigorous in handling endogeneity problems in the estimation.

The impact of conventional measures of financial development on inequality is yet to be further investigated. First, some theoretical models illustrate that financial development decreases inequality because it helps the poor to access financial credit (Banerjee and Newman 1993; Galor and Zeira 1993). However, Greenwood and Jovanovic (1990) present a
model showing that financial development increases inequality in the early period of development because the rich can disproportionately access finance at this stage. Inequality then becomes stable as financial development proceeds because many people can access finance. Overall, empirical studies on the relationship between financial development and inequality are comparatively less in number than those on financial development and growth. Beck, Demirguc-Kunt, and Levine (2004) and Clarke, Xu, and Zou (2013) find evidence of negative effects of private credit on the Gini coefficient since the 1960s. Roine, Vlachos, and Waldenström (2009), however, find a positive relationship between market capitalization and the top 1 percent income share, especially at the early stage of development.

The present research uses OECD country data and estimates the long-run effects of financial development and financialization on countrywide inequality. Thus, our contribution is to differentiate the long-run effects of financial development and financialization on inequality using three different measures of financialization in a consistent framework. We also adopt panel cointegration methods, which are robust to endogeneity problems. In addition, we capture the financialization in terms of three indicators: (1) expansion of the size of the financial sector in an economy; (2) increased share of shareholders in the profits or financial resources of non-financial sectors; and (3) increased overseas financial activities (financial globalization). The first two definitions have been used in the existing definition of financialization, and we have added the last indicator to reflect the growing importance of international financial activities.

We find that the second measure—that is, increasing payment of dividends—is the most significant and robust cause of the rising inequality in the long run. In contrast, the two other measures have few robust relations with inequality measures. We find no robust long-run relationship between financial development variables and inequality in the negative or positive direction.

In sum, this study verifies the inequality impact of financialization and financial development using OECD country data. Section 2 reviews the literature and develops hypotheses. Section 3 discusses the data and estimation method. Section 4 presents the estimation results and robustness check. Finally, Section 5 provides our conclusion.

2. Literature on financialization and inequality

Shares of the financial sector in the economy have been expanding in developed countries since the 1980s. For example, the share of value-added in the finance and insurance sectors increased from 4.94 percent in 1980 to 8.3 percent in 2009 in the United States. Spain, OECD statistics available at stats.oecd.org.
Denmark, the Netherlands, and Korea also showed a significant expansion of their finance and insurance sectors during the same period, according to the data on the share of value-added in the finance and insurance sectors available from the OECD Structural Analysis (STAN) database.²

One of the reasons for the expansion of the finance and insurance sectors may be the decrease in profitability of manufacturing in developed countries, which in contrast to the high profitability of the financial sector, owing to financial sector deregulation, development of new financial products, and liberalization of capital transactions in many countries.³ Another possible factor is the spread of the idea of maximizing shareholder value in modern capitalism since Jensen and Meckling (1976). An easy way to maximize shareholder value is to increase short-term profits by increasing financial activities or portfolio investments (Orhangazi 2008; Lin 2016). As a result, the ratio of financial income to realized profits and ratio of financial assets to total assets doubled from the late 1970s to the early 2000s for non-financial firms in the United States; For example, General Motors and Ford earned more than half of their profit from financial subsidiaries in 2004 (Hakim 2004; Lin and Tomaskovic-Devey 2013; Tomaskovic-Devey, Lin, and Meyers 2015).

This paper considers three channels from financialization to inequality. The first channel between financialization and inequality is the spread of the maximization of shareholder value across developed countries. As corporate management focuses closely on shareholder value, especially stock price, a great share of resources and profits of firms goes to shareholders and CEOs in terms of dividends, stock buybacks, and stock options for chief executives, where a small share goes to workers and other stakeholders. An increase of hostile takeover activities since the 1980s also contributed to this phenomenon. Such an increase puts pressure on firm managers to increase stock prices to protect their management rights by increasing dividends and stock buybacks.

Lazonick (2014) observes that 54 percent and 37 percent of U.S. companies’ earnings were spent on stock buybacks and dividends in 449 firms among the S&P 500 firms from 2003 to 2012, respectively. By using U.S. non-financial sectoral data from 1970 to 2008, Tomaskovic-Devey, Lin, and Meyers (2015) argue that financialization is positively correlated with interests paid to debt holders and negatively correlated with labor compensation and taxes. Duménil and Lévy (2001, 2004) and Hein and Schoder (2011) claim that

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³ Philippon and Reshef (2012) argued that the changes of this regulation significantly increased the relative wage in the financial sectors in the United States.
Figure 1. The ratio of net payments of distributed income to net value-added in non-financial corporations and top 10 percent income share: Norway, France, Korea, and the United States

Source: The authors’ calculations using the OECD National Accounts, World Wealth and Income Database (WID).

dividends and interests paid by non-financial firms have been increasing in the United States and France since the 1980s.

Figure 1 shows the correlations between the share of net payments of distributed income of corporations among net value-added for non-financial corporations (distributed income of corporations) and the top 10 percent income share in Norway, France, Korea, and the United States. The distributed income of corporations consists of net payments of dividends and withdrawals from the income of quasi-corporation owners. Net value-added is gross value-added minus fixed capital consumption. The top 10 percent income share of Norway rapidly increased from 22.73 percent in 1988 to 37.06 percent in 2005. During this period, the distributed income of corporations of Norway also increased rapidly from 1.48 percent to 21.8 percent.

4 Data are from OECD National Accounts.
The second channel works through increasing the size of the financial sector in a national economy. As financial industries expand more than other sectors, such as manufacturing, in developed countries, the various incomes of financial managers and workers, such as investment bankers and hedge fund managers, would rise more and they earn exceedingly large amounts of income (Alvarez 2015). Several studies have observed that a large portion (30 percent to 70 percent) of the recent increase of the top 0.1 percent, 1 percent, or 10 percent income share comes from the financial industry in the UK, France, and the United States (Bakija, Cole, and Heim 2012; Bell and Van Reenen 2010; Godechot 2012). Kaplan and Rauh (2010) estimate that in 2004, the sum of the compensation of the top 25 hedge fund managers was greater than that of CEOs of S&P 500 firms in the United States. By conducting a regression of panel data from 16 countries for one century, Roine, Vlachos, and Waldenström (2009) argued that the top 1 percent income share is positively correlated with stock market capitalization.

The third channel is financial globalization, which increases the relative bargaining power of capital more than that of labor. Capital account liberalization and financial globalization enable firms to invest in foreign countries easily, thereby decreasing the bargaining power of workers. By using country-level data, Stockhammer (2013) found that financial globalization measured by the log of external financial assets and liabilities divided by GDP is significantly and negatively correlated with labor income share.

Therefore, we may hypothesize that financialization increases economic inequality in the long run through various channels. If we differentiate the relative impacts among the three channels, then the first channel of the payment of high dividends (via distributed incomes) is directly related to distribution and inequality. In comparison, the two other channels of the size of the financial sector and globalization seem indirectly related or may work although several intermediate links before their impact on inequality is realized. For instance, although the tendency to pay more dividends is a phenomenon affecting every sector of an economy, the impact of just having a large financial sector on the overall level of inequality in an economy may not be that significant. The following empirical analysis can provide further clarification regarding this.

3. Data, variables, and estimation method

3.1 Data and variables
Researchers generally measure inequality on the basis of personal income distribution, such as the Gini coefficient and top 1 percent (or 10 percent) income share, or functional income distribution (labor income share). Several studies have investigated the effects of financialization on the Gini coefficient (Kus 2012), top 1 percent or 10 percent income share (Flaherty 2015), and labor income share (Stockhammer 2013; Alvarez 2015).
As a measure of inequality in personal income, the top 1 percent or 10 percent income share is reliably estimated using taxation data, thereby outperforming other available measures such as the Gini coefficient, which relies on household surveys. Thus, this study uses the top 10 percent income share as it has more observations in the World Wealth and Income Database than the top 1 percent income. Here, income refers to gross total income and includes labor, business, and capital income (excluding capital gains) before taxes and transfers. For inequality in functional income distribution, we use the adjusted wage share, measured as worker compensation as a percentage of GDP at factor cost. We collect these wage share data from the annual macro-economic (AMECO)\(^5\) database of the European Commission.

Considering the definition presented in the previous section, we use three variables to measure financialization. These variables include the share of value-added in the finance and insurance sectors in the total value-added of all sectors (finance and insurance shares), the share of net payments of the distributed income of corporations in the net value-added for non-financial corporations (distributed income of corporations), and the ratio of external financial asset and liability to GDP (financial globalization).

Finance and insurance shares are basic indicators of the relative size of the financial sector in the economy. Such shares also represent the first definition of financialization (expansion of the financial sector in the economy). Darcillon (2015) used a similar measure to estimate the effect of financialization on labor market institutions. We collect the finance and insurance share data from OECD STAN.

The distributed income of corporations reflects how much of the value-added of firms goes to the shareholders and owners in non-financial corporations. To our knowledge, no existing literature has used this country-level variable, and similar measures of dividend payment have been used in firm-level studies (Lazonick 2014; Soener 2015).

Financial globalization\(^6\) measures the activeness of a country in the global financial market and represents the third definition of financialization (increased overseas financial activities). We collect financial globalization data from Lane and Milesi-Ferretti (2007). This variable does not include foreign direct investment stocks and liabilities.

Moreover, we use three conventional measures of financial development, namely, the domestic credit provided by financial sectors to private sectors as a percent of GDP (private

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6 It is measured by the ratio of external financial asset plus liability to GDP (%).
Private credit is a widely used proxy for financial development (King and Levine 1993; Levine and Zervos 1998). It measures how much capital the financial system provides to the private sector. Market capitalization measures the general development of the stock market. Turnover ratio determines how actively a stock is traded and measures the relative trading frictions in the stock market.

### 3.2 Estimation method

We use the panel cointegration approach to analyze the long-run effect of financialization on inequality. Previous studies that use country- or industry-level data generally apply the panel fixed-effects model, Generalized Method of Moments (GMM), or time series model to estimate such an effect. However, the fixed-effects model is not robust to endogeneity problems, such as omitted variables or reverse causality, and the GMM estimator shows a poor small sample property (Bun and Windmeijer 2010). In addition, the sequential exogeneity of independent variables, which are required for the GMM estimation of panel data of a few OECD countries, cannot be easily assumed. The GMM results presented in Appendix A show that the sequential exogeneity assumption is strongly rejected in all specifications. The GMM and fixed-effects models are usually suitable for data with large $N$ (number of cross-sectional units, such as countries) and small $T$ (length of time dimension). Both models derive the asymptotic distribution of estimator as $N$ goes to infinity given a fixed $T$. These estimators fit the micro panel data but do not fit the OECD country panel data with a limited number of countries ($N$). The panel cointegration approach, however, is suitable for the data of countries with a similar number of $N$ and $T$. On the contrary, the time series model is suitable for analyzing one country—it cannot be used to deal with the effects of financial institutions in several developed countries. By using the panel cointegration method, we can also control for endogeneity and estimate the long-run effect.

The basic estimation equation is illustrated as:

$$ y_{it} = \alpha_i + \delta_i t + \beta x_{it} + \gamma' z_{it} + \epsilon_{it}, $$(1)

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7 These variables are from the World Bank WDI database, available at https://data.worldbank.org/.

8 Sequential exogeneity refers to the statistical independence between lagged values of explanatory variables and error terms. The GMM results in Appendix Table A.1 reveal that the Sargan test p-value for all specifications is 0.000.

9 This method derives the asymptotic distribution of the estimator as $N$ and $T$ approach infinity either sequentially or jointly. Thus, the larger the $N$, the better.
where $y_{it}$ denotes the dependent variable, which can be the inequality measure in country $i$ and year $t$, and $x_{it}$ denotes the financialization or financial development variables.

$z_{it}$ denotes a set of control variables: tertiary school enrollment ratio,$^{10}$ trade openness,$^{11}$ and share of information and communication technology (ICT) capital compensation in the total capital compensation.$^{12}$ These variables represent the traditional factors of the insufficient supply of high-skilled workers (Goldin and Katz 2009), globalization (Dreher and Gaston 2008), and skill-biased technological change (Bekman, Bound, and Machin 1998). These are regarded as leading to the increase in inequality in the literature. In accordance with the cointegration test of Pedroni (1999), the number of control variables is restricted in this study.

$\alpha_i$ is the country fixed effect, and $\delta_i t$ is a country-specific linear trend that controls for country-specific time-invariant factors, such as geography, culture, ethnic diversity, initial wealth distribution, and country-specific linear trend of inequality.$^{13}$ $\beta$ is the effect of financialization or financial development on the dependent variable, and $\epsilon_{it}$ is an error term that is stationary if cointegration is present.

The process of empirical estimation can be divided into three steps, namely, panel unit root test (PURT), panel cointegration test, and group-mean fully modified ordinary least squares (group-mean FMOLS).

In the first step, we check whether the variables are stationary or non-stationary. If they are stationary, then their means and variations are stable or do not change over time. Thus, we can adopt conventional OLS or panel estimations. If they are non-stationary, then we can opt for the panel cointegration approach. We conduct two widely used PURT, namely, the Im, Pesaran, and Shin (IPS) (2003) and Pesaran (2007) tests. The null hypotheses of these tests are that the time series of all countries for tested variables is non-stationary, and the rejection of the null hypotheses means that the time series are stationary at least in one country. The Pesaran (2007) test is a robust test because it does not assume cross-sectional independence of error term, although the test has lower empirical power than the IPS test if the cross-sectional independence of the error term holds (Pesaran 2007).

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$^{10}$ Data are from the World Bank WDI database.

$^{11}$ It is $(\text{Export} + \text{import})/\text{GDP}$ (%). Data are from the World Bank WDI database.

$^{12}$ It is the share of ICT capital compensation among total capital compensation (%). Data are from the EU-KLEMS database, November 2009 release (available at www.euklems.net/euk09i.shtml).

$^{13}$ If time-invariant factors, such as initial wealth distribution, have a long-run effect on inequality, then the country-specific linear trend can control for these effects, given that such effects can be approximated to linear effects.
In the second step, if non-stationarity variables for all countries used in the estimation are confirmed, then we conduct a panel cointegration test to see whether a cointegration relationship exists among the variables in the long run. When the linear combination of a set of non-stationary variables is stationary, such variables are considered “cointegrated.” In other words, they are closely related and do not diverge from their equilibrium relationship in the long run. The estimation of the coefficient of the long-run relationship can only make sense with cointegration. This cointegration test involves several control variables as noted in the estimation model (1) and checks whether the key variable—that is, distributed income of corporations—is cointegrated or not with the inequality variable (e.g., top 10 percent income share) and other control variables at 1 percent or 5 percent. We perform the Pedroni (1995, 2004) cointegration test, which uses the individual augmented Dickey-Fuller (ADF) regression for the residuals of the data of each country. The null hypothesis is that cointegration does not exist, and its alternative hypothesis is that cointegration exists for all countries. Many financialization and financial development variables, except the share of distributed income, cannot reject the null hypothesis, indicating the absence of a robust long-run relationship with inequality.

In the third step, if the existence of cointegration is confirmed, we can apply group-mean FMOLS to estimate the long-run coefficients ($\beta, \gamma'$ among variables. Pedroni’s (2001a, 2001b) approach has two advantages. First, its convergence rate is $T \sqrt{N}$, which is faster than the conventional $\sqrt{N}$ convergence rate. Therefore, group-mean FMOLS has a better small sample property than traditional approaches. Second, group-mean FMOLS is robust to the omission of variables that are not included in the cointegration relationship (Pedroni 2007). Thus, omitting stationary variables that can affect the dependent variable and are correlated with finance variables will not be an issue if these variables are not part of the cointegrating relationship.

4. Empirical analyses and results

4.1 Test results: PURT and panel cointegration

The two widely used methods for PURT are the IPS and Pesaran (2007) tests. The selection between both methods depends on cross-sectional dependence (CD) statistics. The significance of CD statistics means that CD exists among error terms, which violates the assumption of the IPS test. In our test, CD statistics are found to be significant for all the variables. Thus, we perform the Pesaran test rather than the IPS test because the Pesaran test does not use CD assumption (see Pesaran 2007).

The results of the Pesaran (2007) test reveal that financial globalization, private credit, and tertiary enrollment ratio are all non-stationary, regardless of the lag structure or existence
Thus, these variables are non-stationary.\textsuperscript{15} The Pesaran test generates mixed results for the remaining eight variables depending on the lag structure or the existence of a linear trend. To investigate the results in detail, we have conducted the Pesaran test for variables up to five lags.

According to the results, the Pesaran (2007) statistics and their p-value increase with lag length for most variables.\textsuperscript{16} Therefore, the test statistics cannot reject the null hypothesis of non-stationarity when enough lags of the residuals are considered. These findings also imply that the significant statistics at lag 0 or 1 are most likely caused by the inappropriately short lag structure. When two or more lags of the residuals are considered, the Pesaran statistics are insignificant for the top 10 percent income share, distributed income of corporations, finance and insurance share, and market capitalization regardless of the existence of a linear trend. Thus, these variables are likely non-stationary. The Pesaran statistics are also insignificant for the four other variables, namely, adjusted wage share, turnover ratio, share of ICT capital compensation, and trade openness, if the linear time trends and enough number of lags are controlled for. Thus, the four variables can be non-stationary data with a linear trend. We use the country-specific linear time trend as a default control variable. Hence, these variables can be considered non-stationary and can be used for the cointegration test.

Tables 1 and 2 present the results of the Pedroni cointegration test. We control for three variables (ICT compensation, tertiary enrollment ratio, and trade openness), country-specific linear trend, and fixed effects in all specifications. Each column in Tables 1 and 2 shows the results of the cointegration test for each of the six finance variables, with the three control variables present. The Pedroni cointegration test produces different results for different statistics. When the top 10 percent income share is used as the dependent variable as in Table 1, four statistics (panels PP and ADF and groups PP and ADF) reject the null hypothesis of the absence of cointegration at the 1 percent or 5 percent significance level in some specifications. In contrast, three other statistics (panels v and $\rho$ and group $\rho$) cannot reject the null hypothesis in all specifications because of their empirical power. We decide to consider and focus more on the results with the PP and ADF statistics than those

\textsuperscript{14} Lag structure is determined by the order of the serial correlation of residuals. A method to determine the order of serial correlation in advance is not found. Thus, we assume that a maximum fifth order of serial correlation of residuals exists. Allowing high order requires a long time series, which is not satisfied for most tested variables. In the Pesaran (2007) test, we use three lag structures of the residual serial correlation from no serial correlation to AR(2).

\textsuperscript{15} The PURT results for these variables are available upon request.

\textsuperscript{16} Because of space limits, these results are omitted. The longer version of the paper includes all the results of the various test. It is available at the author’s website (www.keunlee.com).
### Table 1. Pedroni cointegration test for the top 10 percent income share equation

<table>
<thead>
<tr>
<th>Statistic</th>
<th>Distributed income of corporations</th>
<th>Financial globalization</th>
<th>Finance and insurance share</th>
<th>Private credit</th>
<th>Market capitalization</th>
<th>Turnover ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Panel v-statistic</td>
<td>1.42 (0.922)</td>
<td>0.11 (0.544)</td>
<td>0.92 (0.821)</td>
<td>1.32 (0.907)</td>
<td>0.51 (0.696)</td>
<td>0.72 (0.764)</td>
</tr>
<tr>
<td>Panel ρ-statistic</td>
<td>2.24 (0.988)</td>
<td>2.24 (0.988)</td>
<td>6.1 (0.995)</td>
<td>2.91 (0.998)</td>
<td>2.68 (0.996)</td>
<td>2.56 (0.995)</td>
</tr>
<tr>
<td>Panel PP-statistic</td>
<td>-9.23*** (0.000)</td>
<td>0.63 (0.265)</td>
<td>-0.49 (0.839)</td>
<td>0.99 (0.475)</td>
<td>-0.06 (0.136)</td>
<td>-1.10 (0.136)</td>
</tr>
<tr>
<td>Panel ADF-statistic</td>
<td>-5.43*** (0.000)</td>
<td>0.18 (0.570)</td>
<td>1.44 (0.994)</td>
<td>2.52 (0.675)</td>
<td>0.45 (0.033)</td>
<td>1.83 (0.033)</td>
</tr>
<tr>
<td>Group ρ-statistic</td>
<td>4.01 (1.000)</td>
<td>2.82 (0.998)</td>
<td>3.37 (1.000)</td>
<td>4.34 (1.000)</td>
<td>4.10 (1.000)</td>
<td>3.78 (1.000)</td>
</tr>
<tr>
<td>Group PP-statistic</td>
<td>-15.92*** (0.000)</td>
<td>-2.79 (0.003)</td>
<td>-4.06 (0.210)</td>
<td>-0.81 (0.000)</td>
<td>-3.87 (0.000)</td>
<td>-7.54 (0.000)</td>
</tr>
<tr>
<td>Group ADF-statistic</td>
<td>-4.28*** (0.000)</td>
<td>-1.36 (0.087)</td>
<td>-0.13 (0.448)</td>
<td>2.05 (0.980)</td>
<td>-0.97 (0.000)</td>
<td>-3.85 (0.000)</td>
</tr>
</tbody>
</table>

#### Note:
- Null hypothesis: no cointegration between variables. Three variables (ICT compensation, tertiary enrollment ratio, and trade openness), fixed effects, and country-specific linear trends are controlled. We use d.f. corrected Dickey-Fuller residual variances; Newey-West automatic bandwidth selection and Bartlett kernel; lag length selection based on SIC, maximum lag length is observation-based. ** and * denote statistical significance levels at 1 and 5 percent, respectively; p-value is in parentheses.

### Table 2. Pedroni cointegration test for the adjusted wage share equation

<table>
<thead>
<tr>
<th>Statistic</th>
<th>Distributed income of corporations</th>
<th>Financial globalization</th>
<th>Finance and insurance share</th>
<th>Private credit</th>
<th>Market capitalization</th>
<th>Turnover ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Panel v-statistic</td>
<td>-1.44 (0.925)</td>
<td>-1.54 (0.939)</td>
<td>-0.73 (0.766)</td>
<td>-1.5 (0.934)</td>
<td>-1.14 (0.873)</td>
<td>-0.78 (0.782)</td>
</tr>
<tr>
<td>Panel ρ-statistic</td>
<td>2.90 (0.998)</td>
<td>3.48 (1.000)</td>
<td>3.57 (1.000)</td>
<td>3.51 (0.999)</td>
<td>3.44 (0.999)</td>
<td>3.07 (0.999)</td>
</tr>
<tr>
<td>Panel PP-statistic</td>
<td>-3.33*** (0.000)</td>
<td>1.92 (0.972)</td>
<td>1.47 (0.977)</td>
<td>1.69 (0.979)</td>
<td>1.75 (0.979)</td>
<td>1.18 (0.977)</td>
</tr>
<tr>
<td>Panel ADF-statistic</td>
<td>-3.16*** (0.001)</td>
<td>0.83 (0.976)</td>
<td>-0.68 (0.247)</td>
<td>0.83 (0.975)</td>
<td>1.42 (0.975)</td>
<td>-0.07 (0.975)</td>
</tr>
<tr>
<td>Group ρ-statistic</td>
<td>5.07 (1.000)</td>
<td>5.33 (1.000)</td>
<td>5.19 (1.000)</td>
<td>4.56 (1.000)</td>
<td>5.16 (1.000)</td>
<td>5.09 (1.000)</td>
</tr>
<tr>
<td>Group PP-statistic</td>
<td>-9.69*** (0.000)</td>
<td>-0.41 (0.342)</td>
<td>1.16 (0.927)</td>
<td>-0.34 (0.366)</td>
<td>0.6 (0.366)</td>
<td>0.48 (0.366)</td>
</tr>
<tr>
<td>Group ADF-statistic</td>
<td>-5.39*** (0.000)</td>
<td>0.39 (0.653)</td>
<td>-0.46 (0.323)</td>
<td>-1.23 (0.109)</td>
<td>1.48 (0.109)</td>
<td>-0.07 (0.109)</td>
</tr>
</tbody>
</table>

#### Note:
- Null hypothesis: no cointegration between variables. Three variables (ICT compensation, tertiary enrollment ratio, and trade openness), fixed effects, and country-specific linear trends are controlled. We use d.f. corrected Dickey-Fuller residual variances; Newey-West automatic bandwidth selection and Bartlett kernel; lag length selection based on SIC, maximum lag length is observation-based. ** and * denote statistical significance levels at 1 and 5 percent, respectively; p-value is in parentheses.

with the v and ρ statistics. Thus, we conclude that cointegration exists among some of the key variables.\(^{17}\)

\(^{17}\) Pedroni (2004) found that the power of v and ρ statistics is very poor for a small-sized sample, which is the case of this study. When \(N = T = 20\), and the AR(1) coefficient of the residual is 0.9 (which indicates a stationary residual and the existence of cointegration), the empirical power of panel v and group ρ statistics is near zero, whereas that of the panel ρ statistic is approximately
The results of the PP and ADF statistics in Table 1 imply that distributed income of corporations is cointegrated with the top 10 percent income share and other control variables at the 1 percent significance level. Nonetheless, the results for the five other finance variables (size of financial sector, financial globalization, market capitalization, private credit to GDP ratio, and turnover ratio) are all weak as not all four statistics among PP and ADF statistics are significant about the five variables presented in Table 1. Among the five variables, some reject the null hypothesis of the absence of cointegration in terms of the results of group PP and ADF statistics. However, none of them reject the null hypothesis in terms of panel PP and ADF statistics. Thus, we conclude that none of the five other finance variables, including the three representing financial development, have a robust long-term relationship with the variable of the top 10 percent income share. Therefore, henceforth, we focus on the relationship between distributed income of corporations and the top 10 percent income share in the following regression analysis.

The results for the adjusted wage share presented in Table 2 are also similar but striking. The four PP and ADF statistics are significant at the 1 percent level when the variable of the distributed income of corporations is included. None of the five other finance variables pass the test in any of the four different statistics from either group or panel statistics.

In sum, the results in Tables 1 and 2 suggest that only the distributed income of corporations, rather than the five other finance variables, is cointegrated with inequality variables such as the top 10 percent income share and adjusted wage share.

4.2 Impacts on inequality

Table 3 presents the group-mean FMOLS results for the inequality equation. We only present the estimation results for the specification that includes the distributed income of corporations. This is because the results of the cointegration test become weak about all other finance variables. We control for the linear country-specific trends and fixed effects in all specifications.

Table 3 also shows the estimates of the long-running coefficients $\beta$ and $\gamma$ in Equation 1. When the top 10 percent income share is used as the dependent variable, the coefficient on distributed income of corporations becomes significant and positive at the 1 percent significance level. A 1 percentage point increase in the distributed income of corporations corresponds to a 0.093 percentage point increase in the top 10 percent income share in the long run. When adjusted wage share is used as the dependent variable, the coefficient on

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0.2 for the 5 percent test. However, the empirical power of PP and ADF statistics is approximately 0.6. Among all the cases reported by Pedroni, $N = T = 20$ is the closest to our sample. Thus, using these statistics ($v$ and $\rho$ statistics) may generate misleading results.
distributed income of corporations becomes insignificant. Therefore, the variable is not related to functional income distribution in the long run.

The robustness of the impact of distributed income on inequality must then be tested. The cointegration relationship between this variable and inequality is based on the three specific control variables. If we change the list of control variables, then the cointegration results may also change. Thus, we use new control variables. Moreover, we only focus on the distributed income because other finance variables, such as the size of financial sectors, globalization, and three measures of financial development, have no cointegration with inequality variables with the three existing control variables. They have already been verified as “not robust.” Thus, testing other control variables is no longer necessary.

To check the robustness of the positive relationship between dividend tendency and top 10 percent income share, we change the specifications (or control variables) in various ways. Three new control variables include the square term of the share of the distributed income, the ratio of private wealth to national income, and a new proxy for innovations measured by the patent stocks of countries. Such variables are first tested for cointegration and all are found to be cointegrated with inequality variables, together with the distributed income share.\(^{18}\) We now discuss the results of the FMOLS regressions (Table 4) with these variables added or replacing the previous control variables.

First, we add the square term of the distributed income of corporations to check whether a non-linear relationship exists between dividend tendency and top 10 percent income share. The first model in Table 4 shows the results of group-mean FMOLS regression, which

\(^{18}\) The results of various cointegration tests are available upon request.
### Table 4. Robustness check with square term and additional controls

<table>
<thead>
<tr>
<th>Variable</th>
<th>Top 10% income share</th>
<th>Coef.</th>
<th>p-value</th>
<th>Coef.</th>
<th>p-value</th>
<th>Coef.</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distributed income of corporations</td>
<td>-0.60</td>
<td>(0.123)</td>
<td>0.052</td>
<td>0.149</td>
<td>(0.002)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Square of distributed income of corporations</td>
<td>0.057</td>
<td>(0.010)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ICT compensation</td>
<td>0.122</td>
<td>(0.042)</td>
<td>-0.040</td>
<td>0.008</td>
<td>(0.887)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tertiary enrolment ratio</td>
<td>-0.005</td>
<td>(0.017)</td>
<td>0.035</td>
<td>0.035</td>
<td>(0.013)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trade openness</td>
<td>0.037</td>
<td>(0.011)</td>
<td>0.031</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Log of triadic patents per million populations</td>
<td></td>
<td></td>
<td></td>
<td>3.783</td>
<td>(0.242)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Net private wealth</td>
<td></td>
<td></td>
<td>0.004</td>
<td></td>
<td>(0.003)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of countries</td>
<td>8</td>
<td>7</td>
<td>15</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of observations per country</td>
<td>13</td>
<td>12.86</td>
<td>15.33</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of observations</td>
<td>104</td>
<td>90</td>
<td>230</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Countries</td>
<td>Denmark Finland</td>
<td>France Italy</td>
<td>Denmark Finland</td>
<td>Ireland Italy Korea</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Netherlands Sweden</td>
<td>UK United States</td>
<td>Netherlands Sweden</td>
<td>Netherlands New Zealand</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>UK United States</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Note:** Linear country-specific trends and fixed effects are controlled. Long-run covariance estimates: Bartlett kernel, Newey-West fixed bandwidth, d.f. adjustment. ** and * denote statistical significance levels at 1 and 5 percent, respectively; p-value is in parentheses.

suggest that the square term of the distributed income of corporations is significant and positive. However, its linear term is insignificant. These results imply a U-shaped curve with its bottom at (0, 0) point of the space, suggesting that increasing the share of shareholders and owners in non-financial firms (from zero to positive values) is positively related to income inequality. This is consistent with the results in Table 3.

Second, we add net private wealth to national income ratio to control for the effects of capital accumulation on inequality in the second model in Table 4. Piketty (2014) argued that the overall inequality can also increase when wealth to income ratio increases. The result in the table suggests that the distributed income of corporations is still positively and significantly correlated to the top 10 percent income share in the long run. The coefficient on net private wealth to national income ratio is shown to be positive and significant, which is consistent with the argument of Piketty.

Third, we replace the share of ICT capital compensation with the log of the triadic patent stock per million population. This variable can be considered as another proxy for

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20 Wealth distribution measures, such as the top 10 percent wealth share or wealth-based Gini coefficient, can be alternative measures. However, these data are available only for a few countries or only since the 2000s in available data sources.

21 The results of PURT and cointegration tests reveal that net private wealth to national income ratio is non-stationary, and this specification is cointegrated. Such results are available upon request.
innovation and increases the power of tests by increasing the number of countries in the sample. Triadic patent refers to the patents filed at three major patent offices, namely, the European Patent Office, Japan Patent Office, and United States Patent and Trademark Office.\textsuperscript{22} Thus, the number of countries in the estimation increases from 10 to 15 (Korea, New Zealand, Norway, Portugal, and Switzerland are newly added), and sample size is almost doubled. The results are consistent with those in Table 3. The distributed income of corporations is positively and significantly correlated to the top 10 percent income share in the long run.

As the final robustness check, we use IMF financial development indices to measure various aspects of financial development. Svirydzenka (2016) and Sahay et al. (2015) measured the three dimensions of the financial system, such as access, depth, and efficiency of financial institutions and financial markets.\textsuperscript{23} Nine indices are found. Four of them are financial institution indices (access, depth, efficiency of financial institutions, and overall index of financial institutions), four are financial market indices (access, depth, efficiency of financial markets, and overall index of financial markets), and the overall aggregated index of financial development. The results of PURT suggest that the nine IMF financial development indices are non-stationary.\textsuperscript{24} These indices are like the conventional measures of financial development measures, however, as they are not cointegrated to the top 10 percent income share or adjusted wage share in the long run.

Finally, we briefly discuss the results of the three control variables, which are all cointegrated with the top 10 percent income share. The sign on the coefficient on ICT compensation (Bekman, Bound, and Machin 1998), which is a proxy for skill-biased technological change, changes depending upon model specifications and thus cannot be regarded as robust. For instance, Table 3 shows that the coefficient on ICT compensation is positive and significant, but in Table 4, it is negative and significant in the model with the variable of private wealth. In Tables 3 and 4, the coefficient on tertiary school enrollment is also shown to be insignificant or changes signs.

Trade openness becomes a robust variable by significantly increasing the top 10 percent income share, whereas no effect is found on the adjusted wage share. These different effects of college education and openness on inequality are in sharp contrast to their different impacts on economic growth. For example, Lee and Kim (2009) argue that college education is a robust and positive predictor of economic growth, whereas trade openness is not

\textsuperscript{22} Given that these patents have been filed since 1985, we use the cumulative triadic patent data from 1985 to generate a stock variable. The results of PURT confirm that log triadic patent stock per million populations is non-stationary.

\textsuperscript{23} Financial institutions include banks, insurance companies, mutual funds, and pension funds.

\textsuperscript{24} The results of the panel unit root and cointegration tests are available upon request.
robust. Such a distribution impact of trade openness is consistent with the Stolper-Samuelson theorem in the Heckscher-Ohlin trade model, which suggests that free trade increases the relative wage of skilled workers more than unskilled workers in skilled-labor-abundant developed countries. This variable reflects the effects of general globalization and needs further exploration and robustness test.

Table 4 presents the robustness of the impact of the distributed income share on the top 10 percent income share. We do not produce a similar table on the wage share, however, because the three new variables added for robustness are not cointegrated with the wage share variable based on tests.

5. Concluding remarks

This study has investigated and compared the long-run impacts of financialization and financial development on inequality using the panel cointegration approach, which is robust to endogeneity. The estimation results show that financialization and shareholder capitalism, especially dividend tendency in non-financial corporations (distributed income of corporations), cause the rising inequality measured as the share of the top 10 percent richest. In contrast, other measures of financialization, such as the increasing size of the financial sector and financial globalization, are found unrelated to inequality by cointegration tests. The argument that financial development reduces inequality by relaxing the credit constraints of the poor is unsupported. In addition, there is no evidence that financial development aggravates inequality.

These results are consistent with the findings of other streams of research that claim that a large portion of the rising inequality is more related to the inequality between labor and asset-based incomes than with inequality among salaried workers (Davies and Shorrocks 2000; Lee and Lee 2017). The findings also explain why East Asian economies, such as South Korea, have recently observed rising inequality, signaling the end of the so-called East Asian capitalism as argued by Lee and Shin (In press). One reason for the end of this capitalism is the increasing tendency of paying high dividends in East Asian economies since the post-crisis period. In contrast, the impact of skill-biased technological change (which is the closest to inequality among labor-based incomes) is not a robust variable in explaining inequality.

The policy implication is that a simple focus on financial development or high educational attainment is not enough to promote inclusive growth (or to reduce inequality). Government policies are necessary, including differentiated taxation on dividends and

25 In contrast, Jeong and Kim (2018) find that a new measure of financial access is negatively related to income inequality.
reinvestments, which induce non-financial firms to focus on productive reinvestments from profits and discourage high dividends for shareholders.

References


### Appendix A

**Table A.1 Results of GMM estimation**

<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>Top 10% income share</th>
<th>Adjusted wage share</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distributed income of corporations</td>
<td>-0.024 (0.386)</td>
<td>0.191** (0.050)</td>
</tr>
<tr>
<td>Financial globalization</td>
<td>0.010* (0.004)</td>
<td>0.007* (0.002)</td>
</tr>
<tr>
<td>Finance and insurance share</td>
<td>2.194** (0.556)</td>
<td>1.085 (0.426)</td>
</tr>
<tr>
<td>Private credit</td>
<td>0.058** (0.020)</td>
<td>0.025 (0.017)</td>
</tr>
<tr>
<td>Market capitalization</td>
<td>0.060* (0.031)</td>
<td>0.071* (0.008)</td>
</tr>
<tr>
<td>Turnover ratio</td>
<td>0.006 (0.018)</td>
<td>0.026* (0.007)</td>
</tr>
<tr>
<td>ICT compensation</td>
<td>-0.133 (0.676)</td>
<td>0.091 (0.035)</td>
</tr>
<tr>
<td>Trade openness</td>
<td>-0.135* (0.051)</td>
<td>0.149** (0.037)</td>
</tr>
<tr>
<td>Tertiary enrolment ratio</td>
<td>-0.205 (0.119)</td>
<td>0.067* (0.033)</td>
</tr>
<tr>
<td>Number of obs.</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>Number of countries</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Number of periods per country</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>AR(2) p-value</td>
<td>0.234</td>
<td>0.000</td>
</tr>
<tr>
<td>Sargan p-value</td>
<td>0.778</td>
<td>0.000</td>
</tr>
</tbody>
</table>

**Note:** Constant and period dummies are omitted. One-step system GMM estimators are used. Five-year averaged data are used to reduce the length of time-dimension. ** and * denote statistical significance levels at 1 and 5 percent, respectively; robust standard error is in parentheses.
Comments on Impact of Financialization and Financial Development on Inequality: Panel Cointegration Results Using OECD Data

Yanrui Wu, University of Western Australia: This paper uses a panel cointegration technique to examine the long-run impacts of financialization and financial development on inequality. The empirical work is mainly based on the macroeconomic data of selected OECD economies. The authors argue that previous studies were based on the analysis of a sole outcome variable whereas in this paper they analyze the effect of financialization and financial development not only on inequality but also on investment and growth by using various measures. The authors also investigate both the domestic and international aspects of financialization. In general, this is an interesting paper that addresses a topical issue. I have the following comments for the authors.

The first draft of this paper with 61 pages and 32 tables is ambitious. The authors highlight the use of more variables and improved econometric methods as the contributions of this paper. The expansion of scope may be at the expense of academic rigor, however. For example, the authors could just choose either financial development or financial globalization and then focus on robustness checks and sensitivity analysis.

The choice of the variables for inclusion in the empirical model should be appropriately explained. Currently these variables are simply listed in Table 1 without justification. Are these selected according to economic theories or empirical evidence?

Both long-term and short-run effects are discussed but the period covered by the actual sample is short. The longest period for the sample is just over 20 years.

Four hypotheses are tested but they are not mentioned at all in subsequent discussion and empirical analysis. Are they confirmed or not?

Hypothesis H2 states that financial development decreases inequality in the long run and hypothesis H3 tests that financialization increases inequality in the long run. The definitions of financial development and financialization are ambiguous. Once again, it would be better to focus on just one of these in the paper. In addition, a non-linear relationship could be explored here.
Finally, the authors argue that the panel cointegration approach can be used for data with large \( N \) and large \( T \). In this paper, the \( N \) is less than 20 and \( T \) is about 30. One must question the use of this approach in this paper.

Maria Socorro Gochoco-Bautista, University of the Philippines: The study examines the long-term effect of financialization and financial development on inequality, investment, and growth using OECD data and panel cointegration and other econometric procedures.

It defines financialization in terms of the following factors: (i) expansion of the financial sector in the economy, measured by the share of value-added in the finance and insurance sectors among all sectors (%); (ii) increased share of financial sector or shareholders in the profit or resources of non-financial sectors or the distributed income of corporations, measured by the share of net payments of distributed income of corporations among net value-added for non-financial corporations (%); and (iii) increased overseas financial activities or financial globalization as measured by the ratio of external financial assets plus liabilities to GDP (%).

Financial development is proxied by one of the following: (i) domestic credit provided by the financial sector to the private sector as a share of GDP; (ii) market capitalization of listed domestic companies as a percent of GDP; and (iii) turnover ratio or domestic shares traded divided by market capitalization (%).

Inequality is measured in three ways as well: (i) the share of the top 10 percent income among national income (%); (ii) the adjusted wage share as measured by the compensation per employee as a percentage of GDP at factor cost per person employed (%); and (iii) the Gini coefficient of the ratio of the area that lies between the line of equality and the Lorenz curve over the total area under the line of equality (%).

Using a panel cointegration approach to estimate long-run effects, this paper finds that: (i) financial institutions and economic outcomes such as inequality, labor income share,
investment, and growth are cointegrated—that is, are related in a linear way so that a shock in one of the explanatory variables leads to an adjustment toward equilibrium in the long run; (ii) a high dividend ratio is positively correlated with inequality in the long run; (iii) financial globalization is negatively correlated with private investment and financial development is positively correlated with private investment in the long run; (iv) VECM panel results show that there is uni-directional Granger causality from financial globalization to private investment; and (v) there is no observed direct effect of financialization and financial development on growth, but there is an indirect effect via private investment.

**Comments**

1. Motivation of the paper: To explain the rising incidence of income inequality shown in Figure 1 by focusing on the role of financialization—the top 10 percent income share among 12 OECD and 5 non-OECD countries in 1980 and 2009 (in %).

Looking at Figure 1, one notices that in countries like Sweden, Norway, France, Australia, and New Zealand, for example, inequality did not rise much between 1980 and 2009, and in Denmark, inequality fell in the more recent period. Comparing these countries with the others in Figure 1, I was wondering whether many of these countries that did not experience a large increase or a decrease in income inequality in the two periods had certain unique characteristics, such as a more socialist or welfare-state kind of government. Also, what is the role of history here, or the role of “initial” conditions (i.e., the state of income inequality in 1980, on inequality in 2009)? The United States, for example, had a more unequal distribution of income in 1980 (the top 10 percent held 32.87 percent of national income) versus about 25 percent in Norway and Denmark in 1980; and yet in 2009, the U.S. top 10 percent share of national income rose further to 47.81 percent while Denmark’s fell in 2009 and Norway’s rose a bit but was still under 30 percent. India, like the United States, started off in 1980 with relatively high inequality, with the top 10 percent holding over 30 percent share of national income, which then ballooned and worsened to over 50 percent in 2009. Meanwhile, Russia is an outlier, with an even lower level of inequality in 1980 compared with Sweden, Norway, and Denmark, which deteriorated to 50 percent in 2009. Except for Russia, there seems to be a great degree of persistence in the inequality outcomes in 2009 relative to 1980.

So, given these sorts of stylized facts of the changes in inequality in these different countries, how does one motivate the topic of the paper and focus on the role of financialization in inequality, other than that no one else has done so—because, looking at countries like India or Russia, I think it is not obvious that one can make a case for financialization as an important factor in explaining inequality.
2. How about the initial distribution of wealth or ownership of resources? If a small number of people control a large share of the stock of wealth to begin with, wouldn’t this lead to a disproportionate amount of income being generated from this wealth to wealthy people and give rise to income inequality?

3. The financial development indicators tend to capture size and liquidity more than access, depth, or efficiency of the financial sector. The IMF has a more detailed FDI database. It is not clear here whether access to finance, which is what the authors say early on in the paper, is the link to inequality and is captured by these proxy variables for financial development.

4. The authors mention that financial development “increases inequality in the early period of development because the rich can access finance disproportionately at this stage, and then inequality becomes stable as financial development proceeds because more people access finance.” This seems to suggest a Kuznets-type inverted U curve relationship between financial development and inequality. The cursory evidence from Figure 1 suggests increasing inequality in all OECD countries except Denmark in the sample of OECD countries included here between 1980 and 2009. Were there similarly large differences in the level of financial development in OECD countries in both years? The other point is, to the extent that there is such a Kuznets-type curve in the relationship between financial development and inequality, would panel cointegration, which looks for a linear relationship that is stationary among the explanatory and dependent variables that are non-stationary, be appropriate? Should the regression have some squared terms as explanatory variables?

5. How is the increase in the capital to income ratio like or different from the change in the share of distributed income of a corporation as a share of net value-added of non-financial corporations?

6. On the channels of effects of financialization and inequality, the authors mention several channels, namely, (i) the spread of maximization of shareholder value across developed countries in which a greater share of resources and profits of firms goes to shareholders and CEOs and a small share goes to workers and other stakeholders, which may have to do with the distribution of the initial wealth endowments and could also be related to a second channel they cite, namely; (ii) financialization increases the relative bargaining power of capital over labor; and (iii) the rise of financial managers and the volume effect, the boom in the stock market. (Ironically enough, this latter can also potentially increase access to finance by middle-class individuals and middle-sized firms.) They cite Figure 3 to show that dividends and interest paid by non-financial firms increased in the United States and France since the 1980s. I think that Table 3 should show the relationship between distributed share and the share going to labor compensation rather than the former over time.
This might also shed light on whether there has been a loss of manufacturing jobs in favor of the financial sector, for example, or even skill-biased tech change in favor of the financial sector over manufacturing jobs.

7. Why use three different PURT tests? It seems better to do the CD Pesaran test to see whether a variable has cross-sectional dependence in the error term and run the Pesaran-amended ADF test shown in Equation 5 to test whether the time series are stationary in at least one country.

8. For the Pedroni cointegration test, which uses the ADF regression for residuals of each country data, do the authors know which country has non-stationary variables since individual OLS regressions are run? If so, are these individual country variables dropped in the Pedroni cointegration test (null hypothesis is that cointegration does not exist)?

9. After the existence of cointegration (among which variables?) is confirmed, group mean FMOLS is used to estimate the long-run coefficient, Equation 7. FMOLS consistently estimates the average of cointegrating vectors if these vectors are heterogenous, according to the authors’ citation of Pedroni, and removes the bias from the endogeneity problem arising from the long-run correlation between individual country error terms equal to the change in the set of regressors, and the error term across countries in the FMOLS equation.

I wonder if it is fair to compare PURT results in regressions using different sets of countries in a sample with different inequality measures as is done in Table 2.

10. I am also at a loss as to how to assess test results when the results of either the PURT or the Pedroni cointegration test are mixed and depend on the length of the lag structure or type of test statistic used, (e.g., finding rejection of the null hypothesis of non-stationarity most likely caused by an inappropriately short lag structure). Thus, apart from choosing explanatory variables (based on theory), the choice of lag structure also matters and in some cases may matter more than the choice of explanatory variables to include. In any case, the authors find that the distributed income of corporations, rather than other financialization variables, is cointegrated with inequality variables, such as the top 10 percent income share and adjusted wage share.

11. When the VECM Granger causality test is done, the study finds no Granger causality between distributed income of corporations and the top 10 percent income share, contrary to the findings obtained using panel cointegration test and group-mean FMOLS. Also, there are few observations per country—12, with 7 estimated parameters in VECM. So why do a VECM if the data are insufficient?
12. In terms of explaining investment, financialization is thought to compete with funds for investment—also domestically versus abroad. In terms of growth, the effect of financialization could work through investment.

13. And then proceed to do robustness checks on the relationship between the distributed income of top 10 percent income share? Even if, as the authors say, “cointegration may exist if the control variables are changed.” This does not seem to solve the problem of the small number of observations. Furthermore, the inclusion of variables in the cointegrating regression are based on or should be based on some prior hypothesis/theorizing about them being legitimate variables that explain the dependent variable rather than be based ex post on the result of a purely econometric exercise.

14. In hindsight, shouldn’t the authors have started with what they call “robustness checks” to get a sense of variables that may be cointegrated and in a sense, go from the more general to the specific?

15. Finally, it is strange that whereas market capitalization and private credit have a robust and significant long-run correlation with investment, consumption, and except for private credit, on inequality, they have no such effect, direct or indirect, on growth. The implication is that financial variables influence inequality but not growth, contrary to Schumpeter’s theory that a role of finance in economic growth via its effect on innovation.

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Summary of the General Discussion on “Impact of Financialization and Financial Development on Inequality: Panel Cointegration Results Using OECD Data”

The paper by Hochul Shin and Keun Lee stimulated a wide-ranging discussion, encompassing its place within the relevant literature, country coverage, model formulation, econometrics, and the interpretation of the results.

Ninghua Zhong opened the discussion by suggesting that the authors should clearly define the nexus of financial globalization and private investment and its implications for income inequality by drawing on the relevant literature. Mohamed Ariff wanted the authors to place the empirical analysis of the paper in the broader context of the literature of finance and economic development. He specifically mentioned the relevance of pioneering contributions of Joseph Schumpeter on finance development for the analytical context of the paper.

Relating to the country coverage, both Guanghua Wan and Chun-Chien Kuo wanted the authors to clearly explain the rationale behind their exclusive focus on OECD countries. Financial globalization essentially involves shifting financial flows from OECD countries to developing countries. Thus, they argued that the issue at hand was directly relevant to the latter countries.

On the methodology, Deng-Sing Huang questioned the relevance of the gravity model, which is essentially a tool for modeling gross trade flows (trade data compiled from Customs records), to model value-added trade. He argued that the standard gravity variables such as aggregate income, geographic distance, common geographic borders, and common language are not relevant for determining value-added trade, which is an outcome of the structure, conduct, and performance of the domestic economy. Keun Lee, by referring to his own research using patent records, emphasized the importance of considering innovation and R&D in determining value-added within the global value chain in empirical studies of this nature. Guanghua Wan and Henry Sunghyun Kim noted two other missing variables in the estimation equations: a measure of business cycles and an intercept dummy to capture the 2008–09 global financial crisis.
Yunjong Wang argued that by solely focusing on merchandise trade, the authors have missed out a large part of the relevant story because services now account for over 70 percent to 80 percent of GDP in OECD countries. Relating to this, he made the interesting point that the treatment of the manufacturing sector in the economy as a separate sector is becoming increasingly problematic because of the on-going process of servitization (servitization)—shifting on activities traditionally undertaken within manufacturing sector to service sector.

Relating to the interpretation of the econometric results, Wan noted that the sign of the regression coefficient of the labor share variable was perverse (positive), but a priori reasoning suggested a negative relationship between this variable and the degree of income inequality. Relating to this point, Ayako Obashi pointed out that the perverse sign could perhaps reflect the failure to appropriately disaggregate this variable by skill categories. Skill intensity varies among difference slices of the production process. The results are consistent with the possibility that in OECD countries the labor force could have been shifting toward high-skill categories. On the same issue, Siow Yue Chia alluded to the difficulties involved in matching the available standard skill classifications with actual still requirement of value chain activities. Chalongphob Sussangkarn wanted to know how semi-skilled wages negatively impact on value-added exports. Skill labor is mobile with the value chains. The availability of semi-skilled labor, therefore, determines the attractiveness of a given country as a production location within the global value chain (GVC) (production networks). Therefore, one must expect a positive, rather than a negative, sign for this regression coefficient. Liping He agreed with the point made by Sussangkarn.

Prema-chandra Athukorala warned that the findings of this paper needed to be treated with caution because of two fundamental limitations of the value-added trade data used in the empirical analysis. First, OECD statisticians have lumped together both parts and components and the studded intermediate goods in computing trade in value-added, whereas only the parts and components are relevant as inputs for GVC trade. Second, for some of the countries covered in this study, input–output data do not have separate domestic and imported input matrices and the statisticians arbitrary disaggregate the available aggregate transaction matrices into the two by making the “import similarity” assumption—that is, the degree of import intensity of export production is the same as that of production for the domestic market.

Zhong suggested the authors clearly define the policy recommendations arising from their finding in the revised version of the paper.