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A Cross-National Evidence on Initial Inequality and Openness [*]

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Using a cross-national evidence, this paper establishes a negative association between initial inequality, either asset or income, and trade openness. It is found that a country with a higher initial inequality (measured by land or income gini indices close to 1960) tends to have more trade protection. In other words, a country with greater asset or income inequality generally has a lower "openness measure" (compiled by Sachs and Warner), smaller "shares of trade (sum of export and import) and import to GDP" and a higher "black market premium" (compiled by Levine, Loayza and Beck). The empirical results are robust to a few different econometric methods and to the inclusion of some independent variables. A possible interpretation of the observed relationship is that well-organized "special interests" groups can influence their interests in the formation of trade policy. Further, the existence and number of organized groups in an economy can be determined by the asset and/or income distributions. Therefore, the main implication of this paper is that it is possible to observe an indirect impact of inequality on economic performances, such as investment and economic growth, through openness as long as the openness is endogenous on initial inequality.

Keywords: Initial inequality, Income gini index, Land gini index, Openness

1. INTRODUCTION

One of the prevailing issues in recent economy is to recognize the impact of globalization on economic performances. In particular, the outcomes of trade openness have been widely examined over long periods of time and most economists agree that a society's welfare is maximized when there is free trade in the absence of market imperfections. Yet, trade frictions are prevalent in international trade, hence, trade openness is a constant subject of political debate. As an influential paper, Grossman and Helpman (1994) theoretically established that the equilibrium structure of trade protection results from the pressures applied by well-organized "special interests" groups.[1]

However, few studies were focused on the sources of trade openness. As long as the degree of a country's openness can be determined by the existence of "special interests," it is possible to claim that the determinants of "special interests" can affect the openness. Specifically, initial asset and/or income inequalities may affect the formation of "special interests" groups. Indeed, a smaller number of rich producers form a greater number of lobbies in setting more protection than do large poor consumers. Mitra (1999) argued that a greater inequality in asset distribution leads to greater number of lobbies and more protection.[2]

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[1] See also Helpman (1995) and Mitra (1999).

[2] Few attempts have been made to analyze the linkage between inequality and trade protection. The only exceptions are Mayer (1984), Mitra (1999) and Yang (1995), at least for my knowledge. Mayer and Yang focused on the formation of equilibrium tariff, which is determined by the median voter's ownership of the sector specific input (Mayer) or weighted mean of voter's individually

The main motivation of this paper is to examine the impacts of initial inequalities, measured by land or income gini indices around 1960, on openness using cross-national evidence. In other words, a few different openness measures will be regressed on land or income gini indices as well as other explanatory variables. The empirical findings are consistent with the theoretical background: that is, a country with a greater asset or income inequality tends to have more trade protection. The impacts remain broadly unchanged when using a few different openness measures and are robust to the inclusion of some exogenous variables.

The question whether initial inequality affects openness has some important implications. First, most empirical studies on the linkage between trade openness and the real sector, such as economic growth, treated the openness as an exogenous variable[3], which can be associated with the initial level of economic situation, such as inequality. Second, we are able to observe an indirect impact of inequality on economic performance through openness as long as the openness is endogenous on initial inequality. Third, several studies have examined the change in investment levels (or economic growth rates) through various channels when inequality varies. For instance, initial inequality affects investment or economic growth through an imperfect credit market (e.g., Aghion and Bolton, 1997; and Galor and Zeira, 1993), political process (e.g., Alesina and Rodrik, 1994; and Persson and Tabellini, 1994), education expenditures (e.g., Sylwester, 2000) and saving rates. However, few studies have focused on other channels. Another plausible channel affecting aggregate economic performance is trade openness, which is the main consideration of this paper. Finally, initial inequality has an important role in determining current or future various inequalities through trade openness. For instance, Borjas and Ramsey (1995) indicated that a small number of trade-impacted concentrated industries can explain the aggregate wage inequality in the US.

The remainder of this paper is organized as follows. In Section II, the theoretical background is provided to analyze a negative association between initial inequality and openness. Section III consists of data descriptions and a set of empirical equations. Section IV provides empirical findings from cross-section estimations using a few different econometric methods. That is, several openness measures are regressed on initial inequality as well as other explanatory variables. Finally, Section V contains some conclusions and implications.

2. THEORETICAL BACKGROUND

It is generally accepted that free trade promotes economic growth by specializing to comparative advantage, adopting a new technology through investment and exposure to new goods, exploiting increasing returns from the larger markets and so on (e.g., Frankel and Romer, 1999; and Grossman and Helpman, 1991). That is, economists have principally examined the effects of trade openness on economic performances through various channels.[4] However, they were less focused on the determinants of openness to

optimal tariff (Yang). More recently, Mitra provided a lobby formation model, in which trade policy is determined through political contributions by small rich producers.

[3] See Frankel and Romer (1999) for more detailed issues on this matter.

[4] A wide empirical investigation concerning trade policy and economic growth using cross-national evidence was provided in Rodriguez and Rodrik (1999).

free trade. Most analyses treated the degree of a country's openness as a pre-determined (exogenous) variable.

In particular, few attempts have been made to analyze the impacts of initial asset or income distributions on the openness. Just as in the lobby formation model (e.g., Grossman and Helpman, 1994; and Mitra, 1999), well-organized groups can influence their interests in the formation of trade policy. The existence and number of organized groups in an economy can be determined by the asset and/or income distributions (e.g., Mayer, 1984; Mitra, 1999; and Muller, 1989). Mitra suggested that industries with large stocks of capital, more inelastic demand, fewer capital owners and smaller geographical dispersions could be organized in equilibrium. One typical example of the lobbies and policies is concerned with trade openness. A smaller number of big potential gainers have much greater incentive to lobby in securing more trade protection than a large number of small potential losers (e.g., Helpman, 1995; Hwang, 2001; and Mayer, 1984). In other words, small rich producers produce a greater number of lobbies in setting more trade protection than do large poor consumers. In addition, Rodriguez (1999) provided a formal political model that the positive relationship exists between inequality and rent-seeking, in which redistribution is decreasing in inequality. From the points of the existing literature, one can empirically establish that a strong and negative association exists between initial inequality and openness, which is the purpose of this paper.

Consider the following equation that determines trade openness, denoted as OPEN.

$$\text{OPEN} = f\,[\text{Inequality}\ (-),\ X], \tag{1}$$

where $f\,[*]$ is a linear function of its respective variable. Inequality can be either LGI or IGI, where LGI and IGI are the abbreviations of "Land Gini Index" and "Income Gini Index," respectively. Other factors that are associated with trade openness besides income or asset inequalities are denoted as X. The sign " – " indicates that asset or income inequalities are predicated to have negative effects upon the dependent variable. In equation (1), it is assumed that a country with a higher initial inequality tends to have more trade protection. Indeed, the empirical analysis based on (1) is to examine the impacts of initial inequality (LGI or IGI) on several openness measures.

It is worthwhile to note that there are some analyses on the effects of trade openness on income inequality.[5] For example, Spilimbergo, Londoño, and Székely (1999) examined the effects of several trade openness measures on income distribution. To represent income inequality, they used the income gini index compiled by Deininger and Squire (1996). They concluded that the effect of openness on income inequality depends on factor endowments; namely, skill-intensive countries have more equal income distributions than land and capital-intensive countries. In contrast with their work, the analysis of this paper uses LGI and IGI close to 1960 that may be considered as predetermined measures of asset and income inequalities. Therefore, it is possible to trace out the reverse effects of initial inequality on openness.

[5] The effects of trade on wage inequality have been more widely examined (e.g., Borjas and Ramsey, 1995)

3. DATA AND EMPIRICAL EQUATIONS

The choice of countries was largely dictated by the availability of the data, such as the land gini index around 1960. The sources and short descriptions for major data are provided in Table A1 in Appendix. The main purpose of this paper is to consider how changes in the openness may be affected by initial inequalities. Data on land distribution (i.e., Land Gini Index) are used to represent the initial asset inequality, because data on the distribution of other income generating assets, such as bonds and equity, are available for only a limited number of countries. The Land Gini Index (LGI) is obtained from a study by Deininger and Squire (1998),[6] and the index was compiled based on the land rental market uses. The Income Gini Index (IGI) that was also compiled by Deininger and Squire (1996) is used to represent the initial income inequality. We preferentially make use of the "high quality" data on IGI. In countries for which these data are not available, it is taken the IGI used in Alesina and Rodrik (1994). The selection of both data close to 1960 is to reflect an initial level of inequality and data earlier than 1960 is basically available in very limited countries. The summary of statistics for LGI and IGI are provided in Table 1, which show huge variations across countries. For example, LGI varies from 27.43 in Korea Rep. to 93.55 in Peru. Unfortunately, the observation of IGI (N = 47) is smaller than that of LGI (N = 57), which shrinks the sample size of our analysis.

Table 1. Summary Statistics of Primary Variables

Variable	Mean	Median	Standard Deviation	Maximum	Minimum	Sample Size
LGI	67.38	71.00	16.52	93.55	27.43	57
IGI	43.94	42.79	10.83	67.83	25.30	47
OPEN6590	0.48	0.23	0.45	1	0	57
BMP7095	0.17	0.07	0.27	1.40	0	53
TS8485	63.10	54.96	33.76	158.18	14.31	48
IMS8485	31.45	26.99	17.65	86.84	5.51	47
DEQ	0.32	0.33	0.21	0.71	0.01	50

Note: See Table A1 for the definitions of variables.

Four openness measures are separately regressed on the initial inequality and other variables that may affect the openness. First, we begin by considering the Sachs and Warner (1995) openness measure, denoted as OPEN6590. Data on OPEN6590, scaled between 0 (least open) and 1 (most open), is the fraction of years during the period 1965-1990 in which the country is rated as an open economy according to the following criteria. An economy is deemed to be open to trade if it satisfies four tests: (i) average tariff rates below 40 percent; (ii) average quota and licensing coverage of imports of less than 40 percent; (iii) a black market exchange rate premium that averaged less than 20 percent during the decade of the 1970s and 1980s; and (iv) no extreme controls (taxes, quotas,

[6] The World Bank kindly provided the data on LGI compiled by Deininger and Squire (1998).

state monopolies) on exports.[7] Therefore, the first empirical regression takes the following form:

$$(OPEN6590)_i = c + \alpha_1 (Inequality)_i + \alpha_2 Ln(GDP65)_i + \alpha_3 Ln(POP65)_i + \varepsilon_i, \quad (2)$$

Here the subscript i denotes countries; c is a constant; α_j (j = 1,2,3) are estimated coefficients of the corresponding independent variables; Inequality can be either LGI or IGI; and ε is unobservable components. Of particular interest in (2) is the estimated coefficient of α_1, which shows whether OPEN6590 is affected by the degrees of initial asset or income inequalities. The expectation of the coefficient is a negative sign and statistically significant, implying that a greater level of initial asset or income inequality result in more trade protection.

Since the indicators of openness are highly correlated with other sources of bad economic performances, the initial level of GDP per capita estimated in current international prices in 1965 and population in 1965 (denoted as GDP65 and POP65, respectively) are used as independent variables to represent the proxies for the initial stage of an economy. Both variables are drawn from the Penn World Tables 5.6. GDP65 and POP65 are first-differenced since the measures have huge variations across countries. This is done to avoid any biased estimations resulting from a greater effect of a smaller number of countries that have greater volumes of GDP per capita and population in 1965.

Second, Black Market Premium (BMP) provided by Levine, Loayza and Beck (1999) data set is considered as another openness indicator. The BMP is defined as the ratio of black market exchange rate and official exchange rate minus one, which is the average during the period 1970-95, denoted as BMP7095. Rodriguez and Rodrik (1999) provided a plausible theoretical argument that, under certain conditions, foreign exchange restrictions act as a trade barrier. Suppose that all imports are financed at the margin by buying foreign currency in the black market, while all export receipts are handed to the central bank. In this case, the ratio of import to export exchange rates will be (1+BMP), and hence the presence of a BMP works exactly like a trade restriction. However, we need to be more careful to interpret the BMP as an indicator of trade policy, because the reverse case of the above situation does not work like a trade restriction.[8] Although the argument whether BMP can be a measure of trade restriction is controversial, it is natural to think that the existence of a sizable BMP over long periods of time reflects the policy failure, which adversely impact on openness to free trade. In addition, the simple correlation coefficient between OPEN6590 and BMP7095 is relatively high; -0.52. One of the reasons is that the BMP is included as a criterion in the formulation of the OPEN6590.

The regression form is the same as in (2) except the dependent variable, and we expect a positive and significant coefficient of inequality (either LGI or IGI). This means that a country with a higher initial inequality results in a higher BMP. Since it is possible to obtain the panel data on BMP, the regression proceeds in the pooled estimation by combining the average BMP for each of the five periods (1970-75, 1975-80, 1980-85, 1985-90 and 1990-95). To consider the correlations among error terms in each period, the SURE (Seemingly Unrelated Regression Estimation) method is used for the panel analysis, and all regressions are based on a fixed-effect regression model. For example, a shock

[7] See Sachs and Warner (1995) for more detailed measurement on OPEN6590. Some arguments for an earlier version of this data (a zero-one dummy) was also provided in Rodriguez and Rodrik (1999)

[8] See Rodriguez and Rodrik (1999) for more detailed examination on this matter.

affecting BMP for the period 1970-75 may spill over and affect BMP for the period 1975-80 or other periods. The BMP regression for the panel estimation takes the following form:

$$\begin{aligned} BMP_i = {} & c^* DY7075 + c^* DY7580 + c^* DY8085 + c^* DY8590 + c^* DY9095 \\ & + \alpha_1 (LGI * DY7075)_i + \alpha_2 (LGI * DY7580)_i + \alpha_3 (LGI * DY8085)_i \\ & + \alpha_4 (LGI * DY8590)_i + \alpha_5 (LGI * DY9095)_i \\ & + \beta_1 Ln(GDP)_i + \beta_2 Ln(POP)_i + \text{error term.} \end{aligned} \quad (3)$$

Here, the subscript i denotes countries; c is a constant; DY7075 (7580, 8085, 8590 and 9095) represents a time dummy for the period 1970-75 (1975-80, 1980-85, 1985-90 and 1990-95)[9]; α_j (j = 1…5) and β_k (k = 1,2) are the estimated coefficients of corresponding independent variables.

Third, two conventional openness measures that are highly correlated to each other are also examined on how they are affected by the initial asset distributions. One is the Trade Share (TS), which is the sum of the exports and imports of goods and services as a percentage of GDP. The other measure is Import Share (IMS), which is the ratio of imports to GDP. Both are the average for each of the three periods 1974-75, 1984-85 and 1989-90 (TS), and 1974-75, 1984-85 and 1994-95 (IMS), respectively. Both data are drawn from the World Bank's (2000) *World Development Indicators*. Data on TS for the period 1989-90 is used instead of 1994-95, because the data on TS in the latter period are available in the smaller number of countries from the same source. The sample statistics for TS and IMS, for example, at the period 1984-85 are provided in Table 1, which show huge variations across countries.

The analysis will account for how comparative advantage arising out of differences in endowment may influence the volumes of trade and import. To do this, data on stocks of natural resource abundance (SXP), arable land (AL), physical capital (INV) and human capital (SSA) accumulation are used as endowment measures. The percentage of primary product exports to GDP in 1971 is used as a proxy of the natural resource abundance (adopted from Sachs and Warner, 1995). The data on hectares of arable land (in thousands) is from the "Food and Agriculture Organization in the United Nations (FAO)" statistics yearbook for various years.[10] The percentage of secondary school attained in total population aged 25 and over, adopted from Barro and Lee (1996), serves as a proxy of the stock of human capital endowment. Although data on SXP, AL and SSA are available, data on physical capital in developing countries are not obtainable. Hence, the discounted sum of investment flows of the previous 15 years is used as the proxy of physical capital (INV) endowment. This measure is similar to Balassa (1979), without a slightly longer prior period in a particular year. It must be noted that data on SSA for 1995 are not possible to obtain from the same source.

Therefore, the following equations will be separately and jointly estimated.

$$Ln(TS)_{it} = c_1 + \alpha_1 (LGI)_i + \alpha_2 Ln(SXP)_i + \alpha_3 Ln(X)_{it} + \text{error term}, \quad (4)$$

$$Ln(IMS)_{it} = c_2 + \alpha_4 (LGI)_i + \alpha_5 Ln(SXP)_i + \alpha_6 Ln(X)_{it} + \text{error term}, \quad (5)$$

[9] Note that LGI*DY7075 denotes the multiplication between LGI and a time dummy for period 1970-75.

[10] These may be downloaded from http://www.fao.org.

where the subscripts i and t denote countries and time periods; c_1 and c_2 are constants; and *X* is a set of endowment measures excluding a natural resource abundance measure (SXP) that does not vary with time;[11] and α_j (j=1,….., 6) are the estimated coefficients of corresponding independent variables. Of particular interests in (4) and (5) are the estimated coefficients of α_1 in (4) and α_4 in (5), which show whether trade and import volumes are affected by the initial asset inequality. The expectations of the two coefficients are negative signs and statistically significant due to the same reason as in the previous estimation equations. The dependent variables and all endowment measures are first-differenced since some measures have a greater variation across countries. This is designed to avoid any biased estimation resulting from a greater effect of a smaller number of countries that have greater volumes of the endowment measures.

Two econometric methods, such as the OLS and Two-Stage Least Square (TSLS) will be used in the separate estimations. It is less likely to avoid an endogenity bias because LGI may be affected by other variables in spite of the fact that we use an earlier data on LGI. The distance of the country from the equator (DEQ), scaled between 0 and 1, from Levine, Loayza and Beck (1999) data set is used as the instrumental variable for LGI in TSLS. Data on DEQ is a proxy for the extent to which a country is protected by restrictions to trade with neighborhood countries, which can serve a potential source of rents and hence generates inequalities. The simple correlation coefficient with LGI is -0.48 and statistically significant at one percent level, whereas DEQ is relatively less correlated with TS (i.e., correlation coefficients for each period are as follows: 1974-75: 0.04, 1984-85: 0.17, 1989-90: 0.05) and with IMS (i.e., 1974-75: 0.03, 1984-85: 0.12, 1989-90: -0.09). The estimated coefficients α_2, α_3, α_5 and α_6 suggest the impacts of a country's endowment measures on trade openness.

In addition, (4) and (5) are jointly estimated for two periods (1974-75 and 1984-85). To accommodate the spillovers between two equations, the SURE method will be used to estimate the system equation. That is, the shock affecting TS may spill over and affect IMS and vice versa. The results on system equation will increase the reliability of those from separate estimations as long as both methods show very similar results.

4. EMPIRICAL FINDINGS

Empirical analysis consists of a set of cross-section estimations in which several openness indicators are regressed on the measures of the land or the income gini indices as well as other explanatory variables. The empirical findings on the measure of OPEN6590 are provided in Table 2. Tables 3 and 4 contain the results with respect to the BMP using the OLS method and the panel estimation using the SURE method, represented in (3), respectively. Tables 5 and 6 provide the results of separate regressions denoted in (4) and (5), respectively. Finally, the results on the system estimation, combining (4) and (5), are provided in Table 7.

It is found that both initial asset and income distributions have strong and significant impacts on the formation of trade openness. In Table 2, the regression results indicate that

[11] Although the percentage of primary product exports to GDP (SXP) is not time invariant, the SXP is separated from X in (4) and (5). This is done to follow the conceptual meaning of "natural resource abundance." While it is also tried to use time variant SXP as in other endowment measures, the results are very similar to those provided in this paper, which are available upon request from the author.

a higher asset and income inequality results in the persistence of a lower level of openness. For example, an improve in inequality (i.e., a decrease in LGI) of a country by one standard deviation (16.45 points) is associated with an increase in the OPEN6590 of about 0.17 percentage points, after accounting for the effects of other variables in Column (2). Moreover, it can be seen that the initial stage of the economy is an important factor in determining the openness. A higher GDP per capita in 1965 would significantly lead to more openness. However, there is little evidence on the impact of initial population on the degree of openness. It is worthwhile to note that three variables (LGI, IGI and LGI*IGI) are added in an attempt to determine the individual and joint effects of LGI and IGI on the openness in the same regression. In this situation however, a serious multicollinearity problem arises. The analyses in Table 2 only focus on the individual effects of LGI or IGI on OPEN6590.

Table 2. Initial Inequality and Openness

Dependent Variable: OPEN6590 (Openness measure by Sachs and Warner, 1995)

Independent Variables	**(1)**	**(2)**	**(3)**	**(4)**
Constant	1.10*** (5.11)	-0.72 (-1.44)	1.40*** (5.61)	-0.12 (-0.15)
LGI	-0.92*** (-3.02)	-1.01*** (-4.17)		
IGI			-2.17*** (-4.13)	-1.68*** (-2.73)
Ln(GDP65)		0.30*** (6.27)		0.22*** (3.19)
Ln(POP65)		-0.02 (-0.43)		-0.01 (-0.34)
R^2	0.11	0.44	0.28	0.43
Sample Size	57	57	47	47

Notes: (i) *t*-statistics are in parentheses based on the White's heteroskedasticity-consistent standard errors and covariance. (ii) ***: significant at one percent level, **: significant at five percent level and *: significant at ten percent level. (iii) The estimated coefficients of LGI and IGI are multiplied by 100.

The results on the impacts of initial inequalities on BMP7095, which is provided in Table 3, are also consistent with a prior expectation and are similar to those on OPEN6590. Countries with higher asset or income inequalities result in more restrictions on the foreign exchange, which provides another piece of evidence on trade protection. Initial levels of GDP per capita and population in 1970 provide little evidence on the trade barrier. Only in Column 2, it is found that a negative and significant association exists between GDP per capita in 1970 and BMP7095. The reduced significance on the estimated coefficient of IGI and Ln(GDP70) in Column 4 probably comes from the relatively high correlation between them (i.e., -0.39). It should be noted that we could observe a relatively small correlation coefficient of -0.013 between Ln(GDP70) and LGI. Hence, LGI is a more desirable data than IGI in doing this kind of analysis. Another attractiveness using LGI instead of IGI

provides a greater sample size in our analysis.[12] As provided in Table 1, the observations of LGI and IGI are 57 and 47, respectively.

Table 3. Initial Inequality and Black Market Premium

Dependent Variable: BMP7095 (Black Market Premium by Levine et. al., 1999)

Independent Variables	(1)	(2)	(3)	(4)
Constant	-0.36*** (-2.76)	0.31 (0.97)	-0.27 (-1.59)	0.43 (0.63)
LGI	0.79*** (4.23)	0.76*** (4.19)		
IGI			1.04*** (2.79)	0.78* (1.71)
Ln(GDP70)		- 0.07** (-2.02)		-0.05 (-0.95)
Ln(POP70)		-0.02 (-0.91)		-0.02 (-0.74)
R^2	0.26	0.33	0.16	0.18
Sample Size	53	53	43	43

Notes: (i) *t*-statistics are in parentheses based on the White's heteroskedasticity-consistent standard errors and covariance. (ii) ***: significant at one percent level, **: significant at five percent level and *: significant at ten percent level. (iii) The estimated coefficients of LGI and IGI are multiplied by 100.

Due to the above reasons, LGI is only used in the panel estimation using the SURE method, which is illustrated in Table 4.[13] It presents very similar results as in Table 3 except for the period 1975-80. Unfortunately, it is impossible to detect the reason of an inconsistent result in the period 1975-80. One plausible reason is that the world economy was seriously impacted by the two oil shocks in 1973 and 1978, which made economic environments very unstable. With the exception of the period 1975-80, the results in Table 4 confirm the positive and significant association between initial asset inequality and BMP as a trade barrier. In addition, both GDP per capita in 1970 and the pool series for lagged GDP per capita (GDP) have basically the same impacts on BMP. That is, an increase in Ln(GDP70) of a country by one standard deviation (i.e., 0.89 points) would lead to a decrease in the BMP of about 0.04 percentage points provided in Columns (2) and (3). However, it is impossible to obtain any significant impacts of the population on the determination of BMP as in the previous estimations. It is worthwhile to note that the size and significance of the LGI coefficient is quite reduced in the period 1990-95, which implies that the impact of initial inequality on BMP has a limited duration. It does suggest that a comprehensive study of the dynamic effect of LGI on BMP by increasing time

[12] Deininger and Squire (1998) provided a number of reasons why the data for land holdings are attractive. Among them, the distribution of land is more concentrated and characterized by greater cross-country variation than that of income.

[13] It has also tried to use IGI instead of LGI and provides a very similar result, which is available upon request from the author.

periods would be worthwhile for future research. In fact, the results of panel estimation are not much different from those of the separate regressions (except for the period 1975-80); hence, the results of panel estimation increase the reliability of the results of separate regressions.

Table 4. Pooled Estimation for Initial Asset Inequality and Black Market Premium

Dependent Variable: BMP (Black Market Premium by Levine et. al., 1999)

Independent Variables	(1)	(2)	(3)
Constant * DY7075	-0.39	0.003	0.01
Constant * DY7580	0.01	0.40	0.43
Constant * DY8085	-0.35	0.05	0.10
Constant * DY8590	-0.51	-0.11	-0.05
Constant * DY9095	-0.29	0.11	0.21
LGI* DY7075	0.90*** (2.89)	0.89*** (2.86)	0.87*** (2.82)
LGI* DY7580	0.08 (0.92)	0.07 (0.94)	0.06 (0.85)
LGI* DY8085	0.78*** (3.93)	0.76*** (3.99)	0.75*** (3.94)
LGI* DY8590	1.04*** (4.61)	1.04*** (4.64)	1.01*** (4.54)
LGI* DY9095	0.61** (2.18)	0.60** (2.12)	0.55* (1.95)
Ln(GDP70)		-0.04***(-3.35)	
Ln(POP70)		-0.01 (-1.07)	
Ln(GDP)			-0.04*** (-3.35)
Ln(POP)			-0.01 (-1.02)
R^2	0.18	0.21	0.21
Panel Observations	255	255	255

Notes: (i) SURE (Seemingly Unrelated Regression Estimation) method is used for estimations. (ii) Constant*DY7075 (7580, 8085, 8590 and 9095) and LGI* DY7075 (7580, 8085, 8590 and 9095) denote the multiplication between a constant and a time dummy, and between the land gini index and a time dummy for the period 1970-75 (1975-80, 1980-85, 1985-90 and 1990-95), respectively. Further, GDP and POP represent the pool series for lagged GDP per capita and population, respectively. (iii) ***: significant at one percent level, **: significant at five percent level and *: significant at ten percent level. (iv) *t*-statistics are provided in parentheses. (v) The estimated coefficients of LGI*time dummy are multiplied by 100.

The empirical results on the impacts of initial asset inequality on import and trade shares to GDP (provided in Tables 5, 6 and 7) are also consistent with a priori predictions. Since IGI has the constraint of a small sample size, LGI is only used in the estimations on trade and import shares. The estimated coefficients of LGI are negative and statistically significant at conventional significance levels, which implies that countries with higher

asset inequalities have more trade protection. This is another piece of evidence on the linkage between initial asset inequality and trade protection.

The results are robust to the inclusion of some endowment measures, which determines a country's comparative advantage. The estimated coefficients of the endowments are not consistently significant. A country with a large stock of arable land has significantly small shares of trade and import. The positive and significant effects of the proxy of natural resource abundance on trade share are derived from the source of data. The proxy for natural resource abundance, SXP, is the percentage of primary product exports to GDP in 1971. In most cases, the impacts of either physical or human capital endowments on trade and import shares are less evident. Using DEQ as an instrumental variable for LGI, all results using the TSLS method (Column (2) of each period) concerning trade and import shares are very similar to the results of the OLS method (Column (1) of each period).[14] Basically, it is empirically identified that an initial asset inequality acts as an obstacle in moving to free trade.

Table 5. Initial Asset Inequality and Trade Share

Dependent Variable: Ln(TS) for periods 1974-75, 1984-85 and 1989-90

Independent Variable	Ln(TS7475) (1) OLS	Ln(TS7475) (2) TSLS	Ln(TS8485) (1) OLS	Ln(TS8485) (2) TSLS	Ln(TS8990) (1) OLS	Ln(TS8990) (2) TSLS
Constant	6.07*** (4.61)	7.06*** (4.56)	7.45*** (6.04)	9.11*** (4.92)	4.12*** (2.80)	5.58** (2.41)
LGI	-1.12*** (-4.27)	-1.87*** (-3.76)	-1.14*** (-4.36)	-2.20*** (-3.15)	-0.88*** (-3.01)	-1.76** (-2.12)
Ln(SXP)	0.24*** (4.16)	0.29*** (4.10)	0.22*** (3.70)	0.28*** (3.69)	0.26*** (3.59)	0.30*** (3.28)
Ln(AL)	-0.20*** (-9.31)	-0.19*** (-9.37)	-0.18*** (-9.31)	-0.18*** (-7.38)	-0.16*** (-7.30)	-0.16*** (-7.46)
Ln(INV)	-0.08 (-0.33)	-0.21 (-0.72)	-0.41 (-1.68)	-0.62* (-1.95)	0.18 (0.66)	0.01 (0.03)
Ln(SSA)	0.06 (1.09)	0.07 (1.24)	0.15*** (3.13)	0.14** (2.20)	0.09 (1.28)	0.06 (0.78)
R^2	0.78	0.74	0.77	0.68	0.70	0.64
Sample Size	47	47	48	48	48	48

Notes: (i) *t*-statistics are in parentheses based on White's heteroskedasticity-consistent standard errors and covariance. (ii) ***: significant at one percent level, **: significant at five percent level and *: significant at ten percent level. (iii) Data on AL, INV and SSA are used on the same period as in the dependent variable. (iv) The estimated coefficients of LGI are multiplied by 100. (v) Instrumental variables in TSLS are constant, DEQ, Ln(SXP), Ln(AL), Ln(INV) and Ln(SSA).

[14] The estimated coefficient of LGI on Ln(IMS9495) using the TSLS method, provided in Table 5, is marginally insignificant (P-value = 0.11).

Table 6. Initial Asset Inequality and Import Share

Dependent Variable: Ln(IMS) for periods 1974-75, 1984-85 and 1994-95

Independent Variable	Ln(IMS7475) (1) OLS	Ln(IMS7475) (2) TSLS	Ln(IMS8485) (1) OLS	Ln(IMS8485) (2) TSLS	Ln(IMS9495) (1) OLS	Ln(IMS9495) (2) TSLS
Constant	5.74*** (4.12)	7.00*** (4.44)	7.86*** (5.10)	9.38*** (4.89)	1.91 (1.40)	2.81 (1.42)
LGI	-1.06*** (-3.68)	-2.04*** (-3.42)	-1.32*** (-4.05)	-2.25*** (-2.81)	-0.71** (-2.19)	-1.38 (-1.63)
Ln(SXP)	0.20*** (3.16)	0.27*** (3.21)	0.21*** (2.83)	0.27*** (2.89)	0.27*** (2.83)	0.30** (2.51)
Ln(AL)	-0.21*** (-7.62)	-0.20*** (-7.29)	-0.19*** (-8.05)	-0.19*** (-7.02)	-0.14*** (-5.42)	-0.14*** (-5.78)
Ln(INV)	-0.12 (-0.46)	-0.28 (-0.94)	-0.57* (-1.91)	-0.77** (-2.23)	0.46* (1.88)	0.37 (1.21)
Ln(SSA)	0.05 (0.92)	0.07 (1.12)	0.14** (2.16)	0.13* (1.90)	0.05 (0.70)	0.03 (0.39)
R^2	0.75	0.67	0.71	0.65	0.62	0.58
Sample Size	46	46	47	47	48	48

Notes: (i) *t*-statistics are in parentheses based on the White's heteroskedasticity-consistent standard errors and covariance. (ii) ***: significant at one percent level, **: significant at five percent level and *: significant at ten percent level. (iii) Data on AL, INV and SSA are used the same period as in the dependent variable. In period 1994-95, Ln(SSA) in 1990 is used instead of 1995 due to the data paucity. (iv) The estimated coefficients of LGI are multiplied by 100. (v) Instrumental variables in TSLS are constant, DEQ, Ln(SXP), Ln(AL), Ln(INV), and Ln(SSA).

Table 7 analyzes the system estimation on (4) and (5). As we anticipated, the results are very similar to those on the separate estimations. We do not regress on the period 1994-95 since the data on TS in that period are available in the smaller number of countries, and further that it is sufficient with two periods to conclude on the relationship between LGI and trade protection. That is, a worsening in asset inequality (an increase in LGI) of a country by one standard deviation (16.45 points) would lead to decreases in the Ln(TS7475) and Ln(IMS7475) to about 0.19 and 0.18 percentage points after accounting for the effects of some endowments. The results on some endowment measures show also similar pattern with those in the separate regressions.

Table 7. Initial Asset Inequality and Openness (Trade and Import share): System Estimation on Equations (4) and (5)

Dependent Variable: Ln(TS7475), Ln(TS8485), Ln(IMS7475) and Ln(IMS8485)

Independent Variable	Ln(TS7475)	Ln(IMS7475)	Ln(TS8485)	Ln(IMS 8485)
Constant	6.07*** (4.72)	5.74*** (4.16)	7.64*** (5.88)	8.13*** (5.23)
LGI	-1.13*** (-4.70)	-1.08*** (-4.15)	-1.17*** (-4.98)	-1.38*** (-4.87)
Ln(SXP)	0.24*** (4.64)	0.21*** (3.66)	0.23*** (4.50)	0.22*** (3.60)
Ln(AL)	-0.20*** (-8.59)	-0.21*** (-8.24)	-0.18*** (-8.32)	-0.20*** (-7.44)
Ln(INV)	-0.08 (-0.36)	-0.12 (-0.48)	-0.45* (-1.95)	-0.62** (-2.26)
Ln(SSA)	0.06 (1.21)	0.05 (0.97)	0.16*** (2.84)	0.15** (2.25)
R^2	0.78	0.75	0.77	0.71
Sample Size	47, 46	47, 46	48, 47	48, 47

Notes: (i) SURE (Seemingly Unrelated Regression Estimation) method is used for estimations. (ii) *t*-statistics are provided in parentheses. (iii) ***: significant at one percent level, **: significant at five percent level and *: significant at ten percent level. (iv) Data on AL, INV and SSA are used the same period as in the dependent variable. (v) The estimated coefficients of LGI are multiplied by 100.

In short, it is possible to conclude that a country with a higher initial inequality has a lower level of trade openness. In other words, a greater LGI or IGI generally causes a lower OPEN6590, smaller shares of trade and import to GDP and a higher BMP. These results may be derived form the pressures of well-organized "special interests" to secure their private gains through trade protection. The results are robust to the inclusion of several independent variables and to a few different econometric methods. In particular, the results on trade and import shares are robust to the inclusion of some endowment measures, which determine a country's comparative advantage.

5. CONCLUDING REMARKS

There were fewer attentions paid to the analysis on the linkage between initial inequality and trade openness. In this paper, an empirical examination is made on the impacts of initial inequality measured on the land or the income gini indices on several openness measures. The regression results generally suggest that greater inequalities lead to more trade protection. A possible interpretation of the observed association between initial inequality and openness is that well-organized "special-interests" groups can influence their interests in the formation of trade policy. Further, initial asset or income distributions may influence the existence and the number of organized groups in an economy. The results are robust to the inclusion of some independent variables and for various openness measures.

A number of issues remain for future study. First of all, it is worthwhile to induce the individual and joint (by combining the initial asset and income inequalities) effects of LGI and IGI on trade openness in the same regression. The focus of this paper is only on the individual effects of them due to the multicollinearity problem. Second, the best way to identify the effects of initial inequalities on policies is to look for a natural experiment. In other words, it may be more appropriate to find how an exogenous change in asset inequality (for instance, the discovery of a new natural resource) can affect trade policy. This will complete the analysis of this paper. Third, the land and income gini indices are not the only relevant form of inequality in generating trade policy. For example, one can consider the impacts of ethnic heterogeneity[15] on openness. Fourth, another plausible topic for future study is to identify an indirect effect of initial inequality on the real sector such as economic growth through trade openness. Finally, initial inequality has an important role in determining current or future inequalities (e.g., wage inequality) through trade openness. That is, the problem of causation between inequality and openness remains a controversial issue.

[15] For example, Taylor and Hudson (1972) provided the index of ethnolinguistic fractionalization, which means a measure of the probability that two randomly selected persons from a given country will not belong to the same ethnolinguistic group.

APPENDIX

Table A1. List of Variables and Sources

Variable	Definition	Source
LGI	Land Gini Index around 1960	World Bank, compiled by DS
IGI	Income Gini Index around 1960	DS
OPEN6590	Openness measure, scaled between 0 to 1, 1965-90 average	Sachs and Warner (1995)
BMP7095	Ratio of black market exchange rate and official exchange rate minus one, 1970-95 average	Levine, Loayza and Beck (LLB data, 1999)
BMPxxyy	Black market premium	LLB data (1999)
GDPxx	Gross Domestic Product per capita	Penn World Tables 5.6 and WD
POPxx	Population (in 000's)	Penn World Tables 5.6 and WD
TSxxyy	The sum of the exports and imports of goods and services as a percentage of GDP	WD
IMSxxyy	The ratio of imports to GDP	WD
SXP	The percentage of primary product exports to GDP in 1971	Sachs and Warner (1995)
ALxx	Hectares of arable land	FAO
IVSxx	The discounted sum of investment flows (GDI/GDP per capita) of the previous 15 years	Calculated using WD
SSAxx	The percentage of secondary school attained in total population aged 25 and over	Barro and Lee (1996)
DEQ	The distance of the country from the equator, scaled between 0 and 1	LLB data (1999)

Notes: (i) xx refers to year 19xx, and xxyy refers to an average during 19xx–19yy. (ii) WD stands for "World Development Indicators, CD-Rom" (published at the World Bank, 2000), DS for Deininger and Squire (1996; 1998) and FAO for the "Statistic Yearbook from the Food and Agriculture Organization in the United Nations," various issues.

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