

# Equity Market Liberalization, Credit Constraints and Income Inequality

*Puyang Sun, Somnath Sen, and Shujing Jin*

## Abstract

This paper provides compelling evidence that equity market liberalization, as the most efficient way to smooth financial market frictions such as credit constraints, can alleviate persistent cross-dynastic income inequality by promoting increased human capital accumulation. The authors examine the effect of equity market liberalization on inequality by using data from 72 countries for 1980–2006. Their measured effect is robust to alternative measures of equity market liberalization. Finally, The authors show that foreign equity flows benefit initially less-active stock markets more than the active ones, providing evidence that foreign equity flows act as a substitute for domestic financial markets. This finding emphasizes the possibility of reducing inequality and poverty through equity market liberalization.

**JEL** F36 F41 G0 O11 O15 O16

**Keywords** Income inequality; equity market liberalization; human capital; economic growth

## Authors

*Puyang Sun*, ✉ Nankai University, China, [puyangsun@nankai.edu.cn](mailto:puyangsun@nankai.edu.cn)

*Somnath Sen*, University of Birmingham, UK

*Shujing Jin*, Nankai University, China

**Citation** Puyang Sun, Somnath Sen, and Shujing Jin (2013). Equity Market Liberalization, Credit Constraints and Income Inequality. *Economics: The Open-Access, Open-Assessment E-Journal*, Vol. 7, 2013-12. <http://dx.doi.org/10.5018/economics-ejournal.ja.2013-12>

## 1 Introduction

The world has witnessed stunning cross-country differences in income inequality and persistent poverty, particularly in some under-developed and developing countries. It is not difficult for us to see that poverty in these countries seems to be stubborn, for it is transmitted from one generation to the next. Discovering this feature of current income inequality and poverty, the principal object of this paper emphasizes the persistence of cross-dynastic income inequality.

Income inequality is apparently associated with the level of human capital accumulation. Human capital is unique because it is embedded in human beings, which are dominated by physical and intelligence factors. As such, human capital accumulation, which is the key to high income, is linked to the education an individual has attained. It is clear that with a higher level of education, people tend to receive a higher income than the undereducated. Furthermore, education attained by individual has such variety between people, that it substitutes endowment and intelligence for the rich and complements the brilliance and talent for poor, which indicates that the lack of education investment makes the poor more worse off than rich.

Now it is essential to consider the role of financial market. If there is a perfect financial market where nobody worries about insufficient financial support, the income depends solely on one's endowment. With the same education, superior endowment one can achieve a higher income than those inferior. Unfortunately, there is financial friction in the real financial market, such as credit constraints, which causes economic opportunity to vary. These credit constraints operate on two dimensions. The first one is horizontal, which means that people cannot get sufficient financial support for themselves to develop their own capabilities. The second is vertical which concentrates on the effect of parents' financial restrictions on the children's income inequality. It implies that the reason for a child's poverty is the lack of education investment from the parents, which leads to the transmission of income inequality. For instance, a poor family with tight credit constraint may have more difficulties in investing in their child's education, which hinders the child to go for advanced study and achieve a high income. As is

explained above, the credit constraints perpetuate the cross-dynastic income inequality and make the children lead a similar life to their parents.

In this paper, our research attempts to loosen the credit constraints through opening financial markets, and investigate various impacts on inequality. Equity market liberalization gives foreign investors the opportunity to invest in domestic equity securities and domestic investors the right to transact in foreign equity securities, which is acknowledged to be the most direct and efficient mean to relax credit constraints (Bekaert et al. 2005; Manova 2008). In fact, liberalizing the equity market to receive more foreign equity flow can enrich the supply of domestic financial credit and therefore reduce the financing cost, which means that individuals who did not use those financial services may get the chance to be involved in them. In this term, a poor family expands their economic opportunities to invest in education for the next generation, which may diminish the persistence of cross-dynastic income inequality. Two important aspects generally determine a person's total income, the endowment of the individual and the education one attained in the whole life. The latter is theoretically associated with the access to credit (Galor and Moav 2004; Galor 2009). For instance, children from poor families with superior endowments may meet many more credit constraints than one from rich family, which obstruct the poor children to attain a high enough education level. As a result, poor can only get minimum wage from one generation to another. The tighter the credit constraints, the lower the parental investment in children's education, which makes inequality perpetuate from generation to generation (Beck et al. 2007; Demirgüç and Levine 2009). On the contrary, children from rich families obtain enough education through their parental investment, which keeps them in the top tier of the society. It is a strong belief for us that the equity market liberalization can alleviate these kinds of restrictions, smooth out the financial market frictions and expand the economic opportunity for poor. It enlarges the possibility for poor to diminish this persistent income inequality.

A bulk of literature has discussed the impact of financial development on income inequality; however, few consider the importance of opening financial markets, or even equity market liberalization. Besides, though many studies put emphasis on income inequality, few concentrate on its cross-dynastic persistence, which is especially significant for developing and under-developed countries. The main purpose of this paper is to show how equity market liberalization could affect

the persistent cross-dynastic income inequality through possible effects of credit constraints on the differences in acquiring human capital.

A growing body of psychological and practical research provides conflicting predictions about the effect of financial markets on poverty, since we do admit that finance operates on both an extensive margin and an intensive margin. Increasing access to credit expands economic opportunities for poor, which means that it is easier for poor families to get support with children's education investment. Thus, poor children may develop their own ability and get more return in human capital, which reduces intergenerational income inequality. This can explain how finance operates on extensive margins (Becker and Tomes 1979, 1986; Greenwood and Jovanovic 1990). In contrast, finance can also operate on intensive margins (Greenwood and Jovanovic 1990). The improvement of financial services may fall disproportionately on the advantaged group, who had been involved in financial services. To this extent, the more perfect the financial market is, the more the rich gain from it, which perpetuates the persistent cross-dynastic income inequality. The effect that finance has on income inequality, extensive margins or intensive margins, determines the impact of financial reform on poverty reducing.

As a result, in the fourth section we attempt to check the relationship between financial market liberalization and income inequality by connecting the latter with domestic financial market activity. And we try to answer the controversial question that whether domestic financial markets act as substitutes or complements to foreign equity flow. First of all, it is significant that countries with less active domestic financial markets tend to suffer from serious income inequality. So it is rational to suggest that there is a relationship between domestic stock market and the foreign equity flow. If foreign equity flow benefits more for a developed domestic stock market, it will cause the financial market allocate resources disproportionately to the rich, who gain from the better financial infrastructure. If so, foreign equity flow deteriorates domestic income inequality, which implies that foreign equity flow acts as a complement to domestic stock market (Manova, 2008). On the contrary, equity market liberalization may be a blessing not a curse for under-developed domestic stock markets, for the diminishing return of capital foreign equity flow benefits imperfect financial markets more. Foreign equity flow increases the activity of domestic stock market by way of enriching funds, spreading the risk and so on. To this extent, we may conclude that foreign equity flow acts as a substitute of domestic stock market (Manova 2008). According to

this idea, we have collected some comprehensive indicators of stock market activity and testify the function of equity market liberalization, finding the compelling evidence that foreign equity flow acts as a substitute of domestic stock market in section four.

We organized the rest of the paper as follows. The second section provides an estimation framework, which investigates the relationship among credit constraints, human capital accumulation and the income, and describes the data and estimation models. In the third section we analysis the empirical results, finding that equity market liberalization helps to reduce income inequality though alleviating the persistent cross-dynastic income inequality. The last section is a summary.

## **2 Data and preliminary analysis**

### **2.1 The theoretical background**

In this section, we emphasize the role that financial market exerts on inequality. Some pronounced literatures have discussed the interrelationships between finance and inequality such as Claessens and Perotti (2007), Kunt and Levine (2009). In contrast, our preoccupation is the impact of equity market liberalization on persistence of cross-dynastic income inequality. We make significant attempts in two dimensions. Firstly, we explore the effect of equity market liberalization, which is the most direct and efficient way to relax credit constraints. Second, the principal object of this study is the persistence of cross-dynastic income inequality rather than the poverty itself, which makes it clear to find a transmission mechanism from one generation to the next. As no one can ignore financial market frictions, people have different economic opportunities in participating in economic activities. Considering the credit constraints, poor parents may give up investing in children's education, which hinders children's access advanced education and lose the opportunity to achieve a high income. To this extent, children's income inequality originates in parents' poverty and their credit constraints, which shapes the persistence of cross-dynastic income inequality. Poverty transmits from one generation to the next because of the lack of education investment for children, which makes the income inequality difficult to change. In

contrast, rich families provide sufficient investment to their children and ensure that they develop human capital and get high pay. Prosperity transmits in the rich family, which makes the income inequality stubborn in some countries. Foreign equity flow may be an efficient way to smooth out that friction by facilitating investments, especially for education. After liberalizing the foreign equity market, capital becomes abundant in the financial market, which makes it easier provide finance for everyone. Poor parents have a new channel to get financial support and pay for their children's education. Thus, children in poor families with superior endowment expand their economic opportunity, and may get the opportunity to end the dynastic transmission of low income distribution.

In terms of theoretical mechanism by Kunt and Levine (2009), the equation of total income  $y_{i,t}$  can be expressed like this:

$$y_{i,t} = h_{i,t}w_{i,t} + a_{i,t}r_{i,t}$$

where  $h_{i,t}w_{i,t}$  is the return on human capital and  $a_{i,t}r_{i,t}$  is the return on physical capital(assets),  $h_{i,t}$  is the level of human capital in dynasty i in generation t,  $w_{i,t}$  is the wage rate per unit of human capital,  $a_{i,t}$  is the wealth and  $r_{i,t}$  is the return on asset. Human capital is associated with the endowment of generation t, denoted by  $e_{i,t}$  and investment of generation t-1, denoted by  $s_{i,t-1}$ . So we rewrite  $h_{i,t}$  like this:

$$h_{i,t} = h(e_{i,t}, s_{i,t-1}).$$

If there is a perfect financial market everyone has an equal opportunity to get access investment,  $y_{i,t}$  tends to be the same across dynasties. Unfortunately, there is financial market friction and it cannot be eliminated for a long time, which means  $s_{i,t-1}$  is a function of  $p_{i,t-1}$  and

$$h_{i,t} = h[e_{i,t}, f(p_{i,t-1})],$$

Here  $p_{i,t-1}$  is the credit constraint, one of the presentations of domestic financial friction, which hinders the poor's accumulation of human capital through borrowing from financial sectors. As a result, without considering the asset return, one's income is associated with one's own endowment as well as the education investment that the parents could afford. Since  $\frac{\partial h_{i,t}}{\partial p_{i,t-1}} > 0$ , parents' education investment has a positive effect on a child's human capital accumulation and thus

total income. Namely the lack of education investment in poor family may lead to a low income for children and shape the distribution gap between poor and rich, which will finally form a persistent cross-dynastic income inequality.

We want to prove that equity market liberalization, as an external shock, can smooth the financial market frictions by relaxing credit constraints and expand the economic opportunity for the poor.

## 2.2 Data

To measure the inequality on income distribution, the annual growth rate of the *Gini* coefficient is employed in this paper, which is computed over the period 1980–2006 including 72 economies (UNU-WIDER 2005). We chose the growth rate of *Gini* rather than the level value because of the importance of the persistence of cross-dynastic differences in income and wealth. The growth value implies the change of inequality better than the level value of *Gini* (Kunt and Levine 2009). Considering the transmission of income inequality, it is necessary to use the growth of Gini coefficient since it is a dynamic indicator that expresses the change in inequality from one generation to another.

Private credit is a comparatively comprehensive measure of credit constraints, which will be a lower value if the credit constraint is tight, otherwise it will be a higher value. We use private credit to distinguish the differences among economies, which is presented by the logarithm value of domestic private credit by deposit money banks and other financial institutions over GDP. Data on private credit come from updated versions of the Financial Structure Database, which is collected from International Financial Statistics. Furthermore, to testify the persistence of cross-dynastic differences in income, we use lagged private credit, which indicates the credit constraints over the last period. We want to determine whether the credit constraints that parents face affect the opportunities for their children to acquire the wealth through the channel of education investment.

Data on equity market liberalization are available for 72 countries between 1980 and 2004 from Bekaert et al. (2005). It includes both the official year of equity market liberalization and the “first sign” of liberalization, which is the same presentation as in Manova (2008). The first sign measurement is the earliest of three probabilities: an official liberalization, first launching of a country’s fund and the first American Depositary Receipt (ADR) announcement. So it is clear to see

that the year of the first sign of liberalization is earlier than the official liberalization year, which implies that the impact of equity market liberalization on income inequality may be shown before the official liberalization announcement. In these 72 countries, there are 16 countries opened to foreign equity flows before 1980, while 21 countries liberalized after 2000 and the remaining 35 countries removed their stock market constraint during the period of 1980 to 2004. In Table 1 panel B, there are some significant variables in our analysis which indicate the impact of equity market liberalization on them. The pre- and post-liberalization variables show the change in 35 countries that remove the restrictions during the sample period. Never previously liberalized countries are those that get rid of foreign equity flow before 2000, while the fully liberalized are those that opened their equity market before 1980. To imply the effect of external shock in the equity market, we construct post-liberalization dummies, which equal 1 in the year of and all years after an official or first-sign liberalization. And before that year, all dummies equal 0. As a result, in the sample the liberalization dummies of some developed countries like United States, United Kingdom, Switzerland and so on equal one during the whole sample period, which implies that these countries opened their equity market before 1980 and even earlier. Although the equity market of these developed countries didn't experience financial reform, we still involve them into the whole sample to maintain the sample's integrity. Besides, other countries' opening equity market brings these financially developed countries new access to invest, which will probably affect the financial market and thus income inequality of both sides. Furthermore, these well-functioned financial markets are always attractive to under-developed countries for its variety and safety of financial assets. After equity market opening, investors and borrowers can enter the developed financial markets more freely and conveniently than before. For all the above reasons, it is necessary to consider unchanged financial markets in the analysis.

A person's opportunity to acquire wealth is associated with his or her educational background, which is another crucial variable in our empirical models. To stand in the top rank of income distribution, one needs the opportunity to attain sufficient education even for those with superior endowment. As a result, it is inevitable to involve an education indicator in our analysis. We use secondary school gross enrollment ratio to measure the effect of educational background for it aims at laying the foundations for lifelong learning and human development, by

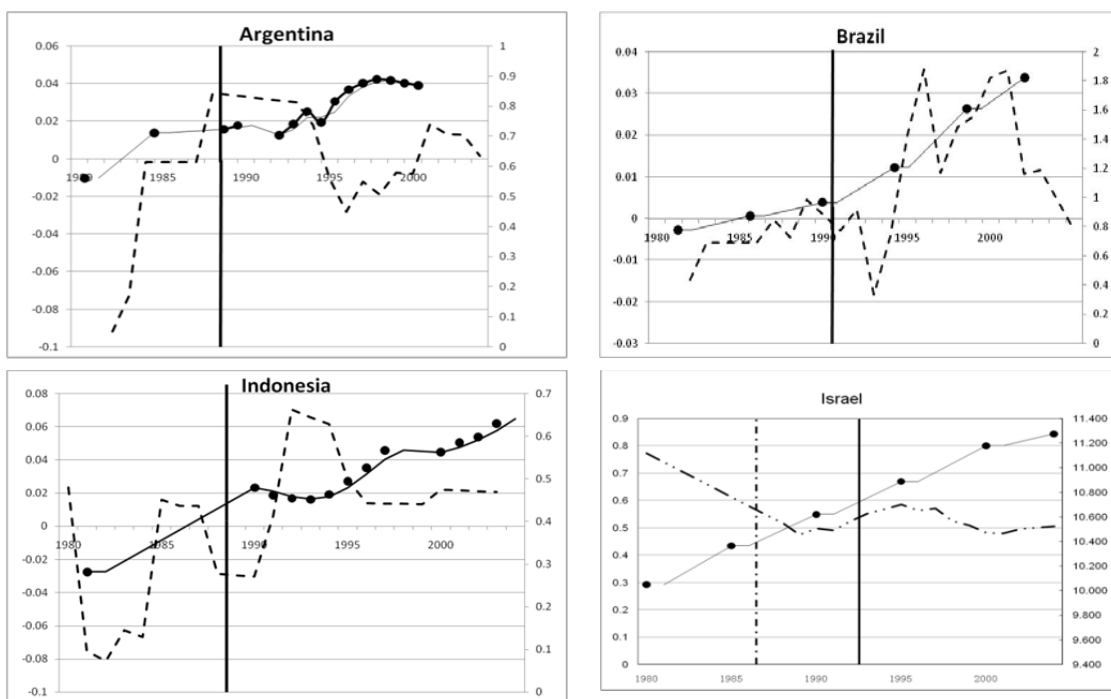


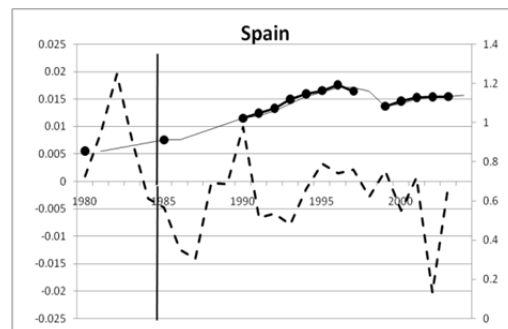
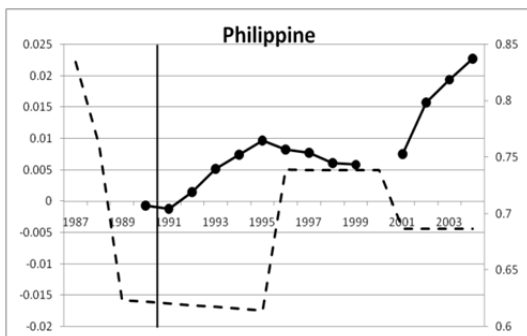
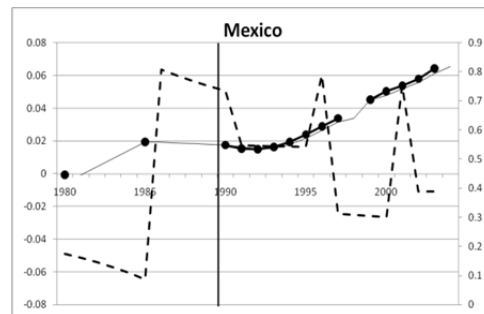
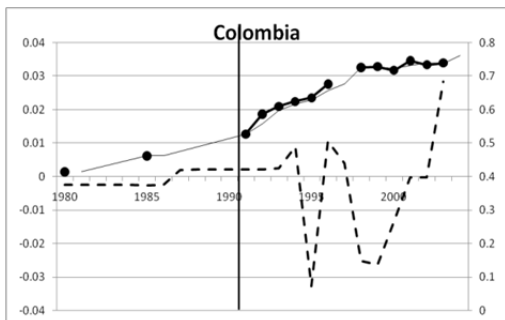
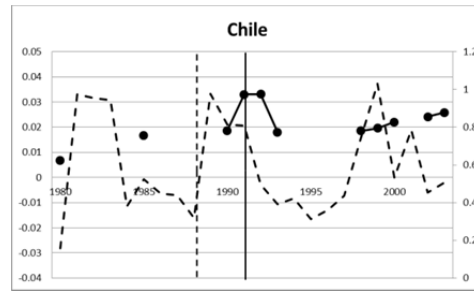
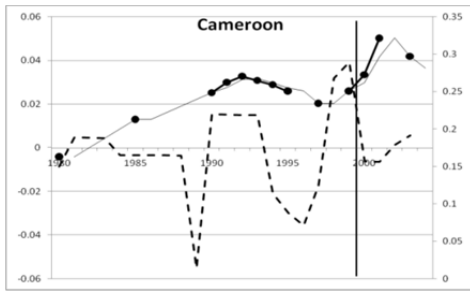
offering more subject or skill-oriented instruction using more specialized teachers. It determines human capital development, which is the key to getting a high wage. In this term, obtaining sufficient education helps poor children to get out of poverty and may diminish the cross-dynasty persistence of relative income.

To show the impact of equity market liberalization on income inequality through the transmission channel of human capital, we choose some countries to draw graphs. In Figure 1, the vertical lines indicate the official or “first sign” year

Figure 1: Liberalization and inequality in typical economies

(- - - GINI coefficient, the black spotted line shows the education, the vertical dotted line and full line presents the year of first sign and official sign of equity market liberalization)





of liberalizing, the other lines are the *Gini* coefficient and the average length of secondary schooling in years. As the graphs illustrate, after liberalizing the equity market, the average length of secondary schooling increases when education investment is sufficient, and what's more, income inequality decreases since the

accumulation of human capital. So we can clearly see the impact of external shock in the financial market on human capital accumulation and income inequality.

Table 1 shows the principal descriptive statistics for the sample of 72 countries from 1980 to 2004. Panel A is a summary statistics and panel B presents the different situations before and after the equity market liberalization. We divided the sample countries into three groups according to the years of liberalization. Countries in the first group are the ones which experienced financial reform during sample period, while the rest groups are respectively the ones that didn't liberalize the equity market until 2000 and the ones that opened their equity market before 1980. From panel B, it is clear to see that after liberalizing the equity market the private credit, education level and the economic growth increase significantly for countries in group one, while the change of both dynamic and level value of income inequality is vague. The similar situation is observed between never liberalized and fully liberalized countries. However, we can easily discover that the education one attained in fully liberalized countries is much more than in never liberalized countries.

*Table 1: Summary statistics*

<i>Panel A:</i>					
Variable	Obs	Mean	Std. Dev.	Min	Max
Growth in Gini	1599	0.000977	0.029174	-0.12885	0.266944
Initial Gini	1674	0.460325	0.075961	0.287459	0.772764
Education	931	0.712277	0.332808	0.04	1.6178
Credit constraints	1775	-1.01927	0.88984	-4.1719	0.837602

<i>Panel B:</i>				
	Pre-liberalization	Post-liberalization	Never liberalized	Fully liberalized
Gini growth rate (%)	-0.46606	0.356416	0.1487	0.2035
Gini coefficient	0.451017989	0.4510695	0.460963	0.486817
Private credit	0.464385571	0.54282834	0.552327	0.464066
Education	0.544961827	0.69858176	0.408171	1.090826
GDP growth rate (%)	3.155237354	3.93592246	2.517136	2.5422

### 2.3 Empirical model

Although most previous studies mentioned the roles of local financial markets on economic growth, our paper emphasizes financial liberalization on the transmission from credit constraint to persistent cross-dynastic income inequality; furthermore, we use the difference in difference dummy variable to measure the global financial liberalization of each nation, whereas the common methods of traditional panel estimation have a serious weakness in the sense that they do not account for a consideration of external shocks from opening the financial markets. We use a generalized difference-in-difference (DiD) approach to test for the differential effect of equity market liberalization on persistent cross-dynastic income inequality across countries. As the panel dataset in our paper has a larger country dimension and a short time dimension, and the endogenous characteristic of the financial variable has a serious negative impact on empirical research on economic development and theoretical studies (Levine 2005 , Kunt and Levine 2009, Michalopoulos et al. 2009, Claessens and Perotti 2007), we use a system generalized method of moments (GMM) estimator approach developed by Blundell and Bond (1998) to overcome the endogenous factors and make the results of panel data more effective. Arellano and Bond (1991) developed the generalized method of moments (GMM) estimator approach, which is specifically designed for situations where there are a large number of cross sections and a short time periods. Unfortunately, the Arellano and Bond (1991) approach can, in some instances, perform poorly if the autoregressive parameters are too large or the ratio of the variance of the panel-level effect to the variance of the idiosyncratic error is too large. Blundell and Bond (1998), building on the work of Arellano and Bover (1995), develop the system GMM estimator which addresses these problems by expanding the instrument list to include instruments for the level equation. In this paper, logarithmic credit constraint is treated as an endogenous variable. The ordinary least squares regressions (OLS) results are supplied as comparisons.

We use a difference-in-difference (DiD) approach to analyse the impact of equity market liberalization on income inequality, using the following estimate function:

$$\begin{aligned} Inequl_{i,t} = & \lambda_{igini} Igin_{i,t} + \lambda_{crd} FinCrd_{i,t} + \lambda_{libedu} EquLib_{i,t} \times Edu_{i,t} \\ & + \lambda_{libcrd1} EquLib_{i,t} \times FinCrd_{i,t-1} + \lambda_{crd1edu} FinCrd_{i,t-1} \times Edu_{i,t} \\ & + \eta_{cv} Contl_{i,t} + \theta_i + v_t + e_{it} \end{aligned}$$

The term of  $Inequl_{i,t}$  measures persistent cross-dynastic income inequality, which is defined as the growth of Gini coefficients in dynasty  $i$  generation  $t$  across different countries. The notion of  $Igin_{i,t}$  is the value of the Gini coefficient at the beginning of the sample period. Financial market frictions are presented as the notion of domestic credit market constraints, which are denoted as the term of  $FinCrd_{i,t}$  in our above model. External financial shocks, specifically at equity market liberalization, are presented as the term of  $EquLib_{i,t}$ , which are shown as either the official liberalization dummy or the first-sign dummy in our model.  $EquLib_{i,t}$  is a binary variable either equals to 1 in the year of and all years after an equity market liberalization or 0 otherwise. The ability to acquire human capital is presented as the level of taking education, and we use the gross enrollment of secondary school and finally, denoted as  $Edu_{i,t}$  in the above equation. The term of  $FinCrd_{i,t-1}$  is employed to indicate the credit constraints that are apparent in the last generation, which is an important determinate for persistence of cross-dynastic income inequality. Poor families with serious credit constraints have difficulty in sending their children to attend advanced study, which reduces the human capital accumulation and cause the children remain in poverty.  $\theta_i$  and  $v_t$  represent the error terms including the unobserved country effect and year effect, respectively. And the  $e_{it}$  is the composite error term of unobserved country and year effect. The control variables include capital inflow, GDP per capita, openness in constant price, investment share of real GDP per capita, government consumption and population.

The coefficients of initial income inequality, denoted as  $\lambda_{igini}$ , are expected to be positive in the estimation model, since countries with low initial income inequality tends to experience slower reductions in the levels of the income inequality. It is obvious that the improvement in countries with severe income inequality will meet more obstacles than relatively equal countries. The coefficient of  $\lambda_{crd}$  represents the level of credit constraints: the lower level of  $FinCrd_{i,t}$  means more serious credit constraints, since we use private credit to indicate the level of credit constraints. Thereby,  $\lambda_{crd}$  is expected to be negative. We expect  $\lambda_{libedu} < 0$ , which means after experiencing the liberalization shocks in equity

markets, those obtaining more education will probably acquire more social wealth. In this term, equity market liberalization alleviate the cross-dynastic persistent income inequality though the effects of developing human capital.  $\lambda_{libcrd1} < 0$  since equity market liberalization, acting as an external shock to domestic market, can relieve the credit constraints and reduce the persistence of intergeneration income inequality. For instance, it is difficult for poor parents with serious credit constraints to invest in their children's education, which definitely affects the human capital accumulation for children and makes the next generation keep on leading a straitened life.

### 3 Empirical results

To confirm the necessity of choosing dynamic income inequality, it is meaningful to find the impact of equity market liberalization on the level value of income inequality. In Table 2 and Table 3, the dependent variable is the level value of Gini coefficient itself, which makes the effect of equity market liberalization vague and ambiguous. So it is reasonable to choose the dynamic variables and analyze the persistence of cross-dynastic income inequality.

In empirical research, we firstly testify the relationship between credit constraints and inequality. Without considering credit restrictions, we can clearly find that initial income inequality and education show as the same as our expectations in column A and B of Table 4. Education is the key to human capital accumulation, which reduce inequality. Accumulating knowledge is proved to be the shortcut to equal income distribution. And initial income inequality indicates the value of *Gini* coefficient in the beginning of sample period, which is the initial income condition of the country, so initial income inequality has a positive impact on inequality. Table 4 presents the regression results using the econometric methods of GMM. Before considering the impact of equity market liberalization on income inequality, the results in this table assess the impact of non-liberalization determinants. Both initial inequality and credit constraints are the same as our expectation. Considering the effects of credit constraint in column C, as expected it enters negatively and significantly. Credit constraint, one of the main presentations of financial market frictions, hinders the poor to get sufficient

education investment, which perpetuate the persistent cross-dynastic income inequality. In this empirical research, we use private credit to indicate credit constraints, which means that the higher private credit, the less credit constraint.

Table 2: Different dependent variable (the Gini coefficient) in OLS regression

	A	B	C	D1	D2
Education	0.1313*** (7.04)	0.1373*** (7.43)	0.1305*** (7.51)	0.0963*** (5.29)	0.1020*** (5.57)
Credit constraints		0.0455*** (5.43)	0.0258* (1.81)		
Lagged credit constraints			0.0248* (1.78)		
EquLib				0.0055 (0.78)	-0.0030 (-0.41)
EquLib*L.FinCrd				-0.0061 (-0.73)	-0.0018 (-0.21)
L.EquLib*Edu				0.0764*** (5.17)	0.0709*** (4.8)
Capital inflow	- 0.0369*** (-5.47)	- 0.0333*** (-4.97)	-0.0350*** (-5.4)	- 0.0378*** (-5.86)	- 0.0364*** (-5.65)
GDP per capita	0.0337** (2.01)	0.0379** (2.29)	0.0784*** (4.36)	0.0778*** (4.35)	0.0793*** (4.44)
Openness in constant price	-0.0135 (-1.56)	-0.0143* (-1.68)	-0.0112 (-1.3)	-0.0107 (-1.25)	-0.0126 (-1.46)
Investment share of real GDP per capita	0.0074 (1.1)	0.0099 (1.49)	0.0118* (1.79)	0.0110* (1.68)	0.0112* (1.72)
Government consumption	-0.0209** (-2.31)	-0.0200** (-2.24)	-0.0279*** (-2.82)	- 0.0278*** (-2.84)	- 0.0278*** (-2.84)
Population	-0.0030 (-0.13)	-0.0066 (-0.29)	0.0385 (1.51)	0.0495* (1.78)	0.0592** (2.15)

t statistics in parentheses, \*significant at 10%; \*\*significant at 5%; \*\*\*significant at 1%

Table 3: Different dependent variables (the Gini coefficient) in GMM regression

	A	B	C	D1	D2
Education	0.0151*** (12.02)	0.0128*** (10.8)	0.0116*** (8.17)	-0.0015 (-1.39)	-0.0011 (-0.84)
Credit constraints		0.0148*** (11.11)	0.0058*** (4.17)		
Lagged Credit constraints			0.0150*** (9.08)		
EquLib				0.0077*** (5.61)	0.0070*** (10.99)
EquLib*L.FinCrd				- 0.0055*** (-5.15)	- 0.0044*** (-7.22)
L.EquLib*Edu				0.0283*** (12.68)	0.0277*** (11.6)
Capital inflow	- 0.0026*** (-4.18)	0.0004 (0.48)	0.0019*** (4.06)	0.0005 (0.44)	0.0012 (1.24)
GDP per capita	0.0085*** (4.99)	0.0081*** (3.53)	0.0078*** (4.32)	0.0063*** (3.33)	0.0075*** (3.3)
Openness in constant price	0.0067*** (8.4)	0.0015* (1.82)	0.0011 (1.4)	-0.0001 (-0.05)	-0.0006 (-0.47)
Investment Share of	- 0.0060*** (-8.37)	- 0.0036*** (-4.94)	-0.0019*** (-2.61)	-0.0012* (-1.66)	-0.0017** (-2.22)
Real GDP per capita					
Government consumption	- 0.0092*** (-6.41)	- 0.0086*** (-5.36)	-0.0079*** (-3.86)	- 0.0084*** (-4.46)	- 0.0079*** (-3.58)
Population	0.0019 (1.01)	0.0023** (2.05)	-0.0001 (-0.03)	0.0023 (0.47)	0.0008 (0.34)

t statistics in parentheses, \*significant at 10%; \*\*significant at 5%; \*\*\*significant at 1%



Table 4: Credit constraints and inequality (dependent variable is Gini growth rate)

	A	B	C	D
IGini	0.0584*** (2.79)	0.1269*** (3.64)	0.1486*** (4.18)	0.1409*** (3.98)
Education		-0.0851*** (-5.09)	-0.0938*** (-5.54)	-0.0924*** (-5.47)
Credit constraints			-0.0241*** (-3.02)	-0.0473*** (-3.56)
Lagged Credit constraints				0.0286** (2.2)
Capital inflow	-0.0122*** (-3)	-0.0102* (-1.67)	0.0140 (0.82)	0.0185 (1.09)
GDP per capita	0.0264*** (3.05)	0.0189 (1.12)	-0.0112* (-1.82)	-0.0119* (-1.94)
Openness in constant price	-0.0069 (-1.43)	-0.0212*** (-2.66)	-0.0196** (-2.46)	-0.0202** (-2.53)
Investment Share of Real GDP per capita	0.0011 (0.31)	-0.0031 (-0.5)	-0.0046 (-0.74)	-0.0039 (-0.64)
Government consumption	0.0003 (0.06)	0.0044 (0.48)	0.0050 (0.54)	0.0037 (0.4)
Population	0.0335*** (2.64)	0.0692*** (2.89)	0.0678*** (2.83)	0.0676*** (2.83)

t statistics in parentheses, \*significant at 10%; \*\*significant at 5%; \*\*\*significant at 1%

On the contrary, in column D the lagged credit constraints indicate the private credit that parents obtain, enters positively. This is the same as our hypothesis, that credit constraints in generation  $t-1$  determine the parental investment in children's education, which has the intergenerational impact on income inequality. For poor parents with superior endowment, children saw the dawn to reduce the poverty but the lack of education investment stops the children attaining advantaged study, which makes them fail in competing with children from rich families. To this extent, it is the credit constraint that perpetuates cross-dynastic income inequality. The notion of education is negatively associated with growth of inequality, which is the same as our ideas that more education helps developing human capital and

increasing one's probability to get high income. And also we find the negative effect of openness as well as the positive effect of population to the inequality.

After the preliminary analysis, we involve the equity market liberalization to investigate the effect of itself on persistent cross-dynastic income inequality. Table 5 presents robust results by using a fixed effect estimation method, while in Table 6 these results remain robust after considering endogeneity and using the method of GMM. The regressions reported in column A1, A2 and A3 are the standard determinants, which exclude the impact of equity market liberalization on income inequality. It is clear to see that the initial income inequality and credit constraints in last generation enter positively and significantly, which are exactly the same as our expectation. Also, credit constraints, denoted by private credit, and secondary school enrollment are negatively related to inequality, which indicates that the increasing of human capital accumulation through loosening of credit constraints slow down the persistent intergenerational income inequality, as our hypothesis stated. Results in column B and column C consider the various measurements of liberalization, which are respectively the official equity market liberalization and first-sight liberalization, both of which present the information of equity market liberalization. The initial inequality, credit constraints and gross enrollment in secondary school remain significant. However, in columns B3 and C3, the cross term of equity market liberalization and credit constraints in the last generation, denoted as the time of  $t-1$ , enters negatively, which shows that when we consider the effect of liberalization the financial market friction in generation  $t-1$  can be smoothed by foreign equity flow. The severe credit constraint causes parents to refrain from investing in their children's education, which hinders them from accumulating human capital, which is the key to high income. However, when we consider the equity market liberalization, parents have a brand new way to obtain financing and may expand their investment opportunity. To this extent, parents have much more opportunity to obtain financial support and invest in their children's education, which will definitely reduce the persistence of cross-dynastic income inequality. And as the same as the former estimation results, we find the negative effect of openness and positive effect of population to the inequality.

Table 5: Results with fixed effect

	A1	A2	A3	B1	B2	B3	C1	C2	C3
	Standard determinates			Official liberalization dummy			Fist sign liberalization dummy		
Initial Gini	0.1269*** (3.64)	0.1486*** (4.18)	0.1409*** (3.98)	0.1265*** (3.63)	0.1335*** (3.8)	0.1205*** (3.37)	0.1281*** (3.67)	0.1262*** (3.6)	0.1249*** (3.49)
Education	-0.0851*** (-5.09)	-0.0938*** (-5.54)	-0.0924*** (-5.47)	-0.0887*** (-5.26)	-0.0923*** (-5.45)	-0.1012*** (-5.76)	-0.0889*** (-5.23)	-0.0851*** (-5.08)	-0.1001*** (-5.65)
Credit constraint		-0.0241*** (-3.02)	-0.0473*** (-3.56)						
L. FinCrd			0.0286** (2.2)						
EquLib				0.0071 (1.57)	0.0139** (2.44)	0.0205*** (3.07)	0.0058 (1.24)		0.0183*** (2.6)
EquLib*L.FinCrd					-0.0105* (-1.86)	-0.0207*** (-2.64)		-0.0022 (-0.48)	-0.0186** (-2.32)
L.EquLib*Edu						0.0265* (1.88)			0.0225 (1.59)
Capital inflow	-0.0102* (-1.67)	-0.0112* (-1.82)	-0.0119* (-1.94)	-0.0114* (-1.85)	-0.0124** (-2)	-0.0135** (-2.18)	-0.0110* (-1.79)	-0.0102* (-1.66)	-0.0129*** (-2.08)
GDP per capita	0.0189 (1.12)	0.0140 (0.82)	0.0185 (1.09)	0.0163 (0.96)	0.0189 (1.11)	0.0223 (1.31)	0.0172 (1.02)	0.0230 (1.36)	0.0222 (1.3)
Openness (in constant price)	-0.0212*** (-2.66)	-0.0196*** (-2.46)	-0.0202*** (-2.53)	-0.0192*** (-2.39)	-0.0194*** (-2.41)	-0.0200*** (-2.49)	-0.0191*** (-2.35)	-0.0220*** (-2.75)	-0.0189*** (-2.33)
Investment (Share of Real GDP per capita)	-0.0031 (-0.5)	-0.0046 (-0.74)	-0.0039 (-0.64)	-0.0035 (-0.56)	-0.0038 (-0.62)	-0.0033 (-0.53)	-0.0036 (-0.58)	-0.0031 (-0.51)	-0.0036 (-0.59)
Government consumption expenture	0.0044 (0.48)	0.0050 (0.54)	0.0037 (0.4)	0.0047 (0.5)	0.0038 (0.41)	0.0033 (0.36)	0.0046 (0.5)	0.0034 (0.37)	0.0034 (0.37)
Population	0.0692*** (2.89)	0.0678*** (2.83)	0.0676*** (2.83)	0.0537** (2.07)	0.0575** (2.22)	0.0657** (2.5)	0.0576** (2.24)	0.0742*** (2.97)	0.0676*** (2.59)

t statistics in parentheses, \*significant at 10%; \*\*significant at 5%; \*\*\*significant at 1%

Table 6: Results with GMM

	A1	A2	A3	B1	B2	B3	C1	C2	C3
	Standard determinates			Official liberalization dummy			Fist-sign liberalization dummy		
Initial Gini	0.2344*** (21.27)	0.2107*** (27.11)	0.2269*** (11.61)	0.2297*** (14.76)	0.2214*** (22.92)	0.2275*** (10.53)	0.2424*** (24.72)	0.2215*** (22.89)	0.2118*** (15.12)
Education	-0.0385*** (-22.4)	-0.0365*** (-14.92)	-0.0415*** (-27.64)	-0.0431*** (-18.48)	-0.0460*** (-18.68)	-0.0922*** (-18.32)	-0.0417*** (-29.96)	-0.0466*** (-19.59)	-0.0902*** (-24.96)
Credit constraint		-0.0154*** (-4.81)	-0.0605*** (-14.27)						
L. FinCrd			0.0637*** (13.85)						
EquLib				0.0024*** (2.71)		0.0167*** (8.7)	0.0051*** (5.23)		0.0159*** (6.63)
EquLib*L.FinCrd					0.0040*** (3.7)	-0.0240*** (-12.13)		0.0058*** (5.2)	-0.0229*** (-11.15)
L.EquLib*Edu						0.0904*** (12.46)			0.0878*** (13.55)
Capital inflow	-0.0032* (-1.71)	-0.0073*** (-4.68)	-0.0054*** (-2.84)	-0.0079*** (-2.99)	-0.0042** (-2.03)	-0.0057*** (-3.25)	-0.0075*** (-6)	-0.0049** (-2.2)	-0.0052** (-2.12)
GDP per capita	-0.0099*** (-12.59)	-0.0120*** (-9.31)	-0.0104*** (-8.75)	-0.0095*** (-6.45)	-0.0092*** (-8.98)	-0.0054*** (-2.75)	-0.0099*** (-11.93)	-0.0093*** (-9.69)	-0.0074*** (-4.13)
Openness (in constant price)	-0.0107*** (-6.02)	-0.0032 (-1.43)	-0.0023 (-0.78)	-0.0064* (-1.88)	-0.0107*** (-4.06)	-0.0130*** (-3.65)	-0.0076*** (-2.84)	-0.0118*** (-4.4)	-0.0144*** (-4.98)
Investment (Share of Real	-0.0042 (-1.51)	-0.0047*** (-2.78)	0.0000 (0.01)	-0.0022 (-1.38)	0.0005 (0.29)	0.0039 (1.25)	-0.0048** (-2.18)	0.0008 (0.44)	0.0023 (0.84)
Government consumption	0.0043*** (3.88)	0.0066*** (5.23)	0.0062*** (5.93)	0.0039*** (3.21)	0.0032*** (4.23)	0.0009 (0.58)	0.0039*** (4.25)	0.0030*** (3.87)	0.0019 (1.41)
Population	-0.0007 (-0.87)	-0.0037*** (-3.07)	-0.0019 (-1.23)	-0.0008 (-0.66)	0.0013 (1.13)	0.0061*** (3.96)	0.0000 (0.01)	0.0015 (1.22)	0.0058*** (4.56)

## **4 The effect of foreign equity flow in different domestic stock markets**

### **4.1 Theoretical background of the effect**

At the first stage of estimating the model, it is certified that equity market liberalization, acting as an external shock on domestic credit constraints, has a role in alleviating or diminishing credit constraints, and therefore to affect the income inequality by loosening the credit constraints on accumulating human capital. Considering the income inequality is significant in under-developed and developing countries, whose activity in the domestic stock market is relatively low, we raise another question hereby: which kind of domestic equity markets benefit more from the diminishing credit constraints? It is important for us to investigate how the effects of foreign equity inflow vary with the activity of domestic stock market. If the less active domestic stock market, which more likely leads to insufficient financial support and then income inequality, benefits more from equity market liberalization, it is convincing to conclude that equity market liberalization could help to reduce the global persistent income inequality. However, if the more active domestic stock market prior to equity market reform gains more the conclusion may be very different.

So first of all, in Table 7 are the summary statistics in different domestic stock markets. It is clear to find the distinct effect of equity market liberalization on countries with different activity of domestic stock market. Countries with lower active domestic stock markets show significantly drops in income inequality after opening equity markets, while the ones with active domestic stock market display vaguely. Similarly, there is an increase in private equity after the opening of the equity market, while education rises as well. Statistically, it is obvious that the impact of equity market liberalization on different domestic stock markets is significant, especially on the less active markets.

In the empirical research, we must firstly investigate the relationship between domestic stock market activity and intergenerational income inequality and make sure whether the less active stock market leads to serious income inequality. If so, the way to compensate domestic stock market can definitely diminish cross-dynastic income inequality.

*Table 7: Summary statistics in different domestic stock market*

Variables	Pre-Liberalization		Post-Liberalization		Without-Liberalization	Fully-Liberalization
	active stock market	less Active stock market	active stock market	less Active stock market		
Gini growth rate(%)	-0.673603	0.01129	0.553021	-0.1350975	0.1487	0.2035
Gini coefficient	0.454092949	0.44394558	0.45724183	0.435638674	0.460963	0.486817
Private credit	0.420929823	0.573024941	0.43073891	0.823051901	0.552327	0.464066
Education	0.568774357	0.4854305	0.74736883	0.576614085	0.408171	1.090826
GDP growth rate(%)	3.494466775	2.307163802	4.01619571	3.735239351	2.517136	2.5422

Furthermore, we must assess how finance operates on income inequality. Finance can operate on intensive margins, enhancing the access to financial services for well-developed stock markets prior to the equity market liberalization (Greenwood and Jovanovich 1990). It is reasonable to believe that the initially active domestic stock market leads a relatively equal income distribution since it allocates resource among people efficiently. Before liberalization, people are supported by the domestic stock market, which makes it much more probable for the poor to invest in education and get a higher income. As a result, foreign equity flow, a complement of the domestic stock market, may help countries with better financial infrastructure more, which may not have so significant impact on world inequality. To this extent, we may say domestic stock markets and foreign equity flow act as complements.

However, at the same time, less-developed equity markets may gain more due to finance also operating on extensive margins? Initially a less active domestic stock market leads to serious inequality for it is hard to provide sufficient investment for poor, which definitely widens the inequality of income distribution. After financial reform, an under-developed stock market can provide the poor and former disadvantaged groups much more fund support than before. People may expand their economic opportunity through parental investment in education or self-investment in increasing the ability to acquire more income or wealth, which can reduce the intergenerational persistence of relative incomes. To this extent, we may say, domestic stock market and foreign equity flow act as substitutes. So it is crucial to find that whether the activity of domestic stock market exerts a complement or substitutional role on foreign equity flow. Knowing this, it is probable to conclude the impact of equity market liberalization on intergenerational income inequality.

## **4.2 Empirical framework of the effect**

To measure stock market activity, we choose stock market value traded divided by GDP (stvt) and stock market turnover ratio (stto) following the ideas by Manova (2008). We examine whether domestic stock market and foreign equity flow act as substitutes or complements by extending equation (1) and adding interactions of domestic stock market activity with equity market liberalization.

$$\begin{aligned}
 Inequl_{i,t} = & \beta_{igini} Igini_{i,t} + \beta_{crd} FinCrd_{i,t} + \beta_{mktlib} MktAct_{i,t} \times EquLib_{i,t} \\
 & + \beta_{mktedu} MktAct_{i,t} \times Edu_{i,t} + \beta_{mktlib1} MktAct_{i,t-1} \times EquLib_{i,t-1} \quad (Equation 2) \\
 & + \beta_{mktlibedu} MktAct_{i,t} \times EquLib_{i,t} \times Edu_{i,t} + \beta_{crd\vedu} FinCrd_{i,t-1} \times Edu_{i,t} \\
 & + \eta_{cv} Contl_{i,t} + \theta_i + v_t + e_{it}
 \end{aligned}$$

If countries with a lower level of initial income inequality (low Initial Gini) tend to experience slower reductions in that inequality, we expect  $\beta_{igini} > 0$  as before.  $\beta_{crd} < 0$ , since the fewer credit constraints (higher private credit), the slower the inequality growth. Similarly,  $\beta_{mktedu} < 0$  if an active domestic stock market stimulates investment in education, this simultaneously increases enrollment in secondary school and reduces the income inequality. And if active domestic stock market can alleviate the credit constraints laid in the last period, it may facilitates the education investments to children for parents and the  $\beta_{mktlib1} < 0$ . Finally, if domestic stock market and foreign equity flow act as substitutes, which means after equity market liberalization, less developed domestic stock market gains more and the extensive margin effect of finance operates, the income inequality will be reduced and  $\beta_{mktlib} > 0$ ,  $\beta_{mktlibedu} < 0$ .

### 4.3 Analysis of the empirical result

Before analyzing the impact of foreign equity flow on different domestic stock markets, it is necessary to ensure the relationship between domestic stock market activity and persistent cross-dynastic income inequality. In Table 5 column A1 and A2, we test this kind of relationship and, as our hypothesis stated, find that domestic stock market activity is negatively associated with income inequality, suggesting that countries with less active stock market tend to experience skewed income distribution.

Colum B, C, D and E in Table 8 show the results of testing whether the domestic stock market and foreign equity flow substitutes or complements. The results reported in column B, C and column D, E consider a variety of stock market activity measurements which are respectively stock market value traded and stock market turnover ratio. With the same consideration of stock market activity measurement, column B and C vary in different equity market liberalization dummy and so it does in column D and E. Results in column B and C focus on the measurement of stock market value traded and our findings are



Table 8: Foreign equity flow and domestic stock market

	(MktAct=stock market traded value)									(MktAct=stock market turnover ratio)				
	A1	A2	B1	B2 (official)	B3	C1	C2 (first sigh)	C3	D1	D2 (official)	D3	E1	E2 (first sigh)	E3
Initial Gini	0.1460*** (7.79)	0.1623*** (6.87)	0.1396*** (7.51)	0.1593*** (6.09)	0.0935*** (5.16)	0.1452*** (7.68)	0.1645*** (7.12)	0.1012*** (5.8)	0.1332*** (4.32)	0.1484*** (4.53)	0.1038*** (3.06)	0.1018*** (6.78)	0.0969*** (6.38)	0.1348*** (4.37)
FinCrd	0.0068*** (3.14)	0.0067*** (3.7)	0.0022 (0.73)	0.0033 (1.12)	-0.0094* (-1.88)	0.0021 (0.58)	0.0015 (0.4)	-0.0002 (-0.03)	0.0025 (0.84)	0.0030 (0.99)	-0.0036 (-0.76)	-0.0028 (-0.93)	-0.0025 (-0.87)	-0.0042 (-0.93)
Education	-0.0601*** (-13.42)	-0.0646*** (-13.42)												
MktAct1†	-0.0069*** (-5.38)													
MktAct2‡		-0.0040*** (-8.01)												
MktAct*EquLib			0.0631*** (8.13)	0.0711*** (8)	0.0641*** (5.28)	0.0738*** (9.51)	0.0743*** (6.41)	0.0806*** (11.68)	0.0064** (2.41)	0.0098*** (3.81)	0.0118*** (3.06)	0.0046 (1.16)	0.0044 (0.98)	0.0082** (2.4)
MktAct*Edu			-0.0741*** (-7.72)	-0.0348*** (-7.35)	-0.0314*** (-5.95)	-0.0854*** (-8.79)	-0.0401* (-1.68)	-0.0378*** (-4.55)	-0.0135*** (-3.51)	-0.0027 (-0.22)	-0.0098*** (-3.51)	-0.0101* (-2.04)	0.0000 (0)	-0.0127*** (-4.42)
MktAct*EquLib*Edu				-0.0495*** (-6.1)	-0.0478*** (-4.86)		-0.0478* (-1.87)	-0.0538*** (-5.26)		-0.0144 (-1.23)	-0.0118*** (-3.01)		-0.0091 (-0.76)	-0.0060 (-1.59)
L.MktAct*					0.0104			0.0005			-0.0006			-0.0012
L.FinCrd					(1.07)			(0.06)			(-0.16)			(-0.4)
L.FinCrd*Edu					0.0058 (0.98)			-0.0006 (-0.08)			0.0041 (0.8)			0.0000 (0)
Capital inflow	-0.0083** (-2.39)	-0.0096*** (-2.64)	-0.0125*** (-3.48)	-0.0111*** (-3.42)	-0.0110*** (-2.83)	-0.0119*** (-3.37)	-0.0087** (-2.1)	-0.0093** (-2.26)	-0.0103** (-2.23)	-0.0102** (-2.19)	-0.0134*** (-3.21)	-0.0200*** (-5.83)	-0.0195*** (-5.57)	-0.0141*** (-3.31)
GDP per capita	-0.0081* (-1.92)	-0.0112*** (-2.63)	-0.0176*** (-7.04)	-0.0123*** (-4.74)	-0.0030 (-0.63)	-0.0173*** (-6.04)	-0.0150*** (-3.34)	-0.0095*** (-3.64)	-0.0127*** (-3.94)	-0.0153*** (-4.09)	-0.0070 (-1.58)	-0.0152*** (-4.86)	-0.0137*** (-3.56)	-0.0101* (-1.78)
Openness in constant price	-0.0080** (-1.96)	-0.0079 (-1.36)	-0.0051 (-1.17)	-0.0106** (-2.14)	-0.0115** (-2.26)	-0.0053 (-1.22)	-0.0094** (-2)	-0.0127*** (-3.07)	-0.0100** (-2.39)	-0.0083* (-1.71)	-0.0070 (-1.61)	-0.0048 (-0.84)	-0.0064 (-1.06)	-0.0064 (-1.42)
Investment share of RGDP	-0.0090*** (-2.64)	-0.0081* (-1.91)	-0.0188*** (-3.67)	-0.0168*** (-4.52)	-0.0036 (-0.93)	-0.0174*** (-3.37)	-0.0160** (-2.46)	-0.0066* (-1.67)	-0.0217*** (-5.07)	-0.0254*** (-4.81)	-0.0041 (-1.12)	-0.0174*** (-5.37)	-0.0164*** (-4.87)	-0.0090** (-2.09)
Government consumption	0.0049 (1.11)	0.0076 (1.6)	0.0144*** (4.76)	0.0110*** (2.91)	0.0023 (0.53)	0.0138*** (4.3)	0.0105** (2.11)	0.0058* (1.81)	0.0095*** (2.74)	0.0124*** (3.01)	0.0023 (0.37)	0.0107*** (3.14)	0.0087* (1.96)	0.0040 (0.69)
Population	-0.0089** (-2.39)	-0.0104** (-2.28)	-0.0159*** (-4)	-0.0114*** (-5.86)	-0.0052 (-1.27)	-0.0147*** (-3.59)	-0.0105* (-1.86)	-0.0097*** (-2.87)	-0.0099*** (-2.86)	-0.0136*** (-3.41)	-0.0078 (-1.49)	-0.0069** (-2.23)	-0.0049 (-1.07)	-0.0016 (-0.29)

robust to using both official liberalization dummy and first sign dummy. We find that the initial Gini and credit constraints are associated with the growth of income inequality in the way we expected. The positive relationship between the interaction between domestic stock market activity and foreign equity flow with the growth of income inequality in column B and C prove that equity market liberalization benefits the less-developed domestic stock market more than the developed ones, slowing down the growth of income inequality. What's more, the negative relationship between the interaction of market activity and education indicates that similar with foreign equity flow, domestic stock market stimulates investment in human capital, which absolutely alleviates the transmission of inequality. The triple interaction term is negatively associated with Gini growth, as we expected, which indicates that foreign equity flow stimulates less-developed domestic stock markets, increases the human capital accumulation, thus equalizes the income distribution. From this analysis, there is compelling evidence that foreign equity flow and domestic stock markets act as substitutes. When we consider the stock market turnover ratio as the indicator of domestic stock market activity, the results remain significant when using the official liberalization dummy. The main results are similar as in column B and C and the same as we expected. This can be considered the third piece of evidence that equity market liberalization compensates for under-developed stock market.

At the beginning of the analysis in this section, we have already testified the relationship between domestic stock market and income inequality, which implies that a less active stock market is associated with severe cross-dynastic income inequality. As a result, based on the above analysis, foreign equity flow compensates the less active domestic stock market, which indicates that an income unequal country resulted from less active domestic stock market gains more from equity market liberalization. There is no doubt that though providing sufficient financial support, equity market liberalization reduces the persistent cross-dynastic income inequality.

## 5 Conclusions

This paper illustrates that equity market liberalization, an external shock of the financial market, can smooth out financial market frictions such as credit constraints and expand the economic opportunities especially in under-developed domestic stock market for poor. Without consideration of equity market liberalization, the lack of parental education investment hinders human capital development and accumulation, which is the main reason for persistent cross-dynastic income inequality. Besides, we testify the relationship between domestic stock market activity and intergenerational income inequality and find that a less active stock market leads to severe cross-dynastic income inequality. Furthermore, we prove that finance operating on extensive margins more than intensive margins on inequality through empirical research. In particular, we test that the foreign equity flow acts as a substitute of domestic stock market, which means that initially less active domestic equity market benefits more from foreign equity flow. Considering income inequality is serious in countries with less active stock markets, opening equity market benefits more to this kind of countries and consequently reduces persistent cross-dynastic income inequality.

## References

- Arellano, M., and S. Bond (1991). Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. *The Review of Economic Studies* 58(2): 277–297. <http://ideas.repec.org/a/bla/restud/v58y1991i2p277-97.html>
- Demirgüç-Kunt, A., and R. Levine (2009). Finance and inequality: Theory and evidence, NBER Working Paper 15275. <http://ideas.repec.org/p/nbr/nberwo/15275.html>
- Beck, T., A. Demirgüç-Kunt, and R. Levine (2007) Finance, inequality and the poor. *Journal of Economic Growth*, 12(1): 27–49. <http://ideas.repec.org/a/kap/jecgro/v12y2007i1p27-49.html>
- Bekaert, G., and Harvey, C. R., and C. Lundblad (2005). Does financial liberalization spur growth? *Journal of Financial Economics* 77(1): 3–55. <http://ideas.repec.org/a/eee/jfinec/v77y2005i1p3-55.html>
- Becker, G.S., and N. Tomes (1979). An equilibrium theory of the distribution of income and intergenerational mobility. *Journal of Political Economy* 87(6): 1153–1189. <http://ideas.repec.org/a/ucp/jpolec/v87y1979i6p1153-89.html>
- Blundell, R., and S. Bond (1998). Initial conditions and moment restrictions in dynamic panel data models. *Journal of Econometrics* 87(1): 115–143. <http://ideas.repec.org/a/eee/econom/v87y1998i1p115-143.html>
- Claessens, S., and E. Perotti (2007). Finance and inequality: Channels and evidence. *Journal of Comparative Economics* 35(4): 48–773. <http://ideas.repec.org/a/eee/jecon/v35y2007i4p748-773.html>
- Demirgüç-Kunt, A., and R. Levine (2009). Finance and Inequality: Theory and Evidence. NBER Working Paper 15275. <http://ideas.repec.org/p/nbr/nberwo/15275.html>
- Galor, O., and O. Moav (2004). From physical to human capital accumulation: Inequality and the process of development. *Review of Economic Studies* 71(4):1001–1026. <http://ideas.repec.org/a/bla/restud/v71y2004i4p1001-1026.html>
- Galor, O. (2009). Inequality and economic development: An overview. Working Paper 2009-3, Brown University, Department of Economics. <http://ideas.repec.org/p/bro/econwp/2009-3.html>
- Greenwood, J., and B. Jovanovic (1990). Financial development, growth, and the distribution of income. *Journal of Political Economy* 98(5): 1076–1107. <http://ideas.repec.org/a/ucp/jpolec/v98y1990i5p1076-1107.html>
- Manova, K. (2008). Credit Constraints, Equity Market Liberalizations and International Trade. *Journal of International Economics* 76 (1): 33–47. <http://ideas.repec.org/a/eee/inecon/v76y2008i1p33-47.html>

- Levine, R. (2005) Finance and growth: Theory and evidence. In: Aghion, P., and S. Durlauf (eds.) *Handbook of Economic Growth*. Amsterdam: North-Holland Elsevier.  
<http://ideas.repec.org/h/eee/grochp/1-12.html>
- Michalopoulos, S., L. Laeven, and R. Levine (2009). Financial innovation and endogenous growth. NBER Working Papers 15356.  
<http://ideas.repec.org/p/nbr/nberwo/15356.html>
- UNU-WIDER. (2005). World Income Inequality Database, Version 2.0a.  
<http://www.nsd.uib.no/macrodatabguide/set.html?id=49&sub=1>

Please note:

You are most sincerely encouraged to participate in the open assessment of this article. You can do so by either recommending the article or by posting your comments.

Please go to:

<http://dx.doi.org/10.5018/economics-ejournal.ja.2013-12>

The Editor