Financial Sector Development and Open Economy for Income Inequality Reduction: A Panel Fixed Model Analysis

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Abstract
This study utilizes a panel fixed model to analyze the impact of financial sector development and commercial openness on income disparity of 40 developing countries over the period between 1995 and 2016. The empirical results suggest that there is a relationship between financial sector development, trade openness and income inequality. We establish that, in Latin America, the financial sector development increases income inequality while in Subsaharian Africa, we show the existence of an inverted U-shaped relationship between financial development and income inequality. Trade openness increases income inequality in the 40 selected countries. The increasing of 1 percent of trade openness leads the rise of 0.077 and 0.068 percent of income inequality in Latin America and Subsaharian Africa respectively. To alleviate income inequality, the government should (1) more develop financial sector and socially wide-ranging over period, important to welfares for both the rich and poor, and (2) diversify its commercial and industrial base beyond primary products in order to export high value-added products to generate more resources, better distribute them between rich and poor, and create more job opportunities.

Keywords: financial sector development, trade openness, income inequality, panel fixed model analysis

JEL Classifications: C23, D31, F41, G14.

1. Introduction
After the financial crisis, many researchers have started paying more attention on the increasing of income inequality over the world. According to the OECD report from November 2016, the level of income inequality remains many high in many countries despite declining unemployment and improving employment rates. Several factors might have contributed to exacerbate this phenomenon: reduced role of labor union (Diamond, 2016); globalisation and technology (Jaumotte et al., 2013); structural change (Kum, 2008); executives.bonus and compensation (Bakija et al., 2012; Kaplan & Rauh, 2010); skill biased technological change; tax and transfer system (Denk & Cazenave-Lacroutz, 2015). But this study focuses on others possible determinants of income inequality. May financial sector development and trade openness play a role in explaining the evolution of income inequality?

In the literature, the concept of financial development has evolved during this last decades. In 1973, Shaw defined it as the accumulation of financial assets at a faster rate than the accumulation of non-financial assets. Levine, in 2005, improved the definition of this concept and considered that these is financial development when financial instruments, markets and financial intermediaries reduce the costs of obtaining the information, contract execution costs and transaction costs. Through five functions, Levine (1997) has showed that financial development improves growth by providing the efficient allocation of capital and reducing borrowing and financing transaction costs/constraints.

In the same way, Mishkin (2007) has showed that financial system consists of institutions and markets that interact, typically in a compound manner, for the purpose of mobilizing funds for investment and providing facilities, including payment systems, to finance commercial activities. Much more, as the World Bank (1989) has described, the purpose of a financial system is to simplify the transference of savings from surplus sectors to deficit sectors. The surplus sectors include savings while the deficit sectors refer to the entrepreneurs and
government directed out of their own savings. Recently, Fernández and Tamayo (2017) define financial development as the process by which financial system improve (or eventually overcome) information and enforcement frictions, as well transaction costs, in order to facilitate trade, mobilize savings and diversify risk.

According to the literature, the relation between financial development and income inequality is based on the three following hypotheses: broadening suggestion, finance-inequality thinning suggestion, and finance-inequality reversed U-shaped suggestion. The first two proposed suggestions are derived from the conceptual background of Banerjee and Newman (1993) and Galor and Zeira (1993), while the third suggestion was postulated from the theoretical framework of Greenwood and Jovanovich (1990).

The finance-inequality broadening hypothesis exposes that financial development benefits only to wealthy individuals when the quality of institutions is not robust. This hypothesis further proposes financial development is profitable to the rich due to their credit-worthiness to the banks. In that conditions, income inequality increases.

The finance-inequality thinning hypothesis suggests that the poor can now get access to banks credits due to the broad presence of financial development. The accessibility of poor to better education that can help them improving their labour productivity. Doing so, financial development increases income distribution of poor and is considered as a potential mechanism in a process of reducing poverty for some countries in transition (Jalilian & Kirkpatrick, 2002). Honoban (2004), Beck et al. (2004, 2007), Stijn and Perotti (2007) obtained the similar results.

The third hypothesis developed by Greenwood and Jovanovich (1990) shows that the early phases of financial development increases inequality, and this eventually peaks, afterwards disparity decreases once the financial sector tends to mature. This explains the presence of an inverted U-shaped hypothesis between financial development and income inequality. Tan and law (2012), Ling and Xia (2012) obtained the similar results respectively in the cases of developing countries and China.

Reviewing the existing literature on openness shows that there is not a clear definition of trade openness. According to some authors, trade openness implicitly refers to trade policy orientation and what they are interested in is to assess the impact of trade policy or trade liberalization on some economic phenomenon. For other authors however, trade openness is a more complex notion covering not only the trade policy orientation of countries but also a set of other domestic policies (such as macroeconomic policies or policies related to law and institutions for instance) which altogether make the country more or less outward oriented. In this study, we are interested to the relationship between trade openness and income inequality.

The literature related on the nexing of trade openness and financial inequality is wideworld important and debatable theoretically and empirically. In a previous study with 51 countries, Jaumotte et al. (2013) show that trade liberalization is source of disparity. Trade openness builds a competitive environment bringing economic growth, development and poverty reduction in developing countries (Ben-David & Winters, 2000; Santarelli & Figini, 2002). Ravallion (2004) founds that trade liberalization positively impacted poverty reduction and income inequality if the effects of exchange are pro-poor in developing countries. Krugman and Lawrence (1993) find that trade liberalization generates new revenue or income inequality reduction in developing countries. Liberalizing trade in developing countries, coupled with increasing of economy integration in the global economy, permits to attract inward foreign direct investments (FDI) and to create new jobs for skills workers.

Using of foreign technology improves the demand for skilled workers, generating wage inequality between skilled and unskilled workers in developing countries (Zhu & Trefler 2005; Dreher et al., 2008), Levine (2012) provides an international comparative literature across countries related on the effects of the mobility of income distribution. As far as regional inequality is concerned, Wang et al. (2008) find the increasing impacts of commercial openness and financial development on regional inequality with the case of China. Ravallion (2004) proposes that inequality in developing countries decline because of the increasing demand of the unskilled workforce.

More recently, using broader databases and cross-section or panel-data estimations, Chang et al. (2009) and Freund and Bolaky (2008) also show that trade openness has a positive effect on income and that this positive relationship is enhanced by complementary policies. The mixed impacts of commercial openness on income disparity are found in a panel study by Calderon and Chong (2001), indicating that trade openness ameliorates income inequality in developed countries and deteriorates income distribution in the case of developing countries. Similar findings are reported by Aradhhyula et al. (2007). On the other hand, using generalized least squares (GLS), Tchouassi et al. (2018) have shown that trade policy positively affects economic development and thereby reduces income inequality in Central African Countries.
It is important here to examine the relationship between financial sector development, trade openness and income inequality.

The last forty years have also witnessed the growth and spread of new technology as well as trade and financial liberalization across the world. Both of these are seen as conduits of growth but their implications for income distribution are less clear-cut.

A recent study by Jaumotte, Lall and Papageorgiou (2008) suggested that while technological change has been a significant driver of the rise in inequality across both developed and developing countries, the contribution of globalization has been relatively minor. This is because trade liberalization generally results in a reduction in income inequality while financial liberalization generally results in an increase in income inequality. Thus the effects of globalization in trade and finance on income inequality tend to offset each other.

Those studies treated the relationship between financial development, trade openness and income inequality. Kai and Hamori (2009) examine the relationship between globalization, financial deepening, and inequality in sub-Saharan Africa between 1980 and 2002. They find that openness (trade and financial liberalization) is detrimental for income inequality but this outcome is contingent to the level of development reached. They also find that financial depth reduces inequality. Similarly to Kai and Hamori (2009), Batuo and Basungo (2015) apply dynamic panel data technique to investigate the effect of liberalisation policies on income distribution for a sample of 26 African countries from 1996 to 2010. They find that financial liberalization tends to escalate income inequality both for *de jure* and *de facto* measures of financial openness.

The objective of this paper is to analyze the relationship between financial sector development, trade openness and income inequality, by investigating if financial sector development and trade openness contribute or not to reduce income inequality.

The organization of the paper is as follows. Section 2 presents the methodology and describes the econometric model, the variables, the descriptive statistics, and the data sources. The empirical results are presented in section 3. Section 4 presents the study’s conclusion and policy implication.

2. Methodology: Econometric Model, Variables, Descriptive Statistics and Data Sources

2.1 Econometric Model

We have collected observations for 40 developing countries (Note 1) over the period between 1995 and 2016. We utilize a panel data estimation methods. Since in this paper, the objective is to analyze the relationship between financial sector development, trade openness and income inequality. We use income inequality as the dependent variable, financial sector development, trade openness and several other variables as explanatory variables. In static setting, the panel equation is as followed:

\[
\log GINI = \gamma + \beta_1 \log CREDIT + \beta_2 \log CREDIT^2 + \beta_3 OPEN + \sum_{s=1}^{a} \beta s X + \eta t + \nu t + \epsilon
\]

From the equation above, \(i\) is for country and \(t\) for year. \(GINI\) is dependent variable representing the income inequality. \(CREDIT\) is one of the independent variables which capture the financial sector development. \(OPEN\) is another independent variables representing the trade openness. \(X\) are other independent variables included in the regression, \(\eta\) and \(\nu\) represent the country and period of fixed-effects, respectively. \(\epsilon\) represents the disturbance term.

2.2 Variable Selections and Data Sources

All variables and data sources are presented in the following table.
Table 1. Variables and data sources

| Variables | Définition | Source |
|-----------|------------|--------|
| **GINI** | The Gini coefficients. It measures income inequality. It value is move from -1 to +1. Internal credit provided by bank to private sector (as a percentage of GDP). It measures the financial sector development. The expected sign of that variable is ambiguous. GDP growth rates. The sign of that variable is expected to be negative since an increase in growth would be wealth improving and then reduce income inequality in presence of an efficient state redistributive policy. The sign would be positive otherwise. | Standardized World Income in Quality Data Base, World Bank, Development Research Group International Monetary Fund, International Financial Statistics and data files, and World Bank and OECD GDP estimates. World Bank national accounts data, and OECD National Accounts data files. |
| **CREDIT** | | |
| **GDP** | Gross fixed capital formation (as a percentage of GDP). The expected sign is negative. | World Bank national accounts data, and OECD National Accounts data files. |
| **INVEST** | Measured by the growth rate of the consumer price index. The expected sign remains undetermined and depends of the inflationary pressure nature: supply-driven or demand-driven (e.g.Blinder and Esaki, 1978 and Buse, 1982). | International Monetary Fund, International Financial Statistics and data files. |
| **INFL** | Trade captures the degree of openness. According to previous studies, the impact of trade on the Gini coefficient is uncertain as asserted by Beck et al (2007) | World Bank national accounts data, and OECD National Accounts data files. |
| **OPEN** | Volume of transfer from migrants to their countries (in GDP percent). The expected sign is negative. | International Monetary Fund, Balance of Payments Statistics Yearbook and data files. |
| **TRANSFER** | Value of taxes represented by the overall rate of taxes as a percentage of commercial profits (in %). The expected sign can be positive or negative. | International Monetary Fund, Government Finance Statistics Yearbook and data files. |
| **TAX** | Female unemployment rate as percentage of female labor force (in %). The expected sign is positive. | International Labour Organization, ILOSTAT database |
| **UNEMPLWOM** | proxied by gross secondary school enrollment rate. The coefficient of this indicator is expected to be negative since the accumulation of knowledge is likely to decrease income inequality. | UNESCO Institute for Statistics (http://uis.unesco.org/) |
| **HUMCAP** | Rural population as a percentage of the total (in %). The expected sign is positive. | United Nations Population Division. World Urbanization Prospects: 2017 Revision. |

Sources: Authors.

2.3 Descriptive Statistics

Descriptive statistics of all the variables is presented in Table 2 below. The statistics show that income inequality varies from 33 to 65.80% while credit provided by the bank to private sector moves from 0.41 to 98.22%. Trade openness varies from 5.88 to 49.32%. For all the variables, the value of mean is in between the range of minimum and maximum values.

Table 2. Statistics of variables of study

| Variables | N | Minimum | Maximum | Mean | Standard deviation | Coefficient of variation |
|-----------|---|---------|---------|------|--------------------|--------------------------|
| **GINI** | 880 | 33,00 | 65,80 | 47,38 | 6,92 | 0,15 |
| **CREDIT** | 880 | 0,41 | 98,22 | 24,48 | 20,04 | 0,82 |
| **GDP** | 880 | -7,01 | 16,56 | 4,29 | 3,38 | 0,79 |
| **INVEST** | 880 | 2,78 | 40,72 | 19,51 | 5,91 | 0,30 |
| **INFL** | 880 | -3,50 | 52,03 | 9,15 | 9,41 | 1,03 |
| **OPEN** | 880 | 5,88 | 49,32 | 24,88 | 7,59 | 0,31 |
| **TRANSFER** | 880 | 0,00 | 19,00 | 2,80 | 3,89 | 1,39 |
| **TAX** | 880 | 0,91 | 44,45 | 14,17 | 5,05 | 0,36 |
| **UNEMPLWOM** | 880 | 0,30 | 39,20 | 10,85 | 8,11 | 0,75 |
| **HUMCAP** | 880 | 5,13 | 99,84 | 53,10 | 28,62 | 0,54 |
| **RURALPOP** | 880 | 4,86 | 92,79 | 50,20 | 22,71 | 0,45 |

Sources: Authors’ calculations.
With respect to the relative dispersion measured by the coefficient of variation, we can establish the dispersion ranking in ascending order (from the least dispersed to the most dispersed) of the variables of the study, presented in graph below. It can be seen that the most volatile and heterogeneous variables are TRANSFER and INFL and the least volatile are GINI and INVEST.

Sources: Authors’ calculations.

3. Empirical Results

In the Table 3, we have presented stationarity test of Maddala-Wu (1999). The results of the test show that most of the variables in the study are integrated in order 1. Only the variables Log_GDP, Log_INFL and Log_UNEMPLWOM are stationary.

Table 3. Maddala and Wu (1999) Panel Unit Root test (MW)

| Variables      | Lag=0       | Lag=1       |
|----------------|-------------|-------------|
|                | Sans trend  | Avec trend  | Sans trend  | Avec trend  |
| LOG_GINI       | 63,729      | 89,642      | 537,917     | 446,085     |
|                | P= 0,9086   | P= 0,2160   | P= 0,0000   | P= 0,0000   |
| LOG_CREDIT     | 112,591     | 84,479      | 473,270     | 396,960     |
|                | P= 0,0096   | P= 0,2195   | P= 0,0000   | P= 0,0000   |
| LOG_GDP        | 428,531     | 402,987     | 3605,753    | 794,996     |
|                | P= 0,0000   | P= 0,0000   | P= 0,0000   | P= 0,0000   |
| LOG_INVEST     | 91,789      | 109,362     | 600,622     | 512,760     |
|                | P= 0,1731   | P= 0,0163   | P= 0,0000   | P= 0,0000   |
| LOG_INFL       | 281,488     | 226,528     | 1588,900    | 678,730     |
|                | P= 0,0000   | P= 0,0000   | P= 0,0000   | P= 0,0000   |
| LOG_OPEN       | 94,789      | 482,089     | 606,433     | 530,431     |
|                | P= 0,1238   | P= 0,0000   | P= 0,0000   | P= 0,0000   |
| LOG_TAX        | 107,998     | 46,347      | 378,089     | 460,347     |
|                | P= 0,0202   | P= 0,9984   | P= 0,0000   | P= 0,0000   |
| LOG_TRANSFER   | 200,973     | 51,445      | 362,934     | 320,223     |
|                | P= 0,0000   | P= 0,9946   | P= 0,0000   | P= 0,0000   |
| LOG_UNEMPLWOM  | 152,283     | 298,396     | 1121,83     | 561,861     |
|                | P= 0,0000   | P= 0,0000   | P= 0,0000   | P= 0,0000   |
| LOG_HUMCAP     | 42,960      | 37,917      | 325,531     | 328,390     |
|                | P= 0,0000   | P= 0,9999   | P= 0,0000   | P= 0,0000   |
| LOG_RURALPOP   | 453,141     | 88,287      | 139,706     | 306,956     |
|                | P= 0,0000   | P= 0,2463   | P= 0,0000   | P= 0,0000   |

Sources: Authors’ calculations.

The empirical results of Hausman test (table 4) suggest that we have to use fixed effect. Moreover, to check the robustness of the empirical results in different econometric specifications and to address several econometric issues, we have also conducted many regressions using alternative estimation methods (such as random effect).
Inequality in Latin America, Sub-Saharan Africa and in total model respectively. So, an increasing of 1 percent of credit leads respectively to, 0.153***, 0.139***, 0.102***, 0.084***, 0.104***, 0.095***.

From the table 4, we obtain that LOG_CREDIT has a positive and significant effect of income inequality. That means that the increasing of credit in the economic exacerbates income inequality in Latin America, Sub-Saharan Africa and in total model respectively. So, an increasing of 1 percent of credit leads respectively to, 0.153***, 0.139***, 0.102***, 0.084***, 0.104***, 0.095***.

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Open had significant and positive estimated coefficient. This means that trade openness aggravates income inequality. More openness economies tend to be associated with higher level of income inequality. The increasing of 1 percent of trade openness leads the rise of 0.077 and 0.068 percent of income inequality in Latin America and Subsaharian respectively. In this countries, the benefits of trade openness have been captured by the rich at the expense of the poor. This result contrasts with that obtained by El Ghak and Zarrouk (2010).

GDP, investment and inflation have insignificant estimated coefficients. This variables have no significant effect on income inequality in that countries. Similar findings had been reported par Enowbi, Guidi et Mlambo (2010). On the other hand, this result contrast with Dollar and Kraay (2000), El Ghak and Zarrouk (2010) and Law and Tan (2009). TRANSFER, UNEMPLWOM and HUMCAP have positive and significant estimated coefficients. These results indicate that Transfer, unemployment of women and human capital increase income inequality in Latin America. RURALPOP has significant and negative estimated coefficient. This findings shows that rural population reduces inequality. The increasing of 1 percent of rural population reduces 0.0117 percent of income inequality.

4. Conclusion

This paper has analyzed the link between financial sector development, trade openness and income disparity. We have argued that financial development and trade openness impact income inequality. The empirical results using a panel data analysis suggest in subsaharian Africa, the existence of an inverted U-shaped relationship between financial development and income inequality proposed by Greenwood and Jovanovic (1990). This results are reported by kiendrebeogo and Minea (2016), Asongo (2013), Bahmani-Oskooee and Zhang (2014), Shehba and al. (2014), Kim et Lin (2011) and Tan et Law (2012). In Latin America, the results show that, there is a linear relationship between financial sector development and income inequality and not confirm the Banerjee and Newman (1993) and Galor and Zeira (1993) hypothesis. Indeed in Latin America, the financial sector development increases income inequality. The similar findings have been obtained by Jauch and Watzka (2012), Fowowe and Abidoye (2013) and Zhang (2016). Trade openness increases income inequality in the 40 selected countries. The increasing of 1 percent of trade openness leads the rise of 0.077 and 0.068 percent of income inequality in Latin America and Subsaharian Africa respectively. This result contrasts with that obtained by El Ghak and Zarrouk (2010).

The most interesting economic policy recommendation of this study is that the government has to propose measures to reduce income inequality. In the sense of reducing income inequality between the rich and poor, (1) the financial institutions have to be more develop and socially inclusive over the period, to be benefits for rich and poor; (2) the economy of the selected countries also must diversify its commercial and industrial base beyond primary products in order to export high value-added products to generate more resources, better distribute them between rich and poor, and create more job opportunities; (3) practically government has to formulate new macroeconomic policies by including tax reforms and investment impetus to reduce inequality.

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**Note**

Note 1. Botswana, Burkina Faso, Burundi, Cameroon, Côte d’Ivoire, Ghana, Guinea, Guinea Bissau, Madagascar, Mali, Mozambique, Nigeria, Tanzania, Togo, Uganda, South Africa, Namibia, Zambia, Rwanda, Gambia, Congo, Kenya, Senegal, Malawi, Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Paraguay, Peru, Argentina, Venezuela, Uruguay.

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